

**PROCEEDINGS OF  
THE INTERNATIONAL UNIVERSITY CARNIVAL  
ON e-LEARNING (IUCEL) 2016**

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KEMENTERIAN PENDIDIKAN TINGGI



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UNIVERSITI TEKNOLOGI MALAYSIA



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# PROCEEDINGS OF THE INTERNATIONAL UNIVERSITY CARNIVAL ON e-LEARNING (IUCEL) 2016

UTM Academic Leadership (UTMLead)  
UNIVERSITI TEKNOLOGI MALAYSIA

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## **Foreword by Chair of Malaysian e-Learning Council for Public Universities (MEIPTA)**

The International University Carnival on e-Learning (IUCEL) 2016 continues its tradition of being the premier exhibition in recognizing the standards of e-Learning practices in higher education. IUCEL 2016 main objective is to support and make online learning an integral component of higher education and lifelong learning. This is in line with the Malaysian government's aspiration to drive Shift #9 (Globalised Online Learning).

IUCEL 2016, held in collaboration with Universiti Teknologi Malaysia (UTM), Malaysian e-Learning Council for Public Universities (MEIPTA), Ministry of Higher Education (MoHE) and Higher Education Leadership Academy (AKEPT) acknowledges and awards innovative efforts in improving and enhancing the quality of online teaching and learning at the institutions of higher education. The carnival is not only viewed as a platform to showcase innovative efforts that contribute to resolving the challenges of online learning but also as a trigger to inspire others who are equally involved in the discussion, research and the delivery of online learning. It is hoped that this effort can be continued as part of the full implementation of the strategy that is driven by educators and stakeholders from institutions of higher learning globally.

I am really fortunate to be part of such a great event and I am very grateful to the program committee who worked very hard in making IUCEL 2016 a success. Finally, I would like to thank UTM as the host university, and the organizations involved, which are MEIPTA, MoHE and AKEPT for their support.

**Professor Dr. Hanafi Atan**

A handwritten signature in black ink, appearing to read "Hanafi Atan".

Chair  
Malaysian e-Learning Council for Public Universities (MEIPTA)



## Foreword by IUCEL 2016 Chair

Assalamualaikum wbt and warm greetings.

I would like to welcome all our delegates and participants to the International University Carnival on e-Learning (IUCEL) 2016. Universiti Teknologi Malaysia (UTM) is proud to host the IUCEL 2016 in collaboration with the Malaysian e-Learning Council for Public Universities (MEIPTA), Ministry of Higher Education (MoHE) and Higher Education Leadership Academy (AKEPT).

IUCEL 2016 acts as a platform to promote, explore, and share best practices and global expertise in e-Learning applications at higher learning institutions from around the world. IUCEL 2016 permits academician and students to showcase their e-Learning products such as multimedia tools, computer applications, mobile applications, and systems.

Awards and recognition are given to individuals, organizations, and universities that demonstrate outstanding achievements in the application of e-Learning, best practice and able to make huge contributions to the development of e-Learning in higher education. An exhibition from local and international technology companies is also held at the carnival.

The IUCEL technical committee had received more than 300 abstracts for the IUCEL 2016 competition. Out of these entries, the committee had shortlisted approximately 150 entries to be exhibited at the IUCEL 2016. The selected abstracts can be found in this proceeding and we hope that this volume will provide valuable study for its readers, who have a direct interest in online and flexible learning. We also hope that the carnival will continue to strive to be the catalyst for knowledge sharing amongst participants.

I would like to record our sincere appreciation to the Malaysian e-Learning Council for Public Universities (MEIPTA), Ministry of Higher Education (MoHE) and Higher Education Leadership Academy (AKEPT) for supporting this international Carnival. I also wish to acknowledge the great contributions of OpenLearning and numerous sponsors and individuals of whom without their support and commitment, IUCEL 2016 would not have become a reality. We are honoured to have the presence of our distinguished invited speakers and we greatly appreciate the contributions of IUCEL 2016 reviewers and judges for their excellent work. Last but not least, I wish all delegates and participants a most beneficial sharing session and fruitful eLearning Carnival. Have a wonderful time at IUCEL 2016!

Thank you.

**Associate Professor Ir. Hayati Abdullah**



Director  
Centre for Teaching and Learning (CTL)  
UTM Academic Leadership (UTMLead),  
Universiti Teknologi Malaysia

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## The Agenda

### Carnival Preparation (19 September 2016)

2:00 PM	IIDEL Registration begins
2:30 PM	IIDEL Exhibition Booth Setup
6.00 PM	Registration ends
8.00 PM	Hall closed

### First Day (20 September 2016)

8.00 AM	Registration
8.30 AM	Carnival begins
8.45 AM	Safety Briefing
9.00 AM	Jury briefing
9.15 AM	IIDEL Judging begins
10.00 AM	Keynote by Prof. Dr. Richard Larson "Like it or Not:Technology Brings Systematic Change to Education"
11.00 AM	Keynote by Y. Bhg. Prof. Dato' Dr. Mohamed Amin Embi "Rethinking Teaching, Redesigning e-Learning"
12.00 PM	Lunch
	Lucky Draw Sessions 1 and 2

### OPENING CEREMONY

2.00 PM	Guest arrivals
2.15 PM	Arrival of UTM Senior Officials
2.20 PM	Arrival of YB. Datuk Md. Jais bin Sarday, Johor State Executive Council for Education, Information, Entrepreneurship Development And Co-operatives
2.30 PM	Welcome speech by Y. Bhg. Prof. Dr. Rose Alinda binti Alias, UTM Deputy Vice Chancellor (Academic & International)
2.45 PM	Opening Speech by YB. Datuk Md. Jais bin Sarday, Johor State Executive Council for Education, Information, Entrepreneurship Development And Co-operatives
3.00 PM	Opening Montage
3.15 PM	Launch of the New Academia Learning Innovation (NALI) Guide Book
3:30 PM	MoA Signing Ceremony with OpenLearning
4.00 PM	Award Presentation Ceremony
4:30 PM	VIP visit to IIDEL Exhibition
5.00 PM	Tea Break
6.00PM	End of Day 1

**Second Day (21 September 2016)**

8.00 AM	Registration
8.30 AM	Carnival opens
9.10 AM	IIDEL Judging (continue)
10.00 AM	Keynote by Asst. Prof. Dr. Inge Molenaar "Data and Learning Analytics in Education: The Route to Personalized Learning?"
11.00 AM	Keynote by Adam Brimo "Creating the Next Generation of e-Learning"
12.00 PM	Lunch
	Lucky Draw Session 3
2.00 PM	Forum: The future of e-Learning
4.00 PM	Result Announcement for IIDEL Competition
4.45 PM	Closing Ceremony & Photo Session
5.00 PM	Medals and Certificate Reservations
5.30 PM	Carnival ends

## Arabic For Tourism Purpose Via Web-Based Learning aT MARA POLY-TECH College (KPTM)

**Mohammad Taufiq Abdul Ghani, Wan Ab Aziz Wan Daud, Muhammad Sabri Sahrir**

Department Of Arabic Language And Literature  
Kulliyyah Of Islamic Revealed Knowledge And Human Sciences  
International Islamic University Malaysia  
53100 Gombak, Kuala Lumpur  
agtaufiq@gmail.com, wabazizwd@gmail.com , muhdsabri@iium.edu.my

**Highlights:** This project presents an educational website for learning Arabic for tourism purposes for beginners that was specifically designed for diploma students of non-native Arabic speakers at the MARA Poly-Tech College (KPTM). This website was designed by using Joomla® as a platform for website development based on ADDIE instructional design model. The website was designed based on students' needs, opinions, and suggestions, which was evaluated by the participants involved in this study among tourism students who studied Arabic language. The study found that the majority of the students have positive response towards learning Arabic language for tourism purposes via website which increases the students' desire, motivates them to learn Arabic and gives them opportunities to practice self-learning.

**Key words:** Web-based learning, Arabic for specific purposes, tourism, design and development

### Introduction

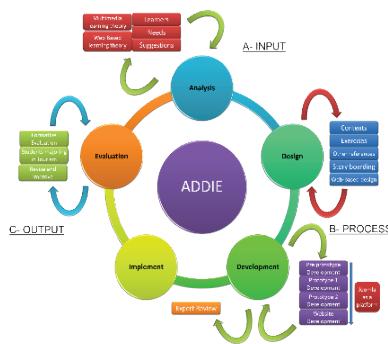
Several studies prove that computer assisted language learning (CALL) in the foreign language classroom, including Arabic are highly positive and well-accepted among educators and learners. Web –based courses and programs have been developed by many academicians in higher institutions, organizations as well as companies worldwide due to its benefits for learners and educators **Invalid source specified.** Using websites as the main tool in learning is one of the effective methods and has become common in education today. The usage of websites in the teaching and learning process is not meant to replace teachers but to create a more enjoyable, effective and meaningful atmosphere of teaching and learning for the students **Invalid source specified.** The use of websites as a mean of computer-assisted language learning (CALL) learning tool in teaching and learning activities has grown rapidly in almost all parts of the world. The use of World Wide Web technology, in particular, has significantly increased the power of computer-assisted language learning by allowing learners to open up and discover their own learning process**Invalid source specified..**

### Web-based Learning

Web-based learning is not a new term in education as it already used for many decades. However, the lack of instructional tools, especially in Arabic language learning is still discussed among many researchers in attempts improve the situation based on several major issues. Computer-based instructional aids in teaching and learning Arabic give high impact to various factors such as: preference in using traditional and non-computer instructional aids among teachers, poor computer literacy **Invalid source specified.**, poor computer skills **Invalid source specified.** and lack of computer training **Invalid source specified..** In teaching Arabic for specific purposes, it is proposed that the teaching process for the Arabic language be changed and transformed in order to equip students with Arabic communication skills to be used for tourism purpose as well as fulfilling the needs of Arab tourists **Invalid source specified..**

### Content

This project presents an educational website to learn Arabic language for tourism purposes among Arabic learner at MARA Poly-Tech College (KPTM). A special website “[www.arabicfortourism.com](http://www.arabicfortourism.com)” was designed by using Joomla® as a platform for website development based on ADDIE instructional model. The design and development of the website has five phases: Analysis, design and development, implementation and last evaluation.



## PHASE 1: NEED ANALYSIS

The first phase is need analysis, which focus on gathering, collecting, analyzing and summarizing data to design and develop the website prototype. This phase is carried out by distributing questionnaire to the students which consist of a set of questionnaire. The prior needs analysis for the design and development of this website prototype was conducted among 70 out of 70 students majoring in tourism at KPTM. The website was designed based on students' need, opinions and suggestions along with the implementation of web-based learning theory and multimedia theory**Invalid source specified..**

## Phase 2: DESIGN PHASE

The design phase concerns with the conceptual construction of the website. In other word, what is the website environment is, what it can do, how to use it, in order to fit the students' needs. The design phase is a process which describe the steps of website design by preparing the storyboards. The function of storyboards is to give clear picture how the website is. Several tasks has added in this phase which is uploading contents, exercise and references, based on students need analysis.

## Phase 3: DEVELOPMENT PHASE

While the development phase was aimed to construct prototype of the website based on storyboard by using Joomla® as a platform. After the first prototype is done, the experts review in Computer Assisted Instruction (CAI) was implemented in this phase. Then the website was modified and improved based on experts' review before the real implementation to the students.

## Phase 4: Implementation

The implementation phase is conducted among tourism students at KPTM who studied Arabic language. A computer lab with the facilities of computers and internet connection was used in this phase.

## Phase 5: Evaluation

A formative evaluation was carried out after completion of this prototype among 40 students in the 2015/2016 academic year. This process is carried out to measure the acceptance level of students in learning Arabic language for tourism purposes by using the designed website. The study found that the majority of the students were positive about learning the Arabic language for tourism purposes through the website which increase the students' desire, and motivate them to learn Arabic as well as provide them opportunities of self-learning. The quantitative result is as shown below:

NUMBER OF STUDENTS	MEAN SCORE AND INTERPRETATION			
	STUDENT'S NEED (TOURISM TERMS)	LANGUAGE SKILLS (SPEAKING)	OBSTACLES	LEARNING STRATEGIES (LECTURES)
70 STUDENTS	4.67 (Very High)	4.81 (Very High)	4.18 (High)	4.54 (Very High)
NUMBER OF STUDENTS	EVALUATION PHASE			
	PERFORMANCE	IMPROVEMENT	INTERACTIVE	CONTENTS
40 STUDENTS	4.57 (Very High)	4.62 (Very High)	4.72 (Very High)	4.65 (Very High)

## Conclusion

This main purpose of this website is to help students, create meaningful environment and effective method in learning Arabic language for tourism purposes inside and outside classroom environment, as it was also equipped with several supportive tools such as electronic dictionaries, language games, video on tourism and chat box in order enable students to communicate with their teachers. This website is indeed used in classroom by students and Arabic lecturers at KPTM.

## Acknowledgement

The authors would like to thank the Arabic language learners who have participated in the study from the Department of General Studies at the MARA Poly-Tech College (KPTM), Kelantan Darul Naim, Malaysia.

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## Mobile Learning Communication Aid

**Ken Nee, Chee, Nor Hasniza Ibrahim, Noraffandy Yahaya & Johari Surif**

Dept. of Educational Science, Mathematics and Creative Multimedia,

Faculty of Education,

Universiti Teknologi Malaysia

knchee2@live.utm.my, p-norhaniza@utm.my, p-afandy@utm.my, johari\_surif@utm.my

**Highlights:** With advent of mobile technology, mobile learning has become a promising pedagogy approach in education realm which allow pupils to learn without constraint of fixed time and location. Moreover, it is notable that communication plays a paramount role in education regardless whoever we are. Handicaps included deaf-dumb and even blind who have impediment in their daily communication in our society need to communicate to normal people as well. They face problem to communicate in the special education school either. However, this kind of welfare for these special group always and has been neglected by mobile application developer. Hence, we develop and design an android application namely MoLeComAid, to be integrated in mobile learning application. This proposed application prototype accommodates special user to communicate with society without hindrance, which mediated by any android platform supported mobile device. Although the proposed application prototype is in the context of education, this application is versatile enough to be adapted for education in general and also non-educational settings with a little modification on the design. Seems mobile learning will go beyond the world of education in the present and the future. It is contemplated that the design and development of the proposed application will serve as a reference for other researchers and developer regarding future developments in mobile learning application.

**Key words:** Communication Aid; Mobile Learning; Android Application; Disabled Individual.

### Introduction

The Institute for Information Technologies in Education (IIITE), UNESCO has made a later and essential strategic commitment as to mobile learning that they observe as key enablers in assisting the objectives of Education for All (GSMA, 2011). Mobile technology could additionally be used to battle against the digital divide and for sustainable development. However, communication will be a challenging task for the disabled individual like deaf, dumb and blind due to their physical limitation with impairment in auditory, or speech or even visual. They face difficulty when they want to communicate among themselves with the same disability and between themselves with different disabilities.

### Content

This app consists of five main apps that embrace Mobile learning, Everyone online chat, Bluetooth chat, Blind-Deaf-Dumb communicator and Everyone translator. The basic function of the MOLECOMAID application is to support communication via mobile devices, in order to allow the students which included differently-abled one to communicate and learn without constraints of time, place and prejudice toward disabilities. Mobile learning integration in the app can be modifiable based on personal needs although this app incorporated google drive as mobile learning source. MOLECOMAID application aim to provide every user in the world especially focusing on people with handicap included blind, deaf and dumb. However, this application is suitable for normal user as well. User can communicate with ease. This app can be a communication aid as alone without mobile learning.

Feature:

- Mobile learning material source embedded in Google Drive.
- Online Chat with anybody who use this app in an internet environment.
- Offline chat by just using Bluetooth to communicate in a without internet environment.
- Act as personal communication helper for conversation in real life between, blind to deaf-dumb; deaf-dumb to blind; among deaf-dumb or even deaf-dumb to normal user.
- Universal Translator with most language covered; comes with accelerator and proximity function for ease user and handicap user especially.
- Included Read Out Loud and Voice Recognition function for the sake of handicap user and convenient for normal user as well.
- User can shake to talk then shake again to send message in online chat and Bluetooth chat.
- User can shake to convert text to speech and shake to convert speech to text as well in the standalone communication helper.
- User can shake to talk then translate text will be displayed and shake again to read out loud the translated word.
- User can cover the devices screen top with any surface to read out loud message in the history for online and Bluetooth chat.

- User can wave palm over the screen to delete message for the translator and standalone communication helper.
- Username just need to key in once and the app will automatically remember.

We designed MOLECOMAID as communication aid no matter for mobile learning or beyond mobile learning with one main goal that is a welfare effort in helping disabled. The application is equipped with modern mobile technologies. The novelty and originality of this app can be assured since there are no any similar app currently that can be noticeable in the MOLECOMAID's Google Play Store Page. Although the proposed application prototype is in the context of education, this application is versatile enough to be adapted for education in general and also non-educational settings with a little modification on the design. This communication aid can be integrated into social media or even messenger as one of the special feature for special needs and for better usability for normal people as well. For instances, normal user does not need to type in message but just shake then talk then shake again then send when in an unsuitable situation. Hence, marketability and profitability is compromised. Researcher recommended for future research to orient towards improving the functionality of the application, fully or partially modify the application as to cope with different scenario such as integration of certain features into chat application and even incorporate the MOLECOMAID in all different educational field in term of course, and level of education.

### Acknowledgement

I (1<sup>st</sup> Author) are grateful for the KPM-UTM Synergy National Blue Ocean Strategy scholarship program.

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## Oh My Jawi!

**Rafizah Mohd Hanifa, Liz Amelia Silikin, Fatin Amirah Mohd Tarmizi & Nurul Atiqah Rohaizar**

Information Technology Department, Center for Diploma Studies, UTHM

[rafizah@uthm.edu.my](mailto:rafizah@uthm.edu.my), [amelia.ame96@gmail.com](mailto:amelia.ame96@gmail.com), [famirah13@gmail.com](mailto:famirah13@gmail.com), & [egarohaizar247@gmail.com](mailto:egarohaizar247@gmail.com)

**Highlights:** Oh My Jawi! is developed for beginners to learn Jawi in a more interesting way. There are three main phases in this module. Phase 1 exposes learners to the basic Jawi alphabets. Phase 2 tests their understanding on Jawi by answering quiz questions. Phase 3 presents a story written in jawi to help them improve their reading skills and whenever they have difficulties to read the word in Jawi, they can just click on the word and listen to the audio.

**Key words:** interactive module, ADDIE, jawi, edutainment, multimedia, animation

### Introduction

One of the techniques to improve student's understanding on a certain topic or learning a new language is to use multimedia (Mayer, 2003) which is a communication process based on computer technology consisting of a combination of text, audio, video, graphics and animation (Lee & Osman, 2012). Through multimedia, information can be communicated more effectively and students can remember facts more easily (Bakar, 1989). Therefore, the use of graphics and animation in the Oh My Jawi! module is to attract the attention of students and help them to interact with the module during the process of learning. The interactive nature of the module will stimulate the interest of student in learning Jawi. The multimedia features when absorbed in the field of education will produce a combination of education and entertainment concept called edutainment (Harun & Tasir, 2003).

### Background

Realizing the significance of multimedia as a vital medium of instruction to enhance knowledge acquisition among students in the new technology age, an interactive module named "Oh My Jawi!" has been developed to help pre-school students to learn "Jawi" in a more stimulating way.

### Description of Product

The module has been designed to attract the student's attention through a combination of audio, graphics and animation throughout the module. Students can choose from the three main phases covered by the module to enhance their understanding of the different aspects of Jawi.

### Usefulness

Since many pre-school students today are weak in mastering Jawi, we have developed the module using Adobe Flash CS6, Adobe Photoshop CS6 and Adobe Illustrator CS6 to make the Jawi learning process more stimulating and effective to young students. ADDIE Model is used in developing this interactive module. To enable future improvement of the module, a questionnaire survey was distributed to 33 respondents who have used the module to seek their view and evaluation of the module. Survey results indicate 85% of respondents agreeing that the module is suitable for use as an additional learning aid for pre-school learners to master Jawi.

### Advantages

The module is developed based on the Jawi syllabus for pre-school currently used by schools in the state of Johor as an aid to stimulate the interest of young children in enhancing their knowledge on Jawi. Besides, it could be used by other Islamic kindergartens in other states in Malaysia to help improve student's knowledge on Jawi.

### Value Added

The interactive nature of the module will not only stimulate the interest of young children in learning Jawi but also to help them learn and have fun at the same time.



Figure 1: Main menu of Oh My Jawi!

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## Industrial Training Assessment System (iTAS)

**Rafizah Mohd Hanifa, Muhammad Firdaus Kamarudin, Mariyah Kasim, Norlyiana Samsuri & Siti Zulaikah Mahadan**

Information Technology Department, Center for Diploma Studies, UTHM

[rafizah@uthm.edu.my](mailto:rafizah@uthm.edu.my), [hopperz\\_pro92@yahoo.com](mailto:hopperz_pro92@yahoo.com), [sweetyaya29@gmail.com](mailto:sweetyaya29@gmail.com), [norlyianasamm@gmail.com](mailto:norlyianasamm@gmail.com),  
[sitizulaikah826@yahoo.com](mailto:sitizulaikah826@yahoo.com)

**Highlights:** iTAS is aimed at creating a paperless environment in managing industrial training at the Department of Information Technology, Center for Diploma Studies (CeDS), Universiti Tun Hussein Onn Malaysia (UTHM). It is specially designed to allow students' assessments to be executed online between the PPD supervisors, students, and industrial supervisors. Hence, no papers are needed as the assessment rubrics are in digital format, and time and money spent on overhead tasks can be substantially reduced.

**Key words:** *industrial training, assessment, paperless environment, rubrics, digital, go green*

### Introduction

The Internet exists before the 1990s but it only began receiving attention from the mid-1990s onwards. However, it was not widely used by organizations (business, government, etc) as much as they do today in improving various aspects of the business or tasks (Dickson & DeSanctis, 1997). The web or Internet which originated as a communication network among universities and research laboratories is no longer just a way of presenting information on a computer screen (Bates, 2006) but has now expanded as a tool in managing data following the evolution of web browsers. Each day, new Internet applications and more efficient ways of doing tasks are discovered (Giguruwa, Anh & Davar Pishva, 2012). In an effort to improve and increase the use of technologies in the education management environment, an online system named Industrial Training Assessment System (iTAS) was developed. The proliferation of the use of Internet, low cost of hardware and the enhancements in wireless communication enabled us to develop this system which provides all relevant parties easy access to all vital information related to students' industrial training assessment in a more organized and efficient way.

### Background

Every day, trees are being cut down causing serious damage to the environment such as flood. One way to reduce this problem is to control the usage of papers in our daily activities. Realizing the importance of reducing the use of papers, an online system has been developed to support efforts in reducing the number of trees being cut and damage to the environment. It is called iTAS (Industrial Training Assessment System) which was designed to be a user friendly, generic and web-based system.

### Description of Product

iTAS is aimed to create a paperless environment in managing industrial training at the Department of Information Technology, Center for Diploma Studies (CeDS). It is specially designed to allow students' assessments to be executed online between the CeDS supervisors, students, and industrial supervisors. Hence, no papers are needed as the assessment rubrics are in digital format, and time and money spent on overhead tasks can be substantially reduced. Digitally stored data could also be readily available for analysis to produce students' result online. iTAS also includes a bulletin board where both students and supervisors can read the important news posted by their respective supervisors through a bulletin board.

### Usefulness

The assessment rubric can be completed by CeDS and industrial supervisors through iTAS as this system will automatically calculate the marks for each student. The assessment criteria provided will have radio buttons for the supervisors to tick the relevant sections and this makes rewarding of marks more standardized and also reduces human error in calculating the marks. Besides, students can also update their details such as their industrial training address, phone number, etc.

### Advantages

No more manual assessment, no more postage cost and delay in receipt of documents, and above all, a paperless environment. This small effort is a step in the right direction in protecting the trees. It takes a second to waste a sheet of paper, but decades for a tree to grow.

## Value Added

For those considering designing a similar online system in managing industrial training assessment, the presented system is very useful and easy to use by all relevant parties even with minimal computer knowledge. All the data inside the database can be easily secured and maintained since everything is being stored on a central server.

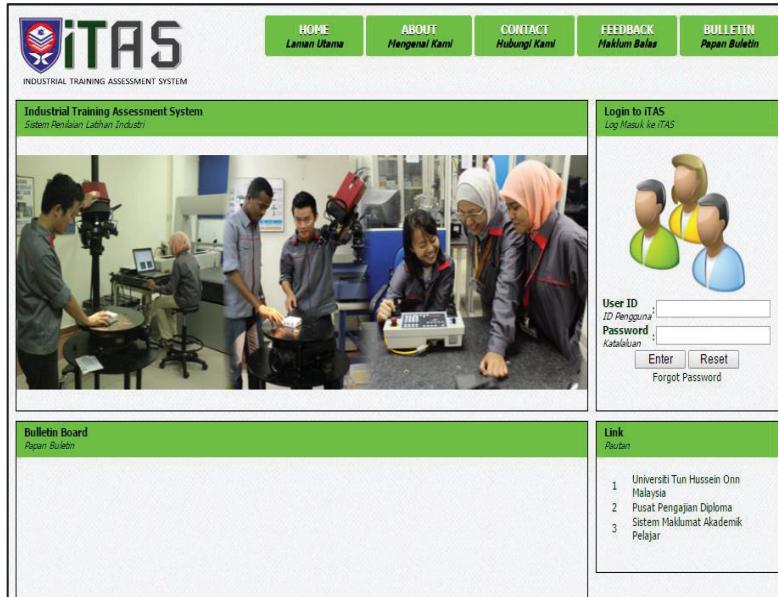


Figure 1: Main page of iTAS

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## Bite Size MOOCs by Master Chefs

**Enna Ayub, Karamvir Singh Godrei, Farouk Othman, Wan Liyana Naznim Wan Omar Sukri**

Taylor's University, Subang Jaya, Selangor, Malaysia

Enna.Ayub@taylors.edu.my

KaramvirSingh.Godrei@taylors.edu.my, Farouk.Othman@taylors.edu.my,

WanLiyanaNaznim.WanOmarSukri@taylors.edu.my

**Highlights:** Taylor's University (TU) with collaboration from the master chefs of the prestigious Tier 6 SETARA, School of Hospitality, Tourism & Culinary Arts (TCHT), came up with a series of MOOCs in Culinary Arts. The MOOCs showcased are 'Basic Pastry Making' by Chef Karam Singh Godrei and 'Advanced Cooking and Fantastic Foods' by Chef Farouk Othman. MOOCs in the subject of Culinary Arts has the potential as it meets the needs of any curious epicurean on the knowledge of culinary arts.

**Key words:** MOOC, Culinary Arts, Cooking

### Introduction

Cooking is a skill in life which many may take for granted. For working adults, finding the time to learn how to cook anything can be difficult. Let alone to be able to learn how to cook from a Master Chef! Realizing that this niche area can be filled up using MOOCs, TU's, TCHT started 3 pilot MOOCs in the subject of culinary arts hosted by OpenLearning. The Leisure-Series MOOCs for the culinary arts enthusiasts are 'Basic Pastry Making' by Chef Karamvir Singh Godrei, 'Advanced Cooking and Fantastic Foods' by Chef Farouk Othman and coming up is 'Essential Cuisine Techniques'. 2 of those MOOCs are showcased here. Culinary Arts MOOC has a huge potential as revenue generation for the institution as it meets the needs of those who wants to learn how to cook the basics or to gain advanced knowledge on the culinary arts skills. The MOOC which is set in self-paced mode and the learning environment designed to be collaborative is suitable for adults who seek just in time knowledge.

### Content

#### Description

The course 'Basic Pastry Making' addresses the needs of adults who would like to learn the basics of pastry making from their devices in the comfort of their homes. The course is lead by Chef de Patisserie, Chef Karam who has over 40 years of international experience. In this course, Chef Karam shares his passion and knowledge in pastry cooking, so that anyone can create amazing desserts by applying the tried and true methods required to assemble a variety of desserts. Participants are made aware of the suitable ingredients and tools to be used in any pastry kitchen. At the end of the course participants are equipped with the techniques to prepare classic pastry items. The facilitated session will resume and participants can have access to the materials while it is run in self-pace mode.

The course 'Advanced Cooking and Fantastic Foods' impart knowledge to students who already have the basic cooking skills and are more advanced in their knowledge of culinary arts. The Chef believes that the knowledge received should not be confined in a particular or specific field only and higher order of thinking skills must be applied for students to use that knowledge to apply in new and innovative way of cooking, hence the 'chef' is able to grow holistically. The MOOC was recently in session in May 2016, and is now in self-pace mode.

### Background

This initiative provides a ground breaking avenue for people in Malaysia to learn vocational skills online, meaning people can be trained not just through face to face training which may not be accessible to everyone. Realizing that this niche area can be filled up using MOOCs, TU provides these pilot MOOCs in culinary arts to see the public's appetite for this types of ubiquitous courses. The MOOC will also benefit potential students who are finding their way to learn skills affiliated with a higher institution as well as the home cooks who are looking for people of the same interest to share their passion for cooking. Also, as this class is in MOOC format, participants coming in to learn are from all over the world and they will benefit through reading the posts made by their peers and by interacting with each other and the chefs, within a time frame in forums.

### Materials and Methods

The course is structured in a relaxed and easy going manner and each MOOC offers a portion of knowledge in the Culinary Arts. E.g. the MOOC 'Basic Pastry Making' focuses on teaching learners the secrets to the art of pastry making in a short time. Basic pastry skills techniques are taught such as the folding, tempering, choux pastry, rubbing, blooming and more.

The 'Advanced Cooking and Fantastic Foods' MOOC focuses on the scientific processes that happen during cooking and showcasing techniques such as braising, roasting, steaming, baking, poaching and sautéing. Chef Farouk demonstrates to the learners in a form of easy to follow instructional videos along with some tips and secrets of gastronomy.

The course content is structured for byte size learning as such, learners who want to learn about the basics of baking will sign up for the MOOC ‘Basic Pastry Making’ and if they have an epicurean flair, they will gravitate towards the course ‘Advanced Cuisine and Fantastic Foods’. Lessons are structured as byte size to increase the effectiveness of instructor-learners engagement as learners today have shorter attention span (Kelly, 2013). Also it is a well-known fact that human beings have limited capacity to process information (Milward, 2005). Hence, instructional videos are presented as small learning nuggets tailored to the learner’s needs. Most videos are not more than 10 minutes long at one stretch. Modules are kept to be short and self-paced to help provide effective ‘Just-in-time’ learning so that learners can get the needed information by accessing a bite sized course on the ‘product’ and courses content can also be accessed through the OpenLearning app installed in the learner’s smartphone.

### **Value Added**

Teaching Culinary Arts using MOOC as pedagogy is an effort to use technology as a tool to courses which are usually conducted face to face. Realizing that courses and instructors must innovate their pedagogy to meet the expectation of learners of the 21<sup>st</sup> century, TCHT of TU explored the option to offer its culinary art courses as a MOOC. These courses are offered as byte size learning programs with just 4 to 8 weeks of course content, not counting the survey which is embedded to document student’s acceptance of MOOC as pedagogy (Goh, Ayub, Wong, 2016). Most activities are social activities example, for example forums set to promote facilitator-student engagement.

### **Awards**

The MOOC Project at TU has received recognition for its Project Methodology in the Best MOOC Award in NUCEL 2014 as well as a gold and bronze medal in the IIDEL NUCEL exhibition in 2014 and 2015 respectively. Apart from the recognition from NUCEL, the testimony from students regarding the quality of TU MOOC is a more reliable measurement of the MOOC as pedagogy.

### **Success Factors**

The MOOC pedagogy framework which is a methodology used at TU for its MOOC development contributes to its success factor (Ayub, Lim, 2016). The e-Content Development Specialists in the e-Learning Academy (eLA) are striving hard to improve the MOOC’s learning design and media and the team also monitors the facilitator-participants engagement in the MOOC. The facilitators play an important role to the success of their MOOCs and they must continuously and consistently interact with students once their session begins.

### **Challenges**

It may be challenging for lecturers to accept MOOC as a pedagogy shifting from the usual face-to-face environment of these courses to a MOOC format. However, the eLearning Academy addresses this issue by giving lecturers training and support to overcome their shortcomings.

### **Commercialization Potential**

MOOC is a new component in a method of Blended Learning at TU. Having received feedback from students that they are comfortable with the MOOC pedagogy, the University recognizes that more courses can be offered in the form of a MOOC. Hence, the MOOCs in the subject of culinary arts were introduced. MOOC pedagogy is accepted by TU’s students as the 21<sup>st</sup> Century generation appreciates the flexible learning which the MOOC format can offer.

In the year 2016, TU is seriously exploring the prospects of commercialization of its MOOCs by offering courses as credit transfer MOOC. In the meantime, courses are offered as byte size courses for learners who seek basic to advanced knowledge in the culinary arts.

### **Acknowledgement**

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## **Business Intelligence (BI) System for Data Analytic in Higher Education Administration**

**Mohd Shahizan Othman, Lizawati Mi Yusuf, Shamini Raja Kumaran, Nur Alia Hamizah Mohammad Rodzi,  
Nurul Liyana Hairuddin**

Faculty of Computing, Universiti Teknologi Malaysia, 81310 Johor Bahru, Malaysia

[shahizan@utm.my](mailto:shahizan@utm.my), [lizawati@utm.my](mailto:lizawati@utm.my), [shamini.rajkumaran@hotmail.com](mailto:shamini.rajkumaran@hotmail.com), [a.hamizahrodzi@yahoo.com](mailto:a.hamizahrodzi@yahoo.com),  
[nurulliyanaadin1803@gmail.com](mailto:nurulliyanaadin1803@gmail.com)

### **Highlight**

Due to the changing in marketplace demand, competitive pressures, onset of technologies and business practices, many organizations increasingly turning to business intelligence (BI) system (Shirani & Roldan, 2009; Sujitparapitaya et al., 2012). Nevertheless, higher education administrations are also one of the sector constantly pressured to produce decisions quickly using large amount of data. Hence, as amount of data keep growing, this certainly becomes a huge constraint to extract right decisions for the right people. That's the reason business intelligence (BI) solution chosen as the best choice to overcome it. BI is the process of transforming raw data into legible information. With a capable and efficient BI solution, education sector able to receive information and make better aligned decisions. This innovation supports a comprehensive overview related in developing postgraduate-driven BI system. The aims of this innovation are to market the architecture of BI in higher education and to present the success of BI system on higher education. By implementing BI strategy in the education sector, this will offer positive impacts to the key-users for long-term accurate decision-making. A BI-driven approach toward the purpose of decision-making can be very effective as BI reaches far beyond the capability to analyze data. The potential benefit of using this innovation includes the improvement in decision-making and helps the institutions to identify the trends and support both strategic and tactical decision-making processes. Oftentimes large costs are used when manual processes are conducted for decision-making that not only in the way of time spent but also have possibility of high probability of assumptions in decisions, as well. These inefficient manual processes which involves predictions, takes away time from that could been spent more efficiently to have greater impact on higher education sector. The idea of utilizing BI in higher education sector reduces operational expenses and increase in productivity of decisions. BI is a tool that able to improve the business operation of organization by analyzing and providing data so the best decision can be taken (Berta, 2012; Mutanga, 2015; Ranjan, 2009; Nyalungu, 2011). Prior to the large data network as well as various transaction business happened in daily basis, the use of BI technology in education sector is believed can sustain and improve productivity as well as maintenance of data efficiently. Taking the advantage of BI, it can assist in visualizing data via charts, info graphs, for higher education based case studies, such as trend of enrolment and more insights focusing on higher education analytics. As decision making becomes measure of the success of higher education performance, higher education institutions should use BI solution to leverage effective decision through disciplined process of valuable information (Zulkefli et al., 2015).

### **Introduction**

Business intelligence (BI) is a basic issues as a process of gathering, cleaning and integrating data from multiple sources and it results in enhancing business decision making and decision support (Karim, 2011). Nowadays, higher education sector desire to assess and evaluate their data into BI systems, which involve an accurate evaluation to distinguish it. In addition, in higher education sector consists of huge amount of data and top management need the right information at the right time and right place to make a good decision. In current education environment, higher education institutions operate in rapidly changing business environment which requires a decision making as a kick-start for the institution. Focusing on academic institutions, a number of higher education institutions are failing to be effective in terms of students' success rate, graduate on time rates, enrolment targets, and staff retentions (Piedade and Santos, 2010).

Universities are obliged to play main role to monitor and understand the performances and elicit the factors that react in postgraduate enrolment and tuition, finance, scholarship, staffing, and asset management (Beckett and Mccomb, 2012; Mutanga, 2015). Therefore, higher education institutions have defects that initially effect the quality of decision making and its academic analytical processes. Hence, business intelligence (BI) is playing important role here. From historical perspective, information technology department has been in charge of creating analytic applications, and reports of insights but the progress of BI in education sector for decision making has not been rapid enough (Vizgaityte and Skyrius, 2012). Higher education management is still unable to possess a complete view of the information via dashboards for decision making. As stated by Guster et al. (2014), toward gaining a good outcome of decision making, the business intelligence shall invest in transformation of knowledge to decisions via data analytics. Data analytics using BI concentrates on distilling the insights from data, trends of data and visualization of performance.

Furthermore, current problem to be highlighted for project is decision makers use manual data visualization using Microsoft Excel and Pdf in education sector as interviewed in Universiti Teknologi Malaysia (UTM). Analyzing data to

identify the trends of postgraduate research students and to improve the Key Performance Indicator (KPI) of higher education institutions have always been an initiative of top management. It is common for higher education staffs to deal with huge amounts of students data with numerous features detail. So the problem here is, how to handle huge amounts of students' data using BI which affect the performance of management in terms of accuracy in decisions.

## Process of BI System Innovation

Corresponding with current higher education cases in decision making, the use of appropriate and precise business intelligence (BI) process in the system is very important. The business intelligence process that has been conducted for the innovation has three main layers. To have a clear understanding of the BI process to further the innovation in depth, this innovation presents the proposed process of BI system to have better decision making. It illustrates three layers which are (1) data source layer, (2) data integration layer and (3) visualization layer. Each layers has its significant contribution toward a precise decision making with good analytics of data. The BI process begins with data source layer and data integration layer (data pre-processing phase). The process of data pre-processing involves large amount data and from data sources as such databases, Spreadsheets, and Microsoft Excel. In this phase also severe cleaning process is conducted. After these two layers, the data pre-processing phase is complete. The clean data then visualized in visualization layer for top management analysis.

## BI System for Higher Education Sector Based on Case Study and its Highlights

BI supports number of organizational objectives such reporting, dashboards, visualization and data analytic. Hence, this advantage causes the institutions to achieve the highest level of quality in higher education by discovering few particular items such as enrollment, student academic performance, student activities and student's financial support. Using higher education dataset, usually, top management need to evaluate all the details to produce report. Finally, with the usage of BI system all the data will turn into significant information in term of knowledge which includes the facts and relationships that has been perceived or discovered through the visualization layer. In this layer, the decision making is visualized in the dashboard with different form of graphs and tables to ease users from different level in academic sector. Below (Figure 1) are the sample of figures of BI system for higher education to enable decision making of different users in the administrative.

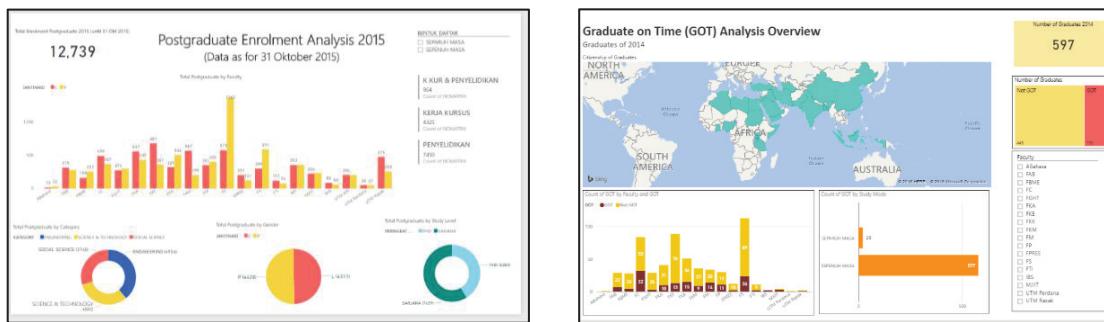


Figure 1 Highlights of BI system innovation

## Impact of Innovation

The major impact of this innovation is to assist decision makers in higher education institution to produce accurate decision. This is to increase institution's performance as well as retain the reliability and reputation of institution.

Following are the general positive impacts that able to influence the betterment of decision making in higher education sector:

1. Acts as a guide for the ability to analyze share, discuss and take the fact-based decisions and actions through data.
2. Proposed BI process design allows the information is accessible to decision makers and drive crucial data outcomes.
3. Attract investors to collaborate developing business intelligence system that has better understanding of the needs of the higher education.
4. UTM able to develop their own business intelligence software that fits all the requirement necessary by top management for decision making.

It is undeniable that this system able to increase the productivity in higher education sector. This business intelligence system for UTM institution has been an initiative under a system named as Graduate Studies Management System (GSMS). This sub-system under the main system GSMS, its main contribution to provide the decision making criteria via BI system. This will be a good kick-off higher education sector to utilize BI as one of the tool to extract right decisions for the right people. This BI initiative lay the foundation radically to accelerate the improvement and geared toward higher education innovation. These innovation has subsequently produce more positive impacts on the systematic data management and it increases 65% on data management credibility. In fact, BI system higher education allow the increase in work productivity which is at percentage of 70%. It is important this BI system to updated time to time as to allow good ad-hoc decision making among the decision makers. A high quality system is the most effective layer required to transform higher education institution. Hence, in order to fulfil demand and need of users in education sector, GSMS has taken its role by implementing new modules like BI system for higher education sector. This shows a good and advantageous impact toward the university itself as it aligned with the motive of Malaysia Education Blueprint (Higher Education) 2015-2025. Nevertheless, the potential of the main system, GSMS, it causes the other universities such as Universiti Malaysia Kelantan (UMK), Universiti Islam Malaysia (UIM) and International Islamic University Malaysia (IIUM) would like to learn on the modules in GSMS. Hence, decision making has been one crucial point in any education sector. Therefore, BI system module allow to broaden the development of GSMS spectrums and offer in management-efficient manner. This will lead into an impact of attracting the investors from other universities to collaborate and develop BI system for better decision making. Despite these important impacts and aspirations, the proposed BI system for education sector will allow to avoid manual decision making and gut-feel decision based on data obtained. This shows the strength of BI system in higher education sector which will assist in developing a more informed, action-oriented decision making to achieve better and impactful decisions.

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## i-Discuss: A Gamified Online Discussion Interface

**Prasanna Ramakrishnan<sup>1,2</sup> & Azizah Jaafar<sup>3</sup>**

<sup>1</sup>Universiti Teknologi MARA (UiTM) Melaka, Kampus Jasin, Melaka, Malaysia

<sup>2</sup>i-Learn Centre (i-LeC) University Technology MARA, 40450 Shah Alam, Malaysia

[prasanna@fksm.uitm.edu.my](mailto:prasanna@fksm.uitm.edu.my)

<sup>3</sup>Institute of Visual Informatics, National University of Malaysia, 43600 Bangi, Selangor, Malaysia  
[azizah@ivi.ukm.edu.my](mailto:azizah@ivi.ukm.edu.my)

**Highlights:** This paper briefly introduces i-Discuss, an online discussion interface with gamification and social strategies. The main reason developing a gamified online discuss interface is to motivate the students to share knowledge online. The goal of this paper is to showcase the main gamification and social features in online discussion interface.

**Key words:** online knowledge sharing, discussion interface, gamification.

### Introduction

Nowadays, students in higher learning institution are often recommended and encouraged to use the discussion interface in e-learning portal for the purpose of online knowledge sharing. Discussion interface now become popular among students for sharing knowledge in e-learning system. It is used by students to discuss topics related to their field or for sharing problems. In general, students taking the same course will be linked in discussion interface for sharing knowledge informally. Thus, discussion interface design should not only focused on usability and sociability (Phang, Kankanhalli, & Sabherwal, 2009; Preece, 2001), but also to a design that could motivate the students to share their knowledge online. Earlier studies found that the students are less interested in sharing knowledge because of less interesting discussion interface design (Jaafar & Ramakrishnan, 2015). In addition, lack of criteria and discussion interface design that motives students for online knowledge sharing are also one of the reason why reason research is conducted. The lack of motivation in the discussion interface design can be overcome through the use of gamification and social strategies. At the end of this study, a discussion interface was developed by applying gamification and social strategies. The developed discussion interface was found to engage and motivate the students in online knowledge sharing. It can be concluded that the designed and developed discussion interface can be adapted by most of the higher education institution. Through this adaptation, the institution is expected to involve more students in knowledge sharing and reduce the cost and resource from moving towards a new platform.

### Background Study

In the context of education, the discussion interface has become a place where students share their knowledge online. Students use this interface to discuss topics related to their studies. Higher education institutions provide a platform to facilitate, to collect and disseminate knowledge in online to be shared. This resulted in every institution to have a discussion interface to enable online learning process. Existing studies have investigated factors that encourage knowledge sharing behavior online (Chiu, Hsu, & Wang, 2006; Sharratt & Usoro, 2003). The identified factors that related to knowledge sharing are personal factors, social, technological and individual motivation (Ardichvili, 2008; Hung, Durcikova, Lai, & Lin, 2011). Many previous studies have given focus to personal factors, social and individual motivations that influence the behavior of sharing knowledge. But it is important to look at designing motivating interface for online knowledge sharing. It was found the game elements can motivate the user in the online interface (Hamari, Koivisto, & Sarsa, 2014). But the use of game elements in the context of non-game is known as gamification (Deterding, 2011). This gamification was used in motivation to predict students' attitudes toward the use of game elements and the intention to continue using it (Hamari & Koivisto, 2013). The implementation of game elements in online interface can engage users while encouraging their activities for learning [13]. Besides that social elements also can increase students learning (Tarantino, McDonough, & Hua, 2013). Thus motivation design factor will be designed using a set of gamification and social strategies to enhance students' motivation for engaging them in knowledge sharing activities.

### Motivation Design Factor

The motivation theory that mainly behind this study is Self Determination Theory (SDT). SDT is a general theory of human motivation and personality (Edward Lewis Deci & Ryan, 2002), which concerns people's inherent growth tendencies and innate psychological needs. There are three psychological needs that enhances intrinsic motivation: autonomy (self-determination in resolving what to do and how to do it), efficiency (to develop and

implement skills for manipulation and control of the environment), and relatedness (in relation to others through pro-social relationships).

### **Autonomy**

Autonomy refers to the degree of selection that students have to perform academic tasks; and about when and how to perform the task (Edward L Deci, Eghrari, Patrick, & Leone, 1994). Ryan and Deci (2000) said that the autonomy occurs when individuals take action on their desire or for personal reasons and not due to be controlled by others (Ryan & Deci, 2000)

Number of activities under the concept of autonomy as proposed in the discussion interface to improve students' motivation to meet their autonomy needs:

- A1: Allow the students to choose appropriate avatar to represent them in the online knowledge sharing activities.
- A2: Allow the students to choose the way to receive feedback immediately about their online knowledge sharing activities
- A3: Allow the students to choose the types of media that wants to be shared in online knowledge sharing activities.

### **Competence**

Competence is the ability of students to complete a task assigned to the successful and efficient in continuous interaction with the social environment. For the students to build their own competence, it is suggested to support the perceived extend of learners' own behaviors (Shi, Cristea, Hadzidemic, & Dervishalidovic, 2014). The feeling of competence is enhanced by (1) unexpected, direct and positive feedback, (2) an optimal challenge and (3) freedom of demeaning evaluations (Edward Lewis Deci & Ryan, 2002). For example, early studies shows that positive feedback can improve the performance of intrinsic motivation, whereas negative performance feedback reducing intrinsic motivation (Edward L Deci & Ryan, 1975). In addition, feelings of competence also can be enhanced by displaying the progress of students in the interface (Barata, Gama, Jorge, & Gonçalves, 2013). When displaying the progress of students to other students, it can also stimulate the relatedness needs (Stott & Neustaedter, 2013). So knowledge sharing activities should be designed interestingly to enable online knowledge sharing activities. Below are some of the suggested activities to help increase student motivation with fulfilling the basic psychological needs for competence.

- C1: Provide the student unexpected response when they achieve required performance in online knowledge sharing activities.
- C2: Provide the student direct response about their position in online knowledge sharing activities.
- C3: Provide the student positive feedback for their effort in online knowledge sharing activities
- C4: Provide the student view of their progression in online knowledge haring activities.

### **Relatedness**

Relatedness is the last requirement for intrinsic motivation. It refers to the need to belong to or dependent on a particular group. Therefore, the feeling of relatedness is connected, belonging and interaction with others in the discussion interface. Feeling a sense of connection not only to share knowledge but also to compete in the leaderboard (Barata et al., 2013). Relatedness support social interaction with other students with various elements such as tagging, ratings, commenting and visualization of social status and reputation (Shi et al., 2014). Number of activities to enhance the feeling of relatedness among students for online knowledge sharing is proposed:

- R1: Allow students with similar interest to be connected.
- R2: Allow the students to visualize their social status, reputation and contribution in online knowledge sharing activities.
- R3: Allow the students to show appreciation to other students' contribution.

## **Implementation of Gamification and Social Strategies in Motivation Design**

This study adopt gamification and social strategies that applies self-determination theory (SDT) to promote intrinsic motivation in online knowledge sharing environments (Ramakrisnan & Jaafar, 2016). Table 1 shows the gamification and social strategies in motivation design.

Table 1: Gamification and social strategies in motivation design

Strategies	Description	Motivation Design
<b>GAMIFICATION</b>		
Avatar	A virtual personality for online knowledge sharing activities	A1
Badges	Visual icons that symbolize achievement in online knowledge sharing activities	C1 R2
Leaderboard	Display of ranks for comparison in online knowledge sharing activities	C2 R2
Player Control	Having control over the online knowledge sharing activities	A2 A3
Feedback	Positive and informative feedback on online knowledge sharing activities	C3 R3
Level	Increasingly difficult in online knowledge sharing environment	C4 R3
<b>SOCIAL</b>		
Tags	Assigned to a piece of information in discussion interface	R1

## Conclusion

In this paper, we have presented the gamification and social features in i-Discuss, a gamified online discussion interface. We have adopted strategies from gamification and social that applies motivational theories in order to promote intrinsic motivation for students' online knowledge sharing in discussion interface.

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## AR-Science Magic Book Learning System

**Mohamad Bilal Ali, Noor Dayana Abd Halim, Danakorn Nincarean Eh Phon, & Mohd Hishamuddin Abdul Rahman**

Universiti Teknologi Malaysia, Skudai, Malaysia

[mba@utm.my](mailto:mba@utm.my), [noordayana@utm.my](mailto:noordayana@utm.my), [danakorn2803@gmail.com](mailto:danakorn2803@gmail.com), & [shamrahman86@gmail.com](mailto:shamrahman86@gmail.com)

**Highlights:** Students have been perceiving even simple concepts in science are particularly difficult to grasp, since many ideas involve three-dimensional thinking. So, an Augmented Reality learning tool called AR-Science Magic Book Learning System (AR-SMB) was developed to provide easy-to-use teaching/learning tools for learners and educators. The unique capability that allows virtual objects to appear in real world can serve as an effective tool to facilitate students to acquire better understandings on science and assist teachers to teach concepts that cannot be easily seen in a natural environment. Thus, AR-SMB has a bright potential for expansion and among potential markets include schools, parents and collaboration with publisher like Sasbadi/Pelangi.

**Key words:** augmented reality; science; elementary school; educational technology

### Introduction

Learning science is not easy. Many of the concepts and phenomena they learn are not only new and unfamiliar, but they are also unable to directly experience it. Learning science may be crucial in early childhood, serving not only to afford opportunities for children to develop a better understanding of the world around them but also to build important skills and attitudes for learning. Even simple concepts in science are particularly difficult for students to understand, since many ideas involve three-dimensional thinking. However, much of the teaching materials used in science education are 2D in nature and there are still few targeted instructional material for science concepts is available for educators and learners. When introduced to science learning in school, many children has difficulty in understanding science concepts (Sanchez, 2014). This may cause their losing interest in the subject, which would later render their negative attitude towards learning. This issue therefore requires improvement in the learning techniques and tools used in science education. Thus there are concerns over the use of emergent technologies as a tool to facilitate students to obtain a better understanding of science. So, an Augmented Reality (AR) learning tool called AR-Science Magic Book Learning System (AR-SMB) was developed to provide easy-to-use teaching/learning tools for learners and educators. AR-SMB is an AR book-based educational tool that allows webcam to recognize pages in the book and turn them into 3D presentations to help students acquire new concepts and overtake misconceptions about science. AR can be defined as taking its' three properties into consideration: combining the real world with virtual worlds, providing interaction, and presenting three dimensional (3D) objects (Azuma, 1997). AR provides both virtual and real world simultaneously to users. AR allows users to work in the real world and interact with virtual objects that are projected on real scenes around them. This capability makes this technology an interesting resource in any type of teaching that is unachievable with the use of other technologies. In addition, appearing of 3D objects in real world creates a magical feeling causing a high degree of surprise and curiosity (Bujak et al., 2013).

There are no similar existing products in term of the design and educational principles used in the current product. The product has been developed based on educational Predict-Observe-Explain inquiry-based learning design and the cognitive theory of multimedia learning (CTML). Unlike other AR applications, which require users to wear goggles or other head-mounted display devices, this invention is used without any devices on the user's body. It only requires a laptop and a webcam to render virtual objects, small in data storage and can run on any platform ranging from Windows XP to Windows 7. AR-SMB could facilitate students to acquire better understandings on science and assist teachers to teach concepts that cannot be easily seen in a natural environment. The product also enables student-centered learning as recommended in Pelan Pembangunan Pendidikan Malaysia 2013-2025. AR also could foster student's creativity, imagination and motivation to learn. Furthermore, the product encourage students to engage in an interactive learning environment that makes learning interesting leading to improved academic results. The findings from the real settings showed that learning through AR-SMB has a statistically significant improvement on student's science performance score and visualization abilities. The amount of student-students interaction and students-AR interaction also were high indicating that they were really interacting and active in the learning activities. By visualizing the abstract concept, AR can help to teach subjects where students could not possibly gain real-world first-hand experience. Beside that, AR also allows students to manipulate the 3D virtual objects from a variety of perspectives to enhance their understanding by just using their bare hands. This friendlier interface allowing users to use their hands to manipulate the visualizations rather than clicking and dragging the mouse which body movement helps people remember what they perceive and provides a cue for future recall.

AR has a bright potential for expansion because of its affordances. Therefore, we can commercialize the product to all school since the subject content of the product was based on science syllabus. Among potential markets include schools, ministry of education, teachers, parents and collaboration with publisher like Sasbadi/Pelangi.

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## **ViEW – A New Way of Online Learning**

**Noraffandy Yahaya, Noor Dayana Abd Halim, Mohd Hishamuddin Abdul Rahman & Danakorn Nincarean Eh Phon**

Faculty of Education, Universiti Teknologi Malaysia, 81310 Skudai, Johor

[fandymcl@gmail.com](mailto:fandymcl@gmail.com), [noordayana@utm.my](mailto:noordayana@utm.my), [shamrahman86@gmail.com](mailto:shamrahman86@gmail.com), [korneducational@gmail.com](mailto:korneducational@gmail.com)

**Highlights:** ViEW is a 3-D online learning environment for cooperative learning. It provides several unique features than the commonly used online learning environment, such as providing the students with verbal and non-verbal communications, many forms of interaction, avatar, interactivity and a realistic learning environment. In order to study its effectiveness, ViEW had been utilized in one of Multimedia class and the results were very promising. Therefore it has potential to be commercialized to other faculties in UTM, higher educational institutions and schools in Malaysia.

**Key words:** Online learning, Cooperative learning, Virtual world, 3-D Virtual learning environment.

### **Introduction**

ViEW is a 3-D online learning environment. It was created by using a virtual world application and designed specifically for conducting online cooperative learning. The idea behind this innovation was to create a better online learning environment for the students as the online and distance learning have become a trend as of late.

### **Background**

Generally, online learning particularly in Malaysia is often conducted through several 2-D online learning environments which were generated by using several Web 2.0 applications such as online discussion room, chat room, blog and social networking sites. However, previous studies had reported that those environments have some limitations particularly in supporting interaction and communication (Sutcliffe and Alrayes, 2012; Bronack et al., 2006), although these elements are considered to be important in any sort of learning activities especially for cooperative and collaborative learning. These limitations have negatively affected students' learning outcomes such as their sense of presences, participation and learning satisfaction, which then impaired their learning performances (Bulu, 2012). Therefore a better online learning platform is needed, and virtual world is one of the latest technologies that have the best capabilities in supporting online learning as it provides users with verbal and non-verbal communications.

### **Description of the product**

ViEW provides users with verbal and non-verbal communications, many forms of interaction, avatar, interactivity and a realistic learning environment. Thus we had utilized this technology to create our own 3D online learning environment, known as Virtual Educational World or ViEW. This 3D virtual learning environment provides students with realistic online learning environment which is suitable for conducting cooperative and collaborative learning activities. It is realistic because inside ViEW environment, every student is represented by a 3D avatar which can be customized in certain ways. Besides, every learning group is provided with their own group name, color, logo and also a discussion room which contains several discussion tools and furniture. Moreover, ViEW also allows students to cooperate in real time with many forms of interactions, not only restricted to text communication. For example, the students can communicate by using audio communication and at the same time they can work together in order to complete the task at real time. These sorts of interaction obviously are not supported by most of the 2D online learning environments. Moreover, we were also developed guidelines for properly conducting cooperative learning inside ViEW, which is based on Johnson and Johnson (1999) cooperative learning theory and Salmon et al. (2010) model of learning in 3D virtual world. According to the guideline, the students should be given a task which they need to work on cooperatively with their group members. Each task will require them to interact and communicate with each other by using the discussion tools and the communication mediums provided by ViEW.

### **Impact on learning**

As far as we are concerned, virtual world technology has been recently exploited for learning in several countries, but not in Malaysia. Hence, ViEW has been utilized in one of Multimedia class at the Faculty of Education UTM in order for us to study its' effectiveness. The learning sessions where conducted by following the guidelines that has been mentioned in the previous sub-topic. At the end of the study, the students' sense of presences, learning satisfaction and performance was measured by using several instruments that we had developed. The results of the study showed that the students' sense of presences, learning satisfaction and performances were high and they were actively interacting and cooperating with each other during learning. Moreover, the students also stated that

they are interested to learn in ViEW again in the future. Thus, the results indicated that ViEW has such a bright future as an online learning platform in our educational context. Furthermore ViEW has potential to be commercialized to other faculties in UTM, higher educational institutions and schools in Malaysia.

## **Advantages**

There are several advantages of ViEW as an online learning platform towards education and community. First, it is a suitable platform for student-centered and distance learning, which currently are trending in most higher educational institutions around the world, and can make those learning activities more versatile than before. As the environment supported many forms of interaction and communication, this can lead to active participation among the students during learning and provides new and better learning experiences to them. Moreover, ViEW can generates high sense of presence and learning satisfaction for the students as it provides them with an immersive 3D environment. Therefor this will lead to better learning performance of the students as many previous researches had stated that these sense of presences and learning satisfaction are the important elements which can determine the success of any forms of online learning. Besides, ViEW also offers privacy, security and flexibility to the users, which means that learning can be conducted in a safe and private environment. From the technical perspective, ViEW can be accessed with just a PC with moderate specification. Thus it can be widely utilized by most of the educational institutions around Malaysia especially the higher education.

## **Commercial value**

ViEW can be commercialized to other faculties in UTM, higher educational institutions and schools in Malaysia. The estimated price will be RM 80 which includes the environment, the user account for the teacher and several proper guidelines on using ViEW as an effective learning tool.

## **Acknowledgement**

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## Grammar Rooms: Gamifying Instructional Games for Engaging Students in Learning Outside the Classroom

**<sup>1</sup>Tuan Sarifah Aini Syed Ahmad & <sup>2</sup>Anealka Aziz Hussin**

<sup>1</sup>Universiti Teknologi MARA Negeri Sembilan, Kuala Pilah Branch, Pekan Parit Tinggi, 72000 Kuala Pilah, Negeri Sembilan  
tsyaini@ns.uitm.edu.my

<sup>2</sup>Universiti Teknologi MARA, 40450 Shah Alam, Selangor  
Anealka@salam.uitm.edu.my

**Highlights:** Learning grammar has always been challenging and regarded as a boring facet of learning a new language (Jalali & Dousti, 2012). Therefore, it is important to provide an effective learning tool that can engage students in learning grammar outside the classroom. Students nowadays find conventional pen-to-paper drills boring (Luu & Nguyen, 2010) while online quizzes that apply technology are insufficiently interesting as they are monotonous and repetitive (Thang et al., 2012). Therefore, online instructional games are introduced as the tool for learning grammar outside the classroom due to their characteristics that can fulfil the learning preferences of the current students.

**Key words:** grammar, instructional games, gamification, Bloom's Taxonomy, multimedia

### Introduction

Learning grammar has always been challenging, and many students regard it as a boring facet of learning a new language (Jalali & Dousti, 2012). Therefore, it is important to provide an effective learning tool that can engage students in learning grammar. Conventional paper-to-pencil drills have long been used in learning grammar, but students find them boring (Luu & Nguyen, 2010). With the advancement of educational technology and the emergence of the Internet, online grammar quizzes have been introduced enabling grammar to be learnt virtually with some interactive and media elements. However, students find them monotonous and repetitive (Thang et al., 2012). Therefore, online instructional games are chosen as a tool for learning grammar. They have long been prominently used in Science, Technology, Engineering and Mathematics (STEM) courses, and are now increasingly popular in language learning (Boyle, Connolly, Hainey, & Boyle, 2012). They promise engagement in learning as they are enjoyable and promote learning as they are educational (Garris, Ahlers, & Driskell, 2002; Carvalho, Bellotti, Berta, & De, 2015; Boyle et al., 2016). Making them available online can extend learning beyond the classroom since they are accessible 24/7 from anywhere. Moreover, offering them to the current students who are from Generation Y can fulfill their learning preferences such as preferring game-like learning activities, a need for immediacy in obtaining learning materials, and high expectation in material presentations (Roberts, Newman, & Schwartzstein, 2012). Furthermore, the students also prefer visual, non-linear and virtual learning (Schofield & Honoré, 2010).

### Content

#### 1. Development of Grammar Rooms

Grammar Rooms was developed online by using Scratch on <https://scratch.mit.edu/>. Scratch is a free application developed at the Massachusetts Institute of Technology (MIT). It does not require the designers to have programming skills in order to create interactive projects since the design process only requires dragging blocks from the block palette and attaching them to other blocks like a jigsaw puzzle. The multimedia such as images, sounds and music were taken from the Scratch website and several other websites that offer the media with the license of Common Attribution 3.0 that permits the use of media for educational and commercial purposes for free. Grammar Rooms is shared on the Scratch website at <https://scratch.mit.edu/projects/102534747/>.

#### 2. Background of the Innovation of Grammar Rooms

Grammar Rooms was developed by applying Gagné's Nine Events of Instructions (Gagné, Briggs, & Wager, 1992) as the game framework. The events are (1) gaining attention, (2) informing objectives to students, (3) stimulating recall of prior learning, (4) presenting the content (5) providing guides in learning, (6) eliciting performance, (7) providing feedback, (8) assessing performance, and (9) enhancing retention and transfer to the job. It helps to design instructional materials systematically.

Certain prominent learning theories are also used in the game design. They are illustrated in the following diagram:

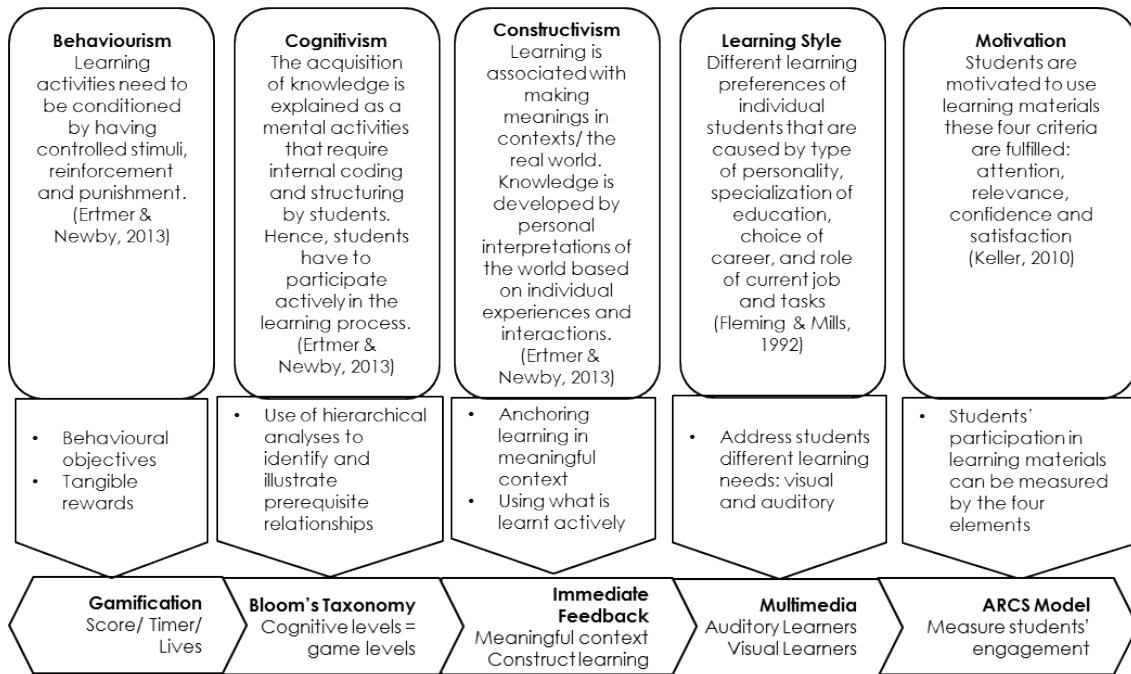


Figure 1: Learning theories applied in developing Grammar Rooms

### 3. Why is Grammar Rooms important to education?

It can help students to learn grammar in the enjoyable way outside the classroom without compromising the attainment of course learning objectives. This can promote them to engage in the learning activities that can enhance the learning of grammar outside the classroom.

### 4. Advantages of using Grammar Rooms towards education

Grammar Games offers several advantages to students. First, it addresses different learning styles of students as the game design take into account the learning needs of two learning style which are visual and auditory. Second, it caters with students with mixed ability because it is designed with six levels of difficulty according to the Bloom's Taxonomy. Third, students can use it as a tool for assessment of performance as it provides scores that allow them to monitor their learning progress. Furthermore, by completing the levels according, their learning progress gradually according from easy to difficult tasks.

### 5. Commercial Values of Grammar Rooms

Grammar Rooms can be commercialized if it is unshared on Scratch website. It can be published by using different platforms such as a commercial windows game or burnt in the CD ROMs.

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## Multiple-Choice Questions (MCQ) Builder and Analyser for Higher Education Institutes (HEI) and Schools

**Tan Choon Keong, Lee Kean Wah & Stennia Miga Anak Radin**

Universiti Malaysia Sabah, Kota Kinabalu, Malaysia

cktanums@gmail.com, keanwah@gmail.com, stenniamiga2531@gmail.com

**Highlights:** Exams in Multiple-Choice Questions (MCQ) format is easier to construct and measure students' understanding and knowledge up to the application level (Bloom's taxonomy domain). However, educators (lecturers and teachers) must create good quality MCQ exam that are theoretically determined by item analysis results (calculation of facility index, discrimination index and distracter analysis values). Past research had shown that manual calculation using calculator is 720 times longer than the same amount of analysis done using computer (approximately 5 seconds only). This innovation is a web-based 2-in-1 solution for teachers to create MCQ exams (Builder module) and will also allow bad items to be deleted (Analyser module). As a result, good items are stored into an item bank for future use.

**Key words:** assessment, evaluation, difficulty index, discrimination index, online assessment.

### Introduction

Examination had been carried out traditionally in exam halls for the past decades for academic courses evaluation. Costly management and preparation of examination halls and printing of exam papers have encouraged more uses of online examination. MCQ Builder and Analyser is a prototype exam software created to help teachers to build quality MCQ exam questions to be stored in the question bank. The study by Tan et al. (2015) revealed that electronic-based exam was better than traditional paper-based exam in areas related to perceptions (enjoyment, fun, etc.), exam management strategies and cost saving. Although traditional paper-based exams are still being practised extensively worldwide in institutions of higher learning due to its good exam security, but it is undeniable that electronic-based exam such as MCQ Builder and Analyser will become handy in term of producing high quality exam questions.

### Content

#### BACKGROUND OF THE INNOVATION

Exams in Multiple-Choice Questions (MCQ) format is easier to construct and measure students' understanding and knowledge up to the application level (Bloom's taxonomy domain). However, educators (lecturers and teachers) must create good quality MCQ exam that are theoretically determined by item analysis results (calculation of facility index, discrimination index and distracter analysis values). Past research had shown that manual calculation using calculator is 720 times longer than the same amount of analysis done using computer (approximately 5 seconds only) (Adam & Armstrong, 1998). MCQ Builder and Analyser **IS IMPORTANT TO EDUCATION** because it can do item analysis automatically. It calculates the Difficult Index (DI) and Discrimination Index (CI) during any test taken by the students. This innovation is a web-based 2-in-1 solution for teachers to create MCQ exams (Builder module) and will also allow bad items to be deleted (Analyser module). As a result, good items are stored into an item bank for future use.

#### THE DESIGN OF THE INNOVATION

The design of MCQ Builder and Analyser is shown in Diagram 1.

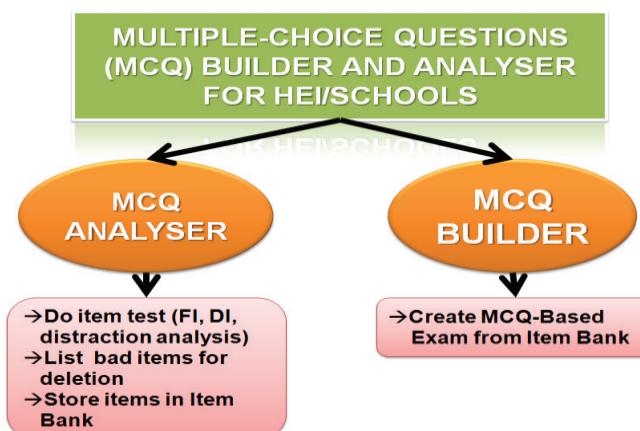


Diagram 1: The Design of MCQ Builder and Analyser system

## **INNOVATION & POTENTIAL COMMERCIAL VALUE**

- ➔ Serve as Question Builder and Analyser by MOE or HEI
- ➔ Serve as Items Bank for academic subjects or courses
- ➔ Low-cost and easy installation
- ➔ Can be used by Schools/University/Colleges for any subjects/courses

## **INTELECTUAL PROPERTY**

Copyright declaration had been done and will proceed with copyright registration.

This innovation is copyrighted and already deployed online at <http://www.edututorial.net/spps/indexMCQ.asp>

## **Acknowledgement**

The researcher thanks Yayasan Sejahtera under its corporate social responsibility for granting this research grant. The research was done in SK Suang Punggor, Kota Belud.

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## Gamification in MOOC: An experiment with Secondary Schools in Sabah

**Tan Choon Keong (PhD), Lee Kean Wah (PhD) & Stennia Miga Anak Radin**

Universiti Malaysia Sabah, Kota Kinabalu, Malaysia

cktanums@gmail.com, keanwah@gmail.com, stenniamiga2531@gmail.com

**Highlights:** Gamification for Creative Personality Analysis (GCPA) is specially designed to aid school/university/college teachers/lecturers to identify their learners' learning styles and creative potential in order to unleash their true creative potentials. The GCPA takes learners on a journey to explore various problem solving situations to induce student's creative decisions. The journey of discovery is packed with rich multimedia activities ranging from interesting graphics to videos and animations. CPA can be installed as either stand-alone or web-based application. GCPA is suitable to be used by education providers interested in developing and enhancing their learners' creative potentials and learning motivation.

**Key words:** gamification, MOOC, multimedia, creativity, problem-solving strategy, personality.

### Introduction

The use of gamification in MOOC is still in its infancy. This study is making use of a research grant (UMS Research Code: GPP0011) to develop a complete MOOC course for a SPM subject in the field of social science. At this stage of writing, the SPM course – Geography SPM, was already completed and was piloted in 5 secondary schools in Sabah. The proposed Gamification for Creative Personality Analysis (GCPA) method is built into the modules of 5 learning topics of the subject. This method allows school students to learn Geography in a fun way to reduce the SPM exam stress that were highly anticipated.

### Content

#### BACKGROUND OF THE INNOVATION

Gamification for Creative Personality Analysis (GCPA) is built into modules of online learning to spur up students' motivation and fun in learning. Computers allow both games and classrooms to walk out of their spaces where discussions and projects may extend when class has ended. Educators have begun to embrace learners' interest in 'digital play' where learners are provided with the opportunities using computer games in educational context (Pim, 2013). Gamification for Creative Personality Analysis (GCPA) are games that encourage problem solving with the help of videos. The installed system **IS IMPORTANT TO EDUCATION** because it can identify students' creative personality that will help lecturers/teachers tremendously in the materials preparation process. In short, Gamification for Creative Personality Analysis (GCPA) will try to reduce the boredom of online learning to a certain extent.

#### THE DESIGN OF THE INNOVATION

The design of Gamification for Creative Personality Analysis (GCPA) is shown in Diagram 1.

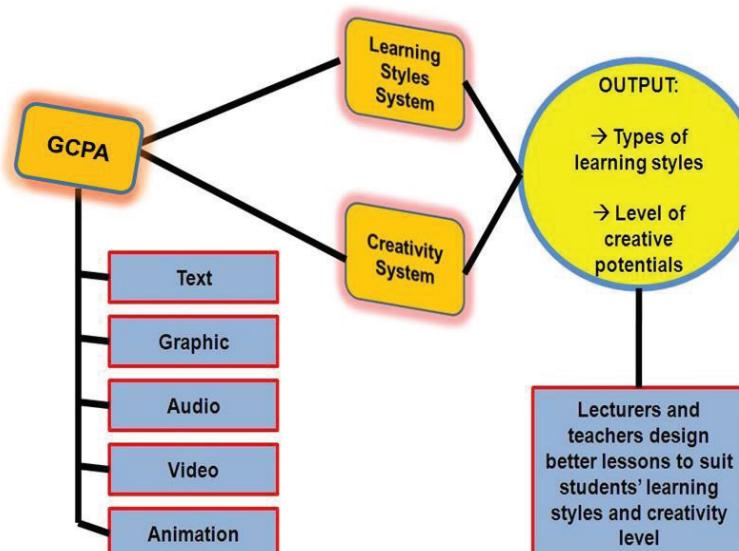


Diagram 1: GCPA Design

## **INNOVATION & POTENTIAL COMMERCIAL VALUE**

- ➔ A novel and fun multimedia game-based tool for identifying & assessing learners' creative personality
- ➔ Fast, easy, and hassle-free approach
- ➔ Low-cost and easy installation
- ➔ Easily adaptable to be used with all levels of education
- ➔

## **INTELECTUAL PROPERTY**

Copyright declaration had been done and will proceed with copyright registration.

This innovation is copyrighted and already deployed online at <http://www.edutorial.net/spps/indexCRanalyser.asp>

## **Acknowledgement**

The researcher thanks University Malaysia Sabah for granting this research grant. Grant Code: GPP0011.

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## C-BOND : Mobile Augmented Reality for Learning Chemical Bond

**Noor Dayana Abd Halim, Nor Farhah Saidin, Noraffandy Yahaya, Masarrah Abdul Mutalib**

Department of Educational Science, Mathematics and Creative Multimedia, Faculty of Education, Universiti Teknologi Malaysia, 81310 Skudai, Johor, Malaysia.

noordayana@utm.my, farhahsaidin@gmail.com, fandymcl@gmail.com, golden\_masz@yahoo.com

**Highlights:** This manuscript presents the C-BOND which is mobile augmented reality (MAR) application which developed to help in visualizing the abstract concept in the topic of Chemical Bond. This mobile application will act as one of the tools that may help the teacher in their teaching instead of using textbook alone. The apps are specially designed according to the Principles of Designing Visualization Tools by Wu and Syah (2003) and the Cognitive Theory of Multimedia Learning (CTML) by Mayer (2003). Instead of the mobile application, there will be a minibook provided as the kit of the mobile application.

**Key words:** Mobile Augmented Reality; Chemical Bond; Technology; Education

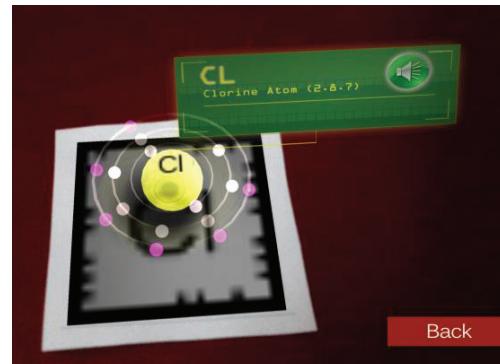
### Introduction

C-BOND is a mobile augmented reality (MAR) application (mobile apps) which developed to help in reducing the misconceptions in the topic of Chemical Bond. The misconceptions exist due to difficulties in visualize the abstract concepts in this topic. From the review conducted by Saidin, Abd Halim & Yahaya (2015), augmented reality (AR) technology has been applied in several fields include education and give more positive influences to teachers and students. Therefore, this mobile app will act as a tool that may help teachers in their teaching instead of using textbook alone which displayed the 2D model compared to 3D. For students, this is a new way to attract their attention, increase their motivation and make the learning process more enjoyable.

Besides, this mobile augmented reality also proven can help students in improving the student's visualization. The MAR technology is a new trend that emerged in the education nowadays since teachers and students can be used it anytime and anywhere. The apps is specially designed according to the Principles of Designing Visualization Tools by Wu and Syah (2003). These principles focus on reducing cognitive load by making information explicit and integrated. Other than that, the MAR also applied the Cognitive Theory of Multimedia Learning (CTML) by Mayer (2003) which emphasized to learn using multimedia elements (audio, animation, text, graphic and video) and also variety sensory (ear and eye) where finally the information can be stored in long term memory.

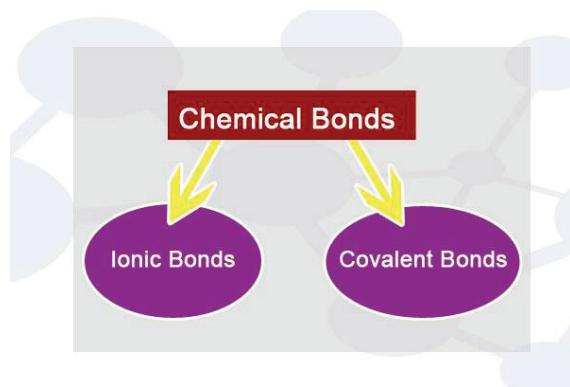
Instead of the mobile application, there will be a minibook provided as the kit of the mobile application. The minibook is needed as a guideline to make sure that the flow of the students learning process is on the right track. The marker of mobile augmented reality will be attach together in the minibook. The apps can be downloaded from Apple Store and Google Play with USD 4.99.

### C-BOND Application





### C-BOND Minibook



### IONIC BONDS

In ionic bonds, usually it is formed when a metal combines with a non metal. Ionic Bonds or electrovalent bond is chemical bond that formed from the transfer of electrons from metals to non metal atoms.

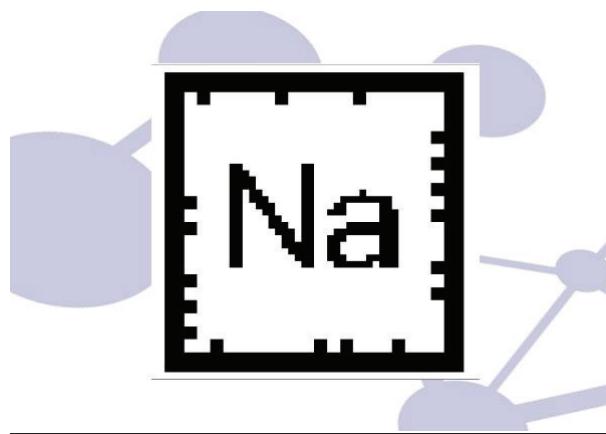
Metal atoms + Non Metal Atoms = Ionic Bond  
 transfer of electrons

### Metals

Metals in Periodic Table are the elements in Group 1, 2 and 13.

Metals will lose the valence electrons to achieve stable duplet or octet electrons arrangement.

As example, Group 1 metal atoms loses one valence electron to form cation with charge of +1



## Content

### Advantages

- Specially designed according to the Principles of Designing Visualization Tools by Wu and Syah (2003) (reducing cognitive load by making information explicit and integrated.).
- Applied Cognitive Theory of Multimedia Learning (CTML) by Mayer (2001) which emphasized to learn using multimedia elements (audio, animation, text, graphic and video) and also variety sensory (ear and eye) where finally the information can be stored in long term memory.
- MAR for C-BOND is designed followed the syllabus of KBSM.

### Important to education

- **Teachers:** New way of teaching and learning instead of using the textbook alone.
- **Students:** Help in visualizing the abstract concepts and new way to attract student's attention by learning in a fun way.
- **Schools:** Provide the schools with a new tool which may help the process of teaching and learning which later may improve students' performance.
- **Other User:** Attract users to know and learn Chemical Bond in a simple way.

### Commercial Value

- Can be commercialize by collaborate with other publisher such as PELANGI and SASBADI to market the mini books together with the revision books.
- Can be downloaded free trial version at apple store and play store. For full version user need to buy the mini book from the information provided.
- Can be commercialize by promote to the school for their learning especially to the class of Form 4 and Form 5 who taking Chemistry Subject.

## Acknowledgement

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## **Learning Vowel Alphabetic Words Mnemonically**

**Prasanna Ramakrisnan, Norshahidatul Hasana Bt Ishak, Siti Nuramalina Binti Johari, Nurul Fatin Nadia Binti Ayob , Azlan Abdul Aziz, Syamsul Ariffin Yahaya & Raudzatul Fathiyah Mohd Said**

Universiti Teknologi MARA (UiTM) Melaka, Kampus Jasin, Melaka, Malaysia

i-Learn Centre (i-LeC) University Technology MARA, 40450 Shah Alam, Malaysia

prasanna@fskm.uitm.edu.my, hasana@melaka.uitm.edu.my, amalina\_johari@melaka.uitm.edu.my,  
tnnadia93@gmail.com , azlanaaa@tmsk.uitm.edu.my, syamsulariffin@melaka.uitm.edu.my

Universiti Teknologi MARA Kampus Dengkil, 43800 Dengkil, Selangor, Malaysia  
raudzahfatiyah@puncakalam.uitm.edu.my

**Highlight:** The purpose of this study to examine the effectiveness of vowel alphabets learning application using mnemonic technique via mobile phones. In learning vowel alphabet words, Preclinical Alzheimer students having problems in memorizing either the alphabets or the pronunciations. This is due to the traditional way of learning vowel alphabet words which is not interactive and less interesting for students especially the Preclinical Alzheimer students. To overcome this problem, mnemonic technique was applied in vowel alphabet graphic design to solve the students' problem in memorizing those alphabets. This technique is proven to help in improvement of student's memory and enhance their imagination in remembering important information. The mnemonic technique was implemented in the vowel alphabets mobile learning application using ADDIE project development methodology. After the development of vowel alphabets mobile learning application, the effectiveness of the application was tested for helping the students to memorize learning. In the testing stage, the students were assigned to two groups: one group that uses flash cards in learning vowel alphabets and another group that uses the developed application. Results showed that there was a significant difference between the two groups. It indicated that learning vowel alphabetic words mnemonically was more effective in helping students to memorize and recall the learning. Thus this study concludes that implementation of mnemonic technique in learning may help increase the effectiveness from the perspective of sustained memory retention rates.

**Key words:** Memorizing technique, Alzheimer, mnemonic method, Mobile Episodic Memory Retrieval

### **Introduction**

Alzheimer is a disease that robs individual's memories. At first, individuals facing hard time remembering recent events, though they might easily review things that happened years ago. Individuals with Alzheimer's might forget their loved ones. They might forget how to get things done such as dressed them, feed themselves, and use the toilet. Based on (Bethune, 2010), a German neurologist and psychiatrist. From the research, Alzheimer's disease (AD) happens when the brain cells responsible for memory and other functions start to die. As pointed out by (Coppola, 2013), Alzheimer is referring when the brain does not function normally in terms of memory, behavior, and clear thinking for everyday activities. In Malaysia, according to Malaysia Ministry of Health, there are 63000 Alzheimer's patients, and it is expected will be increased to 127000 after 10 years (N.A, 2010).

Alzheimer disease has three stages of diseases that begin before the symptoms such as memory loss occurs and before one's to carry out everyday activities are affected (Association, 2014). The three stages are Preclinical Alzheimer disease, Mild Cognitive Impairment (MCI), and dementia due to Alzheimer disease. The most common initial symptom is a gradually worsening ability to recall new data. This occurs because the first neurons to malfunction and die are usually neurons in brain regions involved in forming new memories. The following are common symptoms of Alzheimer's:

- Challenges in planning or solving problems.
- Memory loss that disrupts daily life.
- Confusion with time or place.
- Decreased or poor judgment.
- New problems with words in speaking or writing.
- Difficulty completing familiar tasks at home, at work or at leisure.
- Trouble understanding visual images and spatial relationships.
- Misplacing things and losing the ability to retrace steps.
- Changes in mood and personality, including apathy and depression.

Mobile application is to develop learning into a smarter way of education. In this communicative learning, the students learn about vowel alphabets especially for preschool. Students can learn vowel alphabets in basic learning. This mobile learning develop specific user of the preschool students between 5 years and 6 years old.

Besides that, it is also suitable for teachers and parents on how to teach vowel alphabets. Hence, this mobile learning application improves in five characters learning that follow the step for beginner's users. Mobile Learning has been defined differently by different researchers and organizations.

According to (Al-Fahad, 2009), defined mobile learning as learning across through social, multiple contexts and content interactions, using personal electronic devices which are without limitation of time and location. Besides that, m-learning also is to learn knowledge ubiquitously and movably (Shudong, 2005). However, a commonly accepted definition of Mobile Learning is using mobile technologies to promote and facilitate at any time and learning anywhere educational activities (Ting, 2007).

### **Memorizing strategy using mnemonic technique**

According to (Jeffrey P. Bakken, 2011), mnemonic strategies are efficient techniques for improving the memory and making data more important. Their particular usage is in developing better ways to deal with encode information so it will be much more straightforward to recover and remember the information. Although there many different retrieval strategies that can be implemented to attempt to retrieve forgotten information, research has demonstrated that the way information is initially encoded facilitates memory and the review of this data better. Mnemonic strategies do not represent a "rationality" of education. Mnemonic strategies ought to be executed for one and only reason: to help individuals recollect to-be-learned data.

The used of Mnemonic technique in learning has been proven as effective technique for children to learn alphabet. The combination of image and sound can be categorized as a good technique used in Mnemonic to deliver knowledge to children (Emmanuel Manalo, 2013). This techniques work with the aid of image including the alphabets. Fig. 1. Shows example of Mnemonic technique by Dr Emanuel Manalo.

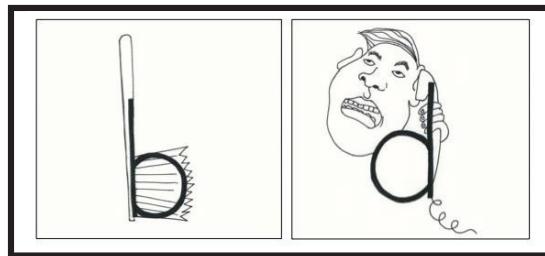


Fig. 1. Mnemonic technique by Dr Emanuel Manalo

This technique will be applied for Alzheimer's students to learn alphabet in this research. Vowel alphabets using mnemonic technique that is developed to help Alzheimer students memorizing. This technique then represent something that the students' needs to remember. The technique make the learning easier to remember and more meaningful. Besides that early treatment gives to the patient is a best way to help them in a future (Benjamin M. Hampstead, 2014).

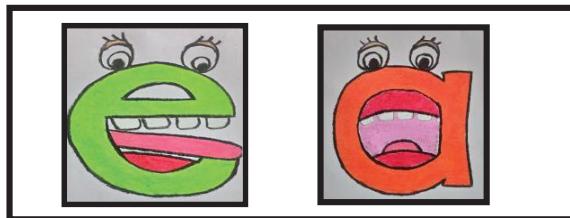


Fig. 2. Example of Mnemonic method

Fig. 2. Is an example of Mnemonic technique that will help the students remember the vowel alphabets. Moreover users also know the pronunciations of vowel alphabets by looking the alphabets character. Thus, through this technique, learners can also repeat alphabets pronunciations by hit the button of sound to hear. The example of the alphabets also will appear at the bottom of the alphabets. If user does not already know the vowel alphabets with pronunciations, the mnemonic technique will be help them in remembering the alphabets.

## **ADDIE Method**

For developing mobile learning vowel alphabets application for preschool students between 5 until 6 years old, ADDIE has been chosen as a research methodology. ADDIE is short for Analysis, Design, Development, Implementation, and Evaluation. All of these phases represent for making impressive guidance and an effective tools that will support performance. Figure 3.1 below shows the diagram of the ADDIE model.

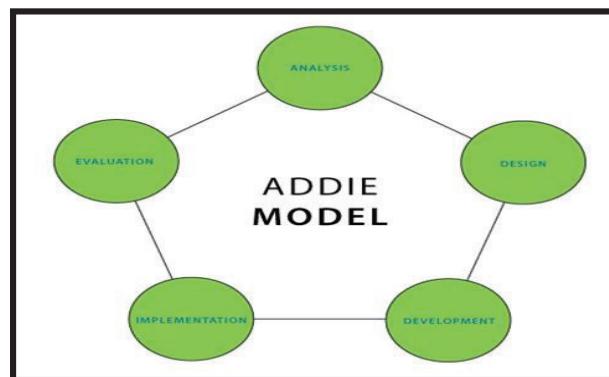


Fig. 3. ADDIE model diagram

The analysis is the most essential part for the project. The analysis phase defines the independent of how these necessities will be satisfied and requirements of the system. This phase defines the issue that the user's is trying to solve. The deliverable result at the end of this phase is a prerequisite document. Ideally, this document states in a precise fashion and clear what is to be developed. This analysis represents the "what" phase. The requirement document tries to capture the requirements from the user perspective by characterizing objectives and associations at a level expelled from the implementation details. All in all, everything about the project will be analysed such as ensure the suitable interface ,the user of this project for preschool students between 5 until 6 years old in terms of font size, background colours, font colors, sound and images. Other than that, the problem about the previous product is also clarified and the goals with objectives are established. From the observation, might be students bored to learn the subject because teachers used traditional method and low attractiveness elements to teach them. During analysis, the instructional designer has gather information regarding:

To evaluate the functionality of the mobile learning application vowel alphabets by using mnemonics method:

- Identified the methodology: ADDIE Model
  - Identified the project scope:
    - Children age 5-6 years old.
  - Identified learning strategies.
  - Identified the software and hardware:
    - Hardware and software.
    - Scripting Language: Action Script 3.0

From this phase, the objective problem, research area and target user we can identify. Then, we also know the suitable technique that will be used based on target user and lastly we also know the suitable hardware and software that will be apply for the application.

In design phase, storyboard that represents the user interfaces will be creating. The instructional methods according to the intended behavioral outcomes by domain such as the way to attract the students that viable to use this application will apply in this phase. As for this project, the designing flow of how the information is picked up and been combined is important before it being create. Furthermore, the step to design the user interface also will be shown. Multimedia design for mnemonics technique vowel alphabets via mobile application has to consider the followings:

- Interface design – The interface design must also include number of screens, which objects on which screen and the positions of the objects on the screen, meaning of audio channels and input devices. It is also imperative to consider the usefulness of object, the content of menu bars, and the particular controls. Storyboarding is also part of multimedia design process. It is a place to plan out digital story in two dimensions. The first dimension is time: what happens first, next, and last. The second is of interaction: The story interact with the images, the visual transitions and effects help tie together the images. Any components can associate with any other one, and the storyboard is the place to plan out the impact intended to make on the audience. In order to ensure concrete graphic design, the use of colour, or organization can be considered.
  - Content presentation – integration, utilization, and manipulation of certain multimedia elements that incorporate texts, video, audio, graphics, script and animation to present the content. Script writing is the art of character, writing dialogue and plot for a specific topic. The information related to a subject matters gathered during the previous phase are compiled to form a draft, followed by strict proof reading to ensure accuracy of

it content. Once users either the Alzheimer students from preschool or teachers are satisfied with it, the development process will proceed.

Furthermore, during development phase, there will be a development of the project based on creation in the design phase. This project is going to use software like Adobe Photoshop ,Unity3D, and Audacity to develop this project. Adobe Photoshop is used to create illustrations of vowel alphabets such as a, e, i, o, and u. Unity3D also used to make the environment of the alphabets. Audacity will be used to edit, utilise sound ,record and put sound into the system. Lastly, for sure this project must have a smartphone or mobile application to complete the project and functionality. At this phase also, testers will perform the procedures of investigate. The project is going to be adjusted and reviewed based on any feedback given.

During implementation phase, implement the prototype to the target user. There are 24 preschool students Sekolah Kebangsaan Star,Gua Musang that use the prototype application to test the application whether effective or not . As for this project, mobile application is used as the approach of the learning. The main objective of this phase is to ensure the learning is conveyed successfully and effectively. After being tested, the user will give feedback about this project, so that this project can be modified and adjusted to enhance any deficiency.

Evaluation is the last phase in the ADDIE model. In this phase, after user had test the system, the system will be evaluated to the user using interviews. The terms that will be evaluated are system usability, understanding and memorising of the user on the learning of vowel alphabets via mobile application. After the evaluation done, it is time to check whether system has meet the project objective. With the feedback from the user, either it is good or not, it is important so that in the future, this project can be improved to better performance. We test the user whether remember or not the learning by test the existing application with our application by given time which is one day.

## Conclusion

This project would draw the attention of governments, international organizations and aid agencies to the Alzheimers' and the threat that it posed to public health systems in line with the agreement among Asia Pacific organizations. Besides that, it is aligned with the requirements of the health minister to support and not to neglect the Alzheimers' patient. The mnemonics method is more simple and easy to handle. The technique that used in this application is much more interesting and it's suitable for the Alzheimer's students to understand and practice. The mnemonics can be more interesting if the teachers could use the material in attractive way. It can help the students learn more words in a variety method. Teachers need to encourage the students in learning vocabulary using fun and enjoyable technique and material, and the mnemonics technique could be a good choice to be applied.

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## **LEAP with MyLinE: Empowering students' language skills for entering and graduating Malaysian Public Universities**

**Fatimah Puteh, Ummul Khair Ahmad, Awis Rumaisya Azizan, Shazwani Abd Rahman, Nurul Na'imma Hamdan**

Universiti Teknologi Malaysia, Johor Bahru, Malaysia

[m-fatima@utm.my](mailto:m-fatima@utm.my), m-ummul@utm.my, awisrumaisya@utm.my, shazwani@utm.my, naimmah@utm.my

**Highlights:** LEAP with MyLinE (MUET) houses quality materials to prepare students for Malaysian University English Test (MUET). It aims to address the lack of practice and activities among the low English proficiency students (LEP) and to provide a one-stop centre for practice among MUET test-takers. To ensure validity and reliability, the MUET items were piloted on 62 newly registered first year students with band 2 MUET score. After a 10-week intervention programme, results of their MUET showed a significant improvement where 75 percent scored one band higher while five percent scored two bands higher. The online nature of this innovation allows users to access the materials anytime, anywhere and at their own pace.

**Key words:** Preparatory online resources, Malaysian University English Test (MUET), Low English Proficiency (LEP), Language learning skills, Supplementary online materials

### **Introduction**

LEAP with MyLinE is a link developed in MyLinE portal with Malaysian University English Test (MUET) test-takers and low English proficiency students (LEP) among MyLinE registered users in mind. The idea sprouted when the Malaysian government announced the MUET band requirements for entering and exiting programmes in public universities in Malaysia. Seen as a necessity, MyLinE took the initiative to address the low English proficiency issue among students since MyLinE is accessible to registered students in all public universities in Malaysia.

MyLinE, an Online Resources for Learning in English, is a virtual language learning platform for tertiary education level students to learn English and learn in English by providing an avenue to learn, practice, share and connect in English. MyLinE aims to bridge the gap and meet the language needs of students at university level. Originally initiated by Universiti Teknologi Malaysia (UTM) in 2006 as an e-learning course known as UTM Online Learning Resources in English, it quickly gained popularity with students and later was launched as a national language learning portal in 2008. Since then, MyLinE has been providing online language support to 20 public universities in Malaysia and continues to remain relevant to its users by providing value-added language support materials for students' needs. In response to Shift 9 of the Malaysia Education Blueprint 2015-2025 (MEB-(HE)) where the nation aspires to harness the power of online learning, the resources and activities in MyLinE including the newly developed and tested LEAP with MyLinE (MUET) link in MyLinE website are able to contribute towards achieving this shift.

### **Content**

#### **Background of Innovation**

LEAP with MyLinE (MUET) was piloted in a special intervention programme called LEAP-ex to a group of 62 newly registered first year UTM students 2015/2016 intake who scored band 2 in MUET upon entering UTM. The intervention programme blended both face-to-face teaching and students' online participation. Students were required to attend 20 hours of class for 10 weeks, and spend another 20 hours online in MyLinE by doing the MUET practices as well as attempting other resources available in the portal. The practice exercises are similar in format to MUET, and students could attempt the questions multiple times until they are satisfied with their performance. Students who completed the 10-week intervention program were invited to re-sit for MUET in March 2016. The intervention programme proved to be successful where 75 percent of the test takers scored one band higher than their previous band while five percent scored two bands higher. Those who remained in the same band improved their scores for all the four skills but the scores were not enough to move them to a higher band.

#### **Importance to Education (Language Learning)**

MUET has been used as a requirement for both entering and exiting university programmes in Malaysian public universities. Approximately 20 percent of students enter universities with low English language proficiency (MUET bands 1 and 2), and they are expected to survive academically on their own with no formal language remediation program, other than the mandatory, regular English language courses. With the implementation of higher exit requirement for MUET, many students are in dire need of supplementary English language assistance in

order to achieve the required MUET band before graduation. However, resources and assistance to help bridge the gap in these students' language proficiency level while they are following their degree programs are scarce and limited due to many constraints.

#### Description of Innovation

One of the latest additions to MyLinE is the online preparatory materials for MUET (LEAP with MyLinE). To date, there is no specific website yet which has been developed comprehensive enough to prepare MUET-takers for all the four skills tested and this new innovation aims to bridge that gap. With the intention of providing the much needed support for LEP students, MyLinE has collaborated with Majlis Peperiksaan Malaysia (MPM) to produce supplementary online materials specifically to provide a platform for students to practice so that they could improve their MUET bands. These materials are parked under the latest tab called MUET, divided into four sub-categories namely listening, speaking, reading and writing. These preparatory online materials consist of exercises and activities that cover all skills tested in MUET.

Unlike its printed counterpart sold in the market, MyLinE is a one-stop online centre where all related materials are available to its registered users at their convenience. New materials close to the real MUET test are continuously designed and uploaded. These materials undergo stringent vetting based on the advice and suggestions given by two MUET experts in Listening, Writing and Reading to meet the MPM standards. MyLinE registered users preparing for MUET are able to practice brainstorming ideas by participating in forums created to address the speaking and writing needs.

#### Advantages of Innovation

The results of the pilot study acted as a turning point for the material developers as they marked the significance and relevance of the materials already developed meeting the needs of the test takers, especially LEP students. The successful results of the LEAP-ex pilot study intensified the material development and enhancement process where more materials incorporating current issues are made available as practice items in tab. These developed materials allow students to be autonomous in deciding which skill and activity they would like to focus and spend more time on, the direction they would like to take, and the pace they want to set. The resources include listening exercises for students to practice as the listening test in MUET is known to be challenging to many students. With the resources available in MyLinE, students could choose and listen repeatedly to recordings which allow them to develop and strategise listening skills in the English language. Similarly, students could also practice their reading skills and all exercises come with immediate feedback. Through the online forum, users could practice generating ideas with fellow students distributed across the nation, this skill could be useful in the real MUET speaking test as well as for Question 2 of the expository essay in the writing test.

#### Marketability and Future of Innovation

Starting July 2016, the MUET preparatory online materials in MyLinE are extended to selected Form 6 students in government schools in the state of Johor through a collaboration with Jabatan Pendidikan Negeri Johor (JPNJ). With these additional users, MyLinE is able to provide a larger shared platform for students attempting to meet similar MUET requirement, even at pre-university entry stage. Students who have access to the MUET preparatory online materials in MyLinE will be able to connect with and learn from fellow learners since MyLinE users come from across the country.

To address this expansion, MyLinE task force is currently working on enhancing the features of the MUET preparatory online materials -- we aim for students to be able to gauge their own MUET band level for receptive skills of reading and listening as they completed the series of practice exercises. As new materials are constantly added online, students will have ample practice to sharpen their language skills and build better confidence to be proficient users of the language. All in all LEAP with MyLinE was first developed with the intention of assisting LEP students in public universities to meet the required MUET bands for graduation. However, with the success of the LEAP-ex pilot study, more materials have now been developed and will continue to be developed allowing MyLinE to open its doors to even pre-university students and part-time university students: providing the much needed online resources for MUET preparation with minimal subscription fee. Figure 1 shows the phases of the development of LEAP with MyLinE.

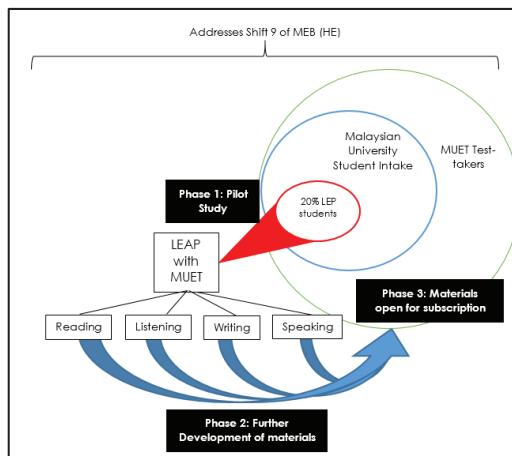


Figure 1 Development of LEAP with MyLinE

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## Storybird: vocabulary building through narrative artwork

**<sup>1</sup>Fatimah Puteh, <sup>1</sup>Farhana Diana Deris, <sup>1</sup>Lim Pei Rong, <sup>2</sup>Athirah Shukri**

<sup>1</sup>Universiti Teknologi Malaysia, Johor Bahru, Malaysia

<sup>2</sup>UniKL MITEC, Bandar Seri Alam, Masai, Johor, Malaysia

[m-fatima@utm.my](mailto:m-fatima@utm.my)

[diana@utm.my](mailto:diana@utm.my), [prlim0130@gmail.com](mailto:prlim0130@gmail.com), [athirah.shukri@unikl.edu.my](mailto:athirah.shukri@unikl.edu.my)

**Highlights:** storybird.com is an easy-to-use website that offers 21<sup>st</sup> century online tools and resources supportive of language learning. Its repository of attractive and illustrative artwork is used for scaffolding writing and reading skills. Language teachers and learners as users pick and choose artwork and create their own Storybird on the website's drag-and-drop interface. As users describe the artwork to tell their own story, they concentrate on word choices and on formulating expressions that effectively contextualise the visuals, making Storybird a powerful tool for vocabulary building. Storybird is also a social space where users can write collaboratively, publish their works online, and read stories created by others. When users read illustrated stories, they create connections between words and artwork, and thus, expanding their vocabulary. Taking a step further than what Storybird currently offers, audio is incorporated into the use of Storybird. This innovation adds to its richness of multimedia and caters for multiple language learning strategies. As users read the texts on the creatively illustrated pages and listen to the words being pronounced in fun and expressive storytelling mode, attention to and retention of vocabulary is increased.

**Key words:** Storybird, language learning, vocabulary building, online tools and resources

### Introduction

storybird.com is a collaborative storytelling website that allows users to create professional-looking publication, called Storybird, in the format of longform book (multi chapter), picture book (multi-page) and poem (single page). Created for language art classes, the premise behind it is the use of artwork to inspire users, particularly young learners to read and write. The collection of narrative artwork, supplied by participating artists, includes various art themes and options for users to choose from. Clicking on a particular art theme reveals other artwork by the same artist that can be used by users to illustrate their writing. The final products, or Storybirds, can be shared, tagged, commented and purchased as well. All shared Storybird is screened in advance to ensure its content and language are appropriate for young learners. Supplied artwork, users' tags and comments are monitored as well. Monitoring and screening are done to facilitate virtual classroom that is 'safe' and 'private' where learners feel comfortable to participate as writing community, collaborating, reading and commenting on each other's Storybirds. In this digital age, using Storybirds to support language learning is fitting as it introduces and promotes new media skills while reinforcing and consolidating language skills in fun and artsy way. Its use is also in line with seventh shift of the Malaysia Education Blueprint to transform the education system by leveraging Internet Communication Technology (ICT) tools for self-paced learning and customised learning.

### Content

#### Background of Innovation

Storybirds are created online on simple drag-and-drop interface using available tools and resources. Specifically, users begin by exercising their autonomy and creativity in deciding the theme that they want to write about. Users have at their fingertips a repository of professionally-looking artwork to browse through for ideas and to choose from. Once they have decided on the art theme, they can tap on the array of artwork produced by the same artist. This means that users may find illustrations focusing on a certain theme with qualities such as object(s), foreground, scenes, impressions and colour schemes that are similar to one another and in quantity sufficient to be manipulated to create and tell a story. Users then pick and shuffle the narrative artwork on the interface and reorder pages in sequence to provide a visual representation of a story. For the poem publication, this includes looking at words in visual format, dragging-and-dropping them on the illustrated page to compose the poem. For longform book and picture book, users have to type the texts to accompany the illustrated page. Completed Storybirds can be published and users may choose to provide a summary, tags and other comments to go with the final products. The stories can also be appealing, engaging and multimedia learning aids to be projected on a screen or using a smartboard in the face-to-face classroom.

On storybird.com, Storybird Studio, which houses a set of tools built for educators, empowers teachers to enhance learners' learning experience. Teachers can create virtual classroom as a shared space for his/her

language class and assign Storybird tasks for learners to do. Learners may be asked to create and share Storybird to the class or make it available to the public. Using the sophisticated review dashboard, teachers can sort learners' Storybirds by assignments or students and quickly review and provide feedback. Learners may also be tasked with reading other Storybirds and commenting on them. Storybirds created by teachers can be an excellent source of language input to scaffold learners' language development as the texts accompanying the art-inspired pages can be purposefully chosen to suit certain language learning needs.

### **Importance to Education (Language Learning)**

Being able to tell stories and to understand and appreciate one are important for language learners. However, not all learners are linguistically equipped for literary tasks. In other words, they do not have sufficient vocabulary to effectively express themselves or to comprehend reading materials. Storybirds may be the panacea to learners' lack of vocabulary. Creating Storybirds entail learners deliberating on the narrative artwork and word choices to go with the artwork, and the story as a whole. The artwork inspires learners to bring to mind appropriate words and to put them together in combination that is best for contextualising the illustration, and to associate and expand on words and concepts to present a complete idea or story. Meanwhile, reading Storybirds increases the opportunity for learners to encounter a broad range of new words on illustrated pages, thus encouraging learners to connect words with illustrations. With audio-enhanced Storybirds, both knowledge of the meaning and pronunciation of words is enhanced. Through reading and listening to illustrated Storybirds, learners learn to expect linguistic features associated with certain themes, images and stories, and therefore, develop schemas or frameworks of the words and expressions to go with certain contexts and situations.

### **Description of Innovation**

Storybirds for vocabulary building are developed by selecting and using available narrative artwork to tell stories with themes that suit younger learners such as adventures and magic, of being brave and of thinking of others before oneself. The sequencing of artwork on pages supports a story structure, i.e. a beginning, middle and end of a story, highlighting how characters interact and evolve, with the main character(s) resolving conflict or obstacle. Each illustrated page is accompanied with a sentence or sentences with age-appropriate level of complexity, which serves to explain the illustration on the page. This includes introducing the characters, describing the surroundings, and showing main character(s) coming face-to-face with conflicts. In doing so, readers are exposed to vocabulary for describing physical and personality traits, surroundings, feelings, and anything related to everyday life. Direct and indirect speeches are also included to explain the illustration on the page, to make the stories more interesting and to reflect real-world language use. Although the features in storybird.com do not include audio to be added to pages, audio is incorporated into the use of Storybirds where the sentences on the pages are being read with correct pronunciation and in fun and expressive storytelling mode. Vocabulary development and retention is fostered as learners are immersed in the language of the story, connecting spoken and written words to a variety of representations and art.

### **Advantages of Innovation**

Storybirds for vocabulary building meet the needs of young learners who love stories, especially when the stories are read to them, engaging their imagination. Storybird, compounded of creatively illustrated pages, written narration and descriptions, and audio recording of the story, offers richness of multimedia, appeals to multiple senses and exposes learners to a variety of representations and art. When learners read illustrated stories and listen to the recording simultaneously, they will have better retention of vocabulary because they can create connection and association between the words in written and spoken forms and the accompanying illustrations. Art-inspired, written and read aloud stories not only cater for multiple language learning strategies but also are relevant for young learners who require easier, engaging and fun ways of language learning. Literacy exploration through Storybirds may very well improve learners' overall attitude about reading.

In addition, in a study conducted to examine ESL learners' receptive vocabulary development with the use of Storybird as medium, results from pre-test, treatment, and post-test revealed that learners performed better in the post-test, which suggests the significance and potential of Storybird in helping learners make sense of unfamiliar words.

### **Marketability and Future of Innovation**

Storybirds for vocabulary building, especially supplemented with audio recordings are valuable resources for language learning and exceed what the tools and resources on storybird.com currently offers. This indicates the innovation's potential for commercial purposes through content licensing on the site, and thus, may earn royalties from the use of the innovation in connection with the site.

### **Acknowledgement**

We wish to express our appreciation to Storybird Inc. for the tools, resources, and services offered for stories to be created and shared with community of young language learners.

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## Memorise Chinese Characters with 1+1 > 2 Technique

**<sup>1</sup>Jinghong Low, <sup>2</sup>Soonhin Hew & <sup>2</sup>Cheeonn Wong**

<sup>1</sup>Faculty of Management, Cyberjaya, Malaysia  
<sup>2</sup> Faculty of Creative Multimedia, Cyberjaya, Malaysia  
jhlow@mmu.edu.my

### Highlight

Memorising Chinese Character is a very essential as this is the first time on learning Chinese language (Zhang, T.R., Chen L.H. & Li, 1995). If a Chinese as foreign language learner (CFL) learn the Chinese language without memorising the Chinese Characters, then the learner is not able to continue learning the Chinese language. If a CFL is not able to memorise the Chinese Characters, then the learner is not able to recognise the Chinese Characters and not able to apply and communicate it Chinese language. Therefore, that is a need to use this innovative representation to memorise Chinese Characters as this innovative representation help the CFLs to build a strong foundation for Chinese language learning.

### Introduction

Memorise Chinese Characters is a challenging task to complete by the Chinese foreign language learners. Memorising Chinese Characters is challenging because the appearance of Chinese Characters similar to a piece of picture or image (Moser, 1991). The appearance similar to a piece of the picture because the formation of Chinese Characters does not used alphabetical concepts, compare to alphabetical languages such as English, Malay and Spanish languages (J. R. Allen, 2008). The formation ideology of Chinese Characters required the Chinese foreign language learners to memorise the Chinese Characters by rote learning. Rote learning is a memorization technique based on repetition. A Chinese foreign language learner is required to rewrite characters for many times and spelling approach to memorise the Chinese Characters (Dai, 1998; Zhang, T.R., Chen L.H. & Li, 1995). This learning approach had bored the Chinese foreign language learners, and the Chinese foreign language learners give up with the Chinese language learning (Moser, 1991). An innovative representation should be introducing to overcome the boringness learning experience on memorising Chinese Characters with rote learning, (Soonhin & Jinghong, 2014). This introduction of innovative representation can reduce the withdraw rate of Chinese foreign language learners. This innovative representation introduction is important as it will enhance the memories experience with Chinese Characters by retaining the Chinese foreign language learners. This innovative representation introduction is important as it create a fun learning environment for the Chinese foreign language learners, and it also reflected the idea of the most effective in learning must be fun (M. W. Allen, 2003; R E Mayer, 2009; Richard E Mayer, 2005).

### Development Idea and Principles

The innovative representation is designed and created according to the concept of 1 plus 1 is more than two concepts (Soonhin & Jinghong, 2014), which shows in Figure 2. one plus 1 is more than two ideas is used because the formation of representation of Chinese Characters is similar as the Lego blocks combination concepts. Figure 3 shows the idea of how the idea of 1 plus 1 is more than two concepts represented as in Chinese Characters cases. The word of 木 represents the meaning of wood or trees. A combination of another 木 means that many trees. This is a symbolic representation of the word of the jungle in Chinese Character. Therefore, the sum of 2 木 means jungle symbolically. In fact, the CFLs will associate the meaning with the characters' structure appearance. Association approach to memorise items is important as is give the learners details information on an item (Gregor, 2014). Therefore, rather than rote learning, the CFLs memorise the Chinese Characters by associate the meaning of sub-component of the Chinese Characters. In term of multimedia representation, morphology technique is applied. Morphing techniques mean the use of transition to transmitting an image into another by displaying a series of frames that creates a smooth movement as the first image transforms itself into the other shape (Vaughan, 2011). Normally, this morphing technique is used as part of the cinematic special effects.

$$1 + 1 > 2$$

Figure 2 1+1 more than 2 idea.



Figure 3 The Innovative Idea.

Beside morphing technique was applied in this innovative representation, evolution idea also used in this innovative representation. The evolution of Chinese characters is started with the original formation idea representation until the format used today (Brandon, 1978; Hew et al., 2012; Low, Wong, Han, Jung, & Yang, 2009). In fact, the Chinese Characters evolution representation is similar to the human evolution idea, as in Figure 4. Therefore, it is good to integrate this evolution idea into our innovative idea as this approach enable the CFLs to memorise by associate the appearance of the Chinese Characters with its meaning. This approach enables the CFL to memorise better by association and create a curiosity toward fun learning with the Chinese language.

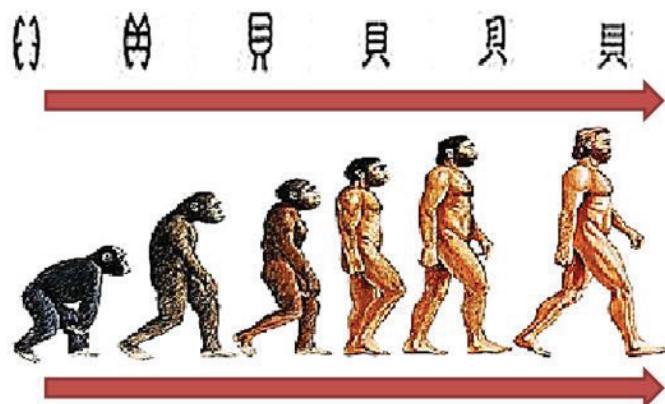


Figure 4 The Innovative Idea.

Principles of multimedia learning are applied in our innovative representation (Ayres, 2015; Richard E Mayer, 2005). The purpose of using the principle of multimedia learning is to enhance the effectiveness of our innovative representation of Chinese Characters. Effectiveness enhancement is important as this will ensure the CFLs will learn better from multimedia messages when the innovative representation of Chinese Characters is designed in the ways that are consistent with how the CFLs mind works. Figure 5 shows the image transmitting sample of the proposed innovative representation.

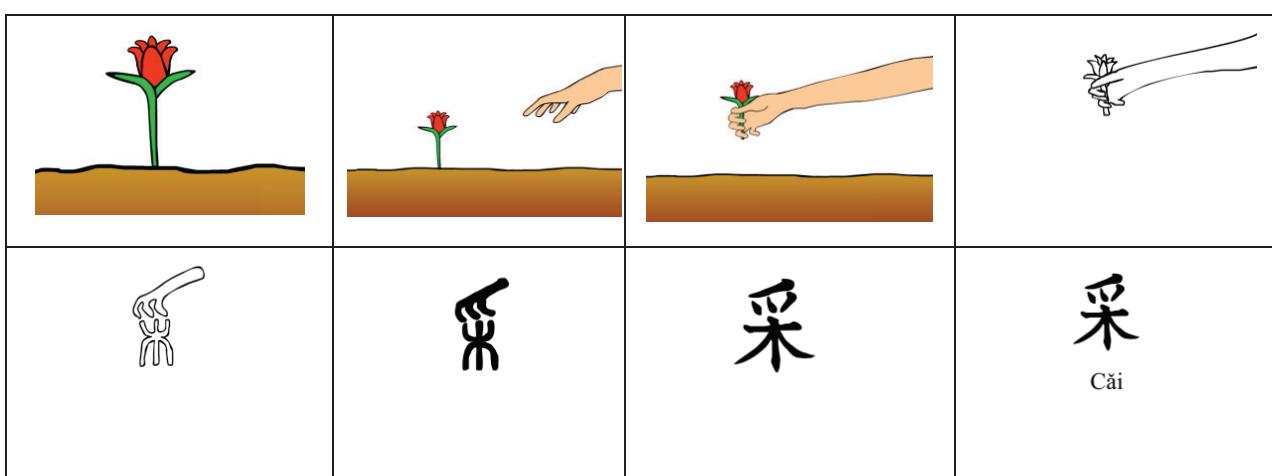


Figure 5 The Innovative Representation of 采

### The important of Innovative Representation

Memorise Chinese characters with rote learning are very challenging. Memorise rote learning is challenging because it made the learning process boring. Therefore, an innovative representation should be used to make fun learning with Chinese Characters. Fun learning is important as it will enhance the engagement with the CFLs. Also, fun learning can reduce the sufferers of learning especially for the first time learner with the Chinese language.

## **Impact**

The innovative representation of Chinese Characters can enhance the memorising rate of Chinese Characters among the CFLs. This enhancement can enhance the quality of learning the Chinese language as foreign language, especially the primary, secondary and university schools level. Also, the introduction of this innovative representation can enhance the availability of learning CFL tools and enrich the existing learning tools on memorising the Chinese Characters.

## **Commercialization Value**

This innovative representation of Chinese characters is represented in the video format, MPEG-4. MPEG-4 is a digital multimedia most commonly used to store video, animation, and audio. This innovative representation for ICCC used .mp4 format for representing this innovative representation because this format is feasible. It could be commercialized as a digital dictionary for e-learning contents and creations. Also, the innovative representation could be used as a format to save some Chinese Characters for database creating purpose. This database purpose could be used for any apps, application and software development purpose. The market size of CFL increase annually. This is because more and more language learners learn Chinese as a foreign language because the importance of Chinese language enables them to enhance the employment opportunity in this globalisation environment.

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## Captain Carnival Game: Game-based Learning Application for SPM English Literature Novel

**Rosfuzah Roslan, Navin Kumar A/L Kaliparamah, Mohamed Azlan Ameer Oli, Najihah Naim,  
Muhammad Faheem Marjohan**

Department of Information Technology, Centre for Diploma Studies (CeDS), Universiti Tun Hussein Onn Malaysia  
(UTHM), Batu Pahat, Johor, Malaysia  
rosfuzah@gmail.com

**Highlights:** In this day and age where access to technology is no longer uncommon, it has become a necessity to find ways that technology can be applied to further improve the education of our youths. The use of books in the educational system cannot be removed or replaced as it is a tried and true method of teaching. However, that does not mean that an educational gaming application would be ineffective. Contrarily, most students find these applications more compelling than books, which makes it viable to be used additionally with books for studies. 'Captain Carnival Game' is a game-based learning application built to captivate and help students test and exercise their knowledge of the novel "Captain Nobody" by Dean Pitchford, a novel that is used for the national SPM 'Literature in English' component. The application was built using combinations of elements that make up a successful multimedia project, such as the use of captivating texts, graphics, audio, video and animation. The application holds questions that challenges the user about their knowledge of the novel, from questions regarding the characters to questions about the plot points, all of which will prove to be more than enough materials for an individual to answer exams with full confidence.

**Key words:** *Gaming Based Educational Application, SPM English Literature Novel, Captain Nobody*

### 1. Introduction

There are various methods of learning and teaching or in Malay called 'Pengajaran & Pembelajaran' (P & P) that can be applied in the classroom to enhance students' skills. According to Jamaluddin (2000), different approach in P & P is able to provide opportunities for students to apply what they have gained in the course of everyday life. One alternative approach that is associated with Research and Development (R & D) is through the use of technology (Hoon, T. S., 2010). According to Sanjaya M. and Ramesh C.S (2004), the application of technology in education brings benefits to the global economy. Multimedia-based learning approach to transferring information from a form of static text books to a new learning patterns are more interesting (Jamaluddin, 2000). Students can learn in their own convenient time, understand the content of the lesson easily and also able to apply the knowledge gained. In addition to the increasing of interest in English Literature component amongst the students, it is also able to tap their creativity and innovation by applying what they have learned via computer multimedia technology which also contributes to the teaching and learning advancement.

A multimedia game-based learning application is introduced called 'Captain Carnival Game' in which the target audience and users will be the Form 5 English teachers and students. The quizzes or questions are related to the selected English Form 5 literature component novel named "Captain Nobody" written by Dean Pitchford. Captain Carnival Game addresses these following issues; i) current module-based learning which only incorporates texts and diagrams does not successfully capture the student's interests in learning the English literature component and ii) students have difficulties in understanding the contents of the selected SPM novel. The goal of 'Captain Carnival Game' is to produce strengthening exercises and understanding through sets of questions in the form of quizzes which focus on the SPM English Literature component novel. This is to create a fun learning environment that is less stressful in order to help raise the level of student understanding and participation. The questions covers all chapters in the novel which consists of 24 chapters. The objectives of 'Captain Carnival Game' are listed as follows:

- (i) To design a learning media that is based on English literature SPM novel entitled 'Captain Nobody'.
- (ii) To produce a learning application that uses a 'game-based' approach that incorporates multimedia elements to attract students.
- (iii) To test the proposed product by analyzing the user's (teacher and Form 5 students) acceptance and assessing the impact made on the P&P of English SPM Literature.

### 2. Background

The background studies have been conducted towards 2 types of multimedia based learning sources which are i) module-based learning application such as courseware, videos and quizzes and ii) game-based learning application. Most courseware that have been studied are those produced by previous Diploma students in UTHM for their final year project such as courseware for course Data Structure (Afifqah I. et al., 2014), Systems Analysis and

Design (Mohd H.M., 2014) and Java Programming (Rasyiqah A. et al., 2014) and in which all are produced in 2014. Videos and quizzes from various sources over the internet have also been explored. Meanwhile, studies on game-based learning application were conducted on Educational Game for Introduction to IT course (Mohd I. et al. 2014) developed by diploma students from UTHM. Article displayed by New Media Institute in <http://www.newmedia.org/game-based-learning--what-it-is-why-it-works-and-where-its-going.html> discussed the meaning and impact of game-based learning application. Based on the article, an effective game-based learning applications can draw us into virtual environments that look and feel relevant and familiar. According to Dr. Susan Ambrose, director of Carnegie Mellon's Eberly Center for Teaching Excellence, this is motivational because we can quickly see and understand the connection between the learning experience and our real-life work.

### **3. Scope**

'Captain Carnival Game' presents 2 sets of questions or quizzes in a fun filled game concept with "carnival" theme. There are 2 stages in which each stage consists of 1 set of questions that presents a shooting game concept in a carnival where users are required to shoot the correct answers. The questions are based on the Malaysia's Ministry of Education selected SPM English novel called 'Captain Nobody' for the secondary schools in the Malaysia's south zone starting 2016. The Form 5 students will be tested on their knowledge for all 24 chapters of that novel which focused on the plot and characters. This product aim to strengthen the Form 5 student's knowledge and understanding provided that they have read the whole novel beforehand. Summaries of the novel divided by each chapter also are presented in this game to help the user or students in completing the entire game.

### **4. Process and Design**

To develop this game-based learning application, ADDIE model was selected as a development methodology. Each phase has its own purpose, which lets developers set the pace of work while carrying out the construction process. This model is the basis of the model and other design, ADDIE model has some advantages of its own. Among its advantages is it consists of five basic phases of instructional design. Each phase has its own purpose, which lets the developers set the pace of work during the process of construction of multimedia modules. ADDIE stands for Analysis, Design, Development, Implementation and Evaluation.

#### **4.1 Analysis Phase**

In this phase, the process of analyzing requirements based on the learning game development was being done. For example, an analysis of the content of lessons and learning styles. Learning style refers to how they receive and process information to be converted to a form of knowledge. In addition, some analysis such as the analysis of potential users and the analysis of the learning environment is also carried out. The user analysis is important because the details were vital in defining the concept of learning as well as the content is presented in the application software based learning games are easy to understand. The Captain Nobody Novel and a couple of exercise books were studied in which were given by SMK Sri Gading's English teacher.

#### **4.2 Design Phase**

This phase is carried out after the needs analysis process is completed. The whole view about the shape of the product, structure, learning theory, types of media and technology that will be involved were confirmed after the analysis phase. Among the element that needs to be determined in this phase is the user interface. To confirm the interface, look and flow of the product, methods of sketching storyboard is implemented.

#### **4.3 Development Phase**

In the development phase, the application is developed using game -based learning programs that have been selected. The main software used is Adobe Flash. Other supporting software such as Adobe Photoshop, Adobe Illustrator and Powtoon (online software) also being used for the production of the game application.

#### **4.4 Implementation Phase**

The implementation phase is aim to make sure that this application is built to meet the objective and is suitable for the usage of the targeted users. This way, problems can be identified which were not realized during the design phase and during development. Before the formalization of the product, aspects of weaknesses that were identified before has been improved. In this phase, the discovery of the need of users or player 'Help Button' or 'Help Page' which displays summaries of the novel were identified and customized into the product. It was implemented in a form of 'Ticket Counter'.

#### **4.5 Evaluation Phase**

Evaluation is divided into two parts namely, formative assessment and summative assessment. Formative assessment is carried out on all phases to ensure its effectiveness. While summative evaluation is taking place at the end of the production when it is completed. It involves feedback from users of content, strategy, graphics, audio, video, interface and so on through supervision, tests, questionnaires, interviews. In this study, a formal assessment is carried

out with the English teacher and a few of her students. The results shows that 75% satisfies with the animation and graphics, while 25% categorized it as 'great'. 100% agreed that the audio in this product is 'good'. Meanwhile, 100% agreed that it is a great alternative other than the ordinary exercise book.

## 5. Importance to Education

The aim of usage of this product is for the SPM students throughout Malaysia. The results of the study and collection of information was carried out at the SMK Sri Gading in Sri Gading, Batu Pahat, Johor in which were explained in the section 4.5. The application can help the students gain knowledge in a simple and interesting way, ease the educator's work and also enhance the quality of teaching and learning in SMK Sri Gading. The importance to students and educators are explain as follows;

### a) Student

This learning media applications has its own way of conveying messages in a way which cannot be achieved by the print media. Multimedia application, is expected to give a new dimension to students which embed learning techniques that lure the audience focuses to deliver information effectively. Next, it also may help students to address or focus more on their weak parts.

### b) Educator

Game application is also important to educators who teach this course. Educators can use the media as a tool to help ensure the delivery of learning and teaching environment that is active and effective. With this, the teaching process becomes more meaningful and the quality is in line with the Ministry of Education.

## 6. Advantages

Advantages of this product towards education and community;

- i) Introduced an alternative and a 'portable' medium of learning in the form of a game based on the English literature SPM novel titled 'Captain Nobody'. It is 'portable' because it can be used anywhere using a computer.
- ii) It enhance the process of learning and teaching which take place effectively through combining multimedia elements to improve the understanding of the students thus closing the gap of traditional method of teaching and learning.
- iii) The product manages to get the student's interest and engagement towards English literature component based on the feedback received at the evaluation session.

## 7. Commercial Values

We believe that this product has a commercial values in which it can be publish as a desktop game which can be purchase and downloaded on the internet or being market as an educational compact disc (CD). The disc can be enclosed along with the exercise books provide to Malaysian Form 4 or 5 students. As the Ministry of Education (MOE) is using this particular novel for SPM English Literature component material starting 2016, thus it indicates a lot of potential users or customers. Apparently it is also being used as a medium of education and widely read by fellow teachers and children in other countries as well such as America.

## Acknowledgement

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## **Energizing Algebraic Thinking Among Boarding School (SBP) Students through Technology via VLE Frog Platform**

**Najihah binti Mustaffa, Zaleha binti Ismail, Zaidatun binti Tasir, Mohd Nihra Haruzuan bin Mohamad Said**

University Technology Malaysia, Skudai, Johor Bahru, Malaysia

najihah27@live.utm.my

p-zaleha@utm.my, nihra@utm.my, p-zaida@utm.my

**Highlights:** Algebra is a subject that is connected with the real world and application in various fields. However, the students think that Algebra is too abstract, meaningless and more procedural. Moreover, the teaching and learning of Algebra does not emphasize on thinking skills which is a step by step solving questions. Hence, the learning task of the integration of Algebraic Thinking through Problem Based Learning via VLE Frog platform are applied in enhancing algebraic thinking among Boarding School (SBP) students. In order to enhance Algebraic Thinking, the learning task consists of how the implementation of the Integration of Algebraic Thinking through Problem Based Learning are practiced by the teacher. Numerous research has been done on Problem Based Learning in order to enhance the student's thinking, cognitive ability as well as affective domain. Rarely, research of the integration of Algebraic Thinking through Problem Based Learning. Based on cognitive constructivism from Piaget and social constructivism from Vygotsky, the learning process are implemented in learning Algebra to enhance Algebraic thinking. The objective of the study was to determine the differences between Problem-Based Learning and conventional approaches in relation to algebraic thinking. Therefore, the quasi experiment pre-test and post-test design was carried out for 5 weeks involving 55 Form Two (14 years old) boarding school (SBP) students in Perak. The experiment group (EG) was exposed to the Problem-Based Learning, whereas the control group (CG) was taught conventionally. Besides that, two sets of instruments were employed in this study, namely Learning Task of Problem-Based Learning (PBMAThinking), as well as pre and post-test Algebraic thinking test. The data were analyzed by using MANCOVA. The results indicated that the application of Problem-Based Learning approach enhanced the students' algebraic thinking, especially in Reasoning about and with Representations compared to Connecting Representations. The students were able to connect the variable with equations, graphs tables and real situations compared to connecting two or more functions representations and using one representation to reason about another.

**Key words:** Problem based Learning, Technology, Learning Task, Algebraic Thinking

### **Introduction**

Learning algebra is important at school level as its application is imminent in various fields and functions as a gateway to enter the higher education institution. However, the students have been found to fail to apply the concept of algebra in their real life and assume that this mathematical aspect is meaningless. Therefore, various teaching and learning approaches have been applied towards improving the learning of algebra in conjunction to algebraic thinking. However, in Malaysia, teaching and learning algebra emphasize more on the manipulation of symbols and how to solve the questions and get the correct answer rather than emphasize on how the students think algebraically. Moreover, the students were unable to connect with real world. The teacher should be as a facilitator and the students should able to solve the problems in groups. As a facilitator, the teacher should be able to encourage the students to think rather than act as a conveyer of the information. The students should independently solve the problems and construct their own knowledge and concept (Adu & Olaoye, 2015; Ajai & Imoko, 2015; Baharom & Palaniandy, 2013; Rotgans & Schmidt, 2011). These environment leads us to the Problem based Learning. Furthermore, based on a previous research (Tan, 2003), the Problem-Based Learning approach exhibited a positive impact in enhancing thinking skills among students. As such, the Problem-Based Learning approach had been applied in this research to enhance Algebraic Thinking among boarding school (SBP) students via VLE as a platform.

### **Design**

In this research, teachers and students were given a learning task of Problem based Learning that consist of a scenario of problems in Algebra, how to implement Problem based Learning in Algebra specifically linear equation and the cycle of Problem based Learning. There are two scenario problems which are related to business and health. The scenario problem was related to the business which the students plans and do the budgeting on as well as communicate and discuss with outsiders such as suppliers via phone or email. The students were able to relate to

the scenario problem with other mathematical concept such as percentage and profit. The students were also able to think algebraically such as Connecting Representations, Exploring Relationships, Using Algebra as Tool and Manipulation of Symbols and Procedures. Meanwhile the second scenario problem is regarding to health. The students were given an article and a video of healthy food as an introduction the scenario problems. At the end of the learning process, the student was able to suggest a healthy menu for lunch for 14 years old boys and girls as well as Generalizing and Formalizing, Reasoning about and with Representations, Using Algebra as Tool and Connecting Representations. In this research, the researcher implemented Problem based Learning to enhance Algebraic Thinking using VLE Frog as a platform in teaching and learning of Algebra. VLE Frog was one of the suggested tools to be implemented in schools by the Malaysian Education. Every student, teacher and parent have the ID for VLE Frog. Documents in the VLE Frog was freely accessed and online textbooks were supplied in the library of VLE Frog. The students submitted the assignment online. The important is unshared file with other individual. The students can only able to submit the assignment to the teacher. They are unable to send the file to other individual. This was to prevent the students from plagiarizing the files sent by other students. However, the VLE Frog takes a long time to load and connect to the internet. In this research, VLE Frog was used as a platform to implement the learning process of Problem based Learning.

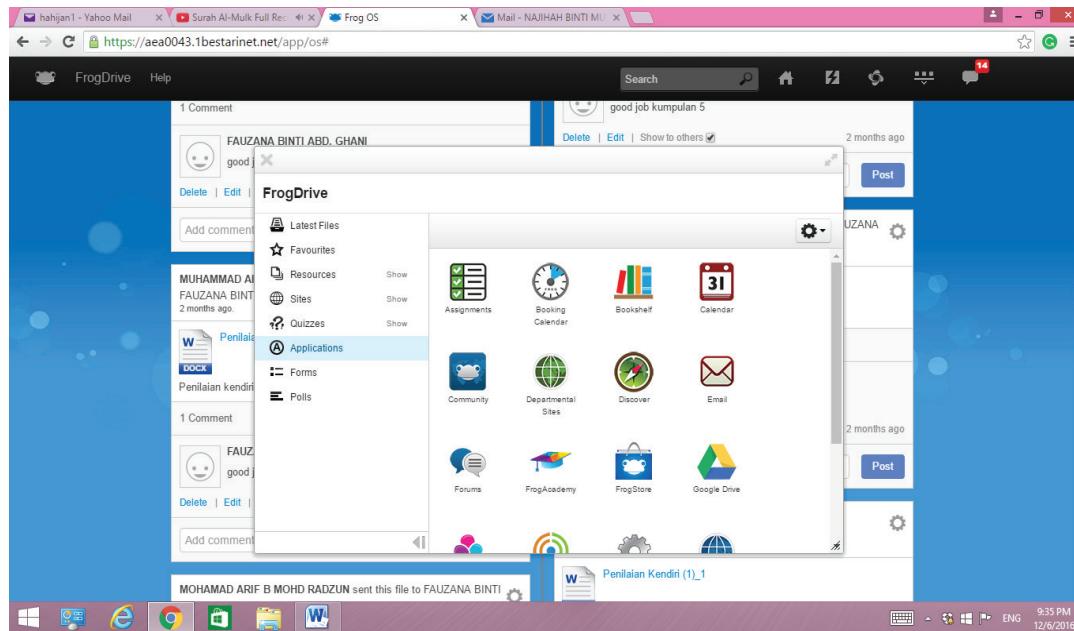


Figure 1: VLE Frog Application

## Evaluation

Figure 2 shows that a group of integration of Algebraic Thinking through Problem based Learning have an improvement in every characteristics of Algebraic Thinking. However, there is a significant difference in this research which are Reasoning about and with Representations compared to Connecting Representations. The students are able to think about or with representations of functions such as equations, graphs, tables, and situations compared connecting two or more function representations and using one representation to reason about another. In accordance, characteristics of Problem Based Learning that starts with scenario problems (E & Hmelo-Silver, 2004; Savin-Baden & Major, 2004; Schmidt, Rotgans, & Yew, 2011; Tan, 2003). The students were able to think representations of situations that are related to real life. However, the students were still uncertain in connecting two or more function representations and using one representation to reason about another. Commonly, the students have difficulties in understanding mathematical concepts when they failed to connect algebraic and graphical representations (Bayazit & Aksoy, 2010). Perhaps, the teaching learning approach that was previously used, which is the traditional approach, approaches more on the manipulation of symbols rather than connecting representations such as graphical representations.

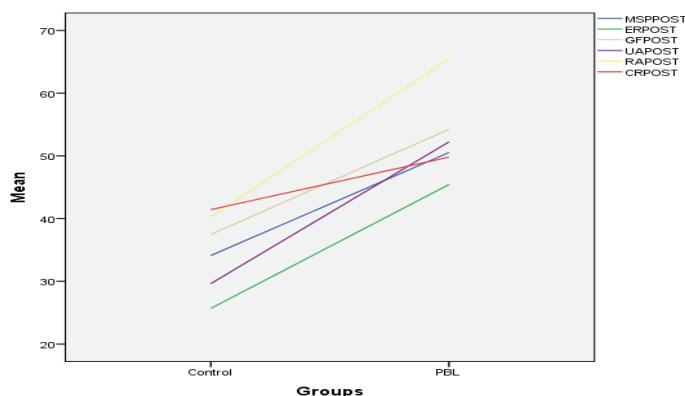


Figure 2: The comparison of characteristics of Algebraic Thinking between Conventional group and Integration of Algebraic Thinking Through Problem based Learning compared to conventional group.

### Acknowledgement

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## Driving Holistic Development through the SHINE Portal

**Cheah Su Ming**

Taylor's University, Subang Jaya, Selangor, Malaysia

[Suming.cheah@taylors.edu.my](mailto:Suming.cheah@taylors.edu.my)

**Highlights:** The Shine Portal project was conceptualized to support the 2nd Transcript administration for Taylor's University and is an online holistic development portal which manages, tracks and recognises student participation and engagement in approved on-campus and off-campus extra-curricular activities during their term of study at Taylor's University. In September 2014, the SHINE Portal went live and was piloted from September- December 2014 with 300 students. By December 2015, the SHINE Portal was actively used by 1676 students.

**Key words:** holistic development, co-curricular transcript, points-reward system, mission statements, online journals

### Introduction

In September 2013, the Taylor's University Senate and Council approved the 2nd Transcript framework and work was underway to roll-out the SHINE Award Programme which underpinned the 2nd Transcript in September 2014. The Shine Portal project was conceptualized to support the administration of the 2nd Transcript for Taylor's University. It is defined as an online holistic development portal which manages, tracks and recognises student participation and engagement in approved on-campus and off-campus activities during their term of study at Taylor's University. In September 2014, the SHINE Portal went live and was piloted from September- December 2014 with 300 student users. By December 2015, the SHINE Portal was actively used by 1676 students.

### Content

#### Description

Taylor's University's strategic direction towards holistic education was manifested through the 2<sup>nd</sup> Transcript initiative. Taylor's aspired to provide opportunities for students to develop holistic capabilities of intellectual, personal and social development. Thus, the academic transcript and the complementary 2<sup>nd</sup> transcript aimed to contribute towards a holistic university experience to develop well-rounded graduates.

#### Background

The Shine Portal project was conceptualised to support the 2<sup>nd</sup> Transcript administration. The SHINE Portal enabled categorization of events according to 4 learning packages, namely Personal Development, People and Leadership, Professional Development and Global Engagement. This strategy was to intentionally empower students to develop life-long life skills and emotional wellbeing in these specified areas.

Additionally, prior to the launch of the SHINE Portal, the university did not have an official platform to capture and measure participation rates in extra-curricular activities. Therefore, the SHINE Portal was an opportunity to house the university events on a single platform and support the development of "intentional learners" who intentionally take up activities based on their interests and needs. Thus, this supported the fundamental part of the SHINE Portal design which focused on the development of self-aware, self-directed and reflective learners.

#### Materials and Methods

Within the SHINE Portal student modules, the students could access the following tasks:

- Audit their graduate capabilities at specified periods
- Keep track of their mission, goals and action plans
- View and register for a range of extra-curricular (ECA) activities organized on and off campus
- Manage and track the activities they sign up for in keeping with their mission and goals
- Write reflections on what they learnt from the activities they attended
- Upload artifacts such as certificates of attendance, pictures, relevant testimonials as evidence for learning or skills acquisition
- Gain SHINE Points for recognized learning
- Aim and Apply for the SHINE Award

#### Value Added

Co-curricular transcripts like Taylor's 2<sup>nd</sup> Transcript are relatively new in Malaysia and in the South-east Asian region. Thus, Taylor's University's 2nd Transcript framework has been recognised as a benchmark and the SHINE Award Centre has conducted knowledge-sharing workshops for Malaysian and international universities like Lyceum of the Philippines University Laguna, University Utara Malaysia, Universiti Malaysia Terengganu, Universiti Teknologi Petronas and Politeknik Mara.

Another key value of the SHINE Portal was that it was purposefully built to foster personal development planning in an effort to cultivate intentional and reflective learners. Many co-curricular platforms around the world focused primarily on artefact collection as evidence of participation. While, the SHINE Portal also encouraged this, the modules within the SHINE Portal focused more on engaging and extending the expected behaviours of "reflective" and "intentional" learners. The students were expected to complete their reflections post-activity, capturing their impressions and learnings using a set reflection criteria which got them to Reflect-Interpret-Evaluate-Plan.

Additionally, the SHINE Portal's comprehensive point system was a key strength and was definitely unique to the SHINE Portal and wholly original. The SHINE point system was based on a verification and validation system based on "points", given based on different levels of participation, victories and positions. The recognized extra-curricular activities were weighed against the SHINE point templates (SPoTs). A paper on the SHINE point system was delivered at the Taylor's 8th Teaching and Learning 2015 (TTL2015) in November 2015 and will be published online in the Conference Proceedings by Springer. More information can be found at

<http://www.taylors.edu.my/ttlc2015/testing.html>

Furthermore, employers who are SHINE Award Partners can now look to the 2nd Transcript and the SHINE Award to gauge their new hires for their company as the 2nd Transcript via the SHINE Portal has a validation and verification process which substantiates the transcript's integrity. The 2nd Transcript is generated from the SHINE Portal award management module. With the 2nd Transcript to complement the academic transcript, employers would be able to better assess and evaluate potential hires for their talent pipeline.

The SHINE Award Programme and the 2nd Transcript had also received recognition from the Malaysian Government, namely the Malaysian Ministry of Education (MOE). On 15 Nov 2014, the Director-General of Higher Education: Dato' Prof. Asma Ismail officially launched the Shine Award Programme and the 2nd Transcript during the Taylor's 7th Teaching and Learning Conference (TTL2014).

### Awards

The Shine Award Centre has received internal and international recognition for the SHINE Award Programme. At university level, the SHINE Award Centre received the Group CEO Brand Ambassadors Award in 2014 for the SHINE Award Programme. Internationally, the SHINE Award Centre received Honourable Commendation for the SHINE Award Programme: A Commitment to Holistic Development and Graduate Employability in the Wenhui Award 2015, held in Xiamen, China on 30th November 2015. The SHINE Award Programme at Taylor's University was selected as one of 4 award recipients from 76 nominations from 18 countries. For further info, please check out:

<http://www.unescobkk.org/education/apeid/wenhuiaward/wa2015/results2015/>

### Success Factors

The students in the SHINE Award Programme benefited the most from the SHINE Portal as it supported the roll-out of the SHINE Award Programme. As students progressed through the 4 SHINE Learning Packages, not only were they able to manage and track their involvement in extra-curricular activities, they were now in an advantageous position to intentionally plan, direct and self-pace their activities in keeping with their mission and goals. They were directly in-charge of their own holistic development.

Campus buy-in was also important as Taylor's student support departments and Taylor's 13 academic schools could now highlight and promote their campus events on a key event promotional platform like the SHINE portal to attract greater student involvement. Furthermore, students themselves could nominate events onto the SHINE Portal. All SHINE-approved events and their collaterals also sported the SHINE Points logos. Event promotion entailed advertisements on the SHINE Portal landing page and on the SHINE Events calendar within the SHINE Portal.

### Challenges

Getting students and staff to start nominating their events onto the SHINE Portal was a challenge in the beginning. Roadshows to educate staff on how relatively easy and important it was to nominate their activities were carried out to gain buy-in. The SHINE Award Centre also offered a holistic promotional package where event publicity on the SHINE Portal also ensured that nominated events would be promoted on the following channels:

- Electronic Digital Mailers alerting on monthly event updates to students and staff on campus
- Facebook Promotions on the official SHINE Award Centre Facebook page :

<https://www.facebook.com/shineaward>

Another stumbling block was that the SHINE Point system was not comprehensive enough when the SHINE Portal was launched in September 2014. The 10 point templates, derived at the onset, did not cater to the range of activities available. Certain student activities could not be credited points till the new templates had undergone testing. By Sept 2015, the SHINE Portal included a wide spectrum of extra-curricular activities that could be classified under 17 different point templates.

### Commercialisation Potential

For universities which are committed to holistic development and capturing their students' extra-curricular activities on a validated and verified platform, the SHINE Portal is definitely a replicable benchmark. Notably, these local private and public universities have sought our expertise in this area: Lyceum of the Philippines University Laguna, University Utara Malaysia, Universiti Malaysia Terengganu, University Teknologi Petronas and Politeknik Mara.

### Acknowledgement

We are grateful for the support and commitment of the staff from the SHINE Award Centre and the Life Skills Development departments of INTELLECT (Integrated Teaching and Life-Long Learning Centre @ Taylor's).

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## Fluid Dynamics in Biological System: Apps-integrated Activity

**Phoon Chow Lin**

Taylor's University, Subang Jaya, Selangor, Malaysia  
Chowlin.phoon@taylors.edu.my

**Highlights:** PhET Interactive simulations (PhET) is an interactive computer simulations for teaching and learning physics. It provides a highly effective tools for teaching fluid dynamics for biological system. PhET can be applied in various educational ways, including lecture, in-class discussion, group activities and laboratory activities. These interactive teachings have enhance students learning and understanding, help students build mental models and concepts, and allow students to integrate knowledge to applications.

**Key words:** interactive simulations, fluid dynamics, build models, integrate knowledge

### Introduction

An understanding of the physics concept of fluid dynamics, pressure-volume relationship is vital to an understanding of biological system as diverse as the human cardiovascular system. Fluid dynamics is one of the most complex branches of mechanics. Most students in university foundation programme find it difficult to learn because it is not easily understood in an instinctive way, hard to visualise and mathematically challenging. Let alone to comprehend the effects on the changes in the fluid dynamics of the blood due to sustained exercise or cardiovascular disease. The use of PhET in Physics can help lecturer to begin introduce this difficult topic to students effectively and to connect with students' prior knowledge, understanding in everyday life. It also help students to build on understanding the model concepts rather than the maths, and to engage students in class discussion on conceptual questions.

### Content

#### Description

Various Ways to use PhET in teaching and learning:

- Lecture

Use PhET as intuitive illustrations or visualise demonstration to introduce fluid dynamics of blood in classroom. PhET shows the process of how blood cells flow through aorta, arterioles and capillaries. The process of blood flow can be slowed or sped up depending on the concept being showed. The invisible blood cells can be made visible.

- Classroom activities

Posing a scenario and asking students to write down their prediction based on their experience in everyday life. For example the students can be asked to predict what effects on the pressure drop in a blood vessel due to the build-up of plaque on vessel wall; artery blockage. After students have written down what would happen and compare it with their predictions. Lecture then run the PhET for observe and compare it with their predictions. This leads students to in-class discussion about and why it makes sense based on fluid dynamics principles.

#### Advantages

- **Allowing students to learn by doing:** provide a way for students to become active participants in the learning process and to strengthen their ability in logic reasoning.
- **Keeping students engaged:** provide a valuable supplement to traditional face-to-face teaching that keep students engaged and deliver course content to a wider variety of learning styles.
- **Expanding learning beyond the classroom:** allow students to practice concepts and skills from any location as it is readily accessible,

#### Success Factors

PhET is a powerful tool for achieving student learning of circulatory system. It helps students to build a mental framework about concepts of fluid dynamic in circulatory system which cannot be directly observed. It encourage students to investigate, explore, ask questions and make connections of the key features. In addition, students tends to reduce on memorise information but rather it strengthen their ability to reason logically, particularly n conceptual questions. Students attitude towards the use of interactive learning environment in this topic were positive.

## Challenges

PhET needs to be carefully integrated into the curriculum with appropriate activities created in addition to in-class face-to-face lecture. With minimum guidance, students may be unfamiliar with key variables, a great deal of thinking required for the students to elicit their own correct mental model on the blood dynamics concept.

## Acknowledgement

I am grateful to the entire team, University of Colorado who develops PhET interactive simulations. The PhET work is supported by NSF, Hewlett Foundation, Microsoft Research, S. Gilbert and C. Wieman, the University of Colorado, and King Saud university.

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## **Training Management System @ i-Learn Centre, UiTM**

**Janudin Sardi @ Mohd Yusop, Anealka Aziz Hussin, Harrinni Md Noor, Johan @ Eddy Luaran, Mohd Nor Hajar Hasrol Jon, Prasanna Ramakrisnan, Rahayu Hasanordin, Norsaniah Md Noh**

i-Learn Centre, Universiti Teknologi MARA, Shah Alam, Selangor  
ilearn@salam.uitm.edu.my

**Highlights:** The training management system, or referred to as 'sysilearn' is managed by i-Learn Centre, Universiti Teknologi MARA. This system helps to support the university e-learning centre by systematically managing the database of training for e-content development. The platform provides easy access for lecturers, facilitators and i-Learn Centre to keep track of and provide relevant information on e-content development training matters. The system is divided into three major components, mainly for Administrators (i-Learn Centre), Trainers (facilitators) and Users (lecturers). This interactive on-line platform also enables lecturers to register for relevant and current e-content development courses. It can be accessed at the main campus as well as the state campuses. The online system is available at <http://www.sysilearn.uitm.edu.my>

**Key words:** Training Management System, On-line application, e-content

### **Introduction**

The e-Learning Centre (i-Learn Centre) of Universiti Teknologi MARA (UiTM) was established in December 2005, to serve as the core unit in initiating and implementing e-learning at the main and state campuses. The main function of the centre is to implement and provide services to create a learning environment where lecturers provide e-contents and online learning activities. e-Learning has seen a tremendous growth during the past decade concurrent with the rapid development of Information and Communication Technologies (ICT). As evidence, more Hands on training workshop to introduce the portal to all academic staff from 25 faculties campuswide and all 12 branch campuses were on track since March 2005. The whole process of these introductory workshops took a year to complete. Academicians were given training in computer labs during weekends and term holidays and at the end of the training sessions they are able to upload at least one course content digitally. Based on the success of the training workshop, the i-Learn Centre envisions constant efforts to promote the usage of the portal for all academic staff in UiTM. As such, it is deemed that these exercises are not only a one-off effort, instead should be carried out continuously. The training exercises ensure retention of usage, as well as boost up the knowledge among the academic staffs with regards to the additional features of the portal, which promoted interactivity. Besides introductory hands on training with regards to content delivery, the academicians were also given hands on training on conducting online discussions using the Course Forum and i-discuss features as well as conducting online assessments among others. In addition, the centre currently offers 24 different training modules available throughout the year based on demand. Among others, training is provided for Microsoft Office Suites that are tailored to producing electronic contents, Adobe Acrobat as well as Audio/Video for e-Learning. Unwilling to rest on its laurels, the centre also established a selection of online training whereby users of the i-Learn Portal may undergo asynchronous training on the portal at their own self-paced and convenience.i-Learn Center (i-LeC) in Universiti Teknologi MARA, UiTM was established on the 1st of December 2005 and operates under the Academic Affairs Division (HEA). The center is responsible for handling adaptation of e-learning in UiTM. As a start, the center has formally launched its Learning Management System (LMS) portal on the 30th December 2005. As of now, the center is coming up with strategic planning to ensure e-learning achieves its objectives. The training management system, also referred to as sysilearn, is an innovation by i-Learn centre in the training management system that is systematic and efficient. It is an ongoing initiatives towards quality managing of UiTM staffs. One of the objectives of i-Learn Centre is to ensure that the number of lecturers Sistem Pengurusan Latihan, or Training Management System These Extended

The i-Learn Centre future efforts aim to make the e-learning environment more engaging, powerful and valuable in order to realize the e-learning best practices as a culture among academics and students of the university more than it is experiencing today. Through the initiatives and programs conducted, the centre hopes to achieve the following educational goals: 1. To comprehensively train, equip and enable the academic staff to create online course content/materials and develop their competence to use the contemporary tools provided i.e. content creation and editing tools, online assessment tools etc. with ease 2. To provide a robust and reliable e-learning facilities and services for academicians and students community in content delivery, synchronous and asynchronous modes of teaching and learning which includes an infrastructure of hardware and software availability taking into consideration the emerging technologies as part of campus wide learning strategy. 3. To create an online learning environment that will expose the academicians and students to new teaching and learning approaches as they acquire skills for life-long learning, seamlessly

E-learning is not that much about technology but more about learning using technology which offers different levels of instructional design and applications. Understanding and managing issues surrounding how and what learning is all about could help provide better, more engaging, prevailing and valuable environment not only for academicians to lecture but also for students to learn. The need for training hasn't changed as people still need to be educated about new products and processes, updated practices and alternative methods or operations in the portal; an excellent system is always prescriptive and yet flexible and adaptive to change; the quality of content must be superior yet meaningful to the learners; and lastly there is a constant need to seek out new and innovative ways to attract, retain and impact lecturers and learners alike in the knowledge age. Only when we are truly prepared to continuously address key issues of integration of campus and virtual communities can we be on the path of successful global e-learning communities.

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## LAMS as an Alternative Platform to the Traditional Classroom Presentation

**Mee-Lee Looi**

Taylor's University Lakeside Campus, Subang Jaya, Malaysia  
MeeLee.Looi@taylors.edu.my

**Highlights:** Oral presentation is an effective way of delivery and sharing new knowledge or results gathered by an individual. However, there are challenges to perform effective knowledge or content delivering. In this paper, Learning Activity Management System (LAMS) which is an online system, is highlighted as a virtual presentation platform. It is also an alternative to the conventional in-class presentation.

**Key words:** LAMS, virtual presentation, collaborative learning.

### Introduction

Learning Activity Management System (LAMS) is an open source Learning Design system. It enables educators to create sequences of learning activities and initiate collaborative learning environment via content sharing among participants. Activities offered by LAMS include information and resources sharing, assessments, collaborative and reflective activities. By incorporating various tools in the learning sequences, it could enhance the learning process. In addition, online learning environment offers flexibility, freeing the constraints of time and learning space. To ensure effective learning process, monitoring of learner's activity is feasible via LAMS.

### Content

#### Background:

Communication is an important employability skill and become an integral part of graduate capabilities, depict the fact that communication skills have an impact on graduates' later work performance and career development (Lowden, Hall, Elliot, & Lewin, 2011). Communication skill assessment via oral presentation has been a common practice in universities. Classroom presentation is rather common and allowed dissemination of information in an allocated time duration. However, there are challenges and drawbacks of traditional classroom presentation that limit the effectiveness of the presentation.

Traditional classroom presentation requires wealth of time for content delivery, especially when it involved large cohort of students. Classroom presentation may not be feasible as several one-hour class sessions may be needed to allow each student to present his or her work. Due to limited time allocated to each presenter, it is also rather challenging to request immediate feedback from the audience. Ideally, presentation should allow interaction with audience, but frequently this is not feasible. Long hour of presentation session make the students have difficult time to pay attention and understand the content. Due to low attention span, students may tune out after the first few presentations.

Video recording and online presentation via Knovio, followed by online forum offered by LAMS may serve as an alternative platform to the traditional classroom presentation, which potentially overcomes the drawbacks.

#### Methods:

"Hybrid" model, involved both virtual and face-to-face sessions is employed in the process. Basic concepts and principles of the module syllabus are delivered in class. Case studies are set as presentation assignments. There are focus questions specifying the problem ought to resolve. Students are requested to work in pair and to research topic-related literature for in-depth explanation of the findings. This encourages those who are intrapersonal to interact with another and put into practice what they had learned. Knovio ([www.knovio.com](http://www.knovio.com)) is introduced to students for the recording and presentation of the materials. LAMS serves as a virtual space for students to share their presentation videos and enable feedbacks from peers. Simple LAMS learning sequence which incorporated resources sharing and online forum functions is created and employed (Figure 1). Resources sharing tool in LAMS allowed collaborative content sharing. Online forum is set as a follow up activity in the LAMS workflow; it enables students to leave written feedbacks to their peers and hence intensifying the discussion. Follow up activity is not limited to online forum, quiz assessment can be incorporated as part of the learning sequence. Finally, to wrap up an online presentation assignment, a brief in-class discussion is suggested. In the session, lecturer can ask advanced questions, reflection can be carried out to highlight everyone's key learning points.

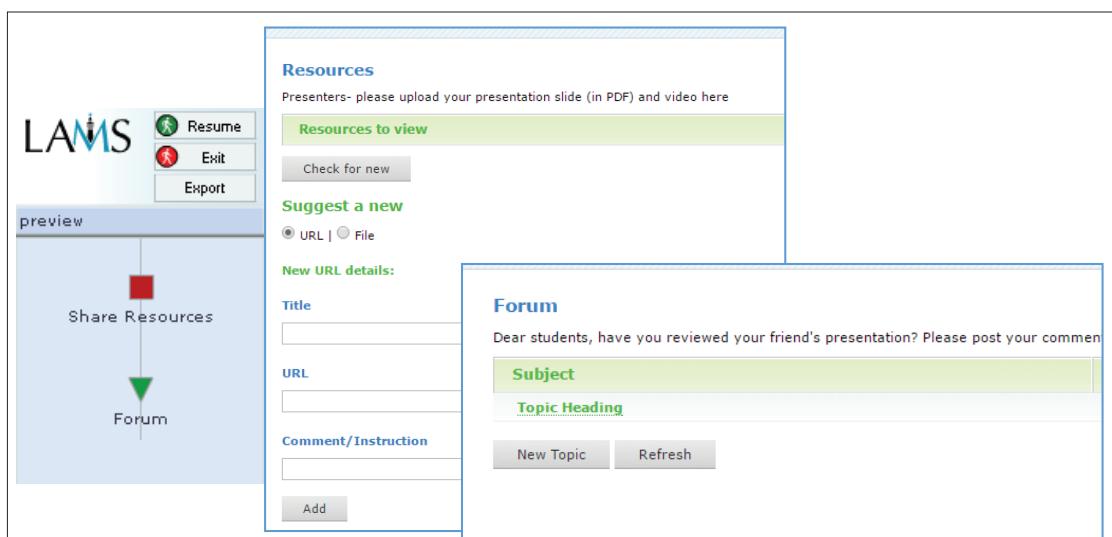


Figure 1: LAMS learning sequence for online presentation and discussion.

### Impact of the process:

Apart from saving valuable in-class time, virtual classroom via LAMS encourages collaborative learning among learners. All students can involve in the resources sharing and reflective activities which allowed students to communicate with each other and gather opinions. Moreover LAMS provides a real-time follow up and tracking monitoring interface where lecturers can interact with students as they go through the learning activities. Production of multimedia resources can engage students in their own learning pace. Audience also have more time to connect to the content and understand the message. Online presentation via virtual classroom could enhance digital literacy of students by effective use of Information and communications technology. Video recording and review have been evidenced as an effective way to improve presentation skills (Guo, 2013). Quality presentation and feedbacks are guaranteed.

### Transferability:

The model is simple and easy to practice. LAMS offers creative and innovative learning sequences creation. Nevertheless, virtual classroom offers flexibility, synchronous supervision and facilitation are still needed.

### Acknowledgement

This work is supported by e-Learning Academy of Taylor's University.

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## **Stimulating Autistic Children through the Use of Courseware for Improving Social Interaction Skill (StiMAv2)**

**Ida Aryanie Bahrudin, Rafizah Mohd Hanifa, Muhammad Afiq Zulhafiz Suhaimi**

Universiti Tun Hussein Onn Malaysia, Parit Raja, Malaysia

[aryanie@uthm.edu.my](mailto:aryanie@uthm.edu.my), [rafizah@uthm.edu.my](mailto:rafizah@uthm.edu.my), [aifiqzulhafiz.work@gmail.com](mailto:aifiqzulhafiz.work@gmail.com)

**Highlights:** StiMAv2 is a teaching and learning aid for enhancing social interaction skills of autistic children which founded on established instructional and learning theories and multimedia development models. It supports individualised and group learning. StiMAv2 is an "intermediate" invention which applicable in future educational aids development.

**Key words:** Autistic Children, Social Interaction Skill, Autism, Courseware

### **Introduction**

Awareness towards autism which is, a lifelong neurobiological disorder that blocks a child's communication, emotional and social development, is increasing in Malaysia. The number of children with autism is also on the rise. According to the National Autism Society of Malaysia (NASOM), there has been an increase of 30% in the number of children registered as autistic from 2008-2011 as well as the number of children diagnosed with Autism Spectrum Disorder (ASD). Characteristics often associated with autism include quality impairment in social interaction such as eye-to-eye gaze, facial expression, body postures or lack of social or emotional reciprocity; quality impairment in communication such as delay of development of spoken language or repetitive use of language and restricted repetitive and stereotyped patterns of behaviour, interest and activities.

Although the awareness towards autism is there, greater understanding of the problems and on what can be done to address the issue is needed. Thus, Azizan stated that more research is necessary to assess the situation and to draft effective education provisions to address needs of autistic children. According to a UNICEF report, early childhood intervention that enhance the development of their social, behavioural and communication skills and could reduce the severity of autism. Children with ASD however, vary considerably in their autistic characteristics across individuals posing additional challenges in determining appropriate intervention. Thus, the variations within the disorder have significant implications on choice of educational strategies.

Among the many challenges faced by autistic individuals, social interaction is arguably the most lacking in their daily lives. The importance of social interaction cannot be overstated as it is a principle aspect of development that is influential throughout one's life. The fact that the ability to integrate comfortably in a social setting often eludes individuals with autism can be very taxing for family and friends during childhood and even through adulthood. Thus, improving social interaction skills is essential in improving the quality of life for autistic individuals and their family members. The good news is, early intervention can help individuals acquire the social interaction skills that they need to engage in typical interaction with others. It is recognised that there is no single rigid method that will be successful in enhancing social interaction skills for all children with ASD.

However, increasing the involvement of a child with the computer courseware has been shown to have the potential to improve his/her social interactions skills. Thus this project aim is to help the autistic children to improve their social interaction skill through supporting tools like the computer courseware.

### **Content**

#### **Description of innovation**

Given the tremendous growth of touch screen technology for computer and mobile in Malaysia, the development of a touch screen application would greatly enhance the educational needs of children with autism. Since most of the early education material for autistic children are associated with either courseware or web portal which are less suitable for their use currently, it is time to develop an application that is available for touch screen gadgets. Touch screen educational aid are mobilize, easy to be used and cost effective. Additionally, touch screen eliminates the difficulty in manipulating a keyboard or understanding the connection between the mouse and cursor. Currently, nearly all application for touch screen gadgets involves entertainment and only few of them are educational based. Therefore, StiMAv2 was developed to improve social interaction skill among autistic children.

#### **Background of the innovation**

StiMAv2 addresses one of the most critical needs of autistic children that are not addressed in conventional multimedia applications. StiMAv2 development process was informed by mainstream learning theories and special education models to result in a novel educational multimedia apps for special educational purposes.

### Importance to education

StiMA supports government initiatives for special needs education by helping autistic children to develop better social interaction skills. StiMA is expected to increase equity and access to education and supports human capital development of the country.

### Advantages of innovation

The innovation will enhance the effectiveness of education for special needs learners through better practices in teaching and learning of social interaction skills

### Commercialization potential

StiMA can be commercialized as an educational aid for autistic children in collaboration with NASOM (National Autism Society of Malaysia).

Figure 1 shows some screenshot of StiMAv2.



Figure 1: Some screenshots of StiMAv2

### Acknowledgement

This project is funded by FRGS Grant Phase 2/2013 Vote1432.

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## **RMATHs – Mobile Based Numeracy Learning Applications for Learning Disabilities Students**

**Rozita Abdul Jalil, Zaidatun Tasir, Shaharuddin Md Salleh**

Universiti Teknologi Malaysia, Johor, Malaysia

[rozitajalil@utm.my](mailto:rozitajalil@utm.my), [p-zaida@utm.my](mailto:p-zaida@utm.my); [p-shah@utm.my](mailto:p-shah@utm.my)

**Highlights:** Mobile Based Numeracy Learning Applications (RMATHs) is an educational tool that consists of five mobile applications that is specifically designed for learning disabilities (LD) students in primary schools in Malaysia, specifically, for students in Special Education Integration Program (SEIP) classes. The unique features of RMATHs include the use of an attractive technology-based tool, namely mobile devices; and the design of learning interactions and activities is suitable for LD students. This invention also can improve LD students' performance and motivation in learning Mathematics. RMATHs is a market-ready product with five copyrights and one trademark filling and looking forward to be commercialized.

**Key words:** educational technology, mobile application, learning disabilities, special education

### **Introduction**

The literacy rate is an important measure of the value of a nation's human capital. It is, therefore, an essential task to ensure that all citizens are equipped with this foundation skill. Providing quality basic education for all children is one of the Malaysia Government's core commitments, as promised by the 164 signatory countries under the UNESCO Agreement(MOE,2012). This goal is very challenging, particularly for children with learning disabilities(LD). Over the past three years, the enrollment of LD students in primary Special Education Integrated Programme (SEIP) has shown a steady increment (Refer Figure 1). In 2014, the enrollment total was 28,658 and has become a major portion compared to Special Education Schools enrollment of visual, deaf and hearing impaired students (Human Rights Commision of Malaysia, 2015).Gifted children, slow learners, autism, Downs syndrome, cornelia de lange syndrom, cerebral palsy, hyperactive, hypoactive, microcephalus (moderate to serious inhibitory mind) and hydrocephalus (prone to suffer mental retardation) are the categories of LD that qualify for enrollment at the same class in SEIP(Human Rights Commision of Malaysia, 2015). There is no special class for each category. It is a challenge for teachers who are posted to SEIP to be able to apply the best practices in teaching and managing these students.

Learning disabilities (LD) students experience problems such as focusing attention on any task given (Bottge, 2010). They are also facing the difficulty to developing cognitive abilities and construct knowledge especially in numeracy topics. Teachers have to repeat the syllabus and take longer time for them to master the concept. Furthermore teachers daily confront the reality that LD students attention, theirs lose focus and becomes distracted at school. These learning disabilities can lead to low academic performance and often result in other problems such as misbehavior due to a lack of motivation towards learning. Thus, the need for additional attention strategy involves the use of technology designed for education. Therefore, this invention on numeracy intervention to enhance student performance with the help of mobile technology shows great potential. The aim is to help students with learning difficulties in adapting numeracy skills and motivate them to attain this by using a mobile based learning environment.

### **Description of Invention**

Mobile Based Numeracy Learning Applications (RMATHs) is an educational tool that consists of five mobile apps with different learning objectives and outcomes. RMATHs is created for learning disabilities (LD) students in primary schools in Malaysia, specifically, for students in Special Education Integration Program (SEIP) classes. The content was adapted and aligned with the Integrated Curriculum for Learning Disabilities issued by Ministry of Education Malaysia (2010). Learning activities and environment of RMATHs are designed based on Constructivist Learning Environment (Jonassen,1999) and Cognitive Theory of Multimedia Learning (Mayer,2003). The unique features of RMATHs include the use of an attractive technology-based tool, namely mobile devices; and the design of learning interactions and activities is suitable for LD students. The built-in interactive agent features are embedded to the applications. These features indicate and guide further action, to help LD students to motivate them to keep learning and stay focused. Plus, an additional function of two log data (tutorial and activities) to record the student interaction during the learning session. The apps were developed using Adobe Flash Professional CS6 with AIR 19.0 integration and Actionscript 3.0. It is expected that LD students will understand the topic that they have learnt through RMATHs since it is specifically designed according to their needs. This invention also can improve LD students' performance and motivation in learning. Furthermore, RMATHs play a significant role in creating an attractive learning environment for students with LD. This product also has the potential to generate human beings including those with LD with basic numeracy knowledge and skills that can be applied in their daily life. RMATHs is a market-ready product with five copyrights and one trademark filling and looking forward to be commercialized.

## Background of RMATHs

According to Mayer (2003, 2014), there are three kinds of processing that can occur during multimedia instruction, specifically: extraneous, essential and generative processing. There are also the needs for three kinds of instructional design goals, namely: reducing extraneous processing, managing essential processing and fostering generative processing (Mayer, 2014). Therefore, the researcher applies the principles of multimedia in the design and development phase of the multimedia instruction in mobile based numeracy learning applications for LD students. Plus, three major roles are employed, namely: modeling, coaching and scaffolding of constructivist learning environment (Jonassen, 1999) also adapted into the instructional strategy in RMATHs. The elements included in the tutorial include: text, graphics, animation, as well as audio and interactive agents which act to encourage learning interaction for improved learning. The Interactive Agent with haptic sense, animation and audio element will appear if no interaction during learning session. This agent prompt the further action to help LD students to motivate them to keep learning and stay focused. In the learning activities, there are elements of text, graphic, audio and animation which act as coaching methods to demonstrate how to answer a particular question. This helps to promote a deeper level of learning that creates meaningful learning and knowledge.

## Important to education (novelty and uniqueness)

A novel idea of RMATHs lie on the use of attractive technology-based tool namely mobile devices; and the design of learning interactions and activities is suitable for LD students' needs. The scientific underpinnings of multimedia principles and constructivist instructional strategies made groundbreaking contribution to promote a deeper level of learning that creates meaningful learning and knowledge, specifically to LD students. It is expected that LD students will understand the topic that they have learnt through RMATHs since it is specifically designed according to their needs. This invention also can enhance LD students' performance and motivation in learning. This invention based on university research, have gone through the series of testing, evaluation and validation and received a highly recommended from the experts.

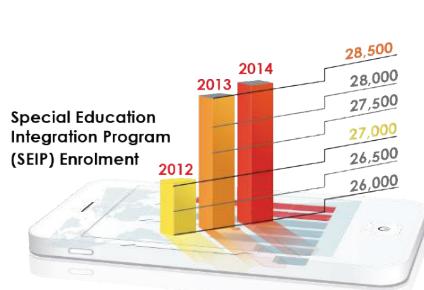


Figure 1: SEIP Enrollment

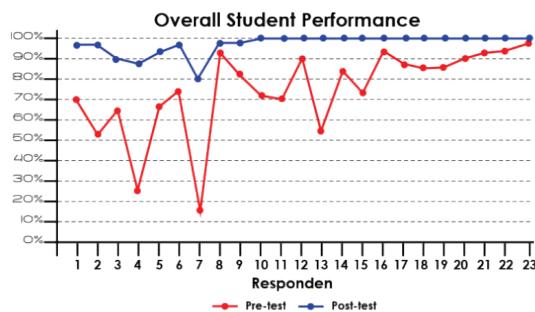


Figure 2 : Pre-post Test Student Performance

## Advantages of invention towards education and community

RMATHs can contribute to public for LD students, teacher and parents for purpose of learning, teaching and training. RMATHs support the government initiatives to encourage teachers to use cross curriculum element (EMK) in their teaching and learning session. Therefore, RMATHs is applicable for to be applied in all Special Education Integration Program (SEIP) classes in Malaysian primary schools. This invention has the potential to support and enhance the learning process of students with learning disabilities in terms of applying basic numeracy knowledge and skills in their daily life, which in turn has the potential to contribute in the betterment of societal well-being.

## Potential to be Commercialization

RMATHs android application package (APK) will be used for distribution and commercialization purposes. APK file can be installed on any Android devices, in two ways, either by downloading the RMATHs application from the online apps store (Google Play, Apps Zooms) or can be installed directly in the mobile devices by using RMATHs kits (APK files, Dual USB 3.0 High Speed). RMATHs is a market-ready product with five copyrights and one trademark filling and looking forward to be commercialized. In term of marketability value, this product has the potential to be used not only for LD student but also for pre school kids and can be accessed worldwide thru apps store.

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## Holistic e-learning via Purpose Learning Framework

**Tee Wee Jing, Raja Kumar Murugesan & Magdalene Chew Meow Khee**

Taylor's University, Subang Jaya, Malaysia

[WeeJing.Tee@taylors.edu.my](mailto:WeeJing.Tee@taylors.edu.my) ; [RajaKumar.Murugesan@taylors.edu.my](mailto:RajaKumar.Murugesan@taylors.edu.my) ; [Magdalene.Chew@taylors.edu.my](mailto:Magdalene.Chew@taylors.edu.my)

**Highlights:** "Holistic e-learning via Purpose Learning Framework" focuses on the implementation of e-learning in a blended learning environment based on the Purpose Learning Framework (PLF). There are six key learning designs that support the holistic approach to e-learning . A case study of a successful implementation of PLF shows that PLF has effectively helped students to become more self-aware and self-directed in their learning, to develop leadership skills and to gain global perspectives.

**Key words:** Holistic e-learning, Purpose Learning Framework

### Introduction

Our world today is in the golden age of technological innovation and evolution where the idea that we are headed for technological singularity is gaining credence. In the face of the possibility of computer intelligence superseding that of human intelligence, the world needs not just thinkers, problem-solvers and field experts, but constructive leaders to move the human race forward while preserving the essence of our humanity. This requires a profound response from the institution whose primary goal is to ready the young generation of today for the future. Taylor's University is focusing on holistic education as a means to fully realise its Core Purpose, which is to "Educate the youth of the world to take their productive place as leaders in the global community". The goal of holistic education is to enable students to have a clear direction in their lives and inspire them to be leaders who will have an impact on the world. Our project "Holistic e-learning via Purpose Learning Framework" focuses on the implementation of creative and interactive e-learning in a blended learning environment based on the Purpose Learning Framework (PLF). Specifically, PLF is composed of the fundamentals of Purpose Learning, Taylor's Graduate Capabilities (TGC), and Project-Based Learning (PBL).

### Content

The evolution of Internet technology has shifted from Web 2.0 to Web 3.0, which is open and ubiquitous. Thus, e-learning has also evolved from 2.0 to 3.0 (Rubens, et al. 2011). The trend of education is also moving from Education 2.0 to Education 3.0 (TeachThought, 2013). The Purpose Learning Framework (PLF) aims to provide holistic education to learners and embeds characteristics of Education 3.0.

#### The Purpose Learning Framework (PLF)

To support holistic e-learning, we propose a Purpose Learning framework (PLF) comprising the following:

- Purpose Learning
- Taylor's Graduate Capabilities (TGC) and
- Project-based Learning (PBL)

In Purpose Learning (Stanford2025, 2016), students declare missions and coupled their disciplinary pursuit with the purpose that fueled it. Students pursue meaning and impact through studies and projects. To support Purpose Learning, PBL can be reinvented to incorporate vision and mission in high impact social projects. When done well with PBL, students use the project as a way to learn about the subject and achieve the mission. The idea is that students learn best not by being lectured, but when they become a part of the learning objective and contribute to the social impact. The outcomes of PBL can also be enhanced by integrating elements of personalized learning, social learning and experiential learning via various e-learning methodologies.

The Taylor's Graduate Capabilities (TGC) (Taylor's University, 2016) initiative grooms students to meet the changing demands of industry. This programme inculcates essential qualities in graduates to give them an added advantage to gain employment and life skills necessary to succeed in the working world. There are eight TGC: discipline specific knowledge, lifelong learning, thinking and problem solving skills, communication skills, interpersonal skills, intrapersonal skills, citizenship and global perspectives, and digital literacy.

Project-Based Learning (Markham, Larmer, & Ravitz, 2003) is defined as "a systematic teaching method that engages students in learning knowledge and skills through an extended inquiry process structured around complex, authentic questions and carefully designed projects and tasks". PBL is an inquiry-based instructional approach that supports a learner-centered environment that focuses on the students' learning curve on the use of various multi-disciplinary concepts and knowledge, experiences and technologies to perform complex problem solving skills in order to solve real-world problems. The goal of PBL is to connect classroom learning to its applications in the outside world. Hence, PBL is perfect as part of this holistic approach to bridge the gap between theoretical knowledge and the relevance of the knowledge in the real world. Real competitions are integrated in PBL assignments in order to

improve learning motivation and provide challenges to students. As a result, students have successfully won in some competitions. Mentorship is provided to elite students in order to provide significant life experiences for individual leadership development.

### **Holistic e-Learning via PLF**

Holistic e-learning employs the use of various e-learning tools and platforms to enable the learner to learn by relating new ideas and concepts in a meaningful way. In this project, we have implemented the following six key e-learning designs that support the holistic approach to e-learning:

1. Purpose Learning is achieved via mentorship, continuous virtual coaching, sharing of success stories, case studies, and inspirational videos.
2. TGC are developed via PBL with e-learning forums and industry events, i.e. guest lectures, expert forums, workshops, industry competitions, etc.
3. Knowledge and resources are shared via various e-learning activities designed on TIMeS (Taylor's Integrated Moodle e-Learning System), e.g. online quizzes, e-forums, videos, news, recorded lectures and tutorials.
4. Motivation is strengthened via online serious games and real-time gamification assessment, e.g. Hour of Code and Kahoot!
5. Synchronous and asynchronous interactive e-learning and m-learning activities (polls, video, quiz, drawing, online reading and research, feedback, and notes) are implemented via Nearpod with automated reporting.
6. Social learning and real time communication between learners and facilitators are implemented via social media such as Facebook (group, page and messenger), WhatsApp, Skype, and emails.

### **Impact**

In this project, we examined student experiences and learning outcomes in higher education in a case study of a successful PLF implementation at the School of Computing and IT (SoCIT), Taylor's University. The finding of this study shows that PLF is an effective approach for achieving the learning outcomes and positive social impact which endorses its purpose as a holistic student-centered methodology.

Some recent key achievements:

1. 2016, a team of students secured RM 30,000 funding from venture capital for their social technopreneur project.
2. 2015, 5 teams with innovative start-up ideas and prototypes won Champion, 1<sup>st</sup> runner up, 2<sup>nd</sup> runner up and 2 merit awards in the i-MSC Start Up Challenge 2015 by Multimedia Development Corporation (MDeC), Malaysia.
3. 2015, a foundation student won the Best Prototype Award at the MIT Global Start-up Labs 2015.
4. 2015, students achieved double wins as Winner of the Smart City Challenge by Cyberview and 1st Runner-Up in the category of World Citizenship of Imagine Cup 2015 Competition.
5. 2015, foundation students were selected as the top 7 finalists in the Big Data Analytics International Competition by Hilti Corporation.

### **Conclusion**

To conclude, with the exponential advances in information technology, challenges remain in the integration of emerging technology into the area of learning and teaching. It has been established that holistic e-learning via PLF can enable students to learn effectively. This project, which focuses on the implementation of creative and interactive e-learning in a blended learning environment based on the Purpose Learning Framework (PLF), has successfully helped our students to become more self-aware and self-directed in their learning, to develop leadership skills and to gain global perspectives.

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## Digital Portfolio: A platform for reflective practice in teacher education programme

**Jasmine Jain**

School of Education, Taylor's University Lakeside Campus, Subang Jaya, Malaysia.  
jasmine.jain@taylors.edu.my

**Highlights:** This work focuses on the benefits and challenges that were experienced by pre service teachers when digital portfolio was used as a platform for their assessment. From the case study which was conducted in a local private university, three categories emerged as to how the pre service teachers saw digital portfolio as beneficial and three categories on the challenges they faced. Overall, it was found that the use of digital portfolio promotes the reflective aspect of the practice, in line with what is aspired by the university's teacher education programme.

**Key words:** eportfolio; teacher education; reflective practice

### Introduction

Of late, there has been a huge transformation in the educational assessment where educators move from traditional pen and paper tests to other alternative forms of assessment (Gray, 2008; Chau & Cheng, 2010). Many emphasized on the use of portfolio, as it facilitates students to reflect on their own learning, leading to a more holistic individuals who meet the learning outcomes of any modules. This paper intended to study learners' perceptions on the benefit and challenges of using portfolio as part of their module assessment.

### The Study

This study investigates the benefits and challenges on the use of e-portfolio as an assessment tool among pre-service teachers who are the students of Diploma in Education (Primary Education) in a Malaysian private university. 15 pre-service teachers were included as the respondents of this study as they are the group that made up the first and the second batches of the program. These pre service teachers have all experienced developing and maintaining e-portfolio as an assessment method for modules that they undertake. Using case study as research design, this research is governed by the following research questions and the findings briefly follow.

a) How do the pre service teachers perceive the benefits of e-portfolio as an assessment tool?

Based on the responses analyzed, the responses can be categorized into three, namely i) ease articulation of ideas, ii) allows creativity and iii) allows deeper reflection.

b) How do the pre service teachers perceive the challenges of e-portfolio as an assessment tool?

The feedback given by the respondents can be generally grouped under three categories, namely i) fair use, ii) time limitation and iii) neglecting content.

### Significance of the study

Good learners, typically, have a higher level of metacognitive knowledge and regulatory skills than poor learners. Metacognitive knowledge offers the insights needed to change the learning process to fit the changing task demands (Ertmer & Newby, 1996). Promoting these metacognitive skills via experience-based reflective learning enhances students' growth competence- an ability for continuing development (Korthagen, 2001). Working on a portfolio stimulates these self-reflecting skills by collecting material and writing reflections (Driessens, 2008). By utilizing reflective thinking skills, students are also able to evaluate results of their learning efforts and effectiveness of learning strategies in certain situations (Ertmer & Newby, 1996). Driessens et al. (2007) found through his study that creating an e-portfolio improve student motivation, more user-friendly for portfolio evaluators, and delivers the same content quality compared to its paper-based counterparts. They also found that students spent significantly more time preparing an e-portfolio than a paper-based one. Hence, it is important to gauge how the students view e-portfolio as a mechanism for their reflective practice and assessment.

The findings of this study were congruent with what other researchers have found in their study (Driessens et al., 2007; Gijbels et al., 2006), that most students find it motivating to develop a e-portfolio as they are able to unleash their creativity and be more reflective in thought. The participants in this study also further suggest that the convenience of capturing photos and other relevant learning evidences in their tablet computers makes them maintain an e-portfolio more efficiently, that allow more time to deeply reflect on other contents. However, the findings of this study also suggest that there are many issues that educators have to pay more attention to before including e-portfolio as part of assessment. From the data gained, it showed that students need more time in preparing for their e-portfolio as they need to take care of both technicality and the depth of the content presented on the e-portfolio platforms chosen by them.

It is also seem apt to provide a hands-on course to expose students on the platforms readily available and advise them to use a standard portfolio host across different modules. Such initiative will enable the novice to learn how to start developing an e-portfolio, instead of wasting time navigating through what was not familiar. Through such workshop also, the pre service teachers could be exposed to the function of privatizing their e-portfolio, to curb the rising issues of fair use, especially in this advance digital age. This issue of fair use is particularly unique to the teacher training program as school placements involve many documentation of their practice and observation in school where videos and photos of children learning are common.

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## Evaluation of the use of smart phone application in engagement of students in Anatomy assessment

**Shajan Koshy, Umesh Bindal & Nilesh Kumar Mitra**

Taylor's University Lakeside Campus, Subang Jaya, Selangor, Malaysia

[Shajan.Koshy@taylors.edu.my](mailto:Shajan.Koshy@taylors.edu.my) ; [Umesh.Bindal@taylors.edu.my](mailto:Umesh.Bindal@taylors.edu.my); [NileshKumar.Mitra@taylors.edu.my](mailto:NileshKumar.Mitra@taylors.edu.my)

**Highlights:** Aim of the study was to evaluate the effectiveness of use of digital app KAHOOT in formative assessment of Anatomy knowledge in a medical school. Use of the app in the formative assessment during tutorial in Anatomy laboratory sessions was found to increase engagement of the students as well as enabled lecturers to find out performance level without verbal intimidation.

**Key words:** Mobile technology, Formative assessment, Engagement, Anatomy, Students

### Background

Use of digital applications and games has been demonstrated to be beneficial for a range of educational purposes<sup>1</sup>. Engagement of students during formative assessment in a complex environment like Anatomy laboratory is challenging. Medical school students usually perceive Anatomy as a complex subject to remember. Previous study has shown that repetitive studying of the subject through formative test increases retention of knowledge to a greater extent<sup>2</sup>. Existing literature does not have evidence of use of applications of smart phone apps in formative assessment in Anatomy laboratory. The keen interest of the current generation towards the mobile technology is well known. The usage of smart phones for most of the time in the day/night schedules is unavoidable. This motivated the team of the researchers to explore the interests of the young learners towards assessment of a complex subject taught with the use of a smart phone app called KAHOOT.

### Objective

Aim of the study was to evaluate the effectiveness of use of digital app KAHOOT in formative assessment of Anatomy knowledge in laboratory setting. The digital platform was constructed and the anatomy questions with images to be identified were incorporated along with further details of structure and functions to generate the interest of the students in their ongoing module.

### Methods

The main features of small group teaching or the tutorials are active participation of the learners in entire learning cycle and well defined assignment alignment with achievable specific aims and objectives in a given time period. Diverse range of methods have been tried to conduct tutorial sessions in the classroom settings.

During tutorial sessions, it is a common practice in a medical school, to give questions to the students and ask them to answer. However, in a subject like Anatomy, where visualisation of structures is an important component, engaging students in the questions and answer session becomes difficult without an effective audio-visual input. We used KAHOOT applications in students' smart phones. On the other hand, the questions were projected to the screen by using same application from a laptop. The pictures of anatomical structures with questions were used as tools for formative assessment of Anatomy knowledge learnt in Anatomy laboratory. Subsequently the students were asked to give their feedback about the process.

### Results

The present setup explored the engagement of the students by using the digital modality. The consequence was clearly visible. The students were encouraged to download the application in their smart-phones before the practical. From the students' perspective, this method of assessment using a smart phone app, was helpful for revision, retention of knowledge and meaningful thoroughness of the subject matter. In a 5-point likert-scale, the mean rating for the enjoyment of this assessment process was 4.3. All the students agreed that they have not been tested using such smart phone applications in any other modules in Taylor's Medical program. The mean rating for the question about their wish about this type of tutorial to replace conventional classroom tutorial, was 4. Most important finding was that the students liked the interface of app and presentation of questions enjoyable (mean rating 4.1). As a lecturer, it was an enhanced way to know the students' enthusiasm in learning the subject matter and how they were able to understand the lessons concerning knowledge, skills and aptitude. It was also helpful for the lecturers to identify the performance of the students. The studies gave a chance to recognize poor performers needing attention, without verbal encounter with them. It helped in playful learning of the subject material, without any verbal intimidation.

## **Conclusion**

As a step moving forward in the process of implementation of e-learning in assessment of teaching-learning process, the smart phone apps like KAHOOT can be used in formative assessment of practical knowledge in Anatomy. It helps in an effective way to achieve increased engagement of every student of the class in the process. This method of use of a smart phone app, improves the quick recapitulation and response skills of the students

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## Towards Excellent Teaching Engagement - The TES, an Innovative 360° Teaching Evaluation and Feedback Tool for Professional Development

**Assoc. Prof. Dr. Tang Siew Fun, Gee Gee Liew**

Taylor's University (Lakeside Campus), Subang Jaya, Malaysia  
[siewfun.tang@taylors.edu.my](mailto:siewfun.tang@taylors.edu.my), [Geegee.liew@taylors.edu.my](mailto:Geegee.liew@taylors.edu.my)

**Highlights:** The Teaching Engagement Scale is a 360° teaching feedback tool designed to identify data-driven areas for professional development towards improving the student learning experience. It incorporates 2 unique approaches: the first being that it measures engagement instead of module content satisfaction, and secondly that it incorporates the feedback of self (reflection), peer and superior. This innovative approach to teaching feedback produces a balanced, specific and data-driven identification of strengths and areas of improvement that the educator can use for effective professional development. When professional development is effective, it leads to higher quality teaching, which is vital for student success.

Key words: evaluation, teaching, engagement, professional development, training needs, feedback

### Introduction

It is critical that educators have ongoing and regular opportunities to learn via professional development, as well as from each other. We know that continuous professional development will keep teachers up-to-date on the latest research on how students learn, emerging technology tools, and more. In fact, the **best** professional development is ongoing, **collaborative** and connected and derived from student feedback. More importantly, effective professional development is likely to lead to higher-quality teaching, and higher-quality teaching is vital for student success. (Archibald, Coggshall, Croft & Goe, 2011)

For these reasons, Taylor's University is dedicated to supporting our educators with continuous professional development towards excellent teaching engagement with the innovative Teaching Engagement Scale (TES). However, in order to maximize their resources for professional development, they needed data-driven evidence

### What is the TES?

In February 2015, Taylor's University began work on a unique 360° teaching feedback and evaluation system, called the Teaching Engagement Scale (TES). This system would be an online, automated method of collecting data and feedback from more than 13,000 students and 700 academics. Today, the TES is fully-implemented and operational across 12 faculties at Taylor's University since August 2015. The TES was designed as an instrument which would allow the university to gather feedback and evaluation evidence with high standards of validity and reliability in the form of TES results.

Once the TES results were published, next, the university developed processes which linked TES results to opportunities for professional growth. This component ensured that decisions made using the TES, will be for the purpose of the development and informing professional growth. During the first cycle of the TES between August and December 2015, Taylor's University successfully recorded a 63% student participation rate, and 70% staff participation rate, more than double the normal course evaluation response rates.

### Why is the TES different?

The TES incorporates several unique features that are directly linked to professional development opportunities which will lead to higher-quality teaching, and therefore, higher levels of student success. (Danielson, 2007)

#### 1. Teaching Engagement as a Measure

Teaching Engagement as a main measurement, as opposed to only module content satisfaction ratings, was purposefully selected as a proven indicator of student success.

Research strongly supports the essential role that student engagement plays in learning and behavior; that engaged students are more likely to demonstrate positive student outcomes such as decreased dropout rates and higher grades. Engaged students are also more likely to demonstrate more effort in classwork, pay more attention and experience more positive emotions (Fredricks, Blumenfeld, & Paris, 2004). Further, research demonstrates that a student's teacher is the most important in-school factor in improving student learning (McCaffrey, Lockwood, Koretz, & Hamilton, 2003; Rivkin, Hanushek, & Kain, 2005).

To measure this, the TES evaluations involved questions linked to the 7 teaching excellence dimensions in the Taylor's University Teaching Excellence Framework where all dimensions were proven by research to lead to higher levels of

student engagement. These research-backed questions were developed through a rigorous validation process that involved statistically validation.

The dimensions put weight on content, but also on the learners i.e. educators must know their subject matter, but also the multiple ways students learn and can demonstrate evidence of their learning. This focus helps educators understand what they will be expected to demonstrate in the classroom.

## **2. Multiple Viewpoints of Teacher Engagement**

While typically, evaluations only considered the student's point of view, the TES quadrangulates feedback from 3 other stakeholders. Each stakeholder would see the lecturer's teaching engagement from a different point of view :

- a. **Self** – a lecturer's own reflective assessment and view of their teaching engagement
- b. **Students** –participants in the lecturer's teaching
- c. **Peer** – someone who knows about the field, the lecturer and their work
- d. **Superior** – someone who has accountability and authority over teaching and learning performance evaluation

The quadrangulation of the results is an extremely important feature of the TES. By being able to compare the evaluation scores and feedback from several viewpoints, the TES results paint a more complete and elaborate picture of an educator's strengths and areas of improvement; one that is singularly agreed upon by multiple stakeholders (Kane, Taylor, Tyler & Wooten, 2011).

Each stakeholder can then be confident that the data collected can be aligned with professional development offerings, leading to more targeted professional development decisions according to the 7 dimensions. With this evidence, all stakeholders are ensuring better alignment with professional growth opportunities.

## **3. Formal Involvement of Peer & Superior**

As part of the TES process, peers and superiors are required to continuously engage with the lecturer they are assigned to, for example, through visitation and professional discussion.

Little (2006) posits that it is through discussing and reflecting on evaluation results like the TES that this evaluation is transformed into a system that supports professional learning, not just accountability. By involving the educator's own self-reflection and involving professional discussion between the lecturer and their peers and superiors, the discussion makes the evaluation process a constructive one (Danielson, 2010). This is further supported by Taylor & Tyler (2011), who support that when feedback discussions between the educator and their peers and superiors are included, it has a sustained impact on teacher practice, especially for less experienced educators.

The design of the TES process is able to provide evidence needed for coaching sessions and professional growth opportunities, and this is where studies say it will have an impact on student learning outcomes (Danielson, 2010).

### **Impact**

The TES has had a tremendous impact on the university, individual faculties and educators themselves

#### **Students**

The true beneficiaries of the TES system are the students. When their educators are empowered with information with which to improve, as well as the professional development they need to improve, students have teachers in their classrooms that are all headed towards a goal of excellent teaching engagement.

#### **Educators**

Educators now have a powerful tool in the TES results that specifically identifies which teaching dimensions they are excelling in or dimensions they can improve further in. More importantly, they have a report that is also balanced, and all parties are in agreement on what these dimensions are. In addition, as the TES stores all evaluation records, they have a year-on-year record of their teaching engagement data for their own improvement, but that can also be used for advancement opportunities.

#### **University leadership**

The TES assists the university leadership in being more efficient and accurate. As it is a one-stop data centre, the reports from the TES are pivotal towards helping our university leadership focus their investments and professional development efforts. This results in the development of faculty-wide, and university-wide measures to more effectively improve student engagement and learning

In addition, through the peer and superior engagement process, the university is fostering an open and collaborative campus culture that supports professional growth through highly specific and contextual feedback.

## Conclusion

As shown by the above, the TES incorporates research and is designed to accommodate and encourage practices that research has stated is common in many high-performing classrooms worldwide – for example, continuous professional engagement through multiple classroom observations, ongoing professional learning community feedback and an ongoing focus on professional growth (Rivkin, Hanushek & Kain, 2005).

In addition, the TES involves not only students, but also peers and superiors and self-reflection. This is a system that encourages more frequent, timely, formative feedback that incorporates multiple measures of success, including that of student learning.

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## Blended learning - An effective application to clinical teaching.

**Prabal Bhargava, Benjamin Samraj Prakash Ernest, Nurjahan Mohammed Ibrahim & Roland Gamini Sirisinghe**

Taylor's University, School of Medicine, Clinical School, Sungai Buloh, Selangor, Malaysia

Prabal.Bhargava@taylors.edu.my; BenjaminSamrajPrakash.Earnest@taylors.edu.my;

nurjahan.ibrahim@taylors.edu.my; RolandGamini.Sirisinghe@taylors.edu.my

**Highlights:** Taylor's University School of Medicine prioritizes on providing a technology-enhanced learning experience for medical students. A blended approach that incorporates eLearning with face to face interaction, that is so crucial to the procurement of clinical skills, has been an essential element in this wide-ranging approach. A "Flipped session" was utilized to teach the clinical examination of the human retina using a "direct ophthalmoscope" and the students were assessed and feedback was obtained subsequently.

**Keywords:** blended learning, clinical skills, ophthalmoscopy.

### CONTEXT:

Technology-enhanced learning environments as part of a blended approach play a crucial role in the core structure of the 21<sup>st</sup> century education system. However there is limited research on application and implementation of blended learning particularly to the teaching and refinement of clinical skills amongst medical students. We evaluated the suitability of the Flipped Learning model (FL) to the introduction of a principally challenging clinical examination skill (CES) - Ophthalmoscopy, in the Ophthalmology module for Year 4&5 medical students at the Taylor's Clinical School (TCS).

### OBJECTIVE:

To scrutinize the benefits of the FL to skill procurement and enhancement for medical students during the Ophthalmology module at the TCS.

### METHODS:

Application of e-learning tools while teaching clinical specialties is in itself an arduous proposition. Teaching clinical skills poses a unique challenge due to a wide range of constraints, predominantly patient discomfort and the dearth of ready volunteers. Ophthalmoscopy (examination of the retina of the eye) is an essential and particularly difficult clinical skill requiring dexterity, repetition & preparation. It is neither feasible that actual patients' eyes be examined multiple times by a large group of novice students nor possible to demonstrate the large variety of diseases. A "Flipped" session was thus introduced to demonstrate and help students master this principally difficult clinical skill (Ophthalmoscopy) in the module. A 21 minute video was prepared including demonstration of the clinical skill on a patient, equipment and procedural details and multiple photographs displaying relevant pathologies/ diseases. A 3 hour session followed with patient and simulators to augment learning. While the short instructional video was viewed by students at home before the class, the in-class time was devoted to skill enhancement, practice & discussion. The session was initiated in October 2015 for Semester 9 (Batch 2) and Semester 7 (Batch 3) students of the MBBS program and ALL the students (58 & 41 from Batch 2 & 3 respectively) viewed the video prior to attending the Clinical Skills Session. The video has been viewed over 300 times. The taught clinical skill was assessed at the end of the posting/ semester using a MiniCEX evaluation tool- a highly recommended and standardized tool used for clinical assessment.

### DISCUSSION:

Application of e-learning tools while teaching clinical specialties is in itself an arduous proposition. Teaching clinical skills poses a unique challenge due to a wide range of constraints, predominantly patient discomfort and the dearth of ready volunteers. Ophthalmoscopy (examination of the retina of the eye) is an essential and particularly difficult clinical skill requiring dexterity, repetition & preparation. It is neither feasible that actual patients' eyes be examined multiple times by a large group of novice students nor possible to demonstrate the large variety of diseases. A meta-analysis conducted by the US Department of Education in 2010<sup>1</sup> concluded that "classes with online learning (whether taught completely online or blended) on average produce stronger student learning outcomes than do classes with solely face-to-face instruction". A systematic review done in 2012<sup>2</sup> concluded that, "There is limited research available on the appropriate use of technology-enhanced learning environments as part of a blended approach to the clinical education of healthcare students". A Flipped Learning model<sup>3</sup> was thus selected and we

aimed to scrutinize its suitability and efficacy in teaching clinical skills in the Ophthalmology module. "In the Flipped Learning model, teachers shift direct learning out of the large group learning space and move it into the individual learning space, with the help of one of several technologies<sup>4</sup>". An in-house video demonstrating the clinical skill was produced and it included detailed instruction of pre-requisites, introduction of the equipment and its use, patient briefing and professional etiquette/conduct and also covered various pathologies/ diseases expected to be diagnosed using the taught skill. The video URL was embedded on our online moodle platform (TlMeS –Taylor's Integrated Moodle e-learning System). The platform also provided for online chats and file exchange. Detailed instructions for this session were provided using this and during the orientation program on the first day of the postings. "Capitalizing on the students' preparation, teachers can devote more time to opportunities for integrating and applying their knowledge, via a variety of student-centered, active learning strategies such as conducting research or working on projects with classmates. Teachers also can use class time to check on each student's understanding and, if necessary, help them develop procedural fluency<sup>4</sup>". The face-to-face class time was utilised for supervised student activity using simulated patients/ mannequins. The supervising lecturer gave instant feedback on steps of examination, procedural flaws and interpretation of examination outcomes.

## RESULTS:

At the end of every session, the students were required to provide a feedback (both on a Likert type scale and an open ended feedback). The session was very well appreciated and students stated numerous benefits including ease, flexibility, uniformity and the chance to view the session multiple times as per their requirement and convenience. 90/99 students strongly agreed that the flipped session facilitated their learning while 86/99 strongly recommended that the same be used to deliver other topics.

## CONCLUSIONS:

Students highlighted that the blended sessions were exceedingly effective and a beneficial learning experience. A vast majority further indicated that they would prefer more topics to be delivered as FL.

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## **Students' perception of ECG interpretation skills learning using Socrative in the first clinical year Internal Medicine postings.**

**Benjamin Samraj Prakash Ernest, Prabal Bhargava, Suresh Ponnusamy, Mohammed Tahir bin Mohammed Azhar, Nurjahan Mohammed Ibrahim & Roland Gamini Sirisinghe**

Taylor's University, School of Medicine, Clinical School, Sungai Buloh, Selangor, Malaysia

[BenjaminSamrajPrakash.Earnest@taylors.edu.my](mailto:BenjaminSamrajPrakash.Earnest@taylors.edu.my); [Prabal.Bhargava@taylors.edu.my](mailto:Prabal.Bhargava@taylors.edu.my);

[Suresh.Ponnusamy@taylors.edu.my](mailto:Suresh.Ponnusamy@taylors.edu.my); [MdTahir.MdAzhar@taylors.edu.my](mailto:MdTahir.MdAzhar@taylors.edu.my);

[nurjahan.ibrahim@taylors.edu.my](mailto:nurjahan.ibrahim@taylors.edu.my); [RolandGamini.Sirisinghe@taylors.edu.my](mailto:RolandGamini.Sirisinghe@taylors.edu.my)

**Highlights:** Taylor's University provides a support to technology-enhanced learning environments and the school of medicine encourages a blended approach to the clinical education of medical students. We explore student perception and suitability of Socrative to introducing ECG interpretation skills (Soc-EIS) in the first clinical year Internal Medicine postings (IM-1). We received upbeat feedback from most students indicating positive student experience.

**Keywords:** blended learning, ECG interpretation, clinical skills, Socrative.

### **CONTEXT:**

There is limited research available on the appropriate use of technology-enhanced learning environments as part of a blended approach to the clinical education of healthcare students. Medical educators have identified that teaching 12-lead electrocardiogram (ECG) interpretation to students and residents is a challenge and is often relegated to self-directed learning (SDL)<sup>1</sup>. This often leads to poor competency in ECG interpreting skills<sup>2</sup>. When ECG interpretation is taught to students with usual teaching-learning methods of "rate, rhythm, axis, intervals" not much could be achieved in terms of actually teaching the learner how to figure out what's wrong in the ECG<sup>3</sup>. Assessment of learning appears to be more powerful than choice of instructional method in enhancing student learning<sup>4</sup>. Socrative is a simple web-based learning assessment tool that could help fill this gap. One of the major issues faced by teachers while teaching ECG is that when a ECG is projected for interpretation it's only the best students who interpret the ECGs. The teacher may then falsely presume that the whole class has understood. Alternatively, it may be that only the most outgoing students who answer, often without understanding, thus making the teacher underestimate the students' understanding. We evaluated the use of interactive session using Socrative for introducing ECG interpretation skills (Soc-EIS) in the first clinical year Internal Medicine postings (IM-1).

### **OBJECTIVE:**

To explore student perception and suitability of Soc-EIS to introducing ECG interpretation in IM-1.

### **METHODS:**

This study was set in Taylor's University, Clinical School, Sungai Buloh, Malaysia. The student population is 35 3rd year medical students in IM-1 at Hospital Sungai Buloh, Malaysia and follow an integrated curriculum with early contact with patients beginning from 3rd semester. Socrative<sup>5</sup> is an internet-based student response system developed in 2010 by Boston-based graduate school students which allows teachers to create simple quizzes that students can take quickly on any connected devices. Simple inexpensive smart phones are now in widespread use by most students. Our university provides continuous Wi-Fi access to students and staff in all its campuses to encourage blended learning in all its schools. These classes followed an introductory session on ECG of 2 hours duration where students were introduced to basic concepts of ECG interpretation. The second class using Socrative was scheduled about 2 weeks after the introductory class. Students (in groups of 11-12) were shown 15-20 ECGs curated for the purpose by PowerPoint during a 2 hours session and asked to interpret the ECGs projected. They were then asked to anonymously report on their findings using the quick question-short answer option in Socrative. Such an interactive session allows students to individually report on the ECG and have each of their answers evaluated and instantly reviewed by the teacher. This lets the teacher to identify misconceptions and rectify them. All student reports on the ECGs were shown to the class and discussed further. Correct responses were identified and further explanations given when required. Explanations on why incorrect responses were so were received with equal enthusiasm. Students participated heartily and feedback was obtained immediately after the session using a seven-point Likert scale.

Socrative and other similar applications can be used to improve student-teacher interaction in a class. Open ended questions to read the projected ECG and report on it can be answered with descriptive answers by each student. Every answer can be kept anonymous which encourages all students to volunteer responses without fear of scorn or

ridicule. But also provides the teacher a channel to sample each students' response quickly and give feedback. With staged exercises of increasing difficulty and complexity, active student participation in each exercise and instant feedback and monitoring of the students' progress (or the lack of it) the teacher would be able to build-up on the students' knowledge and skills.

## RESULTS:

Most students agreed / strongly agreed that the sessions were appropriate to the content, were useful in learning the steps of ECG interpretation and were more beneficial than a lecture session. Students also indicated that they were confident to apply what were learned during this session to interpreting ECGs at the bedside.

## CONCLUSIONS:

Students indicated that they would prefer more topics to be delivered as interactive sessions using Socrative reflecting positive learning experience. ECG interpretation is an essential skill for medical students who should learn to interpret this even though it is an intellectual activity requiring higher order skills of understanding, pattern recognition, analysis and synthesis. By using staged exercises and an anonymous student-friendly interactive interface to assess student response such classes can build-up students' knowledge, problem-solving and analytical skills and confidence. To survive "the second machine age" in "the planet of the apps" universities and teachers should continuously evolve by adapting to new technology and blended classrooms.

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## Innovation In Entrepreneurship Technology Video Using Various E-Learning Tools

Mohd Hafzie Suhaimi

Universiti Malaysia Kelantan (UMK), Kota Bharu Kelantan, Malaysia  
hafzie@umk.edu.my

**Highlights:** Learning from video is one of the effective instructional strategies to attract the students tightening with the educator. The motivational of the students definitely highly increase with the video approach. This paper will show the result of the effectiveness video usage during the teaching and learning period toward students. The constructive of the video are combination of fantastic tools including GoAnimate, Tellagami, Imovie, Touchcast, Padlet and VideoScribe. Therefore, the usage of varieties of e-learning tools will increase the creativity and uniqueness of the learning video.

**Key words:** Video, E-Learning Tools, Student Centred Learning, Interactive Learning Environment

### Introduction

The ultimate goal of the educational nowadays is to enhance the student learning outcomes. With the variety of tools were emerged to support the new paradigm shift of education. Student centred learning is the new method to enhance the outstanding quality of educational perspective in new education era. The video is one of the best methods to attract the students to become more enjoy and fun within the academic period. The environments of education in Malaysia nowadays are totally different if we compare to 20 years backward. The traditional teaching method that involve with one way communication was totally obsoleted. The involving with Information Communication and Telecommunication (ICT) encourage the technology for example video and e-learning tools as an empowerment tools to tighten the students and academician. The students especially in the higher education level frequently access the video for example Youtube to understand certain issue or subject rather than the book. It showed that, video is one of the alternative channels to access in academic environment. Video will act as additional resources to support the lecture session in the class. In this paper show the interactivity video development should combine with variety of e-learning tools to enhance good quality video production.

### Content

#### Description of the process and product development

The development of the best quality and interactive video consist of six (6) steps as show in figure 1. Those showed the vitally steps to follow by the developer (academician) to develop the video in easy way. The first step is the selection of certain subject or chapter that the academician wants to visualize in video appearance. The subject advisable within the academician expertise. Next, is the story board phase whereby the developer will design the flow of the video development. The story board phase is very important phase to do by the developer. The good story board will utilize the video time management development. Therefore, the effect of outstanding story board will encourage the creativity and flexibility video outcome.

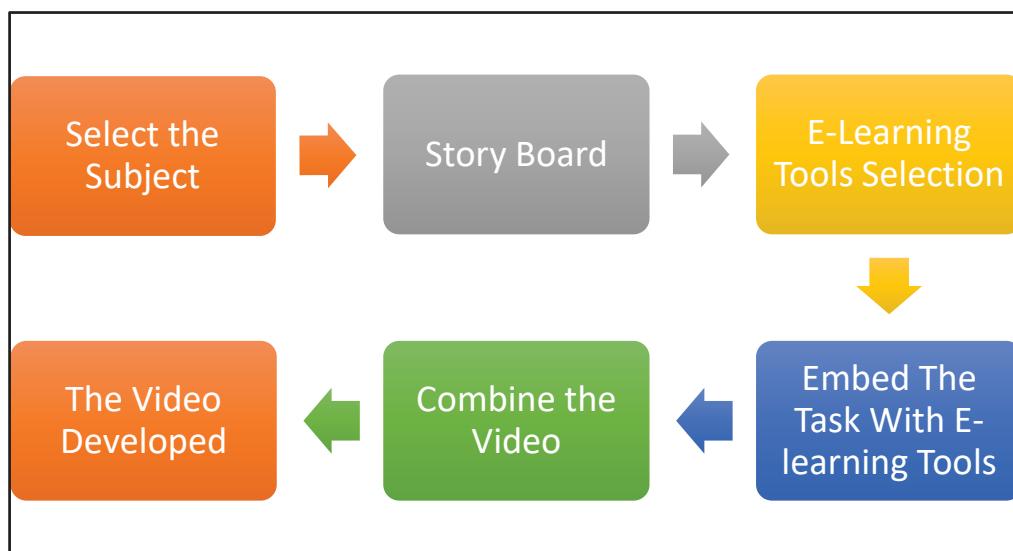


Figure 1: The process of interactive video development

The third phase is the selection of e-learning tools that will be used in the video development. There are about more than 200 tools available to use. In this paper, the combinations of five (5) most popular tools were used to develop an interactive video which are GoAnimate, Tellagami, Touchcast, Padlet and VideoScribe.

- a. **GoAnimate** – software that enable the academician develop the video in cartoon environment. It is a cloud-based animated video development platform. It encourages the non IT savvy person to develop the cartoon video with the professional touch. The high definition (HD) cartoon video quality will encourage the interactive and attractiveness to the students.
- b. **Tellagami** - narrated animations involve with 3-D model involvement. The usage of this application will embed the "WOW" factor to the video.
- c. **Touchcast** – software that creates interactive video presentation that mixes video with web content. This application will record the voice including with the webcam video while you make and instruction for the certain task or others.
- d. **Padlet** – application is superb usefulness discussion tool in e-learning. It works like a sheet of papers where you can put anything (images, video, document , text) from any device (laptop, tablets and phone) together with anyone.
- e. **Videoscribe** – unique tool for creating engaging animated content to tell your story just on a piece of paper. It look like mind mapping transcribe to the video format.

The fourth phase is the embedding the task that the developer have just plan to the selected e-learning tools. In this phase, it is important to the developer to know which application suitable to use. The conversion to the video format is must do to complete this phase. The best format is MP4 format because it may read in all application. The fifth phase is the wrap up phase. For the Ipad user, you may combine the all video using the Imovie. This application eases to use. Finally, your interactive video successfully developed. Youtube is the best platform to share the video that will grab and watch by the student ubiquitously.

### Important to education

The important of this interactive video development are:

- a. **Increase the practical skill** – the government encourages the academician to explore and increase the skill specifically in teaching and learning engagement. The outstanding skill that will be practice by the academician will encourage the student performance and sustainability to seek the knowledge.
- b. **Student centred learning encouragement** – the aim of electronic-learning (E-learning) is to encourage the student involvement during academic session. This new paradigm shifted from teacher centred learning to the student centred learning to empower the student capability during teaching and learning process. The study has been conducted in Universiti Malaysia Kelantan (UMK) with 120 students in the Innovation Technology lecture class to compare the usability of e-learning tools using the Padlet application. The students have given a task to discuss individually in the class. For the first session, the students must answer the question verbally in the class. According to the Table 1, about 30 percent involve in the conversation. Then, the same task applied to the e-learning (padlet) approach. The outstanding result showed 98 percent of the student population in the class involved with the task. The usage of e-learning embarks the student centred learning encouragement more impressively.

Table 1: Comparison of student involvement with Verbally (Traditional) and E-learning tool (Padlet) approach

Type of Asking	Student Involvement Percentage	
Verbally		30 %
E-learning tool (Padlet)		98 %

- c. **Diversify the new type of teaching tool** – The involvement of rapid ICT, the academician should diversify the new approach to lingering with students (Generation Y and Z). The new era of students nowadays practically inherit to tap with internet to seek and gain information. As academician, the innovation and interactive video will encourage the student to get involve more rather than traditional way. It will be act as supplement to harness the quality of teaching materials.

### **Advantage of Innovation Video Development**

The advantages of the innovative and interactive video development are:

- a. **Ease to use** – the developer cum academician ease to use the application with no IT savvy specialty. Nowadays the usage of IT application become easier and fast track learning period.
- b. **Ubiquitous** – the video may be develop and access in anyway and anytime
- c. **Fast** – The development of the video is crucially short time usage. The development of the 5 minutes video will encourage about 30 minute time of preparation.
- d. **Free** – The application that support for the video development are totally free.

6.

### **Profitability of the Innovation**

- a. **Time management** – The practice of video approach is extremely encouraging the time contact with the students. The usage of 15 minutes video equal to one hour contact with the student in the class. In conjunction of that, the video approach practically enhances the time management capability. Therefore, the usage of class physically will be decrease accordingly.
- b. **Interactive Learning Environment** – The innovation video increase the interactivity learning environment in Malaysia perspective. This kind of profitability align with the government aspiration as Information Management and Life Long Learning

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## Fun with Physics (FwP) in Teaching Basic Electricity and Magnetism

**Nurulizzati Makhtar<sup>1</sup>, Nor Fadhlina Jaafar<sup>1</sup>, Amin Aadenan<sup>1</sup>**

<sup>1</sup>Universiti Teknologi MARA Cawangan Negeri Sembilan, Kampus Kuala Pilah, Pekan Parit Tinggi, 72000, Kuala Pilah,  
Negeri Sembilan Darul Khusus.

Email: nurulizzati@ns.uitm.edu.my , norfadhlina543@ns.uitm.edu.my , amin7606@ns.uitm.edu.my

**Highlights:** Fun with Physics (FwP) is an interactive e-learning application designed to help students for a better learning in basic Electricity and Magnetism through visualization and interaction. Our aims are to offer students to learn basic Electricity and Magnetism in interactive way and help to support the lecturers as an alternative teaching tool. FwP uses ADDIE model as a guideline and developed by using i-Spring software. It contains attractive animation and various stimulated exercises in order to attract students understanding in basic Electricity and Magnetism. Examples of FwP interface will be presented.

**Key words:** e-learning, ADDIE model, i-Spring, Electricity, Magnetism, FwP

### Introduction

Engaging student interest in teaching and learning is the most challenging part for all instructors in promoting innovative thinking from the students. For centuries, teaching was found to be more interesting and effective if instructor introduces innovation in their teaching methods. The use of innovation in teaching helps student to increase greater level of understanding and thinking in education. Hence, the development of e-learning content as educational resources has become the most powerful medium in promoting abstract thinking and improving performance from the students.

Teaching becomes more entertaining with the aid of visualization and interaction. Fun with Physics (FwP) is a small-sized e-content application developed by facilitating the use of technology in its content to help students for a better learning in basic Electricity and Magnetism. Through visualization and interaction, it offers an attractive animation with independent practice in order to develop a critical thinking and active learning among students.

### Background of Innovation

In our experience, lecture-based format of teaching alone is often insufficient to help student understanding in basic theory of Electricity and Magnetism. With FwP, students are able to attract their interest through graphical representation and clear illustration. We believe that the level of visualization and interactivity constructed offers student a good learning advantage over such traditional method.

### Methodology

FwP uses ADDIE model as a guideline to develop e-content application to help students trace their limitation in understanding basic Electricity and Magnetism. ADDIE model is an instructional model which is valid for any kind of education that provides an organized process for developing instructional materials. It contains five phases; A-analysis, D-design, D-develop, I-implementation, and E-evaluation. By following these five-step, it helps us to develop an interactive interface and exercises with various interesting figures as to provide a quick way for students understanding.

### Importance of Innovation

FwP offers students to learn basic Electricity and Magnetism in interactive way and can support the lecturers as an alternative teaching tool. It also allows students to focus on the desired concept through visualization and interaction.

### Advantages of Innovation

- FwP provides an interactive visualization of basic concept of Electricity and Magnetism.
- FwP develops student's interest to learn basic Electricity and Magnetism.
- FwP encourages student's active learning through exercises.

## **Commercial Value**

FwP is a small sized e-content application easy to access with interactive activities makes them fun for students who can stimulate their interest in learning basic Electricity and Magnetism. Besides, FwP does not require an Internet connection and is an executable file that does not require installation.

## **Acknowledgement**

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## Online Critique Session in Art & Design Studio: A Framework for Art Education

**Zuhaili Akmal Ismail, Dr. Harrinni Md Noor, Dr. Mohd Khairezan Rahmat**

Kuala Lumpur Metropolitan University College (KLMUC), Kuala Lumpur, Malaysia

zuhaili.ismail@klmuc.edu.my

Universiti Teknologi MARA, Shah Alam, Malaysia

harrinni@salam.uitm.edu.my, khaire787@salam.uitm.edu.my

**Highlights:** Critique session for art students is for good ideas to emerge while simultaneously refining the feedback necessary to resolve any problems within the students' design work. Unfortunately, students and art educators perceived this session as a daunting process due to the non-existent strategies or frameworks in creating a positive and collaborative learning approach for both parties. The outcome of this research is the ZA Framework that converges the power of online critique session in art & design studio to widen access to good quality content and enhance the quality of learning.

**Key words:** Online Critique Session, Art & Design, Studio, Framework, MEB (HE), Heutagogy

### Introduction

In art and design studio, the critique session often revolves around the art educator listening to the student's verbal narrative supported by sketches and an artwork. The educator and the student then embark on a discussion in which the student leads the educator through the design process (Shaughnessy, 2009). While art educators usually perceived critique session as a place for constructive evaluation, many art students see the session as synonymous with an excruciating judgment day (D'Alleva, A., 2012). The negative undertone of a critique session is often seen in the higher education environment as "too often when a critique session starts, excuses begin, and so defensiveness gets in the way of good, responsive work...instead of threatening and intimidating, critique can be used as a tool for generating better work" (Shaughnessy, 2009). Critique session is usually unfocused which did not encourage students' involvement and the development of complex levels of thinking (Foster, H., 2014).

The purpose of the research is to develop a new critique session framework for art educators that allow the expression and elaboration of instrumental meanings within the Malaysian art education classroom setting. The preamble to MQA COPPA Area 3 states that student assessment is an important aspect in contributing to the learning process. Student assessment will eventually drive the programme and learning outcomes (Malaysian Qualifications Agency, 2010). Unfortunately, in the document, there is no description of a critique session as one of the assessment pedagogies. Therefore, there is a need for a proper framework of a critique session that will cumulatively reflects the Malaysian Qualification Framework (MQF) Learning Outcome Domains and can be used as a reference for art educators in Malaysia.

The research method framework in this study was inspired by O'Grady (2011) mixed methods research. The O'Grady-inspired research method framework for this study is divided into three phases: the preliminary study (quantitative), pre-design and development (qualitative) and post-design and development (quantitative). The preliminary study through online survey suggested a low rate of students' satisfaction towards the existing critique session students' and general dispositions toward five dissatisfaction factors including course activity, processed induced, educator's performance, teaching materials and didactic competencies. The pre-design & development phase encompassed a series of classroom observations and a focus group which eventually aided the researcher to discover that there are two types of student behaviours and learning preferences which are non-participants and semi-active participants. These learning preferences were later adapted in designing a new framework, the ZA Framework that supported the Malaysia Education Blueprint 2015–2025 (Higher Education) or better known as MEB (HE). The MEB (HE) highlighted in one of the shifts, Shift 9 - Globalised Online Learning, that blended learning is a staple pedagogical method in enabling greater dynamism to and personalisation of students' learning experience. The post-design and development phase was the period when the researcher briefed art educators regarding the ZA Framework that will frame their critique session. The art educators agreed to apply the framework in the same class as the classroom observations in the Pre-Design & Development phase. After a week, the educators executed the new framework to their respective classes. Through the online survey in the post-design and development phase, the total mean score for all dimensions (positive climate, class management, productivity, student engagement and teacher sensitivity) were almost to 3 (high agreement), reflecting a positive student attitude towards the online critique session. The majority of each dimension was under dispersed which fulfil the model fit. This finding is in agreement that the ZA Framework allows the expression and elaboration of instrumental meanings within the Malaysia art & design studio through an online critique session.

The ZA framework that evolved from this research outlines the critical and crucial components of an online critique session. Each stage in the framework is vital to success in a critique session. Although the framework itself is unique, the underlying structure and prescribed methodologies are adaptations and refinements of other conceptual frameworks used in both Malaysia art education environment and professional settings. The framework places the needs and interests of learners at the heart of the system. In future, the researcher hope that the ZA Framework will be integrated to Continuous Professional Development (CPD) programme for Malaysian art educators in providing a

non-exhaustive overview of an effective critique session framework. Consequently, the framework will allow Malaysian art education to shift from the traditional pedagogy to heutagogy, a new system where the learning resources are not scarce and learners are independent.

### **Acknowledgement**

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## e-FoD : electronic Fundamental of Database

**Nor Intan Shafini binti Nasaruddin & Fadilah Ezlina binti Shahbudin**

Universiti Teknologi MARA (UiTM) Jasin Campus, Jasin, Malaysia

[intanshafini@tmsk.uitm.edu.my](mailto:intanshafini@tmsk.uitm.edu.my); fadilahezrina@melaka.uitm.edu.my

**Highlights:** Over the past few decades, Malaysian higher education has grown and many initiatives have been made to improve the system in order to serve high quality and lifelong education. Technological advancement has tremendously changed the teaching and learning process. Today's educational institutions are highly dependent on Information Technology. With the advancement of technology, e-learning has become an increasingly popular method to facilitate the learning processes. With the advancement of technology, e-learning technology can be used as a method of learning as the learning process can be continued outside the classroom. Based on observation in class, most of the students are having difficulties to understand the term, definition and concept of database. Hence, this research proposes to design and develop an interactive e-learning content that will help the students to understand the fundamental concepts of database. The chosen approach for the development of this application is ADDIE model which consists of six (6) phases namely analysis, design, development, implementation, and evaluation phase.

**Key words:** electronic, e-learning, e-content, database, fundamental of database.

### Introduction

In line with the Ministry aspirations to expand the number of local and international students' enrolment and improve the quality of education system by 2025, flexible and innovative learning approaches and delivery methods are strongly needed. One way of achieving this is to exploit the transformational benefits of Information and Communication Technology (ICT) and fully utilize other new technologies to enrich teaching, improve learning experiences and fit into global education standards. Rapid advancement in Information and communication technology (ICT) has a major impact on people lives. Thus, educators can benefit from these technologies and make use of them effectively to support teaching and learning goals. E-learning has considerable potential to support the teaching and learning approaches. The use of technology is not to replace the lecture-based method. However, it is to shift the learning process from a teacher-centered to a student-centered model. A study conducted by David Mamorella (2013) indicates that 72% students learn best in a student-centered classroom environment and 86% students agreed that the use of technology improve learning. Database is a core subject that must be registered by undergraduate students of Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA (UiTM). This subject should be registered in first year of studies as it is a prerequisite subject. Based on observation in class, most of the students are having difficulties to understand the term, definition and concept of database. Hence, they are not able to apply the concepts in practice. Due to that, this research proposes to design and develop an interactive application that will help the students to understand the fundamental concepts of database.

### Content

E-FoD is an interactive e-learning/e-content that teaches students the fundamental concepts of database. This application includes multimedia elements such as animation, audio and video to highlight the concepts of database in an interactive way. We aim to design and develop an interactive application where it requires the students to be involved such as they can click or touch the screen instead of being passive (i.e. view and read the content only). Studies have shown that interactivity have a significant impact on the effectiveness of the e-learning process. This is important in order to help students learn and apply the relevant skills and knowledge. There are several types of Database Management System (DBMS) available and used in industries such as MySQL, Microsoft Access, Microsoft SQL Server, Oracle, and PostgreSQL. Different types of databases have different features and capabilities. In order to master the different types of DBMS, students must be able to understand the basic concepts.

ADDIE model is one of the most commonly used models by instructional designers, content's developer or educators to develop an efficient and effective instructional design (Nada, 2015). ADDIE model consists of six phases which are Analysis, Design, Development, Implementation, and Evaluation phase. In order to design and develop this e-content, ADDIE model will be used. This is to ensure that this application meets the requirements based on standard syllabus of ITS432 - Database Design and Application. Prior to designing and developing this electronic content, all the requirements need to be analyzed. Next, based on the course information such as objectives and learning outcome, the e-content will be designed. The e-content will be developed based on the design, resources and materials that have been collected. The next phase is to launch the e-content to the students and get feedback from them by conducting usability testing. SUMI (Software Usability Measurement Inventory) evaluation (Kirakowski and Corbett, 1993) method will be used to evaluate the usability of the e-content from the end user's perspectives.

According to (Debevc and Bele, 2008), SUMI-method is suitable for quick and simple evaluation of e-learning content. Hence, this method will be used in order to ensure the e-content meets the requirements.

With this application, students can grasp the basic concepts quickly and easily, wherever there are as the content is accessible through mobile devices such as smartphones or tablets. In addition, this electronic content might help improve students' attention and long-term memory. This is supported from various studies that have shown interactive e-learning have a significant impact on learning process.

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## Enhancing Students' Higher Order Thinking Skills through MyGSP

**Abdul Halim Abdullah, Mahani Mokhtar, Dayana Farzeha Ali, Nornazira Suhairom & Norasykin Mohd Zaid**

Faculty of Education, Universiti Teknologi Malaysia, Johor Bahru  
[p-halim@utm.my](mailto:p-halim@utm.my), [p-mahani@utm.my](mailto:p-mahani@utm.my), [dayanafarzeha@utm.my](mailto:dayanafarzeha@utm.my), [p-nazira@utm.my](mailto:p-nazira@utm.my), [norasykin@utm.my](mailto:norasykin@utm.my)

**Highlights:** MyGSP was developed following various constraints faced by teachers to integrate the Geometer's Sketchpad (GSP) software into mathematics lessons. Three main constraints were identified: (1) insufficient time to prepare for GSP-aided lessons; (2) lack of training on GSP integration in lessons; and (3) lack of references for teaching mathematics using GSP. Therefore, taking into account the computer equipment currently available at schools, MyGSP was developed to overcome these constraints. Teaching materials for mathematics topics were designed at a secondary school level. Teaching strategies adopting higher order of thinking skills (HOTS) were applied in the teaching materials. Apart from this, video tutorials on GSP usage in teaching materials were also developed. The modules, i.e., Teaching Material Module, Download Module, Forum Module, and Video Tutorial Module, were combined into one system known as MyGSP. The MyGSP system also will be updated and enhanced from time to time in the maintenance phase.

**Key words:** Geometer's Sketchpad, Higher order thinking skills, GSP-aided lessons

### Introduction

Many past studies have shown that the use of computer software, specifically the dynamic geometry software, has enabled students to harness their higher order thinking skills (HOTS) in mathematics. Nik Azis (2008), for instance, state that the environment for dynamic geometric software (1) enables students to expand their concrete mathematics experience to a more formal level, (2) encourages their enthusiasm to form conjecture, and (3) increases their mathematical thinking. This matter is supported by Norazah et al. (2010) and Kerrigan (2002) who both emphasise that students' HOTS can be harnessed through exploratory learning and discussion using the GSP software. According to Newman (2000), the use of dynamic geometry software can increase students' desire to know, boost their intellect and challenge their intellectual capability. Besides, the features found in dynamic geometry software allow students to form conjecture. According to Manizade and Lundquist (2009), through involvement in activities based on dynamic geometry software, students will take part in mathematical thinking that will bring them to form their conjecture. Dynamic geometry software can help students to form and hold discourse on conjecture, which are the bases for generalising a certain pattern formed during exploration (Glass et al., 2001). This process can further motivate students to discuss whether the conjecture is true or not (Lange, 2002). Students might also find examples that contradict each other, and this will lead them to form new conjecture (Hirschorn & Thompson, 1996). The ability of GSP to increase students' HOTS is seen as relevant today and is in line with approaches that emphasize HOTS in the Malaysian education system. HOTS is particularly relevant following Malaysian students' decline in international assessments namely Trends in International Mathematics and Science Study (TIMSS) and Programme for International Student Assessment (PISA) that assess the HOTS of students.

A study by Hadi and Zainab (2012) shows that, although teachers may have high desire to use ICT in classrooms, lack of time can be a constraint for them to achieve this. The main reason for this is that ample time is needed for teachers to plan and execute technology-aided lessons in classrooms (Vrasidas et al., 2010; Becta, 2004). In Mathematics subject, although the GSP software is provided in schools and it is very much encouraged to use them in the teaching and learning process, past studies have shown that mathematics teachers do not use the GSP software due to several factors. One of the factors is limited opportunity to attend courses on the use of GSP. In the Malaysian education system, courses and workshops on the application of GSP software have been conducted for Mathematics teachers (Kasmawati, 2006). However, these courses do not require participation from all or the majority of secondary school Mathematics teachers in Malaysia. Agyei dan Voogt (2010), Ozden (2007), and Toprakci (2006) agree that there is a lack of training opportunity available for teachers in integrating education technology into the classroom. According to Kalsom and Lim (2013), among the reasons for not using the GSP software include (i) lack of exposure on GSP usage, (ii) no exposure on GSP, (iii) no exposure from any party although one is rather interested in using it, and (iv) limited courses available on GSP. Among teachers who have attended workshops or courses on GSP software usage, past studies have found that these teachers have not taken advantage of the GSP software provided. This is due to lack of resources to refer to on teaching Mathematics subject with the aid from the GSP software. According to Haslina et al. (2000), although teachers attend certain courses with hands-on activities included, the modules or manuals are not provided for participants' use after the workshop. Therefore, the other main reason is due to lack of references in using education technology including GSP software (Ertmer & Ottembreit-Leftwich, 2010; Becta, 2004). Agyei and Voogt (2010) suggest that a user-friendly environment be built on education technology application for teachers' reference. However, according to Khalid (2009), access to reference sources on certain education technology can be improved through self-training on the Internet. Based on the problems that prevent the usage of the GSP software among teachers, the researcher developed a mathematics teaching material for form one to form five in accordance to secondary school

mathematics syllabus based on the GSP software. It is hoped that these teaching materials will be able to resolve problems faced by teachers and they can be used as a reference in the classroom.

## Content

Among the modules involved in MyGSP were Download Module, Teaching Material Module, Forum Module and Video Tutorial Module. Teaching Material Module consisted of explanations for the GSP-aided teaching activities prepared. However, users would not be able to download the available teaching materials until they have registered themselves. Download Module allows registered users to download GSP-aided Mathematics teaching materials that are available in two formats namely .pdf and .doc. Teaching materials prepared using .pdf format allow users to directly use the materials in lessons. On the other hand, .doc format allows teachers to make changes to the materials according to the teachers' preference and suitability. The Download Module also contains a teaching material namely Introduction to GSP. According to Nik Azis (2008), the use of technology in the teaching and learning process comes with some pre-conditions; students need to have access to the required technology, understand the equipment, and have grasp of the main skills needed to be able to use it. Among the items found in the Introduction to GSP are drawing dots and lines, measuring length, labelling dots, lines and angles, and measuring angles. The Download Module also allows registered users to download video tutorials on GSP usage in teaching materials, other than allowing videos to be viewed online and through the Video Tutorial Module. According to Jamaluddin and Zaidatun (2005), the use of videos in lessons completes the process of delivering information and enables teachers and students to form deeper understanding of the material. GSP-aided teaching materials are prepared by applying learning strategies that can generate students' HOTS. These strategies include discovery learning strategy, discovery learning strategy and forming conjecture learning strategy. After all modules have been developed and tested, the researcher combined them in the integration phases to form the real system. Joomla! was used as the platform to combine all the modules. Joomla! is a type of Open Source Content Management System (CMS) that can be used for free to build a website. Figure 5 shows the interface of MyGSP system, which consists of seven main sections namely Home, Introduction, Syllabus, Teaching Materials, Download, Forum and Video Tutorial.

The <b>Introduction</b> section explains the background of MyGSP system.	The <b>Syllabus</b> section provides the syllabus for Mathematics in secondary school from form one to form five.	The <b>Teaching Materials</b> section gives general explanation on the teaching materials provided. However, users must register to download.	The <b>Download</b> section allows registered users to download teaching materials in the forms of .pdf, .doc, and video tutorials.
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The **Forum** section provides a platform for users to voice their opinions regarding the teaching materials developed and share their experience of using those materials.

The **Video Tutorial** section allows registered users to watch video instruction online on how to use GSP in teaching.

Figure 1. MyGSP system interface

As a conclusion, in this study, MyGSP system was developed as a reference for Mathematics teachers to integrate the GSP software in their teaching process in order to harness the students' HOTS. This system contains Mathematics teaching materials for form one until form five based on the GSP software according to the Mathematics syllabus for secondary schools in Malaysia. The materials developed were prepared in two formats namely .pdf and .doc. Users especially the Mathematics teachers can download materials in both formats for their teaching purposes. Apart from that, videos on the use of GSP in teaching were also provided to facilitate the teachers. The teaching materials provided also applied various teaching strategies that have been proven to harness the students' HOTS. The teaching strategies included discovery learning, contextual learning and conjecture formation. This is in line with the current requirement by MOE to emphasise the teaching and learning practices that encourage the use of HOTS, apart from making use of the available educational technologies provided in schools.

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## i-MoBE System for Educators in Higher Learning Institution

**Rusli Abdullah & Abdifatah Farah Ali**

University Putra Malaysia, Selangor, Malaysia  
rusli@upm.edu.my ; abdifataah4u@gmail.com

**Abstract:** Outcome-based Education (OBE) right now is very important to the academician, especially in Higher learning Institutions (HLI) in ensuring the student will get the benefits in Teaching and Learning (T&L) of their study. In this context, there is a lacking of the intelligent mobile OBE system model in helping the academician to use in OBE management for T&L environment. Since that, the implementation of the OBE as a system model for mobile application called as **i-MoBE** which main objectives is to offer the academician and easy and straightforward access to general information about their courses in T&L intelligently. So that it's easy to monitor the OBE of student achievement based on Cognitive, Psychomotor and Affective (CPA). Therefore, in this research we will be highlighting a system model of intelligent OBE for academician in HLI. The proposed model will be covering the conceptual design and its interaction as well as the system configuration in supporting the academician to use it in their T&L towards effectiveness and its efficiency.

**Key words:** Mobile Computing, Intelligent System, Outcome-based Education, Teaching and Learning, Higher learning Institutions.

### Introduction

Outcome-Based Education (OBE) is becoming popular in teaching and learning (T&L) in order to determine whether the students achieve the curriculum design. The OBE has developed and implemented by researchers in the past, it was broken into two ways which starts from program education outcome, to course outcome called as design method, this they followed with course outcome that is beginning from course outcome goes to program outcome called assessment method. The measurement of OBE can be done through assessment method, which consists of test, assignment, project and presentation and so on. The objective of OBE is designing to support the academicians in order to achieve their educational goal as well as learning outcome, which is based on a particular input and output. The OBE also has been developed or designed based on the scenario in T&L, which is involved the component of input, process and output for a particular program implementation onto the students particularly in Higher Learning Institution (HLI). In developing application of an OBE system model for the academician in HLI in the mobile system, there have been limited study of OBE in mobile application. A framework has been developed and introduced to help us to understand the wide variety of educational technology applications but there is no actual mobile application of OBE for an academician was been developed (Huang, A. H. ,2001).

### Content

The objective of this research is to propose a model of mobile application platform for managing of OBE in HLI. The Mobile Application model for HLI called i-MoBE also being developed that will allow academician to use their mobile devices in managing and evaluating a wide variety of assessment of their course also able to access the information or any other aspect of instructions at anytime and anywhere (Abdullah, R. H., & Abdifatah ,2015). The purpose of i-MoBE also assists the academician to determine whether the student achieve the OBE of their CPA based on their course. The i-MoBE system architecture consists of six architectural features: Academic Agent (AA), Student Agent (SA), User interface Agent (UIA), System Administrator Agent (SAA), Assessment Agent (AssA) and OBE database server as shown in Figure 2. The overall architecture consists of three high level modules as shown in Figure 1:

#### i. Interface Module :

The interface module deals with the academic and student agent that is publicly visible. It provides mechanisms for interacting with agent and supports inter-agent collaboration and communication.

#### ii. Process Module :

The process module is restricted only to the agent that is directly manipulating the contents of the module with access privilege. This module contains methods that implement a variety of functions and processes using which agent can respond to request from other agents and also provide the services that may necessary in solving particular problem.

### iii. OBE Database Module:

The OBE Database Module is restricted only to the agent that is directly manipulating the contents of the module with access privilege. This domain provide domain specific relevant to problem solving. It's responsible for keeping track of what data are stores in the main database and also responsible for retrieving the necessary data requested by assessment agent through database agent.

First of all, the application has to match with the requirement of OBE (Harden, R. M., 2002) as follow:

- i. Coming up with comprehensively designed learning outcomes which can be established prior to more progression.
- ii. Curriculum design for ensuring progress in learning outcomes.
- iii. Assessment process design that will match learning outcome for a student or group of students to guarantee success in the outcomes.
- iv. Remediation and enrichment provision for student in an appropriate manner.

## Result

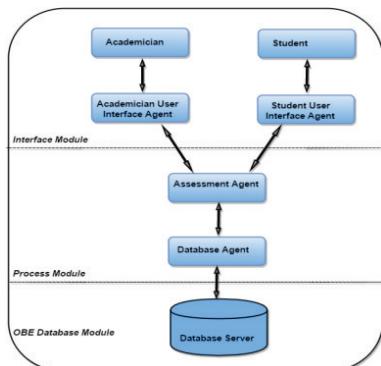


Figure 1: OBE Intelligent Paradigm Systems

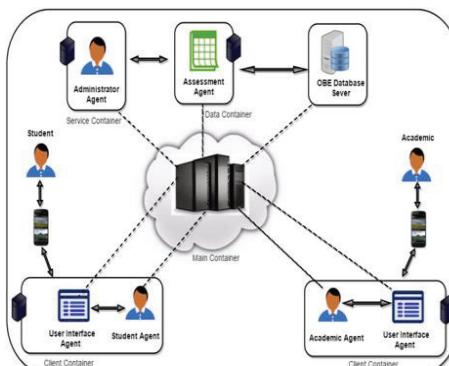


Figure 2: The proposed of i-MoBE System architecture

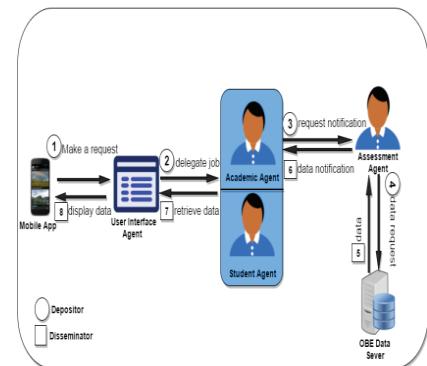


Figure 3: Scenario Based Implementation from Academician and Student Prospective

## Research's Potentials

- ✓ The system will allow academician to use their mobile devices in managing and evaluating a wide variety of assessment of their course
- ✓ The system is able to access the information or any other aspect of instructions at anytime and anywhere.
- ✓ Assist the academician to determine whether the student achieve the OBE of their CPA based on their course.

## Acknowledgement

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## MyLearn.my: Interactive e-learning materials for MEC241-Fluid Mechanics

**Hazimi Ismail, Norhisyam Jenal, Radzi Abdul Rasih, Azmi Roslan & Siti Aishah Taib**

UiTM Cawangan Johor Kampus Pasir Gudang, Johor, Malaysia

[hazimi0172@johor.uitm.edu.my](mailto:hazimi0172@johor.uitm.edu.my); [hisvam0324@johor.uitm.edu.my](mailto:hisvam0324@johor.uitm.edu.my); [radzi\\_rasih@johor.uitm.edu.my](mailto:radzi_rasih@johor.uitm.edu.my);  
[azmiroslan@johor.uitm.edu.my](mailto:azmiroslan@johor.uitm.edu.my); [aishah711@johor.uitm.edu.my](mailto:aishah711@johor.uitm.edu.my)

**Highlights:** MyLearn.my is an e-learning product made of three different components, namely a computer courseware, an online course management e-learning system (OCMES) and a mobile app. These three different components contain the same subject matter content for the course MEC241-Fluid Mechanics that is accessible offline (courseware) or online (OCMES and mobile app). This product is unique as it has four special features which are attractive online videos, interactive assessments, comprehensive and user friendly learning experience. It also has the capacity to be commercialized as a complete online course to be offered in Massive Open Online Courses (MOOC).

**Key words:** MyLearn.my, e-learning, courseware, Massive Open Online Courses (MOOC), fluid mechanics, mechanical engineering

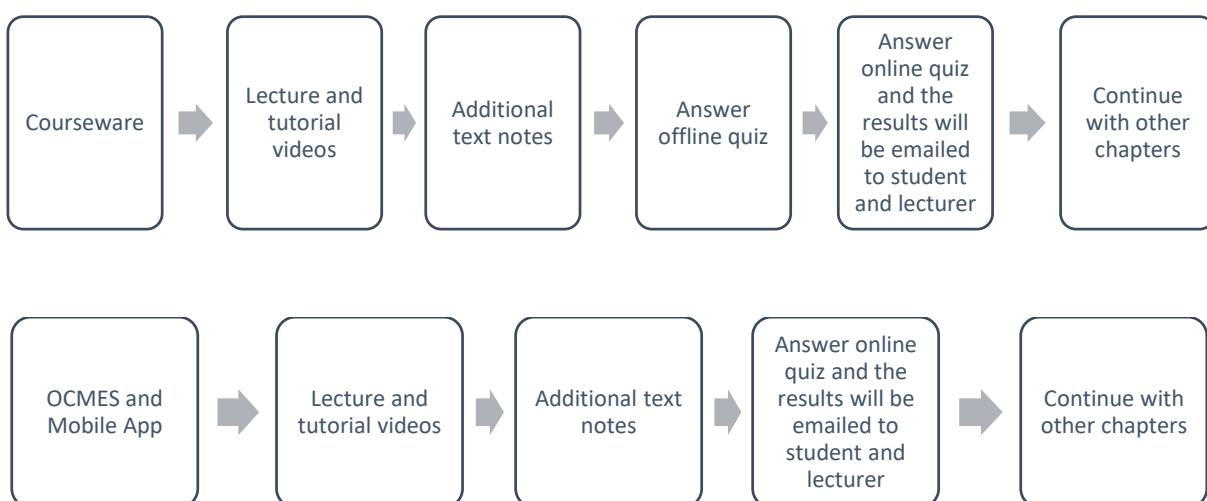
### Introduction

MyLearn.my is developed with the objective to promote blended learning among the Faculty of Mechanical Engineering lecturers in UiTM Cawangan Johor, Kampus Pasir Gudang. This product assists the teaching and learning process by allowing the lecturers to combine their conventional method of teaching with interactive e-learning materials thus providing students with the means to study the subject matter more conveniently on their own.

### Product Descriptions

MyLearn.my is divided into three different components: computer courseware, online course management e-learning system (OCMES) and mobile app. All three components are developed from the same concept and content. This product caters to the need of tech-savvy students by providing all-round learning aids. However, for the time being, MyLearn.my is only available for one course in the Faculty of Mechanical Engineering, which is MEC241-Fluid Mechanics. The first component is Fluid Mechanics Learning Software (courseware). The content of the course is explained in the form of videos and notes, important calculations related to the theories are taught in the form of tutorials, and assessments of the course are conducted in the form of quizzes (offline and online). The students have to simply click on the link provided that redirects them to OCMES (<http://mylearn.my>), the second component of this product, to answer the online quizzes. Results of the quizzes are then sent to the students' and their respective lecturers' emails.

The second component of this product is OCMES (<http://mylearn.my>). OCMES provides access to the same learning materials in the courseware to those who have internet connection, hence attracting worldwide users. The third component of this product is a mobile app. The mobile app is currently only accessible to Android devices that are connected to the internet and it uses a webview mechanism. This mobile app allows access to the same learning materials found in the OCMES. At present, the work to upgrade this mobile app to an offline app is still in progress. Figure 1 explains the learning process conducted using this product in the form of flow charts.



**Figure 1 :** Learning process in courseware, mobile apps and OCMES.

## Background of the Product

There are four special features highlighted in this product, namely attractive online videos, interactive assessments, comprehensive and user friendly learning experience. Technological advancement and access to high-speed internet connection have enabled e-learning to be conducted either to complement or to completely replace the conventional teaching and learning process. Students can now self-direct their own learning process via electronic gadgets such as smart phones, laptops, and tablets. This product fits perfectly in this picture by offering attractive online videos made of lively narration, visualization, and animation to make them engaged in their learning process.

MyLearn.my also provides interactive assessments as all quizzes and assignments are equipped with explanatory answers. The answers are presented in a step-by-step format that enables the students to fully understand the work scheme sequence. Besides, the steps are briefly explained by the instructor in the videos to imitate the teaching and learning process occurred in a real-life classroom. Comprehensive learning experience is ensured by the all-round learning materials accessible to the students -attractive videos and tutorials, simple and informative notes, and interactive assessments. This product is also user friendly as the materials can be accessed via 3 different components- courseware, OCMES, and mobile app- and the simple yet interesting interface makes it easy for the students to use this product. In short, MyLearn.my is a good platform for the students to learn and understand the course MEC241-Fluid Mechanics in a virtual classroom.

## Importance to Education

Students nowadays are more tech-savvy when compared to their non-student contemporaries (Kleimann, Özkilic & Göcks, 2008) and a connection has been made between a high level of education to high internet usage (TNS EMNID, 2012, as cited in Mertens et al., 2014). Therefore, it is crucial to transform the conventional method of teaching in higher learning institutions in order to stay relevant in this age of technology. As one of the public universities in Malaysia that has the highest number of students, UiTM's approach to promote blended learning in all of its programmes can be seen as an attempt to address this situation. MyLearn.my is a product of e-learning materials developed by a team of lecturers to assist the teaching and learning process in UiTM Cawangan Johor, Kampus Pasir Gudang.

## Advantages towards Education and Community

MyLearn.my provides multiple advantages towards education and the community. It acts as a platform for the worldwide education community to engage with the interactive e-learning courseware, website (OCMES), and mobile app related to the course MEC241-Fluid Mechanics. The students who are taking the course do not have to rely solely on the class lectures as the course materials can be accessed anywhere thus enabling them to learn at their own convenient time and pace. The information presented in MyLearn.my is as complete as the in-class materials while the video presentations are designed to be short and concise yet interesting to attract the students' attention. Moreover, the students can also monitor their learning progress by completing the required assessments available within the product. The lecturers, on the other hand, can assist and facilitate the students with their learning progress as the students' results are also made available to the lecturers.

Although MyLearn.my was initially designed to cater the needs of UiTM students, worldwide students who are interested to learn this course will also find it useful since English is used as its medium of instruction. The course content is relevant and suitable to all international institutions, hence providing means for the students to have a secondary source of information to guide them through their study.

## Commercial Value

This product, MyLearn.my, was originally developed as a blended learning platform to engage the Faculty of Mechanical Engineering students in UITM to the intended course, MEC241-Fluid Mechanics. It is made of three components -courseware, OCMES, and mobile app- to complement the conventional in-class learning environment. The combination of these three components has the capacity to be commercialized as a complete course to be offered in Massive Open Online Courses (MOOC) with the addition of in-depth materials and course assessments that can be utilized by any lecturers or institutions worldwide. The universal design and interface of all the three learning components enable the course content to be interchangeable. In other words, other courses can also use the same platform to develop their e-learning courses through the services offered by the developers.

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## Multimedia-based learning Tajweed using smartphones

**Siti Nur Ala'laaqiah bt. Azamudin & Amily Shafila bt. Shariff**

Universiti Pendidikan Sultan Idris, Tanjung Malim, Malaysia

[orelaugh92@gmail.com](mailto:orelaugh92@gmail.com); [amily@fskik.upsi.edu.my](mailto:amily@fskik.upsi.edu.my)

**Highlights:** This study aims to identify the extent of multimedia based learning Tajweed using smartphones has positive effects on learning recitation at Universiti Pendidikan Sultan Idris Perak. This study applied the multimedia elements in the learning Tajweed by using a smartphone app. The importance of this study is conducted to improve the skills mentioned by the proper pronunciation of the letter and make it easier to remember the laws of recitation. An instrument based on a questionnaire survey involving students in Universiti Pendidikan Sultan Idris with the number of 20 respondents who attended classes recitation from various faculties. The result shows that the development of this application by using ADDIE model, the effectiveness of multimedia based learning Tajweed using smart phones in the count mean of (4.15%) showed high levels of these applications does help users learn the laws of recitation in the application. Overall, the development of this application provides a transformation in learning the recitation and improving the student knowledge as well.

**Key words:** interactive learning, smartphone, multimedia, teaching and learning

### Introduction

Based on Lee. K.B and Salman R. (2012) collaboration with the process of learning and using smartphone is a trend nowdays. At the moment, by easily access the information anywhere and anytime, it seemed to improve the the students's cognitive and their results in the class. Jorgensen (2005) define as electronic learning as an approach that is fun, interesting, flexible when it involves new techniques and concepts. Electronic learning also interactive where it involve the students in each step in the process of learning. Futhermore besides electronic learning, there are mobile learning where education is everywhere (Baseni. (2004)). As a conclusion, in this project, multimedia based learning Tajweed using smartphone is a first step to attract students above 18 years old to use and learn the proper pronunciation and remember the laws of recitation.

### The learning process in multimedia based learning Tajweed using smartphone

The idea in this project is to help the students, teenagers especially in to recite proper pronunciation and remember the laws of recitation as well. It has the elements of multimedia and interactivity on how to pronounce each Tajweed properly by using smartphone. It is easier to access anywhere, anytime. The interface has been design to be colorful as to different color means different meaning.

### The Importance

The multimedia based learning Tajweed using smartphone content based on fun learning and interactive, passionate involvement, motivated, creativity and emotion activities.

### Advantages and Value Added

The advantages and value added of this product are:

1. The multimedia based learning Tajweed can create fun, creative and interactive learning environment.
2. The multimedia based learning Tajweed includes the elements of Multimedia which attracts the attention of teenagers to learn pronunciation in a proper way.

### Conclusion

In this generation, having access the technology and social media, it is more challenging to grab the younger generation's attention. Having the interactive and multimedia elements through smartphone provide creative approach of learning wherever and whenever they are free to do so. Also, the students can go through all contents by self-learning according to their own pace or with the help of a teacher. The multimedia based learning Tajweed contents was made to enhance student's pronouncing Tajweed in an efficient and creative approach so that learning can be fun and done anytime as they pleased.

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## Jawi Interactive Learning

**Nurul Akhilah bt. Abd Rasak & Amily Shafila bt. Shariff**

Universiti Pendidikan Sultan Idris, Tanjung Malim, Malaysia

[pinky\\_gurlzaries@yahoo.com](mailto:pinky_gurlzaries@yahoo.com); [amily@fskik.upsi.edu.my](mailto:amily@fskik.upsi.edu.my)

**Highlights:** Jawi Interactive learning is basically based in the real scenario nowdays where the young generations have difficulties in learning Jawi. It is to explore the development of multimedia learning courseware in order to improve learning Jawi by identifying, reading and writing for the students and a medium for teacher in teaching in class. This particular courseware is based on ADDIE model and using a set of questionnaires as the instrument. Overall, the result from using the courseware was at a satisfactory level with all the multimedia elements embedded in the courseware itself. The students were satisfied with the interactive character and fun learning in the courseware as well.

**Key words:** interactive learning, courseware, multimedia, teaching and learning

### Introduction

Based on Xian and Gui (2009) Human Computer Interaction relates to the process of input and output, where it is projected through the interface design within the computer. There are four (4) interaction based on the input and output process: data interaction, image interaction, audio interaction and behavior interaction. These interaction involves the elements of multimedia align with the 6 senses of human such as, hearing, visualize, touching. Basically, having human computer interaction and analyzing the interface design helps people to realize how important the connection between human and computer itself. On the other hand, according to Ahamad Rizali (2007), the study of student's perception in learning through courseware with the elements of Multimedia. The result was the performance of the students by using courseware did improve in their learning process. As a conclusion, in Jawi Interactive Learning along with the interactive design, and elements of Multimedia did attract the student's attention and curiously in learning Jawi.

### The learning process in Jawi Interactive Learning

The idea in the courseware was to have the students identify, read, and write. Also there would be a sing a long and a quiz where to analyze how the student can remember what they have learned before. The first part, is by identify the character in Jawi and after identify all 29, the students will practice to read when the character in Jawi combined together. After, learning to identify, reading, then the students will practice writing the character Jawi, one by one. In this courseware, it has a song which able to help the students memorize in a fun way of learning. Also, a quiz has been created in order to see, whether the student understand what they remembered during the process of learning. The interface of the courseware consists two character of a boy and a girl jumping up and down, eager to learn Jawi.

### The Importance

The courseware's content based on fun learning and interactive, passionate involvement, motivated, creativity and emotion activities.

### Advantages and Value Added

The advantages and value added of this product are:

1. The courseware can create fun learning environment with interactive character in learning Jawi.
2. The courseware includes the elements of Multimedia which attracts the attention of young learners to learn in a fun way.
3. The song and quiz helps the student to remember and recalled what they had learned in the courseware itself.

### Conclusion

Younger students need to have a creativity approach in their learning process. In this generation, having access the technology and social media, it is more challenging to grab the younger generation's attention. Having the interactive and multimedia elements provide fun learning environment. Also, the students can go through all contents by self-learning according to their own pace or with the help of the teacher. The courseware contents was made to enhance student's understanding in learning Jawi in an efficient approach.

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## Mr. Binarie's brain

**Arif bin Ab Aziz & Salman Firdaus bin Sidek**

Universiti Pendidikan Sultan Idris, Tanjung Malim, Malaysia

[arifboyz999@yahoo.com](mailto:arifboyz999@yahoo.com); [salmanfirdaus@fskik.upsi.edu.my](mailto:salmanfirdaus@fskik.upsi.edu.my)

**Highlights:** The major purpose of Mr. Binarie's brain is to enhance previous learning activity for Data Representation and Number System topics through game-based learning approach. This game has three levels where each level contains of different number system and data representation. A player uses drag and drop technique in order to provide answers for the given questions. At the end of the game, the successful player will make the brain become functional and turn Mr. Binarie into a robot known as Mr. Cybot. The genre of Mr. Binarie's rain is falls under the category of Memory and Puzzle Educational Game. It is developed based on Game Development Life Cycle (GDLC) which comprises of 5 stages; Game concept or idea, Technical and artwork analysis and design, Game development, Game quality and testing and also Game deployment and maintenance. The final product will be placed in Malaysia Massive Open Online Courses (MOOC) platform, OpenLearning specifically for CAO course's exercises and activities module.

**Keywords:** game-based learning, data representation, number system, drag and drop, MOOC

### Introduction

The content of Mr. Binarie's brain is related to the number system and data representation which are the subtopics of Computer Architecture and Organization course. The concept of the game is derived from the word 'brain' where in this game, a player have to use their mathematic and thinking skill in order to solve the problem. The unhealthy brain which has blockages in its nerve system had caused Mr. Binarie's brain freeze for a long time. To help his brain back to normal, a player has to resolve the mathematical problem such as binary, octal, decimal, hexadecimal, negative and floating-point questions that will be divided into three game levels. As a result, the blockages will be cleared if the problems are successfully resolved. The fully cleared blockages will make Mr. Binarie's brain functioning and transform him into a robot known as Mr. Cybot.

### The Objective

The objective of this educational game is to apply an innovative game-based learning approach for data representation and number system topics via a joyful learning environment.

### The Features

The Mr. Binarie's brain provides three game levels which refer to the difficulty of the questions. In overall, there are 15 blockages that need to be cleared before the game reaches its end. In order to clear the blockages, a player need to drag and drop the option from the nerve into the blank space provided. In another word, this game uses a drag and drop technique where a player have to drag the boxes of 0 and 1 which block the nerve system into the answer space given at the bottom of the brain image. If the answer is correct, the blockage will disappear and a player can continue to answer the next question. All the nerves system will be functional if a player gives correct answers to all questions. The functioning nerves system will transform Mr. Binarie into a robot known as Mr. Cybot.

### Advantages and Value Added

The advantages and value added of this product are:

1. The digital game-based course's contents can create enjoyment and deep learning environment for the data representation and binary system topics.
2. The instructional video which is provided earlier could support learning activity for self-learning.

### Conclusion

Via student's responses, it clearly shows that Mr. Binarie's brain is able to motivate students to learn more about data representation and number system topics. The animation and multimedia elements are able to avoid boredom among students especially during learning about mathematic-like topics. Mr. Binarie's brain also promotes joyful in learning process and it could enhance student's understanding especially for related topic.

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## DIY: Dr. PC

**Saiful Izzuan bin Osman & Salman Firdaus bin Sidek**

Universiti Pendidikan Sultan Idris, Tanjung Malim, Malaysia

saifuldpu3@gmail.com

salmanfirdaus@fskik.upsi.edu.my

**Highlights:** Previously, the Computer Architecture and Organization's (CAO) students need to attend the practical session in computer maintenance lab in order to learn about computer hardware components and installation. The major purpose of DIY: Dr. PC is to enhance previous approach and propose a game-based learning for both computer components and installation topics. The genre of DIY: Dr. PC is falls under the category of Memory and Puzzle Educational Game. It is developed based on Game Development Life Cycle (GDLC) which comprises of 5 stages; Game concept or idea, Technical and artwork analysis and design, Game development, Game quality and testing and also Game deployment and maintenance. The final product will be placed in Malaysia Massive Open Online Courses (MOOC) platform, OpenLearning specifically for CAO course's exercises and activities module.

**Key words:** game-based learning, computer components and installation, MOOC

### Introduction

M. Virvou, G. Katsionis and K. Manos (2005) stated that the educational virtual reality games could be very motivating while retaining or even improving the educational effects on students. They were also claimed that the educational effectiveness of the game was particularly high especially for students who used to have poor performance in the domain taught prior to their learning experience with the game. At the same time, the educational game-based learning also can create joyful learning environment in higher education as stated by F. Crocco, K. Offenholley and C. Hernandez (2016) through their research result. Besides, it also can improve deep learning for the related topic. For the computer-related topic such as Random Access Memory's (RAM) application, M. Papastergiou (2009) had proved that gaming approach are effective to promote student's knowledge of computer memory concept and it is more motivational if compare to conventional non-gaming approach. Based on this several positive claims, the Computer Hardware Installation subtopic for the Computer Architecture and Organization course is selected to be embedded with digital game concept specifically for the exercises and learning activities module.

### The game idea and design

The idea of the game starts with a hide-and-seek activity in the first game level. The player have to find out the computer components such as motherboard, CD ROM drive, Random Access Memory card (RAM), hardisk, floppy disk drive, graphic card, Network Interface Card (NIC) and so on in a warehouse where these components are hidden between other gadgets, peripherals and hardware which are quite similar look. An incomplete checklist and a basket to keep the components which have been found will be provided. The first level of cognitive domain in Bloom's taxonomy will take its place where the students have to memorize computer components that have been introduced through the instructional video earlier. The time limit to finish up this level is needed as the player has to recall the memorized computer components. The player only can proceed to the next game level after he or she could find out enough computer components which are needed in computer installation.

In the second game level, player needs to install all the components which are found in the earlier game level. The player will be provided with a list of computer casings. He or she has to select the most suitable casing in order to install all the computer components in the correct spots. Besides memorizing correct spots, the player also has to apply their practical knowledge which covers the third level of Bloom's cognitive domain. The successful computer components installation will be remarked through the functional computer display where the "Congratulations!" word will appear. In the other hand if the player fails to install the components, the computer will start smoky and the game will be restarted from the first game level. The interface for the first game level is about a messy warehouse, where it can increase the difficulty of the level. The interface for the latter level is an empty desk surface where the player has to place the selected computer casing on top of it. Any faulty will cause the computer to be smoky and every components will be pulled out automatically.

### The Importance

The course's content based on gaming activities provide fundamental needs of learning through enjoyment, passionate involvement, structured, motivated, ego gratification, adrenaline, creativity, social interaction and emotion activities. The psychological and benefits of gaming has exposed this approach of learning to the mainstream teaching and learning field.

## **Advantages and Value Added**

The advantages and value added of this product are:

1. The digital game-based course's contents can create enjoyment learning environment and deep learning for the computer hardware installation topic.
2. The digital game-based product could reduce the expenditure of replacing the damaged real components where the risk of damage is very high since the topic involves electronic parts.
3. The instructional video which is provided earlier could support learning activity for self-learning.

## **Conclusion**

Via student's responses, it clearly shows that DIY: Dr. PC is able to motivate students to learn more about computer hardware installation topic. The animation and multimedia elements provide such a similar real experience-based learning environment. Moreover the students can go through all contents by self-learning or face-to-face lab session as well. The course's contents promote joyful and full of real life experience in the learning process and it could enhance student's understanding specifically for the related topic.

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## Document Records Management System through Web based on Activity Theory Framework

**Mohd Nihra Haruzuan Mohamad Said, Nur Sakinah Mohd Isa, Lokman Mohd Tahir, Megat Aman Zahiri  
Megat Zakaria, Noraffandy Yahaya & Mohd Fadzli Ali**

Universiti Teknologi Malaysia, Johor Bahru, Malaysia

nihra@utm.my, nursakinahgalaxy83@gmail.com, p-lokman@utm.my, megataman@utm.my, p-fadzli@utm.my

A systematic document management system is needed by many organizations in the management of physical documents. Hence, a study of documents' records management system through the web is conducted with several objectives starting with identifying the system requirements, designing and developing the system and evaluating the system. The system development is based on Hierarchical Levels of an Activity involving a chain of actions which in turn consist of operations. Evaluation of the system was performed and findings revealed positive response received at the overall reactions, screen, system capabilities and system performance.

**Key words:** System, Web-based Learning, Activity Theory, Hierarchical Level, Document, Records.

### Introduction

The development of a document record management system is needed in order to overcome and provide solutions to the traditional documents management problems which are in line with the findings of case studies undertaken by Xiaomi (2009) in the United States. The study shows that the use of computerized record management system promotes a more effective administrative records information management and increases organizational performance. The application of document record management systems plays a pivotal role in educational institutions' management (Xuemei, 2010). According to the Ministry of Education, based on the model presented in JNJK Roadmap 2010-2015 (JNJK, 2009), good leadership and management of educational institutions are among the major factors that contribute to the students' learning process. Thus, proper emphasis should be given to the administration and strategic management of educational institutions to bring impact to students' learning process. However, the development of the document record management system requires accuracy and suitability based on user requirements (Molnár & Benczur, 2013). According to Engeström (2001) a document record management system must be based on an activity and a process that requires interaction and materials to achieve the objectives of the assignment. Thus, Activity Theory could be used to help develop the document record management system because this theory emphasizes human activities with the aim of transforming to a desired (Kuutti, 1996).

### System Framework

Figure 1 shows the framework of document records management system through web based on Activity Theory.

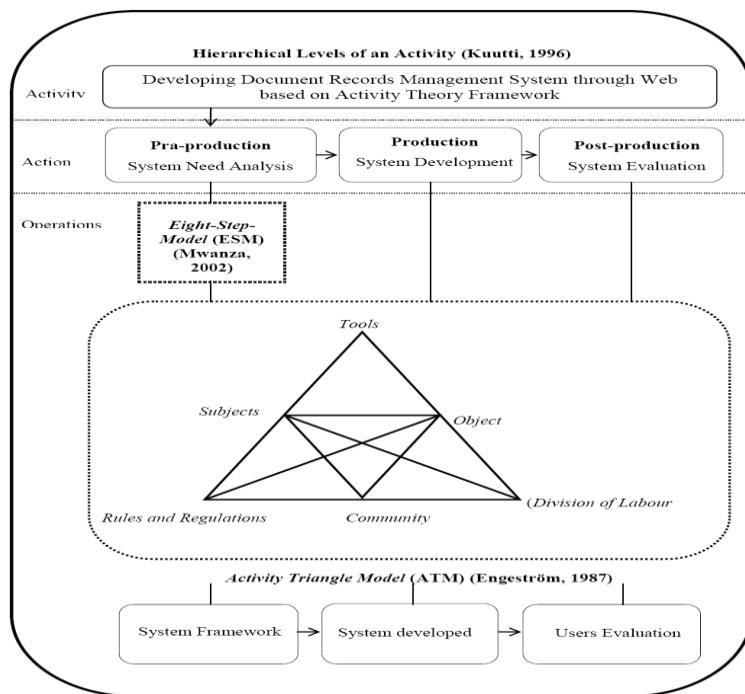


Figure 1: System Framework

## System Interface

In designing the screen interface, it is advisable to opt for a simple and user-friendly design to help educate consumers (Livingston & Herbst, 2005; Meng, Zhao & Xu, 2012). Screen design refers to design principles that emphasize the contrast, balance and consistency throughout the interface. This will help developers design an accurate and consistent system with clear development objectives. For a modern and contemporary look, use Sans Serif font types (Jamalludin & Zaidatun, 2006). Design the background of the interface with a bright and clear display to enhance readability. In addition, every link and graphics button should be clear and concise. The name given for the layout of the screen self-explains whatever activity you decide to be on the page.

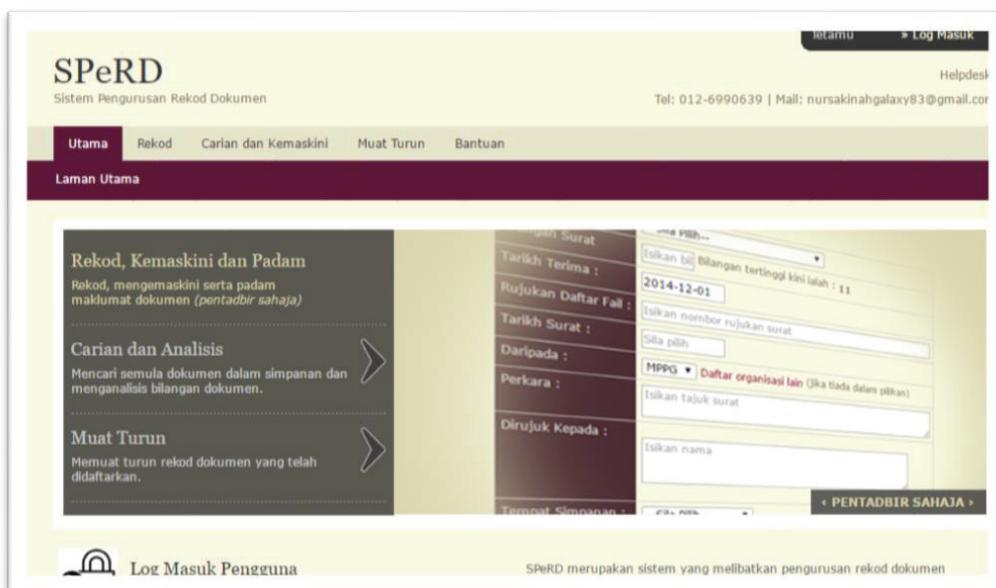


Figure 2: System Interface

## System Evaluation

After the system is developed, a qualitative assessment involving interviews have been conducted with an administrator, a teacher and a staff as well as additional quantitative data through Questionnaire of User Interface Satisfaction (QUIS). The study is conducted at a school in Johor, later the findings reveal that users are satisfied based on positive response received at the overall reactions, screen, system capabilities and system performance. Besides, users acknowledge that the system is suitable for 21st of century, convenient to use, management time can be reduced, simple and so on. In conclusion, the system has been successfully developed using AT and been recognized as the practically and reliability system in managing school documents.

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## eNotes – The New Way Of Learning Biology

**Ahmad Zaimi Mohd Zawawi, Nursyazni Abdul Rahim**

Universiti Teknologi Mara, Cawangan Negeri Sembilan, Kampus Kuala Pilah, Pekan Parit Tinggi, 72000 Kuala Pilah,  
Negeri Sembilan Darul Khusus  
ahmadzaimi@ns.uitm.edu.my , syaznirahim@ns.uitm.edu.my

**Highlights:** Modifying the typical lecture notes and textbooks into animated e-Notes is the main focus of this project. The target user of this interactive kind of notes is the new generation students. They are more attracted to something interactive and can be accessed online, rather than reading the conventional materials such lecture and textbooks.

**Key words:** e-learning, blended learning, e-notes, biology, interactive

### Introduction

Biology is commonly taught using the conventional way as it deals with facts and data. Materials such as textbook and notes are used extensively in the process of teaching Biology. However, this represents a problem where the new generation favors interactive method of learning Biology as compared to the conventional way. Thus this project is aimed to create an interactive note in order to appeal to the students. By incorporating interactive element such as animation, it is believed that it can improve students' understanding towards biology. Additionally, this project includes sounds and transition into the PowerPoint slides. Towards the end of the note, students can utilize the provided quizzes to check their understanding. Furthermore, this material could be accessed easily using devices like smartphone, tablet or notebook. This is seen as an added value for this project as learning process could be done almost anywhere and everywhere.

### Background of Innovation

The conventional method of learning biology is by reading the printed or hard copy of lecture notes and textbooks, which is very dry thus making the subject less interesting as it is hard for students to imagine complex terminologies. This project focuses mainly to transform the conventional materials into materials that are interactive, easily accessible and appealing for the students.

### Methodology

Our project mainly used iSpring software to create the interactive e-notes. Animation and a short video were embedded with the content extracted from the conventional biology teaching materials to create e-notes for the students. Consequently, while reading the important points on the PowerPoint slideshow, students are able to see the movement from the attached videos and animation. Moreover, the facts in the notes appear in a very interesting way compared to the static sentences. Nevertheless, the addition of music in the slides also will help to ease the mind while studying the subjects.

### Importance of Innovation

This new generation can be seen attracted to this type of medium of communication, and eventually give them a clearer view about the note's content thus can help them to excel in their studies. Furthermore, these e-notes can be used as an alternative material by educators to deliver the information to students in a more interesting way.

### Advantages of Innovation

Acknowledging the students' interest in the usage of technology, this project is aimed to incorporate technology in the process of teaching and learning. It is believed that e-notes enable students to learn Biology in a fun and interactive way. Moreover, by using e-notes, students can have the freedom to learn at their own convenience, and at a pace that is suitable for them no matter where they are either in class or at home.

### Acknowledgement

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## Analytic Dashboard for Learning Management System

**Zurina Saaya, Sazilah Salam, Ahmad Fadzli Nizam Abdul Rahman, Ahmad Shaarizan Shaarani**

Pusat Sumber Teknologi Pengajaran  
Universiti Teknikal Malaysia Melaka  
[zurina@utem.edu.my](mailto:zurina@utem.edu.my)

**Highlights:** Analytic dashboards can measure and visualize the teaching and learning activities on a Learning management system (LMS). This supporting tool works by tracking LMS usage log files, mining massive amounts of data to find meaning, and visualizing the results so they can be summarized at a glance. It also able to measure the level of blended or integrated learning in a course.

**Key words:** LMS, dashboard, analytic, blended learning

### Introduction

Learning Management System (LMS) has become a powerful tool for universities where it can be a main platform for the instructors to provide various kinds of learning materials and students can easily access them, instructors and students communicate both synchronously and asynchronously, and students organize their team projects and discuss each other. The data for these activities are captured and accumulated as log files in the LMS. Therefore it can be a good opportunities for the researchers to conduct data mining, and utilize them to improve teaching and learning activities. Our aim for this research is to develop analytic dashboards that measure and visualize the learning activities on an LMS. This supporting tool works by tracking LMS usage log-files, mining massive amounts of data to find meaning, and visualizing the results so they can be summarized at a glance.

This dashboard is consists of there the main components. The first part is to analyze usage data in the LMS and summarize is based on courses and faculty. The second part is to measure the blended learning conducted in a particular course. Blended learning is an integration of conventional and online teaching and learning activities. In each course the instructor will be notified the level blended activities. They can improve the course page accordingly in order to achieve particular level of blended activities. For example in order to achieve 30% of blended learning activities the instructor need to upload one course outline, minimum 7 resources, conduct minimum 3 activities and create 2 online assessment. The resources can be in the form of file, page URL, e-book, and video lecture. The activities can be in the form to chat, forum discussion and survey. The assessments are in the form of online quiz and assignment.

With the help of dashboards, the instructors are aware of the status of their course page. Thus these dashboards are a powerful tool for making teaching and learning truly effective and increase the utility of a LMS.

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## **Using MOOC to Improve Online Learning: The Case of Learning the Computer Architecture and Organization Course**

**Salman Firdaus bin Sidek, Maizatul Hayati bt Mohamad Yatim, Nursaadah bt Fathil, Ahmad Nurzid bin Rosli, Mohamad Farahim bin Mohd Sanimin**

Universiti Pendidikan Sultan Idris, Tanjung Malim, Malaysia

salmanfirdaus@fskik.upsi.edu.my

maizatul@fskik.upsi.edu.my, nursaadah@fskik.upsi.edu.my, nurzid@fskik.upsi.edu.my, farahimsanimin@gmail.com

**Highlights:** In 2008 the Association for Computing Machinery (ACM) revised the curriculum of Computer Architecture to underscore new aspects deemed relevant to the computing undergraduates. In view of the importance of the computer technology, this course has been made compulsory for undergraduates of the Computing Department, Faculty of Art, Computing and Creative Industry, Universiti Pendidikan Sultan Idris. To date, 358 undergraduates have enrolled in this course from September 2015 to June 2016. To run the course, a blended learning approach was used involving online and face-to-face learning. For the former, 46 instructional videos and 7 presentation slides were developed and uploaded to the Massive Open Online Courses (MOOC) OpenLearning platform. For the latter, several topics were taught in computer laboratories to provide undergraduates with experiential learning. To strengthen students' understanding, several exercises, "question-and-answer" activities, and educational games were used in the learning process. In addition, a number of simple quizzes were provided for the purpose of evaluation.

**Key words:** blended learning, experiential learning, instructional videos, educational games

### **Introduction**

Massive Open Online Courses (MOOC) Malaysia was launched in September 2014 by the Ministry of Higher Education, Malaysia. It was one of the initiatives taken by the Malaysian government to enhance the quality of teaching and learning using a blended learning approach. In fact, this learning approach is in line with the ninth Malaysia's Education Blueprint 2015-2025, which aims to accelerate the growth of e-learning in Malaysia. Admirably, Malaysia has become the first country in the world that integrates MOOC in the learning process of almost all its universities as a novel educational strategy implemented at the national level (OpenLearning Global, 2015).

To date, MOOC Malaysia has offered more than 63 courses to more than 144,028 students worldwide (OpenLearning, 2015). The contents of such courses, which are continually being updated, have been developed by the Subject Matter Experts (SMEs) from 20 Malaysian public universities. For example, the Universiti Pendidikan Sultan Idris (UPSI) has developed 6 courses, including Computer Architecture and Organization (CAO) course, which were launched through MOOC Malaysia. Most of the learning contents for the CAO course have been developed in Bahasa Malaysia (BM), which is the Malaysia' official language mainly used in most public universities. Given the dearth of online contents in BM, the choice of using this language in content development was deemed appropriate to enable more local students to access academic materials specifically written in their first language. However, presentation slides and other learning activities are still using English.

The CAO course, which is offered through OpenLearning platform, has four learning outcomes as follows:

1. describe the architecture of the computer system and solve the computing problems via bits, data types, operations, and digital logic structure,
2. describe the bus system, internal and external memory, input/output, CPU structure, control unit operation, and operating system,
3. perform assembly, configuration, maintenance, and troubleshooting of PC and other peripheral devices in group, and
4. analyse the latest development in computer technology through group project.

These learning outcomes, as outlined in the Instructional Plan of this course, encompass all the learning contents of seven (7) chapters that are delivered in 14 weeks of learning.

## The course's contents production, its application and the innovation in learning strategy.

Altogether, the CAO has four learning outcomes, of which different learning strategies were used to achieve them. The first learning outcome was based on the first three chapters of the course. To help students achieve this learning outcome, 10 instructional videos were developed to assist the learning process. Developing such videos was challenging given that concepts such data representation and number system are abstract in nature — which are difficult to visualize. Likewise, topics involving the function of electronic components, such as transistors, gates, registers, and memory and Finite State Machine are difficult to grasp, especially in "seeing how they work". To help address these two main problems, instructional videos of a "green" real classroom environment and animated electronic components were developed to help students learn the "hard to visualize" functions of such components. The development of the instructional videos for the second chapter was based on the real classroom environment, the impact of which could help students to familiarize the online learning method at the early stage of the course. This early introduction to such video learning materials would help fresh students, who are on their first or second semester, to learn more effectively. According to Schwartz and Bransford (1998), an efficient design of instructional videos should include authentic examples or research. Taking cognizance of this contention, the instructional videos for the second chapter also support communication between students and facilitator through selected questions of data representation and number system, which were frequently asked by students in the actual classroom.

The production of instructional video of the third chapter included animation elements that demonstrate the operation of basic and combinational gates and the Finite State machine. Using these animations, students could see the flow of bits, consisting of "0" and "1", from one gate to another with ease and improved clarity. The ease of visualizing such abstract concepts using animations is not surprising as Cowen (1984) asserts that visual media, in contrast to textual media, helps learners process relevant information more effectively and efficiently, leading to better memory retention and recall. In addition, several exercises, "question-and-answer" activities, and educational games were also included at the end of the video materials for the second and third chapters. Solutions to the problems in the activities were also provided to guide the students to perform the activities with ease. For the exercises, 32 questions regarding data representation and number system were prepared, and the students could provide the answers using the blank spaces provided. In addition, the students could play the educational game by which they learned the underlying concepts of the learning of the topics with some degree of enjoyment. Furthermore, the students could perform two activities related to electronic circuitry using the Electronic Workbench (EWB) software, in which their answers or solutions were uploaded to the OpenLearning's platform, allowing their facilitator to assess their work promptly. If the students wanted to communicate in real-time, they could use the links of comments and posts that are located at the bottom of the instructional videos. To gauge the attainment of the first learning outcome, an online examination was held in the middle of the semester to measure students' learning performance.

To achieve the second learning outcome, 33 instructional videos containing animation elements and short video segments were produced and applied in the learning process. The main aim of producing the short video segments (lasting not more than 7 minutes) was to promote active learning among the students, thus avoiding them become disinterested or unfocused. According to researchers in The Center of Teaching and Learning, University of North Carolina at Charlotte, the optimum duration of instructional video is about 3 to 5 minutes in order to maintain student's interest. At the same time, short video segments could increase engagement between students and course contents, and provide them space to control the new knowledge that they have discovered. Consequently, such engagement and control helps promote active learning among students. In fact, Zhang et. al (2006) found that students who were allowed to control video movement, select important sections to be watched, and replay the video as needed attained better learning achievement and a greater sense of satisfaction. Thus, 33 instructional videos were produced based on the learning contents of chapters 5, 6 and 7, which were divided into suitable segments. Musical sound with local flavour was embedded, as recommended by Shih Y.N et.al (2012), into the videos to induce an appealing learning environment, in which the students watched the videos with a sense of fulfilment. Besides, the Malaysian local musical sound helps highlight Malaysia's role in promoting the use of OpenLearning platform on a global scale. The development of these videos was challenging as making abstract concepts (e.g., the programming concept of assembly language) more discernible, and perceptible, through visualization was a monumental task. Nonetheless, these challenges were successfully overcame with the appropriate design and development of animations and multimedia elements in the videos, enabling the students to remain constantly engaged in the learning process. Similar to the first three chapters, examples and solutions to problems of the exercises were provided at the end of chapters 5, 6 and 7.

To help achieve the third learning outcome, three (3) instructional videos containing animations were used in the learning activities. Essentially, these videos helped the students to learn the systematic procedure in installing the computer hardware and operating system, which was based on the learning content of Chapter 4. Specifically, these videos were applied in the online class. Additionally, several exercises and activities (e.g., naming computer components) and educational games were provided for the students to further enhance their understanding of this topic. Furthermore, the students were exposed to 6-hour practical lab sessions, as part of the blended learning approach of this course, in which they gained invaluable learning experience.

For the attainment of the last learning outcome, students were assigned with a group project, which was conducted in a laboratory. For this last learning activity, three (3) instructional videos containing animations were also provided for the students to help learn aspects related to Chapter 4. At this stage of learning, the students had to re-case the PC casing based on selected themes, such as Big Boy Toys, Recycle or Green Computing. Undertaking such a group project helped the students to amass invaluable experiences, of which they shared with their peers as evidenced by their constructive comments and photos that were uploaded to the OpenLearning platform. In essence, the group project involving the new design of PC casing based on the latest technology provided the students with ample learning avenue and opportunity to learn the subject matter more forcefully and meaningfully, making them more resilient, resourceful, and creative — traits extremely important for online lifelong learning.

### **Advantages and Value Added**

The advantages and value added of the course are as follows:

1. The animations and multimedia elements in the instructional videos are helpful to visualize abstract concepts, such as data representation, number system, digital logic structures and programming, of the technical topics.
2. The actual classroom environment helps students, especially fresh students, to feel comfortable with the online class applications.
3. The video segments help attract students' attention and maintain engagement.
4. The examples of problems, with accompanying solutions, in the videos help promote self-learning.
5. The creative activities, including educational games, make the learning process appealing and enjoyable.
6. The active learning environment encourages collaboration through online interaction using novel features such as comment, like, share and post features
7. The face-to-face learning session for the hardware and software topics provides students with real-life experience, and the video contents for these topics promote long life learning in the community.
8. The evaluation of the first learning outcome can be carried out online using objective and structured questions.
9. The overall course resources support blended learning approach.

### **Commercial Value**

Some of the learning materials of the course, such as the instructional videos of computer hardware and software, could be used as a training module for IT technical personnel, PC maintenance technicians, or anyone who is interested to learn computer technology.

### **Conclusion**

The main finding of this study clearly suggests that online learning using the MOOC, which runs on the OpenLearning platform, will be able to help students learn efficiently. Using this platform, learning materials or contents (e.g., instructional videos containing animations and multimedia elements) enable students to learn anywhere, anytime and essentially empowers them to learn at their own pace — ultimately leading to self-learning. In addition, exercises and activities involving educational games and face-to-face practical lab sessions promote authentic and enjoyable learning experience, thus further enhancing their understanding of the subject matter. Combining the above two learning approaches, a formidable blended learning solution can be realized to help enrich students' learning experience. On a larger scale, such blended learning can be applied to promote long-life learning in the community. Overall, this study underscores the utility of MOOC that can help realize efficient online learning, by which students can learn with a greater sense of fulfilment, and enjoyment

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## Online Listening Activities: Learning Listening Through the Fun Way

**Eliyas S. Mohandas, Anealka Aziz Hussian & Tuan Sarifah Aini Syed Ahmad**

Universiti Teknologi MARA, Shah Alam, Malaysia

[eliyas9154@salam.uitm.edu.my](mailto:eliyas9154@salam.uitm.edu.my), [anealka@salam.uitm.edu.my](mailto:anealka@salam.uitm.edu.my)

Universiti Teknologi MARA, Kuala Pilah, Malaysia

[tsyaini@ns.uitm.edu.my](mailto:tsyaini@ns.uitm.edu.my)

**Highlights:** A Massive Open Online Course (MOOC) that entails learners around the globe to learn listening through fun and interactive listening activities. These online activities cover almost every aspect that a MOOC should have; free, contemporary and authentic content, thematic topics & interactive and fun online listening activities. It is hoped that such project like this could be a platform for us and other online learning advocates to create a more effective MOOC as a means of virtual language acquisition.

**Key words:** MOOC, Fun, Interactive, Online, Listening, Listening Activities

### Introduction

Listening skills are vital in acquiring a language. Powers (1986) suggests in his study on the importance of listening skills in an academic setting that there is a need of a further study in looking at the relation between listening skills and second language acquisition. Vandergrift (2007) mentioned that although listening skills are the least skills comprehended and researched for, listening skills are still important especially in understanding a second or foreign language. Despite numerous listening activities available online, some of them are flawed with less interactive activities, overwhelmed exercises for a single topic, monotonous listening audios and outdated content. This innovation will address the issues mentioned as well it enables learners to acquire the language smoothly.

### Content

This Massive Open Online Course (MOOC) focuses on second language acquisition. Listening skill is one of the important skills in learning a language especially English. Hence, this skill has been chosen as the main pillar in developing the course. This course is equipped with thematic topics with compact content that suite the learners' needs, interactive and fun activities, reinforcement activities for knowledge sustainability as well as a form of assessment (that uses the concept of gamification) to gauge and assess learners' ability in understanding the knowledge that is being transferred in this course. With recent development of MOOC in many public universities in Malaysia, the choice of developing this course virtually will not only help to align with aspiration of the government but also to promote the idea of online learning.

### Background of the product

In 2015, Universiti Teknologi MARA (UiTM) has moved to a rather new dimension of teaching and learning. The management of the university, through its department Pusat i-Learn, has encourages its lecturers to develop their courses online. The university believes that knowledge should be shared and exchanged globally in order to face with the millennial demands. Hence, this course is developed to fulfill the aspiration of the university. Moreover, many public agencies have now changed their directions towards green technology. Thus, this paperless course will be another initiative of UiTM in becoming a green-technology advocate.

### The Importance of this product in education

The Minister of Higher Education, Dato Seri Idris Jusoh addressed the significance of online learning and gamification in 21st century in his new year's speech. With this in mind, MOOC is seen as one of the best platforms to promote such idea. MOOC provides the leniency in acquiring knowledge especially language as it encompasses many features of an online learning. Learners will be able to watch videos that contain knowledge of a particular subject or course. These videos allow the learners to pause and rewind to the point that they may have missed out. On top of that, the learners will be able to interact with the content developers who will also act as the administrators and facilitators of their course. Such interaction is vital for both sides; facilitators will be able to assess learners' understanding via the given feedbacks whilst learners will be able to seek clarification from the facilitators without any time limitation. In addition, learners will get to do some fun and interactive activities that will not only help them to understand the content better but also to help them to sustain the knowledge perceived. These are among other features that MOOC could offer in order to promote the idea of online learning.

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## **MyVetPBL™ : A problem-based learning (PBL) tool for veterinary education in Universiti Putra Malaysia (UPM)**

**<sup>1</sup>\*Wan Mastura Shaik Mohamed Mossadeq, <sup>1</sup>Gayathri Thevi Selvarajah, <sup>1</sup>Siti Suri Arshad, <sup>2</sup>Idawaty Ahmad & <sup>2</sup>Hazlina Hamdan**

<sup>1</sup>Faculty of Veterinary Medicine,

<sup>2</sup>Faculty of Computer Science and Information Technology,  
Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia

\*E-mail: wmastura@upm.edu.my

**Highlights:** Problem-Based Learning (PBL) is an approach that incorporates soft skill with content learning and independent learning style as opposed to the teacher-centered learning practiced in universities. However, its implementation is time consuming and burdensome, involving countless paper-based assessments to be graded. Therefore MyVetPBL™, an e-learning tool for veterinary students as a paperless initiative to combat these problems was developed using a Software Development Life Cycle (SDLC) and implemented using Java, PHP language and MySQL database. The integration of e-learning tool with the PBL approach will hopefully enhance teaching and learning in undergraduate veterinary education in Universiti Putra Malaysia.

**Key words:** Problem-based learning, veterinary education, electronic, tool

### **Introduction**

Problem-Based Learning (PBL), a multi-disciplinary pedagogical approach that encourages those who take part in its process to act as an agent of change in teaching and learning styles was first introduced by McMaster University's medical school in 1969 (McLoughlin and Darvill, 2007) and described formally in the early 1980's by Burrows and Tamblyn (1980). Since then, PBL been used as an educational strategy for development where globalization of higher education has been set as an objective (Kolmos and de Graaff, 2007).

However, one of the problems faced by faculty members regarding Problem Based Learning (PBL) is time constraint due to other commitments such as teaching, research and consultancy. Lecturers had to face piles of assessment papers at the end of each PBL session which may be overwhelming and counter-productive. In addition, the increasing annual intake of students makes the logistics required for conducting proper SCL sessions and regular classes a major concern whereby students had to spend more time to search for information outside the classroom as the time allocated for each session is limited. Moreover, the current generation of students or the 'Net Generation' (Prensky, 2001) prefers to connect through social media on a regular basis and search for information required in their class using hyperlinks and social networking sites compared to conventional teacher-centered learning.

Most importantly, a tool that facilitates integration of subjects taught from year 1 to year 5 within the Veterinary Medicine curriculum was needed. An effective e-learning tool is therefore, warranted. In recognition of this need, MyVetPBL™ system was developed in 2015 by researchers from the Faculty of Veterinary Medicine as well as researchers and final year students from the Faculty of Computer Science and Information Technology, Universiti Putra Malaysia.

### **Content**

A standardized software development methodology known as Software Development Life Cycle (SDLC) was imposed on the development of the proposed MyVetPBL™ system. SDLC is divided into five phases: planning, system design, implementation, testing, and finally deployment of MyVetPBL™ system. Basic steps were conducted in system design phases i.e., the interface design and databases design for web version of MyVetPBL™ system. Following the implementation phase in SDLC, the program codes of these designs were developed using Java, PHP language and MySQL database. In order to assist PBL facilitators, students and administrators who are new to this system, a manual for the MyVetPBL™ system is made available. A Trademark (TM) was granted in 2015. The Copyright (©) application is in progress.

The e-learning tool is based on the PBL approach by various public institutions which uses the basic active learning steps namely: Introduction to case, Self-Directed Learning (SDL), discussion or brainstorming session, presentation of findings and ends with a reflection or journaling session. With this e-tool, cases and triggers will be uploaded onto the web at the beginning of the semester but the students will have access to the case scenarios and first trigger only. The subsequent triggers will be available once the learning outcome for the first trigger is achieved. Students will have the opportunity to revisit the case scenarios and triggers at their own leisure time. Additionally, the system

allows the facilitators to assign students to groups on-line and monitor involvement of individual students by forum rooms, where discussion on the case is done.

Real-time observation will be done by the facilitators and group members. The marks and comments however, have to be computed on-line. The opinions and comments regarding the performance of group members will be computed on-line to ensure confidentiality. Students in year 3 will only have access to case scenarios and trigger for that particular year but students in year 5 will have access to all triggers from year 3 and 5, as cases in year 5 are a continuation from cases in year 3. Facilitators and course co-ordinators are able to view the progress on-line throughout the semester.

## **Impact**

It is hoped that the provision of an on-line education environment will help save time, energy, utilization of printed materials/papers for the session and ensure proper monitoring of student's progress in addition to tapping student's affinity towards technology. This tool also enables the flexibility in time-tabling of classes/PBL sessions as problems/case scenarios and instructions are available on-line and can be accessed anytime/anywhere, allowing students to spend more time for self-directed learning and eliminating the need to repeat instructions to students with the aid of tutorials available in the program.

More importantly, the software facilitates integration within the Veterinary Medicine curriculum by incorporating interactive with integrative learning materials from year 1 to year 5 of the DVM curriculum and thus enhances teaching and learning in undergraduate veterinary education in UPM.

This product is commercializable as the system can be modified to suit a greater circle of targeted groups, e.g. veterinary students at the national, international institutions, animal science students, medical students and health professionals. This product is able to penetrate the foreign market as well due to its user-friendly approach and the demand for such tool in teaching and learning.

## **Acknowledgement**

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## An innovative model to integrate multiple knowledge(s) on curricular contents, pedagogy and technology for teachers' TPACK development

**Assoc. Prof. Dr Lee Kean Wah, Cynthia C. James, Assoc Prof. Dr Tan Choon Keong & Dr Noraini Bt Said**

Universiti Malaysia Sabah, Kota Kinabalu, MALAYSIA

[kwlee@ums.edu.my](mailto:kwlee@ums.edu.my)[keanwah@gmail.com](mailto:keanwah@gmail.com)

District Education Office of Kota Kinabalu, Sabah State Education Department, Kota Kinabalu, MALAYSIA

[ccindyjames@gmail.com](mailto:ccindyjames@gmail.com)

Universiti Malaysia Sabah, Kota Kinabalu, MALAYSIA

[cktanums@gmail.com](mailto:cktanums@gmail.com)

IPG Cawangan Tawau, Sabah, MALAYSIA

[msnorainisaid@gmail.com](mailto:msnorainisaid@gmail.com)

**Highlights:** Getting 'digital immigrants' teachers to teach using technology is challenging and research findings are equally damning in the disappointing levels of penetration and success in integrating technology into the curriculum. Teachers' knowledge (lack of it) has been identified as a key obstacle for effective technology integration. A way out of this conundrum is to provide teachers with more than the just technical aspects of technology to include understanding that technology has affordances and constraints both for representing content and identifying pertinent teaching approaches (Harris, Mishra & Koehler. 2009). This study reports on an innovative approach which allows teachers to mobilize their multiples knowledge on curricular contents, pedagogy and technology through the **IDDIPP**(an acronym for the stages Introduce, Demonstrate, Develop, Implement, Reflect, and Revise) through a series of technology integration sessions, thereby enhancing their **TPACK**.

**Key words:** Teacher development, 21<sup>st</sup> century learning, Technology Integration, TPACK, Learning by Design

### Introduction

Preparing in-service teachers who are 'digital immigrants' to teach in the 21<sup>st</sup> century can be daunting. This is because learning in the 21<sup>st</sup> century is so different from yesteryears, due in most parts to the wide availability and advancements of ICT tools, communications, information, and the manner in which human learn and work. Given this change, education must shift to incorporate computer-based, electronic technologies integrating learning with these technologies within the context of the academic subject areas. However, studies have consistently shown that technology integration shows disappointing levels of penetration and success (e.g. Cuban, Kirkpatrick & Peck, 2001; Bauer & Kenton, 2005). Recently, reviews on research and scholarship on technology integration identified teacher knowledge as one of the key obstacles for effective technology integration (Hew & Brush, 2007; Mishra & Koehler, 2006). Findings seem to point towards the need for teachers to know more than the just technical aspects of technology, to include understanding that technology has affordances and constraints both for representing content and identifying pertinent teaching approaches (Harris, Mishra & Koehler. 2009).

### Statement Of The Problem

There is a large body of literature on studies investigating motivation and readiness of teachers towards technology integration in formal learning (Kiraz and Ozdemar, 2006; Bax, 2003; Hafner & Miller, 2011; Thang et al. 2014) and the extent of support provided to teachers using technology in formal learning (Koch, Misook & Kush, 2012; Cut Nora Azizah, 2010; Ertmer & Ottenbreit-Leftwich, 2010) but there is a dearth of literature on investigating teachers' experiences of professional development and self-ownership in creating a teaching and learning tool for local usage, with the exception of Lee et al. (2014) who examined TPACK development with a group of Malaysian in-service teachers and found that the process of designing and implementing digital materials are helpful for integrating technology into the curriculum as it appears to allow teachers' to mobilize their multiples knowledge on curricular contents, pedagogy and technology.

### Background Of The Innovation

**Learning by design** was adopted as a process of solving problems that are complex and ill-structured (Jonassen, 2008). Such problems include a series of cognitive tasks that require designers to identify and analyze problems, explore and evaluate solutions, and make decisions (Jonassen 2008). The learning by design approach allows teachers to take the role of designers of learning activities (Kalantzis and Cope 2005; Yoon et al. 2006). This approach has been used in teaching teachers to integrate digital technologies into the classroom (e.g., Kalantzis and Cope 2005). Through learning by design, teachers' pedagogical repertoires can be expanded (Guñer and Altun 2010; Hjalmarson and Diefes-Dux 2008; Koehler and Mishra 2005). During the design process, teachers are engaged in an authentic environment and experience the complexity of learning and teaching contexts. The innovative **Learning by Design** model involved teachers through the **IDDIRR model** through a series of technology integration sessions.

## The Design Of The Innovation

The innovative IDDIR model (Lee & Kim, 2014) is grounded in the **TPACK framework** (Mishra & Koehler, 2006), the **learning-by-design approach** (Kalantzis & Cope, 2005), **ID models** (Gagné, Wager, Golas, & Keller, 2005; Gustafson & Branch, 2002), and **design-based research** (DBR; DBR Collective, 2003; Reeves, 2006; Van den Akker, Gravemeijer, McKenney, & Nieveen, 2006). The following list presents the guidelines that involve multiple teaching-related elements to facilitate teachers' TPACK development:

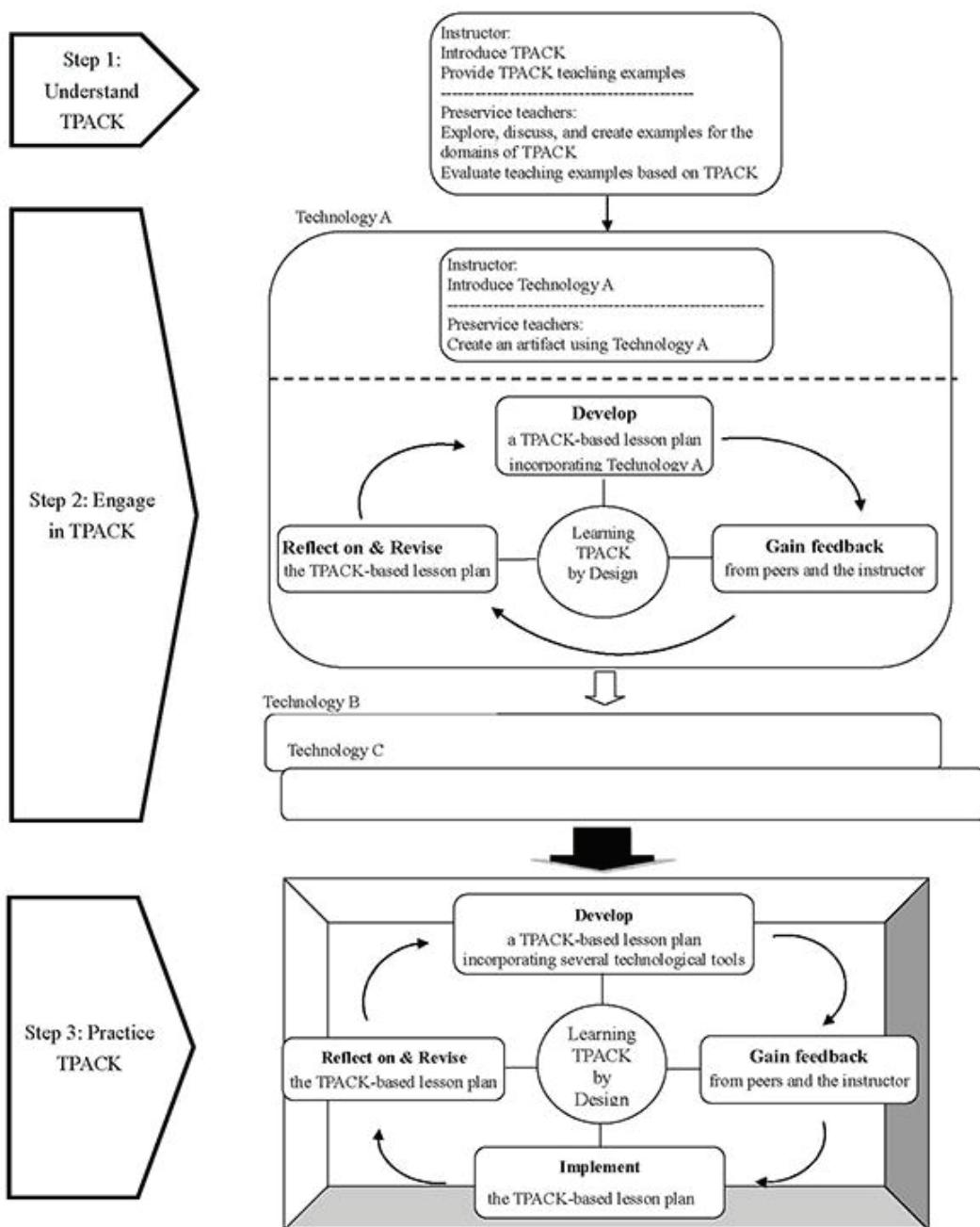
**Guideline 1.** Explicit, systematic procedures should be included to enhance teachers' TPACK.

**Guideline 2.** Discussion of definitions and teaching examples relevant to TPACK should be included to enhance the understanding of TPACK domains.

**Guideline 3.** Development of several lesson plans integrating various technological tools should be included to enhance the connection of technology to specific content and pedagogy.

**Guideline 4.** Implementation of a technology-integrated lesson plan should be included to help transfer knowledge to teaching.

The development of teachers' TPACK was explored via qualitative data, including interview, observation, and documents analysis, which were analysed using thematic analysis approach. This study hopes to provide insights about the factors that afford or impede teachers' development in their TPACK and develop interventions that promote English teachers' TPACK in general.



### Usefulness

- A model for Language Teacher Development
- Useful resources for teaching KSSR/KSSM English
- Localised and Customised DLM suitable for any schools in Malaysia

### Commercial Potentialities

- Training workshops for teachers to create their DLM and provide assistance in starting an online learning node.
- Producing and tailoring DLM for each academic level according to socio-communities (primary and secondary) as a learning material
- Consultation and Workshop for Teacher Development
- A Development Kit for TPACK Development for English Language Teaching

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## Chemistry Authentic Learning: Problem Solving in Electrolysis

**Suraiya Muhamad, Jamalludin Harun, Noor Dayana Abd Halim, Johari Surif, Siti Salbiah Omar**

Department of Educational Sciences, Mathematics and Creative Multimedia

Faculty of Education, Universiti Teknologi Malaysia, 81300 Johor Bahru, Johor, Malaysia

suestar2014@gmail.com, p-jamal@utm.my , noordayana@utm.my, johari\_surif@utm.my sitisalbiahomar@gmail.com

**Highlights:** Chemistry authentic learning module aligns well with the needs of today's participatory learners. The challenge is to channel their collaborative abilities and reflective skills into academic pursuits, helping them to develop the problem solving competency. Authentic practice enhances learners' application of higher-order thinking skills to solve real life tasks. School students were exposed to ill-defined electrolysis problems during intervention in order to train them become competent in problem solving process. This approach has integrated problem solving skills, scientific knowledge and authentic practice in order to develop authentic chemistry problem solving competency in learning electrolysis for school learners in general.

**Key words:** Problem-solving Competency, Authentic Learning Practice, Electrolysis

### Introduction

Authentic learning for the 21st Century introduced learners to the basic elements of an authentic learning experience. Teachers are encouraged to design activities for learners that match, as nearly as possible, the real-world tasks of professionals in the field. Hence, learners will be competent to solve real life problems, complex, ambiguous, and multifaceted in nature, requiring sustained investigation. The main purpose of this "Chemistry Authentic Learning" module is to provide an alternative instructional approach to improve student's higher order thinking skill (HOTS) in solving the open-ended problems in chemistry. This module aims to guide and lead the educator or teacher to conduct a meaningful, fun-filled and effective way of teaching electrolysis in the authentic environment.

### Background

Authentic learning activity is designed to draw on the existing skills, talents and experiences of learners, building their competency and confidence through participation. The activity is matched to the needs of the new "participatory learner," one whose expectations for active, hands-on involvement in learning have been raised by the proliferation of creative opportunities available through website, social medias etc. Increasingly adept at creating new-media content and evaluating the content of others through blogs, wikis, and social networking sites, incoming school learners are accustomed to working collaboratively and shaping the direction of online communities forged from personal interests. Teachers can channel these creative and collaborative energies into discipline-specific pursuits and help learners develop the higher-order thinking skills they are least likely to acquire on their own. Within the context of real-world challenges, an effective authentic learning exercise will provide guided opportunities for learners to practice the "portable" skills that will serve them well in any professional context.

As per students' performance report in Malaysia national examination, previous research and survey report that electrochemistry is a crucial topic for learners in learning chemistry at secondary school in Malaysia. Electrolysis is a part of learning objective in the chapter of Electrochemistry (Lee, 2008; Lee and Kamisah, 2012, Lartson, 2013). Studies have been carried out and results showed that animation and simulation using Information and Communication Technology (ICT) can help learners to visualize and hence enhance learners' understanding in learning abstract chemistry topics.

Problem solving competency would be developed if learners are able to apply the scientific competencies to solve the open-ended problems in an authentic learning environment. Learners must be equipped with the problem solving skill and should be able to apply it to confront with real-life problems, outside the classroom (Surif et.al,2014). Thus, this "Authentic chemistry learning" was developed for the purpose of promoting the development of problem solving competency in electrolysis by considering learners' scientific knowledge competencies and problem solving skill as their chemistry problem solving competency.

ADDIE Model (Rosett, 1987) was applied in the production of this on-line module. Based on the findings in the preliminary study, researcher will identify the problem underlying factors that influence the development of problem solving among school students. Then, on-line module for learning Chemistry shall be designed for intervention at Full Residential School. Researcher will apply ADDIE model by ADDIE Model ( Roseett, 1987) to design the module. Rationally, ADDIE model is considered as practical and appropriate to be applied due to the five systematic steps. The module is developed based on social constructivism theory because this theory emphasized on collaborative problem solving and authentic learning environment which will enhance the construction of knowledge in the real life situation (Jonassen, 2007). Four identified elements of reflection, ill-defined problem; real life task and collaborative problem solving are fully integrated to design an authentic chemistry learning environment. These type of problems requires the application of higher-order thinking skills not only application of knowledge (Bozi and Tramullas, 2014).

## Objective

This module is designed and developed to achieve some objectives as stated:

1. To improve the learner's problem solving skills to solve open-ended problem in chemistry.
2. To attach learners with real life activities (tasks) in learning electrolysis
3. To encourage the collaborative problem solving to solve open-ended problem in chemistry
4. To develop the reflective practice among learners during solving the problem.
5. To interconnect the learners' scientific knowledge competency with real life problems.

## Impact

Towards meeting the 21<sup>st</sup> Century education requirements and in order to provide world class education in Malaysian context, this module can provide the teacher and educator with practical and updated learning approach to teach chemistry. This online module is a platform for learners to access the real life tasks and solve the ill-defined problems collaboratively. By this way, it provides the opportunity for learners to share the solution or product of problem to others. Due to educational research development to emphasize that higher order thinking skills are important in problem solving task, Malaysian Education Blueprint (2012) has stated one of the key attributes acquired by learners to be globally competitive is thinking skills. Complex real-life problems often required complex solutions that can be obtained through higher thinking processes. Every student will learn how to continue acquiring knowledge throughout their lives and be able to connect different pieces of knowledge to create new knowledge. Activities from this module will improve and equip our learners' problem solving competency for national examination (SPM) and international assessment such as PISA.

This module has been developed to overcome a few issues and give an impact to the teachers and learners. Most of the learners shared their positive feedback from the interview conducted and participant's grid reflection responses. Learners can do the reflection immediately at the end of the lesson. This reflection is an effective self-assessment for participant and teacher to evaluate the learning process and outcomes. Real life task assigned to the participants are assessable at any time and place as long the internet service is available. Participants were inspiring to participate in the activity provided in the on line module as they are able to hands- on and mind- on. The ill-defined problems in the real life tasks assigned for the learners become the challenge for them to solve based on their scientific knowledge, prior experience and problem solving skills. Learners can watch the animation, video and graphic image to understand the concepts of electrolysis in a deep way. Learners have an opportunity to conduct the forum with the expert to solve the real life task about an environmental issue.

Teacher as the facilitator found that this module is a systematic approach to teach chemistry. Facilitator can plan and update the lesson more conveniently with the help of activities and resources provided. The resources for learning electrolysis become multi-perspective. Facilitator can keep track and receive the submission of assignment more systematic. It is easy to analyse and summarize the response from grid reflection.

This on-line learning module has been used as a tool to provide the users with learning material, virtual laboratory, enrichment activity and quiz supported by multimedia elements such as video, audio and animations to engage student with a real life of learning environment. This "Authentic Chemistry Learning" presents the approach on how teachers have used technology to foster authentic learning to improve problem solving competency among school learners. In this "Authentic Chemistry Learning", problem solving competency is an integration of scientific

knowledge and problem-solving skills that can be measured during the process in solving open-ended electrolysis problem based on learners' actual performance.

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## Design and Development of BMT Digital Learning for Basic Movement Course in Physiotherapy Education

**Zahidah Abd Kadir & Nurul Shuhadah Rosni**

Universiti Kuala Lumpur, MIIT, Kuala Lumpur, Malaysia

[zahidah@unikl.edu.my](mailto:zahidah@unikl.edu.my); [nrlshuhadah.adda@gmail.com](mailto:nrlshuhadah.adda@gmail.com)

**Highlights:** Physiotherapy is a course gaining importance due to the needs of acquiring precise knowledge in practical skills. However, research shows that there is a lack of study in this field with the consideration of blended learning that applies online learning resources to assist face-to-face instruction. The purpose of this study is to develop a digital learning resource for basic movement therapy course to enhance student's performance of practical skill for physiotherapy students in UniKL Royal College of Medicine Perak (RCMP). Results revealed that the design of digital learning resource application received high ratings for usefulness and ease of use concepts. The research concludes that the participants consider the digital learning resource material is useful and easy to use.

**Key words:** basic movement course, multimedia design and physiotherapy education.

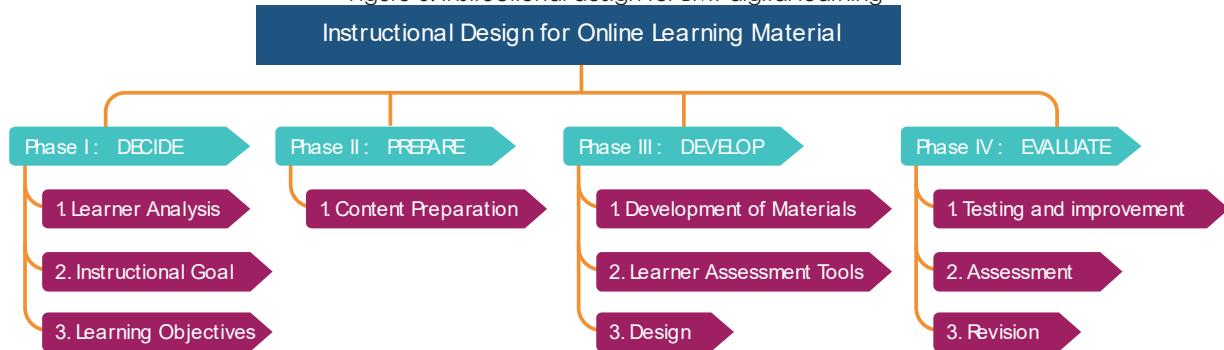
### Introduction

Physiotherapy is a course gaining importance due to the needs of acquiring precise knowledge in practical skills. However, research shows that there is a lack of study in this field with the consideration of blended learning that applies online learning resources to assist face-to-face instruction. Currently, teaching and learning approaches in physiotherapy subjects are merely based on lectures, group discussion, and practice in tutorial sessions and practical in physiotherapy exercise room without the use of technology. The use of Information and Communication Technologies (ICT) is believed to enhance student learning. Nowadays, e-learning has become a popular medium for delivering instruction in medical education. This innovative method of teaching offers unique learning opportunities for medical trainees. (Clark & Mayer, 2011) proposed that to design e-learning material, it is crucial as a designer to know how the most important guidelines might be applied in e-learning courses. Eight principles of multimedia have been used in the design and development of this research consisting of multimedia and modality, exception to modality, temporal contiguity, redundancy, coherence, personalization, segmentation and pretraining principles. The purpose of this study is to develop a digital learning resource for basic movement therapy course to enhance student's performance of practical skill for physiotherapy students in UniKL Royal College of Medicine Perak (RCMP).

### Content

Prototype development in this research is guided using instructional design guidelines proposed by (Galvis, 2007). It consists of four phases called DECIDE, PREPARE, DEVELOPMENT and EVALUATE. Figure 1 illustrates the main phases and activity involved.

Figure 6: Instructional design for BMT digital learning



### Phase 1: DECIDE

Knowing as much as possible about the learners is critical in order to design and implement instruction. By understanding learners' knowledge and skill at the start of instruction, can support to plan effective design to assist learners to be successful in learning. Therefore, to get a complete picture of learners' characteristic it is possible to consider about general characteristic. Based on principles of training and design for adult learners' important characteristic such as learners' personal experience in e-learn, learners' motivation and learning styles information were gathered. The data collected were used to inform general characteristics of learners from the perspective of socio-economic background, personal experience in e-learn, self-motivation and learning styles. The analysis of student's background on learning motivation shows that

93.9% of the students have high self-motivation in studying this course despite of being influenced or enforced by parents, friends, teacher or others. The analysis of student's background on prior knowledge shows that 79.6% of them studied Biology as a subject at school or matriculation level, whereas 20.4% studied Basic Science. The analysis of student's background on Internet access shows that 65.3% of them have access through mobile data. For this reason, the application needs to be designed using offline method due to bandwidth consideration.

### **Phase 2: PREPARE**

Five sequential elements are used to create the learning materials content. First designer need to organize content by identifying key topics. This is to allow designer to identify important content for the online learning material. Next designer need to identify subtopics for each key topics and how they link. Thirdly is to create training flow, which is represented in the organizational diagram for the online learning material presentation. Preparing for the web-based material structure must choose a design that mirrors the nature of the learning subject. Designer must avoid design that can make learner become lost or find the design lacking in their interest, challenge and motivation (Clarke, 2001).

### **Phase 3: DEVELOP**

In this step, key topics and subtopics have been identified for the content development of digital learning material. Digital learning material allowed content to be access with hyperlink in non-linear format to ensure that key topics and sub topics are connected. The digital learning material consists of two types of materials: a) printed materials and b) electronic materials. A printed material is provided for long reading information whereas an electronic material contains video learning and 3D simulation assessments. To measure learners' learning comprehension, 3D simulation assessment was developed using 3Ds max software, Unity 3D and motion capture equipment. All characters, which are modeling in 3Ds, max software. The interactive 3D content used Unity 3D as a main coding development. Motion capture equipment allows precise motion for the therapy procedures. Experience therapists were used to demonstrate the procedure for recording purpose using the motion capture equipment. Grounded by Clark & Mayer (2011) works, the designing phase used this guideline in digital learning material. Table shows the multimedia guidelines proposed by Clark & Mayer (2011).

**Table 1: Multimedia guidelines (Clark & Mayer, 2011)**

Design Guidelines for e-learning	
Multimedia and Modality Principles	To communicate content use relevant graphics explained by audio narration
Exception to Modality Principle	For information that needs learner's time to process use text on the screen
Temporal Contiguity Principle	Do not separate visual and audio that describes the visual
Redundancy Principle	When using graphics on the screen do not present words as both onscreen text and narration
Coherence Principle	Avoid irrelevant videos, animations, music, stories, and lengthy narrations
Personalization Principle	Use conversational style using first and second person for audio scripting
Segmentation Principle	Break content down into small chunks using continue or next button
Pretraining Principle	Teach important concepts and facts prior to procedures or processes

### **Phase 4: EVALUATE**

In this phase, the final product undergoes evaluation by educator, designer and learners. Through formative assessment, two faculty members with extensive knowledge of basic movement in physiotherapy background reviewed the digital learning material. Three undergraduate learners used the digital learning material and provided feedback to designer. The research then considered all the feedback and suggestions and implemented changes for the final version of digital learning material.

The design and development of instructional environment and materials can bring students from the state of not being able to accomplish tasks given to them to the state of being able to accomplish it. Thus, it is important that designing for education learning materials must be based on theoretical and practical research for more informed and effective design and development practices in eLearning(Kanuka, 2006). In education, the role of instructional designer employed a high level of precision, care and expertise in the planning, development and evaluation process of learning instruction(Sharpless Smith, 2010). This is because design is a goal-directed process, which aims to conceive and realize some new thing that can be resulted for practical utility. However, to simplify the content sometimes important information has to be taken out, consequently making the content insufficient. Thus, appropriately, the design that places for student-centered design requires that all the considerations must be addressed from the very beginning.

Skill and practical subject such as basic movement therapy course in physiotherapy education, require students to apply their knowledge and understanding about human movement in order for them to be able to perform treatment technique. In this subject students learn about muscle action, fundamental anatomy, assessment tools, manual therapy and hydrotherapy. This subject needs to be acquired by students in their second semester and serve as an entry-level knowledge before they enter to the next level. Theoretical parts in this subject are crucial for students to learn and understand as they are fundamental in clinical practice.

Despite the development in education transformation using digital media, we do not have enough contents to support blended learning, therefore current higher education does not foster current needs in teaching and learning process. There are still many issues that need further investigation in designing effective application for optimal learning environments. Currently, teaching and learning approaches in this subject are merely based on lectures, collaborative learning, group discussion, practice in tutorial sessions and practical in physiotherapy exercise room without the use of technology. In spite of the growth technology in education, technology-mediated teaching and learning in physiotherapy education appear to be less than satisfying with limited research available on the appropriate use of technology-enhanced learning environments (Rowe, Frantz, & Bozalek, 2012).

Learning skills such as note taking while instructor demonstrates, imitate among peers and discussion from learning by doing in a small group and notes revision are not enough to promote learning. Students are required to do self-study after finishing the class. However, the lack of learning resources and materials has limited students' to self-regulate learning proficiently. Azer, Alkhelaif & Aleshaiwi(2014) also found that for many years, students relied on their clinical teachers as one of the main sources for learning practical skills because they do not have structured resources for references. As a consequence, result can be seen during assessment through individual practical test where students were not able to perform better.

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## **Integrated Naqli & Aqli Self-Instructional Learning Module Framework Design For USIM**

**Najwa Hayaati Mohd Alwi, Nurul Fathihin Mohd Noor Shah, Norasikin Fabil, Rozhan M. Idrus, Mu'azz  
Sahari, Nurhuda Ruzlan**

Universiti Sains Islam Malaysia (USIM), Nilai, Negeri Sembilan, Malaysia  
najwa@usim.edu.my

fathinshah@usim.edu.my\_norasikin.fabil@usim.edu.my\_rozhan@usim.edu.my\_muazz\_sahari@yahoo.com,  
nurhuda.ruzlan@usim.edu.my

**Highlights:** This study proposed a framework design name as Integrated Naqli & Aqli Self Instructional Learning Module (INASILM) Framework. This framework is the pioneers SILM framework that integrated with Naqli & Aqli knowledge. Finding shows that, there is no framework related to the integration of the Naqli (revealed) and Aqli (human) knowledge for content development of self-instructional teaching and learning materials. This framework consists of four domains learning which are cognitive, affective, psychomotor and spiritual. The framework is instils the Islamic way of thinking and be able to develop characteristics of a holistic, comprehensive and balanced students. This framework also has commercial values which can be used in USIM and others higher education institutions.

**Key words:** e-Learning, design, e-content, Self-Instructional Learning Module, framework, Naqli & Aqli integration

### **1.0 Introduction**

Nowadays, to develop characteristics of a holistic, comprehensive and balanced individual is the one great challenge. In recent years, Universiti Sains Islam Malaysia (USIM) as one of Malaysian public universities has determined to be a university that is ahead in both disciplines the revelation knowledge (the Naqli knowledge) and rational science (Aqli knowledge) with philosophy – pioneering Islamic science and spreadheading knowledge. In line with the university philosophy, the integration of Naqli and Aqli knowledge in the education curriculum for courses in the university has been commended and embarked. Integration of religion with social and physical sciences in all USIM programs enabling it to become an instrument for the new solution in the current global problems (Ibrahim, et.al, 2015).

This approach involves all disciplines from science and technology and social science as well. The academician from the entire faculty and academic centres in the university has been encouraged to develop a suitable teaching and learning content that integrate naqli and aqli knowledge. Naqli knowledge is the knowledge that is sourced from Quran and Sunnah of the Prophet Muhammad, while Aqli knowledge is sourced from the rationale and findings of human thoughts in relationship with the progress of human civilization (Ibrahim, et.al, 2015). Thus, due to new character of 21<sup>st</sup> century learner that appreciate the self-learning concept, one of the effective methods is preparing e-content by developing a Self-Instructional Learning Module (SILM) with the aspiration to develop learner autonomy and independence (Jones, 2007). Knox (1986) had claimed self-instructional strategy gives individuals the ability to learn at his or her own pace and choose a setting, providing the learner autonomy. The learning process is focusing more on student centric. Furthermore, lectures can emphasize on the meaningfulness and relevant content such as graphic or video, and self-check activities.

### **2.0 Description of Product: Framework Design**

This Framework consist of 2 two categories

1. Components of SILM use of constructivism theory
2. Learning domain integrated with the four levels of Integration Naqli & Aqli

Framework guideline

1. Prepare a complete SILM module on a topic by following suggested component of SILM
2. Classify the content on the SILM by domain of learning.
3. Based on the integration level, integrate the Naqli & Aqli knowledge by referring to field of knowledge derived from Al-Quran & Sunnah.
4. The integration level has covered the previous level.

A framework (Figure 1) has been developed by separating the level of integration with the domain of learning:

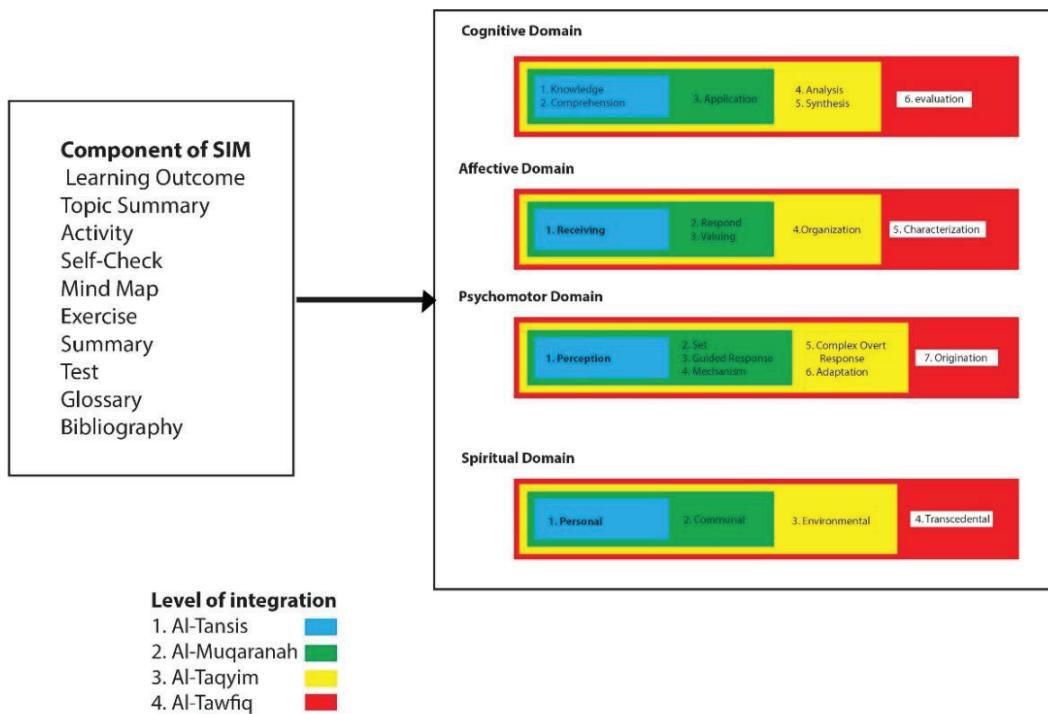


Figure 1: Integrated Naqli & Aqli Self-Instructional Learning Module Framework Design For USIM

### 3.0 Background of the Framework

#### 3.1 Self-Instructional Learning Module (SILM) Design

The process of designing the SILM is based on Kolb's Learning Cycle **Invalid source specified.** and Constructivism Theory (Duff, et.al, 2013.). Kolb's theory of experiential learning was used as a starting point because of its consistency with stages of cognitive growth and development. The core of the theory is that learners progress through a learning cycle in which experience leads to observation and reflection, which then lead to concept formation.

#### 3.2 Naqli and Aqli Knowledge

To date it is known that there are four elements of Naqli and Aqli knowledge integration (Mohd Rushdan,2013).

- Mustawa1 (M1)- Al-Tansis / Al-Maqasid (ayatisasi / ayatization)**  
Referring to the primary sources of Islamic sciences and knowledge.
- Mustawa 2 (M2)- Al-Muqaranah (Perbandingan / comparative)**  
Identify the differences and similarities of dimension / approaches in Islamic and conventional knowledge.
- Mustawa 3 (M3)- Al-Taqyim (Adaptasi / Adaptation)**  
A process of selecting, filtering, adapting and using principles, values and framework which are not contradict to Islam.
- Mustawa 4 (M4)- Al-Tawfiq (Integrasi / Integration)**  
Combining and applying various disciplines of knowledge that can produce holistic curriculum.

The results of integration of Naqli and Aqli Knowledge in education curriculum would be as listed below:

- Integration can generate Islamic compliance goods and services.
- It instills the Islamic way of thinking i.e. looking at things, understanding things, re-act at things.
- Remove the intellectual confusion created in Muslim mind by secular elements.

To date, not many-documented integration of Naqli and Aqli knowledge reported in literature. Since there is a gap in literature on Naqli and Aqli integration, this paper would like to highlight the possibility of designing an Integrated Naqli and Aqli Self-Instructional Learning Module that will be useful for teaching and learning especially in USIM.

### **3.3 The Integration of Naqli and Aqli Knowledge in SILM**

The purpose of Naqli and Aqli knowledge integration as listed below also can be seen in the context of application in SILM:

- To make Islamic knowledge and sciences relevant in learning module.
- To highlights the knowledge with the Islamic worldview.
- To achieve tawhidic understanding on relation of knowledge.

We are suggesting in adapting the bloom taxonomy as a start and focus on using nine Gagne events of instructions to embrace the Naqli and Aqli knowledge and apply in SILM components. Any four mustawa can be instilled at any events of instruction to embrace the Naqli and Aqli knowledge.

### **4.0 The Importance of Framework to Education**

The important of framework to education are:

- The framework is integrated with domain learning (cognitive, affective, psychomotor and spiritual).
- The framework is instils the Islamic way of thinking for examples looking, understanding and re-act at things.
- The framework be able to develop characteristics of a holistic, comprehensive and balanced students.

### **5.0 The Advantages of Framework to Education**

The advantages of framework to education are:

- The framework ready for Integrated Naqli & Aqli Self-Instructional Learning Module (INASILM) development.
- The framework are prepared as a guideline for academicians to develop teaching and learning materials.
- The framework is the pioneers SILM framework that integrated with Naqli & Aqli knowledge.

### **5.0 Commercial Value**

- The framework will be converted to template to be used for academicians at USIM.
- A module training for SILM developer and 21<sup>st</sup> century educator will develop from the Framework template.
- The framework can be commercialized to others higher education institutions.

### **6.0 Conclusion**

This paper showed the advantages of the use of SILM in the teaching and learning process and the integration of Naqli and Aqli knowledge to produce a better teaching and learning process for a Rabbani generation. The proposed framework can be used as a guideline for academicians to develop teaching and learning content materials. This is inline with the USIM's vision and philosophy to apply the Naqli and Aqli knowledge in teaching and learning process and also meet the aspiration of KPM on e-learning use in teaching and learning process.

### **Acknowledgement**

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## Enhancing Post Graduate Supervision through a Hybrid Community of Practice (H-CoP) Approach

**Fariza Khalid & Nurul Syaida Md Zuki**

Universiti Kebangsaan Malaysia, Bangi, Selangor, Malaysia

fariza.khalid@ukm.edu.my

nurulsyaidazuki@gmail.com

**Highlights :** The role of supervisors and supervisory committees, as well as the relationship between students and their supervisors, are key components affecting the success of students in their programs (Vessey et al., 2008). Mismatch of expectations between supervisee and supervisor, lack of support from supervisors as well as hierarchical relationships, were among the issues that often become hindrances to postgraduate students' progression in their research undertaking (Lee, 2007). To overcome such difficulties, there must be an effective way to conduct supervision so that it will fulfill both parties' (supervisee and supervisor) expectation. This research therefore, was conducted to formulate the best model of postgraduate students' supervision so as to facilitate their research process. In this presentation, a model of a hybrid CoP (H-CoP) supervision will be explained based on this action research findings. This approach is proven to be effective for postgraduate students to move forward and complete their research on time.

### The Innovation

The hybrid community of practice (H-CoP) approach is an approach that blends virtual and traditional collaborative environment. The approach used is a hybrid community of practice with social learning as the underlying theory. This involved daily conversation among students and their supervisor via mobile apps (WhatsApp) and file sharing via Trello, which is a mobile friendly project management application and related information to research process shared via the lecturer's web page – Research Support (which comprised of references and e-forum). Face-to-face meetings were held on regular basis, which covered various topics, from basic of research to data analysis software and to sharing experience with ex-students who passed their postgraduate studies. This approach, although seemed to be informal, it injected a high discipline among the students e.g., to fill up and submit their supervision form which highlighted few prominent issues to be tackled by individual students. A CoP approach was selected as a framework of the community building as it gives students' more sense of agency towards their learning and at the same time helped them to negotiate their identities as a researcher and member of a community.

### Design

Ten students (7 masters and three PhD students) were involved in this project. Data was collected via open-ended questions sent to the participants via Weebly e-Forum and Trello. The data was analyzed using Nvivo software which involved open coding and the categorization of the codes into themes. The overall process so far has been done for three semesters. Using action research approach, the process of developing a model undertook improvement from time to time.

### The importance of the model to education

The model derived from this research is relevant to be adopted by other university lecturers so as to enhance the effectiveness of a community among research students. It is time to look at supervision from another perspective, i.e., from a social learning theory where students may learn from each other, rather than from their supervisors alone. Engagement in such community can also cultivate students' self-esteem as researchers and confidence to talk aloud about their research problems, techniques and findings. The argumentations, sharing ideas and thought will contribute to their professional development as well. The hybrid model which involved the mixture of face to face and online phases was unique and at the same time supported students and supervisors to appreciate what technology could offer. The documentation of supervision meeting outcome helped students to be more focused on what they actually need to do next. Indirectly, this can cultivate their analysis and synthesis skills.

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## goReason : A Collaborative Learning System for Reasoning Skills

**Nurbiha A Shukor, Ana Haziqah A Rashid & Zaidatun Tasir**

Department of Educational Sciences, Mathematics and Creative Multimedia, Universiti Teknologi Malaysia, 81310 Skudai, Johor, Malaysia.

[nurbiha@utm.my](mailto:nurbiha@utm.my), [anahaziqah@yahoo.com](mailto:anahaziqah@yahoo.com), [p-zaida@utm.my](mailto:p-zaida@utm.my)

### Introduction

Many students are incapable of providing reasons to justify their opinions (Zohar and Nemet, 2002; Sadler, 2004; Tsai and Tsai, 2014). This demonstrates that students are actually lack of reasoning skills which also leads to lack of higher order thinking skills (HOTS) (Conklin, 2011) that effect the results of Trends in International Mathematics and Science Study (TIMSS) and Programme International Student Assessment (PISA) in Malaysia. Reasoning skills can be improved through a proper, structured instructional approach. A lot of studies consistently demonstrate that collaborative learning helps in enhancing students' reasoning skills (Clark et al., 2003; Kidder, 2008; Jadallah et al., 2011; Kim, 2014). A computer-based learning environment has the potential to provide automated feedback, scaffolding and could structure learning towards the desired outcome. A computer-based learning environment that integrates both pedagogy and technology called 'goReason' was developed to improve students' reasoning skills.

goReason is a web-based system that implements collaborative learning approach with the assistance of scaffolding methods which aims in enhancing students' reasoning skills. The main function of this web-based system is to provide a web 2.0 platform for students to collaborate among their group members and gives opportunity to students to elaborate their ideas. The uniqueness of this web system is the computer-based scaffolding method that has been embedded to the discussion forum page. This function enables students to scaffold their peers during the collaborative discussion by referring to the guidance of scaffolding that has been provided. This web system also provides guidance for students to give arguments in order to trigger their ideas and improve their reasoning skills. goReason also has interactive web 2.0 features where it allows students to manage their group learning by allowing students to produce a collaborative report writing.

The implementation of goReason can help students to elaborate their ideas and justify their opinions by experiencing the automated scaffolding in goReason discussion forum. goReason also assist teachers in facilitating students to scaffold their peers in the discussion. Most importantly, goReason helps students to enhance their reasoning skills that will also contribute in improving their HOTS.

### Impact

goReason is a web system that have been developed based on thorough research works that integrate both pedagogy and technology. goReason also have been tested to more than 50 actual users. The special features of goReason are it has automated individual assignment based on role in the group discussion and scripted specific scaffolding for student with different role in the group. Another advantage of goReason is that it allows interactivity through the discussion forum and collaborative report writing. The most important impact of goReason to teaching and learning is it will helps instructor or teacher to conduct group-based learning while facilitating all groups at the same time since every student in the group has their assigned role.

The target market for goReason will be teachers, students and learning institutions. From the number of 419,820 teachers and 10,173 learning institution in Malaysia, we target at least 10% from them will used goReason in their teaching and learning. For teachers, they need to pay RM30 for one class up to 30 students per month while for learning institution they need to pay RM3 per student per month.

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## Fifth Apprentice

**Nur Ezzati Binti Rosli, Noor Fatin Binti Mohd Nazri, Nur Amanina Sahira Binti Mat Musa, Balqish Binti Mat Noor, Ahmad Syafiq Bin Mohd Termizi & Dr. Wan Zuhainis Binti Saad**

Universiti Putra Malaysia, Selangor, Malaysia

[ezzatirosli14@gmail.com](mailto:ezzatirosli14@gmail.com); [ayu\\_qurlz9575@yahoo.com](mailto:ayu_qurlz9575@yahoo.com); [amanina184341@gmail.com](mailto:amanina184341@gmail.com); [gishbalqish134@gmail.com](mailto:gishbalqish134@gmail.com);  
[ahmadsyafiq93@gmail.com](mailto:ahmadsyafiq93@gmail.com); [zuhainis@upm.edu.my](mailto:zuhainis@upm.edu.my)

**Highlights:** Fifth Apperentice is a platform for learning. A website to instill interest in Microbiology. It is full of interactive information to engage learners to create meaningful learning. This website provides an attractive environment through concept maps for users to discover and learn microbiology in a fun way. Learning Microbiology is made easy with Fifth Apperentice.

**Keywords:** Microbiology, Concept Map, Website, Interactive Learning

### Introduction

In this 21<sup>st</sup> century, most of the students will have their own gadgets. In line with the recommendations of the ministry, e-learning has become a demand learning approach in education. E-learning is a useful teaching tool in education and is defined as "the use of internet technologies to enhance knowledge and performance (Ruiz et al. 2006). It is an electronic learning, and typically this means using a computer to deliver part, or all of a course in many fields as training or a full distance learning course.

Fifth Apprentice is a website that contains information about microbiology topic. The target users for this website is the degree and diploma students. It is a platform to help students in enhancing learning of microbiology in a more interactive environment. The main objective of this website is to share the knowledge through concept map. Concept map is a graphical tool for organizing and representing knowledge. They are drawings or diagrams that show the mental connections and association patterns a student makes on knowledge learned (Angelo and Cross, 1993). It includes concepts, usually enclosed in circles or boxes of some type, and relationships between concepts indicated by a connecting line linking two concepts. We discovered that learning with the concept map is better and easy to understand compare to the mind map. Concept map makes learning fun and interesting. Besides, it also help the student to better understand a particular topic. The topic groups of microorganisms are bacteria, fungi, protozoa, algae and virus. The characteristics, morphology, the microbial habitat and also the growth requirement are emphasized.

Fifth Apprentice will also provide short notes on particular topics. This is used as a supplementary reference apart from the concept map provided. Other than the concept map, this website provides other platforms where the students can share extra information. The users of this website can share their own concept maps, mind maps or other important or relevant information. The sharing session will provide extra knowledge. At the same time, the students able to ask and share questions based on the microbiology topics.

Any questions will be directly emailed to the webmaster to provide feedbacks and response. For some answers, they are referred to an expert like the lecturers. This Q&A session can encourage students to develop their communication and critical thinking skills. Besides that, quizzes are also available. The questions are based on all the information provided in the concept map, short notes and the videos. The quizzes will help the students to identify their level of understanding and can be used as self assessment. This will enhance learning and engage learners.

Extra information such as videos, games and fun facts are also can be found in the website to make it more attractive and engaging and learning is supposed to be fun. This website is essential for all learners in microbiology especially those in diploma and degree program. It is an interactive, engaging and interesting platform of learning for the 21<sup>st</sup> Century learners.

### Impact

This website has a lot of advantages towards education and community. It helps learners to gain knowledge through various methods. Other than using the text book, this website will make learning more interesting and interactive. Fifth Apprentice will help learners develop passion and instill interest in learning Microbiology. This website encourage the students to become more IT competence by promoting the advance learning of Microbiology. Not only that, it is also a plattform for learners to unleash their creative potential. Moreover, it will also make educator's job become easier as students are trained to be more independent and prepare themselves for learning. Educators themselves can use this website pre-, in- or post-lecture. It is user friendly and easy to access. This is the best way to instill interest among learners towards microbiology and at the same time develop self directed learners.

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## **Adapdation of ADDIE Model in Inventing Ethnic Relations MOOC Teaching and Learning (T&L) Materials**

**Fazilah Idris, Rozita Ibrahim, Rozmel Abdul Latiff, Nasruddin Yunos, Hasanah Abd Khafidz**

Pusat Citra Universiti, Universiti Kebangsaan Malaysia

[fazilah@ukm.edu.my](mailto:fazilah@ukm.edu.my), [eta@ukm.edu.my](mailto:eta@ukm.edu.my), [rozmelabdullatif@ukm.edu.my](mailto:rozmelabdullatif@ukm.edu.my), [nasrudin@ukm.edu.my](mailto:nasrudin@ukm.edu.my)

Fakulti Pengajian Islam, Universiti Kebangsaan Malaysia  
[hasanah@ukm.edu.my](mailto:hasanah@ukm.edu.my)

**Highlights:** The study aims at discussing the invention of teaching and learning materials for Ethnic Relations course via MOOC mode using ADDIE model as guiding principles. ADDIE's five phases: Analysis, Design, Development, Implementation, and Evaluation—represent a dynamic and flexible guideline for developing effective and meaningful T&L materials. Examples of teaching and learning materials such as videos, interactive activities and online discussion will be presented.

**Key words:** MOOC, Ethnic Relations course, ADDIE Model, interactive activities, teaching and learning

### **Introduction**

Ethnic Relations is a compulsory university course that promotes social cohesion among younger generation in Malaysia. Ethnic Relations classes are normally large in size and involved students from diverse background with various learning styles. Therefore, MOOC is introduced as an invention of *Ethnic Relations* MOOC materials to facilitate the teaching and learning (T&L) process. ADDIE model was the framework used in developing materials for Ethnic Relations course via MOOC mode.

### **Content**

#### **1. Description of the invention of T&L materials using ADDIE model**

The invention used the ADDIE model framework. The five phases—Analysis, Design, Development, Implementation, and Evaluation—represent a dynamic and flexible guideline for creating effective T&L materials. The analysis phase identified the needs to fulfill Gen X and Y learning styles. Therefore in the design phase, learning objectives were constructed and the content of the course was aligned with the learning outcomes in the form of storyboard. In the development phase, the storyboard was translated into the three kinds of teaching materials namely (1) videos (2) interactive activities (3) online discussions. The successful translation of the storyboard into MOOC teaching materials can only be realized with a strong collaboration between subject matter experts (SME) and technical team. Later in the implementation phase, the materials were uploaded onto the openlearning.com platform. Also, training sessions were conducted for the course instructors. Finally, in the evaluation phase, feedback from instructors and students on the effectiveness of the materials were gathered.

#### **2. The background of the invention of T&L materials**

This invention begun since the early phase of introduction of MOOC by Ministry of Higher Education. Ethnic Relation course is one of the courses that involved in the first phase of MOOC. In order to achieve the learning objective to the fullest, ADDIE model was closely referred to in crafting the T&L materials. In order to make the materials relevant and meaningful to the needs of Gen X and Y, various kinds of materials were crafted namely videos, interactive activities and online discussions. Many interesting tools that are readily available in the web such as Powtoon, Videoscribe, Camtasia, etc were utilized. Meanwhile, in developing enhancement activities, apart from tools that are already embedded in the Openlearning.com, we also used external tools such as online documents and slides.

#### **3. Why are they important to education?**

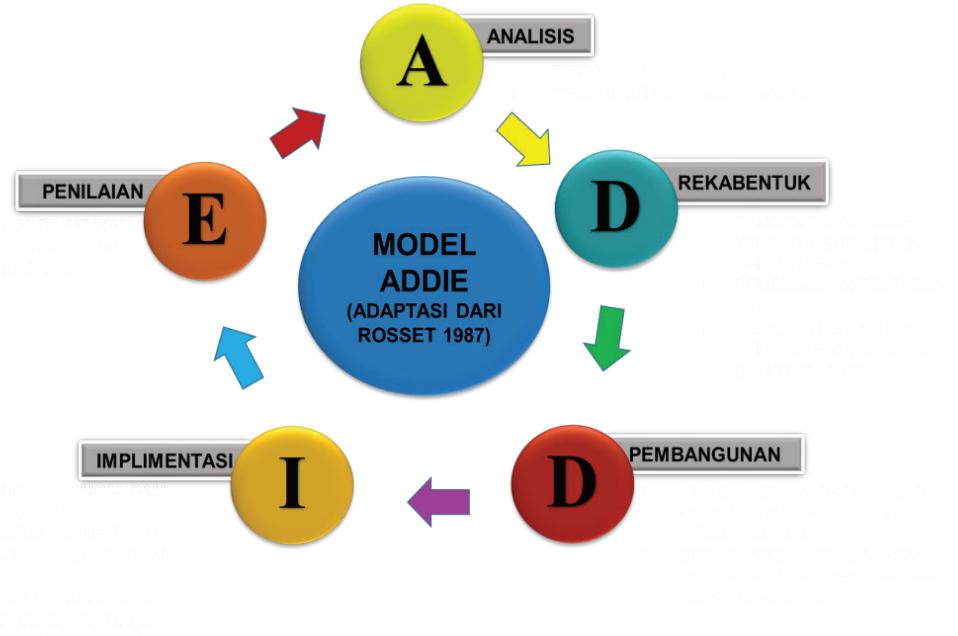
The invention is important in order to ensure that all learning objectives are achieved. The ADDIE model serves as a framework to ensure the invention of learning materials reflective of the students' needs and the same time capturing the predetermined learning objectives

In conclusion, effective adaptation of ADDIE model in designing MOOC materials for Ethnic Relation course managed to increase students' engagement as well as contributed to promote the uniqueness of Malaysian multiethnic society to the world, by upholding the Malay language as the medium of instruction.

#### **4. Advantages of the Instructional design process towards education and community.**

- It serves as a medium that can instill patriotism, national values and moral values towards character building of good citizen among the learners. These values are vital to sustain national unity and nation building in Malaysia.
- Promote national language (medium) and culture(content) -Malay language – to the world.
- Cater to learners both local students and International students (Vietnam, Korea...)
- Featured prominently in openlearning.com under Malaysian MOOC – one of the pioneers

- Open Learning Global (M) Sdn Bhd, Adam Brimo / Suzana Mustafa Ceo And Founder / Business Developmnet
- Ministry of Higher Education
- Multiple awards winners in various poster competitions
- Recognition of expertise – invited speakers –UMK



MODEL ADDIE (Adaptasi dari Rosset 1987)



IMPACT ON STUDENTS

## Acknowledgement

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## Adaptation of Aura Colour Interface Content Presentation based on Learner's Emotion in Personal eLearning Environment using Production Rules

**Rahmah Mokhtar , Fauziah Zainuddin, & Nor Azhar Ahmad Roslina Abd. Hamid**

Universiti Malaysia Pahang, Kuantan, Malaysia

drrahmah@ump.edu.my

fauziah@ump.edu.my, nazhar@ump.edu.my, roslina@ump.edu.my

**Highlights:** Personalization is a suitable approach to adapt the learner to its learning environment. Adaptation for personalization is based on modality and affective aspects of the learner. Most research into adaptation is focusing on modality aspect, thus adaptation in affective aspect is crucial to be explored. This innovative prototype namely, *EmoAPeL* was developed to adapt the aura colour interface content presentation based on learner's emotion in Personal e-Learning Environment using an intelligent production rule. *EmoAPeL* has been tested to 30 Universiti Malaysia Pahang students. The mean results show 88.5% of the students agreed that *EmoAPeL* motivates their inclusive learning environment. *EmoAPeL* development concept can be embedded to any eLearning systems.

**Key words:** Personalization, Personal Learning Environment, Emotion Adaptation, Production Rule

### Introduction

Each learner has different characteristics, preference, learning style and emotions. These differences make one size fits all concepts in eLearning is not relevant anymore. Adaptation in Personal Learning Environment (PLE) solves the problem, where the learners have to accept what have been given or deliver to them without considering their differences. The concept of PLEs refers to the environment that each person constructs in order to manage, build and exchange information and knowledge (van Harmelen, M., 2006; Atwell, 2007; EDUCAUSE, 2009) embedding the adaptation in PLE will make the more efficient and interesting learning environment to the learner. Adaptive learning is a system of learning that customizes the structure of learning contents to the desire for the individual learners. Nowadays, the system is said to be modeling the learners base on their personalization. This concept has the high potential to provide individual learners with the best-personalized learning experiences while studying using eLearning (Sonwalker, 2013). There are a few adaptation types such as a context-aware system, which adapted the presentation of the content. Content was presented in a variety of ways based on both students prior competencies (pre-requisite knowledge and skills) and preferences (Glushkova, 2008). The combination of these two aspects will enhance the learner's interests and motivation to eLearning. The objective of this innovative project is to identify the personalization based on student's emotion, to embed the adaptive based on emotion in the developed prototype for adaptive based learning and to test the effectiveness of the developed prototype in enhancing learner learning motivation and acceptance among IHL's students.

### EmoAPeL Development Framework

Emotion Adaptive Personal Learning Environment (EmoAPeL) is developed through the combination of Aura Colour Based Content Presentation and Production Rules Intelligent Technique. Aura Colour Based Content Presentation is used to develop the content in the Multimedia Technology Application subject. Mir Hazil (2010) identified the emotions could be relieved by using the colour aura. Sad emotion can be ease with the design of an interface that has lots of green colour. The green colour will stimulate the emotion to feel happy and be in neutral environment. Furthermore, for happy emotion, the interface must have lots of pink colour. This is because the pink colour will sustain the happy emotion. Recommended for the angry emotion, the design should have lots of blue colour. The blue colour will ease the angry emotion. In order to adapt the emotion to the content, the researcher used production rules. The process of EmoAPeL is simplified in Table 1.

Table 1 Simplified table for Emotion, Aura Colour and Production Rules

Emotion	Main Colour to ease emotion	Production Rules
Sad	Green	<b>IF</b> learner clicks sad emoticons <b>THEN</b> change to sad presentation <b>ELSE</b> Display existing presentation
Happy	Pink	<b>IF</b> learner clicks sad emoticons <b>THEN</b> change to sad presentation <b>ELSE</b> Display existing presentation
Angry	Blue	<b>IF</b> learner clicks sad emoticons <b>THEN</b> change to sad presentation <b>ELSE</b> Display existing presentation

Figure 1 shows the flows where EmoAPEL starts by detecting the emotion respond from the learners. The production rules which match colour aura will ease the student emotion, and this will lead to enhancing the interest towards the subject content that shown in adaptive Personal eLearning Environment application.

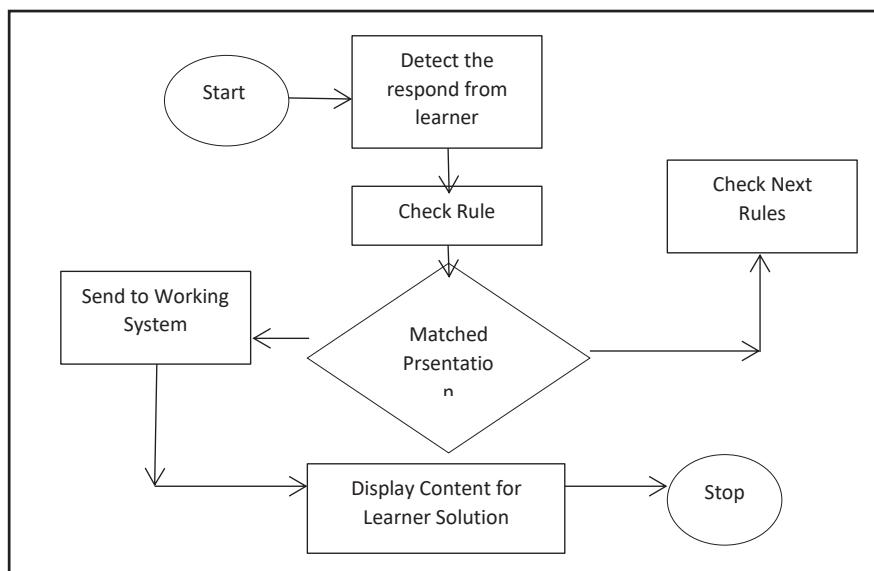


Figure 1 : EmoAPEL Flow Diagram

The adaptive technology based on emotions can help the learner to perceive the knowledge easily. The capability of color aura can ease the learner's emotion and makes their acceptance of learning smoothly without any distraction from negative emotions (Rahmah & Nor Azan, 2016).

## Result and Discussion

Multimedia Technology Application subject is selected as representing EmoAPEL. The testing has been made to 30 students from Faculty of Computer Systems and Software Engineering, Universiti Malaysia Pahang. A set of the questionnaire is given to the students during the test. The results show 87% of the students agree that EmoAPEL can ease their emotions, and 90% agree of their understanding towards the subjects.

## Advantages to Education and Community

- i. Introduce the new approach of PLE in the education technology field
- ii. Enhance the learning motivation, interests and capability to IHL students, thus will increase the value of excellent student, which will be giving it back to the community
- iii. Increase community knowledge
- iv. It can be applied as the problem solver to problematic students in gaining their knowledge
- v. Implemented as one of the tools, especially for developing eLearning content environment.

## Commercial Values

The technology introduces into EmoAPEL can be sold to the eLearning society and developer, where the process and technique can be adapted and use to solve the problem of the learner while perceive the knowledge. Personalization enhances learner motivation towards their learning.

## Acknowledgement (if any)

The researcher would like to thank our students who involve as the respondent for this innovation and CiReL UMP for sponsoring our exhibition participation.

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## MGTG Tool: Modify Greedy Test Generation Tool for Teaching Combinatorial Test List Generation Minimization

**AbdulRahman Ahmed AlSewari, Kamal Z. Zamli, Ameen A. Ba Homaid , Ammar K. Alazzawi, Alaa A. Alomoush, Dr. Taha H. Rassem**

Faculty of Computer Systems & Software Engineering, Universiti Malaysia Pahang, Pahang, Malaysia

alsewari@ump.edu.my

[kamalz@ump.edu.my](mailto:kamalz@ump.edu.my), [ameen2271@gmail.com](mailto:ameen2271@gmail.com), [ammarkareem91@gmail.com](mailto:ammarkareem91@gmail.com), [alla1030@gmail.com](mailto:alla1030@gmail.com),  
tahahussein@ump.edu.my

**Highlights:** Due to the current necessities, software engineering graduates must always be in touch with the current technology. Also, the curriculum is concerned, that increase the student's knowledge by adopting some tools, which they can be used in the labs rather just depending on the theoretical materials. Focus on the practical and technical skills rather than just the body of knowledge itself. There are some available tools in the market, but there are some difficulties to use them. These difficulties can be based on the following factors.

- Usability of the existing free tools is very complex.
- Commercial tools are also vendor specific and very expensive
- Open source testing tools lack documentation and often incomplete.

As part of our research work, we have developed a tool for teaching software testing and Artificial Intelligence techniques, precisely for combinatorial testing optimization problem. The developed tool adopt the Modify Greedy Algorithm to reduce the test list generation. This tool is successfully adopted in the classroom teaching for undergraduate course in two software testing courses – BCS3262 (Software Quality Assurance) and BCS3323 (Software Testing and Maintenance) at undergraduate level. Our results have been encouraging as we have positive responds from the feedbacks of the students.

**Key words:** Optimization Algorithms, Test list minimization, Combinatorial Testing, Software Testing and maintenance, Software Quality Assurance, Artificial intelligence techniques.

### Introduction

Combinatorial testing is a method that can decrease costs and raise the productiveness of the testing process for several applications (Ferrer, Kruse, Chicano, & Alba, 2015; Fraser, Arcuri, & McMinn, 2015; Gonzalez-Hernandez, 2015; Matinnejad, Nejati, Briand, Bruckmann, & Poull, 2015; Nie et al., 2015; Pérez Lamancha, Polo, & Piattini, 2015; Yuan, Cohen, & Memon, 2011; Zamli & Younis, 2010; Zhang, Yan, Zhao, & Zhang, 2014). The main idea beyond this kind of testing is that not each parameter play a part in the failure, as well as, the reason of the most failures is the interactions between approximately few numbers of parameters. Combinatorial testing is used widely as an effectual technique to uncover unplanned feature interactions inside a given software. For this purpose, test cases are constructed by combining tuples of the different input parameters, based on some effective combinatorial strategy. Combinatorial testing gives analysis for the interactions among variables by a few number of test cases. This advanced approach has evidenced success in providing strong, and economical budget in real-world situations. Therefore, one of the crucial problems of software testing in order to detect the software faults is the generating the effective test suite. Many beneficial test suite generation strategies (e.g. Boundary value analysis, equivalent partitioning, cause and effect analysis, and decision table) have been designed during the last 30 years (Hetzell & Hetzell, 1991). In spite of the fact that they are helpful, these strategies have not been sufficiently adequate to lead to a test suite for discovering bugs due to combinations. As a result, many new combinatorial testing strategies - t-way (where t denotes the combination strength) -, specially rely on covering arrays. There are three kinds of combination possibilities which t-way provides generally for producing the most optimal test cases (i.e. Uniform strength, variable strength, and input output based relations) (Hetzell & Hetzell, 1991).

### Objective

To achieve the objectives of this project are as follows:

A lab teaching tool for combinatorial testing optimization class has been developed.

The tool has been used by the students in the lab sections of software engineering at Faculty of Software Engineering and Computer Systems, Universiti Malaysia Pahang, to evaluate the performance of the developed tool.

### Value added

Novel tool based on Modified Greedy Algorithm for combinatorial testing optimization problem

The results have been obtained by the developed tool are efficient and significant compared with the existing tools results.

The usability of the tool is higher than the existing free downloaded tools.

### Usefulness:

By using this tool the students will get practical and technical skills rather than on the body of knowledge itself.

### Design of MGTG

Figure 1 shows the strategy design.

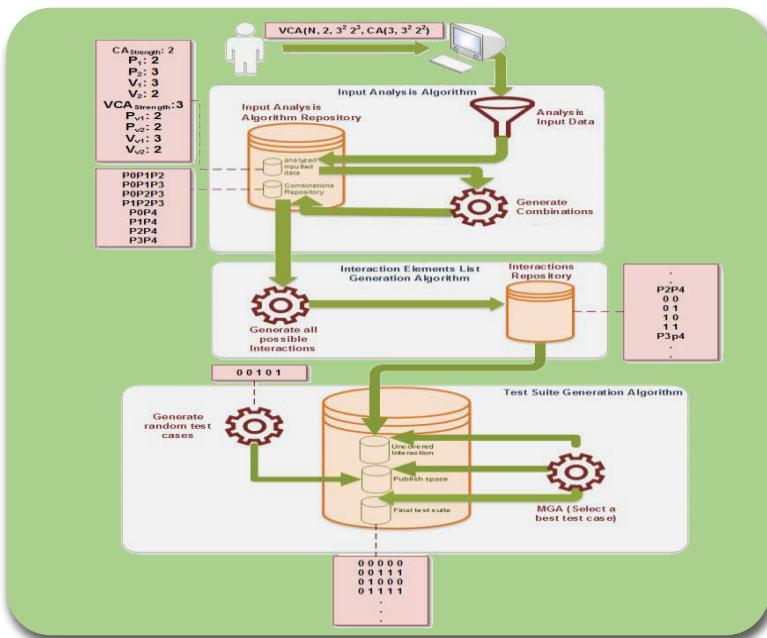


Figure 1. MGTG Design

### Commercialization potential:

ONE Copyright produced.

ONE ISI papers

This tool is already in use to facilitate practical teaching of two software testing courses – BCS3262 (Software Quality Assurance) and BCS3323 (Software Testing and Maintenance) at undergraduate level. E-PAT (Students Lab evaluation)

Suitable implementation for MOOC.

Table 1: E-PAT (Students Lab evaluation) gives promising results

Subjects	Student laboratory Evolution Results from E-PAT Evaluation System
BCS3323 - Software Testing & Maintenance. Semester 2 Session 2014/2015	92.59 %
BCS3323 - Software Testing & Maintenance. Semester 1 Session 2014/2015	91.49 %
Sem 15/16 BCS3263 - SOFTWARE QUALITY ASSURANCE Sem 115/16-BCS3323 - SOFTWARE TESTING & MAINTENANCE	92.02 %
	89.73 %

This tool can be commercialized in two type as fellow:

Each copy can be sold by RM/copy, while HEXAWISE web based tool cost \$1,995/month for company less than 500 license.

Or by providing a services. The payment will be based on the use of the tool such as RM100/day use.

### AWARDS/GRANTS

GOLD medal at CITREX2016

Gold medal at I-RIA2016

2 UMP RDU grants (ONE closed, TWO undergoing ) with RM60k

FRGS grant (Closed )(RM90k)

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## Utilizing Augmented Reality Technology for Teaching Aid Tools based on Model-based Learning (AR-MB)

**Nor Azhar Ahmad, Rahmah Mokhtar, Roslina Abd. Hamid, Fauziah Zainuddin, Emi Syakilah Takhta**

Universiti Malaysia Pahang, Kuantan, Malaysia

nazhar@ump.edu.my

drrahmah@ump.edu.my, roslina@ump.edu.my, fauziah@ump.edu.my, emisyakilah@gmail.com

**Highlights:** The success of model-based learning requires extensive preparations and the adoption of appropriate strategies. This is because object visualization plays a crucial role for this type of learning with student engagement in self-imagination being significantly reduced. Therefore, a prototype was developed using the Augmented Reality-Model-Based (AR-MB) framework to test its effectiveness in providing a better learning tool to students. A study involving a group of university students, who were enrolled in the Ethnic Relation subject was conducted to enhance their understanding of the Iranuns – a Sabahan ethnic group. The study concluded that 86% of students agree that AR can enhance their understanding of the related subject matter. Hence, the prototype proves to be a successful model that could also be implemented in other subjects. Future applications include the adaptation of a developmental framework for architectural modelling courses.

**Key words:** augmented reality, model-based learning, teaching aid, 3D modeling

### Introduction

Numerous subjects taught in educational institutions are based on the show-and-tell approach (Clifton et. Al., 2105). However, this approach may not be the best mode of instruction in educational settings. Educators face many problems in ensuring that students are beyond objective thinkers who tend to only memorize without clearer representations of the material. This is in contrast to students who have photographic memories and are better at remembering things they learn.

Another problem that arises in learning environments is the lack of interest in the subject matter. Contrary to the belief that students are lazy, the reason for the disinterest is due to the materials being dry and lacking creative burst (Jordan et. al., 2014). In addition, students may understand better when they are able to use other senses, such as touch, as opposed to vision and hearing. Currently, technical subjects use books as their main references. However, these books are static and provide a one directional experience to students that prevents them from communicating creatively with the books (Bacca et. al., 2016).

As a solution, an interactive system or courseware is needed to boost the learning experience of students. Lomaliza et. al. (2016) and Diaz et. al. (2015) discussed that the usage of practical virtual objects will enhance an individual's learning capabilities. These interactive visual aids are not only fun but will also improve the memorizing process of students (Novotny, 2013; Bacca et. al, 2015).

### Objectives

We have identified several objectives in conducting the study.

- i. To Identify the suitability of augmented reality (AR) in model-based learning.

We have developed a framework for the implementation of AR technology in line with specific subject objectives. By using this framework, it will ease the process of developing AR for model-based learning.

- ii. To develop AR-model-based(AR-MB) learning prototype.

Based on the proposed framework, we developed an AR courseware for an ethnic study subject, known as Iranun AR courseware, which is an introduction to one of the ethnic groups in Sabah, recognized as the Iranuns.

- iii. To analyze the effectiveness of the proposed model in higher learning institutions.

The developed prototype that uses the AR-MB framework is tested on university students to observe its effectiveness on their learning experiences.

## AR-MB Development Framework

This framework is based on the Augmented Reality Integrated Simulation Education (ARISE) conceptual model (Carlson et. al., 2016) and Connectivism learning environment (Techakosit & Wannapiroon, 2015). Furthermore, ARISE is based on in-situ learning, which is applicable in critical learning environments. In-situ learning is also being used by Mendoza et. al. (2015) and Jeřábek et. al. (2015). For AR-MB, no on-site facilitators are needed due to the nature of this framework that can be built and used via mobile devices.

The combination of ARISE, model-based learning, and mobile devices contributed to the successful development of our prototype. We developed the system without any problems due to each component of the AR-MB framework complementing one another.

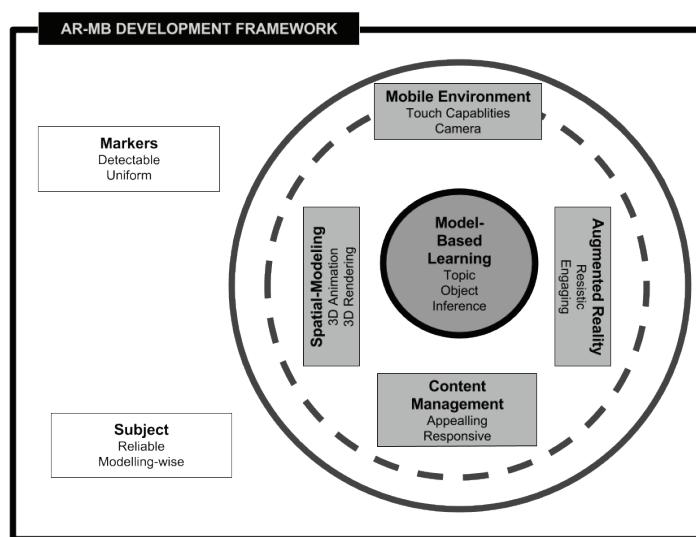


Figure 1 : AR-MB Development Framework with Important Attributes Need to Consider

## Prototype Development (I-ranun)

I-ranun consists of a 3-Dimensional (3D) representation, video, and animation of the Iranuns' unique cultures such as their official wedding ceremony and musical instruments. This mobile application employs the AR techniques that offer users the opportunity to explore and gain an in-depth understanding of the Iranun people, who are one of the minority ethnic groups in Kota Belud, Sabah, Malaysia (Takhta, 2016).

### Background

This prototype comes with a book of the Iranuns that acts as a 'trigger image'. This function allows the users to scan an image which would lead to the 3D objects, video or animation appearing on the screen. The book of I-ranun will be designed creatively to attract the users to view it by following the designing principle. The user can experience the real object in all views instead of the traditional 2-dimentional (2D) images in the book. Additionally, other functions are also available to enhance one's learning experience such as sound, movement, and extra info. By using an AR, information about the Iranuns can be easily understood and assessed in an interactive manner.

### Testing

Thirty students from Universiti Malaysia Pahang, who were enrolled in the Ethnic Relation subject, tested this AR-MB application. After experimenting with the device, the students answered a set of questionnaires as shown in **Table 1**.

### Result and Discussion

Table 1: Usability Testing Result for AR Model-based Learning Implementation on I-ranun

Questions	Result		Summary
	Yes (percentage)	No (percentage)	
Did you easily understand how to use the app?	100	0	The system is easy to use
Do you think I-ranun is suitable for youngsters?	80	20	A suggestion to add more items in contents
Do you think 3D modelling is suitable to represent the Iranun culture?	80	20	A suggestion to design more realistic 3D modelling

Do you think you were able to gain more information about the Iranun culture?	80	20	Lack of contents
What do you think about the Iranun book design?	100 (attractive)	0 (not attractive)	The book's design is acceptable
Did you think I-ranun could preserve the originality of the Iranun culture?	80	20	Only preserve the information of the Iranuns.

The results in **Table 1** show that 86% of students agreed that the I-ranun, which is an AR-MB application, is able to enhance their knowledge by providing an interesting platform to learn the material while preserving the originality of the Iranun culture.

## Key Benefit

- i. Represents a model for educators to develop an interactive model-based teaching aid for any subjects.
- ii. Able to enhance the students' motivations, goals, collaborations, interactions, attitudes and enjoyment of the learning process.
- iii. Speeds up the transfer of knowledge between students and educators.
- iv. Supports the e-learning idea of students having access to the materials by downloading them on their mobile devices whenever they need them; as a result, they are able to independently learn and revise.

## Advantages to Education and Community

- i. Emphasizes storytelling instead of the conventional book-reading.
- ii. Enhances one's ability to deliver a message to the community via modelling through AR instead of reading a text.
- iii. Supports autistic individuals who may have difficulties in comprehending written knowledge.
- iv. Encourages advancements in public education by providing an alternative interactive medium of information.

## Commercial Values

The commercial values of AR-based software/courseware are based on its content. As an example, the prototype provided here has the potential of being used as a tourism app to allow a deeper immersion of a group's culture. Furthermore, the same framework could be used to develop site helpers at cultural and historical locations (Mendoza et. al., 2015). By using markers at these sites, we could animate 3D AR for historical education to improve one's experience (Cianciarulo, 2015). Additionally, since AR applications require devices with a camera feature, mobile devices, such as tablets or smartphones, are the best avenues to expand the usage of this prototype since these apps will have market values through Google Play Store and Apple Store.

## Acknowledgement

We would like to thank the students who participated as software testers and developed the AR-MB prototype, and to CIREL UMP for sponsorship of our participation in the exhibition.

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## e-PRASMO 2.0: Revolutionising Teaching Practicum in the 21<sup>st</sup> century Classroom

**Normazla Ahmad Mahir, Noor Saazai Mat Saad, Zarina Ashikin Zakaria, Norhailli Massari, Haliza Harun**

Universiti Sains Islam Malaysia, Nilai, Negeri Sembilan, Malaysia

[normazla@usim.edu.my](mailto:normazla@usim.edu.my)

[noorsaazai@usim.edu.my](mailto:noorsaazai@usim.edu.my); [zarina@usim.edu.my](mailto:zarina@usim.edu.my); [norhailli@usim.edu.my](mailto:norhailli@usim.edu.my); [haliza@usim.edu.my](mailto:haliza@usim.edu.my)

**Highlights:** Revolutionising from its earlier version, e-PRASMO 2.0 adds reflexivity in its list of properties, making it a supervision tool that conflates both traditional method of support and feedback, and 21<sup>st</sup> century teaching and learning skills. e-PRASMO 2.0 is underpinned by Bigg's 3P model of teaching and learning which strengthens its foundation to produce good learners. Thus, any course that requires supervision is able to adopt this tool in conducting a supervision that is cost-effective and flexible.

**Keywords:** cost-saving, mature learners (PPG), online platform, reflexivity, teaching practicum

### Introduction

e-PRASMO 2.0 is electronic practicum assessment model. It is an electronic platform that contains a standard operational procedure to carry out the teaching practicum for the duration of 8 weeks (4 credit hours). The platform provides an e-workshop, an e-guide book, e-lesson plans, assessment forms and criteria, tips for video recording, steps for uploading on YouTube and samples of good lessons. In addition, it is also an avenue for the supervisors to give feedback and supervisees to ask questions too. All these are done as the supervisee discusses the plans for his/her lesson with the supervisor via an online forum. Then, after uploading the recording of the first lesson, the supervisor gives feedback using the same online forum. Next, he/she will record the second lesson based on the feedback given earlier. This is in line with the traditional method of supervision where support and feedback (Calderhead & Shorrock, 1997) are emphasized. e-PRASMO / e-PRASMO 2.0 has been utilised fully for two semesters for the in-service teachers undergoing their first degree programme at the Faculty of Major Language Studies, Universiti Sains Islam Malaysia (USIM). Figure 1 further introduces e-PRASMO 2.0 and its properties.



Figure 1: The Properties of e-PRASMO 2.0

As illustrated in Figure 1, e-PRASMO 2.0 is designed to make a cost-effective, stress-free and flexible assessment scheme for the practicum; aiding management, supervisors and supervisees. This method is vital because of its cost-saving benefits as well as reflecting the traditional practicum by including opportunity for feedback and discussion or reflexivity. Money and time spent are able to be saved on the site visits. e-PRASMO 2.0

enables saving up to more than 50% of the cost for the running of teaching practicum in the traditional mode. It is also stress-free as supervisees are able to perform their teaching in a low-anxiety environment and supervisors are able to evaluate their supervisees' performance at any time that is conducive for grading purposes. It is also flexible as supervisees are able to manage their video selections and supervisors are able to revisit their reviews.

Furthermore, the accessibility of information on the standard operational procedure of the teaching practicum is just a click away. In short, this online platform is definitely cost-effective, stress-free and flexible as it addresses the current needs of being technologically enhanced and the practicality in the assessment of teaching practicum in the 21st century. In addition, the easy accessibility of information, the inclusion of reflexivity and the enhancement in technology among the users are also properties of e-PRASMO 2.0.

The e-PRASMO/e-PRASMO 2.0 users are mature learners belonging to the Program Pendidikan Guru (PPG) of Kementerian Pendidikan Malaysia (KPM). Professionally they are in-service school teachers with services ranging from 7-25 years of teaching in the government primary schools. Their fields are either Pendidikan Islam or Teaching English as A Second Language (TESL). Their selection as participants are based on their needs for supervision in the teaching practice. Also, their lack of ICT knowledge and skills; pertinent to their performance as effective teachers in the 21<sup>st</sup>. Century classrooms.

#### **The Continual Quality Improvement (CQI)**

e-PRASMO 2.0 is a revolutionised version of the earlier e-PRASMO. A continual quality improvement (CQI) was carried out in terms of an online survey via Google Form to 117 PPG students who were involved in e-PRASMO. The main finding was that the feedback from the supervisor and the interaction between the teacher-students and supervisors were almost non-existent. Thus, this has become the impetus to have it upgraded to e-PRASMO 2.0 where there is reflexivity - where teacher-students and supervisors are able to interact, do consultation, give and receive feedback on the recordings.

#### **Framework**

e-PRASMO 2.0 is underpinned by an adaptation of Bigg's 3P model of teaching and student learning (1993). The framework in **Figure 2** below elucidates this.

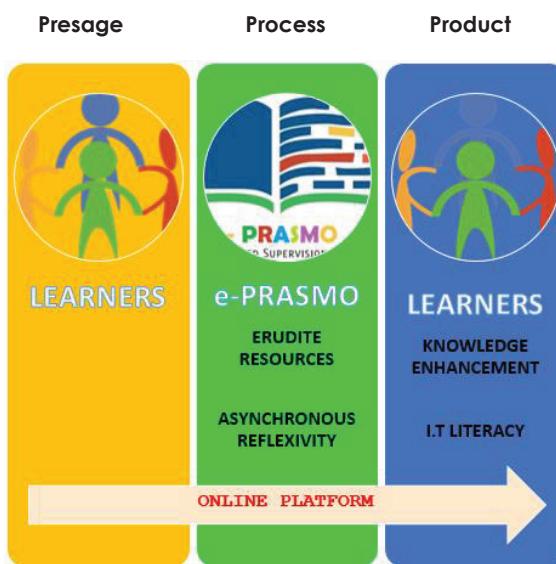


Figure 2: e-PRASMO 2.0 Framework

Figure 2 consists of Presage, Process and Product stages where Presage refers to the characteristics of the learners involved. In this case, they are in-service teachers undergoing teaching practicum and they are digital immigrants. These learners go through the Process stage where they utilise e-PRASMO 2.0 as a platform for their teaching practicum. Through e-PRASMO 2.0, there are erudite resources and asynchronous reflexivity where they have to read information online, record their teaching activities, edit their recordings, upload on YouTube, prepare slides, and interact through online forum, just to name a few activities. Going through this process, the learners reach the last P which is Product. This is where the learning outcomes of moulding them into IT literate group and polishing their teaching skills and knowledge are achieved.

#### **Conclusion**

The six main properties of e-PRASMO 2.0 include its being widely accessible via the internet (GOALS, YouTube) by both Supervisors and Supervisees; cost-saving in terms of axing the supervisors' AMV (Accommodation, Mileage & Vehicle) claims; a stress-free practicum as well as supervision experience to the supervisees and supervisors respectively. Issues on flexibility and practicality are also addressed as not only supervisees will be able to manage their video selections easily, but the supervisors will also be able to revisit their reviews while assessing the videos.

Additionally, information on the standard operational procedure of the teaching practicum is also at their fingertips with the inclusion of reflexivity among the users of e-PRASMO. Most importantly, the life-long learning skills acquired by the supervisees (managing USIM LMS i.e. GOALS & uploading YouTube videos) have been a plain sailing 21<sup>st</sup> century teaching and learning experience (technological enhancement).

Although e-PRASMO 2.0 has been used for teaching practicum, its concept of online supervision which is cost-effective (one of the properties of e-PRASMO 2.0) can be applied to other courses. Using GOALS as a platform, e-PRASMO can be tailor-made to suit the other courses. Thus, it has been promoted to courses that involve supervision like Industrial Training, Industrial Attachment, Work Experience for learning, Industry Engaged Learning, and Programme Internship.

### Acknowledgement

We would like to thank USIM for the Action Research Grant and to GOAL-ITQAN for the continuous support in making e-PRASMO 2.0 a reality.

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## G-ACE

**Dr. Nurkhamimi bin Zainuddin, Intan Ros Safina binti Safri, Nurhuda binti Ruzlan, Nur Syakira binti Redzuan**

GOAL-ITQAN,

Universiti Sains Islam Malaysia (USIM)

Bandar Baru Nilai, 71800 Nilai, Negeri Sembilan

khamimi@usim.edu.my, intanrossafri@usim.edu.my, nurhuda.ruzlan@usim.edu.my, nursyakira@usim.edu.my

**Highlights :** G-ACE stand for Global Access Continuous Education is the hub of a suite of learning technologies used to support teaching by creation of online learning materials. It is a platform to pursue short courses program which combines audio, video learning materials that suit distance learners. G-ACE Cart allows registration online and payment online and the students manage to use the online content for certain duration. In the early of 2016, many short courses have been offered through this platform such as *Sijil Asas Ilmu Tajwid*, *Sijil Lanjutan Ilmu Tajwid*, *Sijil Asas Ilmu Qiraat* and *Sijil Lanjutan Ilmu Qiraat* which are Aqli and Naqli courses.

**Key words:** G-ACE, hub, online learning, platform, technologies, payment online

### Introduction

Busy people are always getting low time commitment on a matter, medium engagement of any activities, low personalization and medium of effecting for conducting their life balance for getting new knowledge. The advancement of the technology has boosted the pace of lives and it needs for people to learn something beyond their job task, especially when it comes to the Islamic things such as lifelong learning that can be used in life. People can discover a lot of information by do searching online through the internet that can be used for continuous education in order to expand their knowledge.

To solve the problem by this people, G-ACE is the great time-saving learning website that allows their students to effectively learn a new knowledge on their time without comprising their busy schedule since USIM got many lectures and teachers from a different field background that can contribute the knowledges while expanding it too.

### Content

G-ACE stand for Global Access Continuous Education is the hub of a suite of learning technologies used to support teaching by creation of online learning materials. Many learning websites out there have a similar function with G-ACE since online learning system based is almost a decade has been introduced. What makes it different from others in the market is, G-ACE program comes with e-payment for enrolling the course provided known as G-ACE Cart. Students need to choose what course they need to enrol and the payment can be done directly by the system via three modes of payment which are Online Banking, Bank Transfer and Offline Banking. In advanced, all the courses are given to teach by USIM's certified lecturers which is core in their respective field. Others, the system itself supported the administration part which can make the administrator easily can generate a report.

This technology is very practical to be used and implement into an education sector for sharing and expanding knowledges to people who is intended to take a course but no time to attend the course. If this technology is practiced in our education area, the education system can make some changes because now everyone can study without needing to pass the grading phase. G-ACE, on the other hand, offered a reasonable price for everyone. In short, there are great time-saving knowledge learning websites that allow students to effectively learn a new knowledge on their own time, without comprising their busy schedule. This way, they can keep working hard while expanding their cultural and knowledge. This platform of learning also provides a certificate for students, but only certificate of participation will be provided due to no assessment attached to the program.

On the other hand, G-ACE offered different types of courses which is represent of Agli and Naqli elements that can be used for a lifetime. It is easy to study and understand the content of the courses. Students may also refer to the instructor and ask further about things they don't understand.

## The Process

The Process of G-ACE will best describe in the figure below.

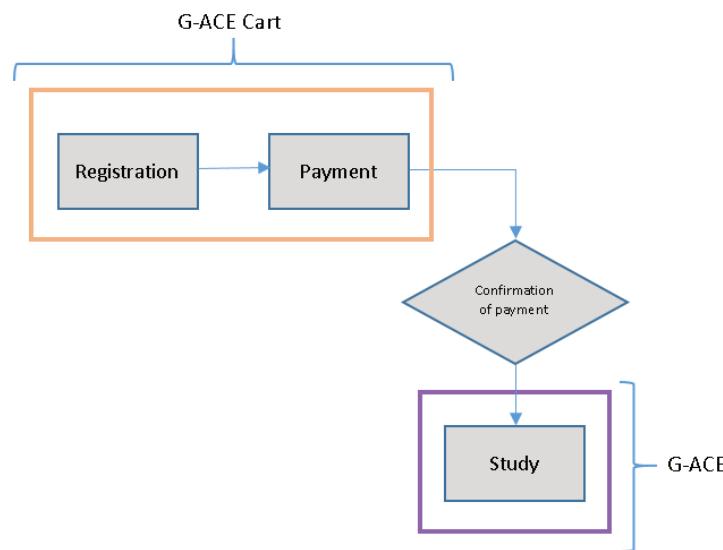


Figure 1: Overall Process of G-ACE

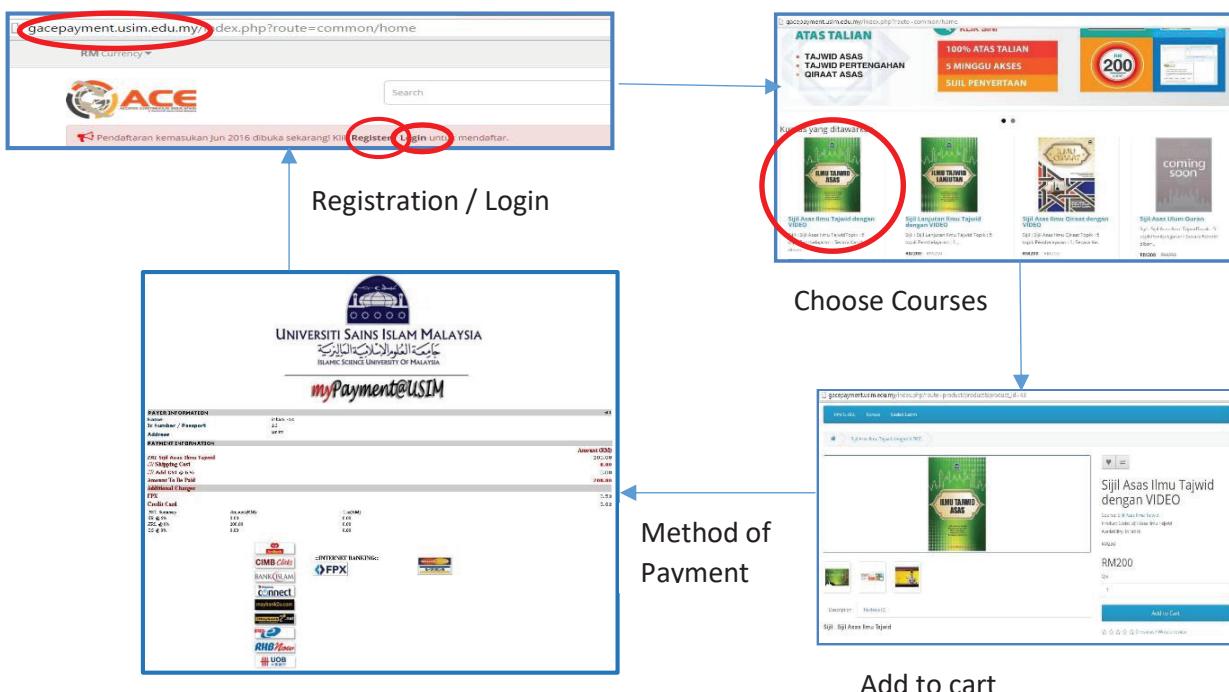


Figure 2: Screenshot of G-ACE

## Advantages

By joining the short course program, it will help others who want to improve their skills for some courses. They do not need to come to the institute, they can study the course in fully online from their home. These will also reduce their budget of transportation and also their time to come all the way to the institution. Furthermore, with this platform of learning they will notice new short courses available for them to join from time to time.

The G - ACE platform of study is different from others because it is focusing more on Islamic learning material which is Naqli and Aqli synchronize to the USIM Principal. In fact, learning program in G-ACE platform acts as flipped classroom that can help to a higher education and it is also relevant to the public in general. G-ACE, on the other

hand, offered reasonable price for everyone. They also can choose their preferable mode of payment. Besides, with G-ACE Cart it is easier for the administrator to monitor and manage to report the ordering courses that have been made by the student.

## **Conclusion**

With this G-ACE platform, it will continuously help USIM institute to offer Lifelong Learning materials courses to people who eager to enhance their knowledge in such courses that relevant to Aqli and Naqli elements. Besides, planning has been made to offer new courses in a few months. Moreover, with this platform, it can reduce budget on transportation, people can also save their time, and also it is easier for them to get to know the new short courses available in USIM.

## **Acknowledgement**

We are very grateful to the lecturers involved in producing the materials of short courses in G-ACE platform, Also thanks given to GOAL ITQAN staff who set up the system.

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## GOALS Reporting Tool

**Nur Syakira Redzuan, Mohamad Faiz Taip, Intan Ros Safina Safri**

GOAL ITQAN

Universiti Sains Islam Malaysia (USIM),

Bandar Baru Nilai

71800, Nilai, Negeri Sembilan

nursyakira@usim.edu.my

m.faiz@usim.edu.my, intanrossafri@usim.edu.my

**Highlights:** GOALS Reporting Tool is a tool to capture the e-learning usage among lecturers. This tool is useful in determine whether the lecturers has achieved 30% Blended Learning for their course where it was in line with 30% Blended Learning Rubric developed by e-Learning Malaysia committee members. Therefore, this reporting tool has been integrated with Global Open Access Learning System (GOALS) for ease of use where lecturers can measure their achievement on e-learning activities usage by viewing data captured by this tool in current semester. Besides that, this tool is helpful in reporting the Blended Learning culture in a university.

**Key words:** reporting tool, measure, integration, capture, Blended Learning, GOALS

### Introduction

Encouraged by the excellent evaluation, taking into considerations, and best practices from other institutions; measuring strategies have been developed to support decision making and to measure individual performance.

Therefore, E-learning has been defined as any utilize of information and communication technology to facilitate learning and teaching process. In Malaysia context, National e-Learning policy has outline on the 30% Blended Learning usage in teaching and learning at higher education institution.

In USIM, lecturers have to achieve minimum of 30% Blended Learning for their course where 30% is a course that blends online and face-to-face delivery, the most proportion of the content is delivered online, typically uses online discussions, and reduced the number of face-to-face meetings.

Previous measuring method used by Learning and Teaching and Innovation Sector of Global Open Access Learning, Immersive Technology and Quality Assurance (GOAL ITQAN), to monitor lecturer's learning activities USIM is based on text form. As a result, often crucial information failed to be understood immediately by lecturers, because of lack of explanation in graphical format.

Consequently, this abstract will discuss the how the integration of Reporting Tool work with Global Open Access Learning System (GOALS) to measure lecturers e-learning activities usage in Moodle platform. This tool will assist all lecturers in USIM to measure their e-learning activities.

### Integration of GOALS Reporting Tool

PHP codes and SQL Queries to the certain table in GOALS act as integration technique for this project. The result of this integration was divided and displayed into 4 categories in line with 30% Blended Learning rubric developed by e-Learning Malaysia committee members. Figure 1 below shows the rubric that was applied in e-learning for USIM.

CATEGORY	DESCRIPTION		BIL. ITEM UTK PENGIRAAN % BLENDED LEARNING
Information (5%)	Course Outline		1 item
Contents/Resources (40%)	Word Processing (.doc) , Presentation Power Point (.ppt), Adobe Reader (.pdf), Flash (.swf), Video, Audio, Book *		7 items uploaded
Activities (35%)	Synchronous	Video Conference: BigBlueButtonBN *	3 Items conducted
	Asynchronous	Wiki *, Discussion, Forum *, Feedback *, Choice *, Survey *, Glossary *, Lesson *, Questionnaire *, Web 2.0	
Assessment (20%)	Quiz *, Assignment *, Workshop *, Turnitin Assignment *,		2 items
(*) is a tool in GOAL			30% bahan disampaikan secara blended

Therefore, Reporting Tool consists of 5% Information, 40% Content and Resource, 35% Activities, and 20% Assessment. Data collected from each course by category in Rubric. The report will show the list of courses and activities within certain range of date for each current semester only.

Firstly, 5% Information is the general information about the course. Lectures have to put their course outline document where the original source must have "course outline" name in order for Reporting Tool to capture the data.

Secondly, 40% Content and Resource is the activity where lecturer collect all the notes and reading material in order to facilitate the students to make revision. Integration work for this category by capturing any file type created, for example (.pdf, .docx, .ppt, video, audio) and the 'Book' module in GOALS. 'Book' module is used to display reading material for individual modules of study.

Thirdly, 35% Activities consists of interesting and interactive activities by lecturers with their students. Students and lecturers can communicate and discussing about a topic. This category can be used to sharing idea as well. Reporting Tool will capture any 3 modules in GOALS for this category for example like Forum, BigBlueButton, Wiki, Feedback, Choice, Survey, Glossary, Questionnaire, Lesson and Web 2.0. However, there were certain tools for Web 2.0 that will be captured depending on the applications that were commonly used by lecturers; the addition will be made from time to time based on lecturer's demand.

Lastly, 20% Assessment is a place to make assessment to determine the level of student's understanding. The data will be captured by Reporting Tool for any 2 modules in GOALS such as Quiz and Assignment. Figure 2 below shows the screenshot of Lecturer's statistic report page.

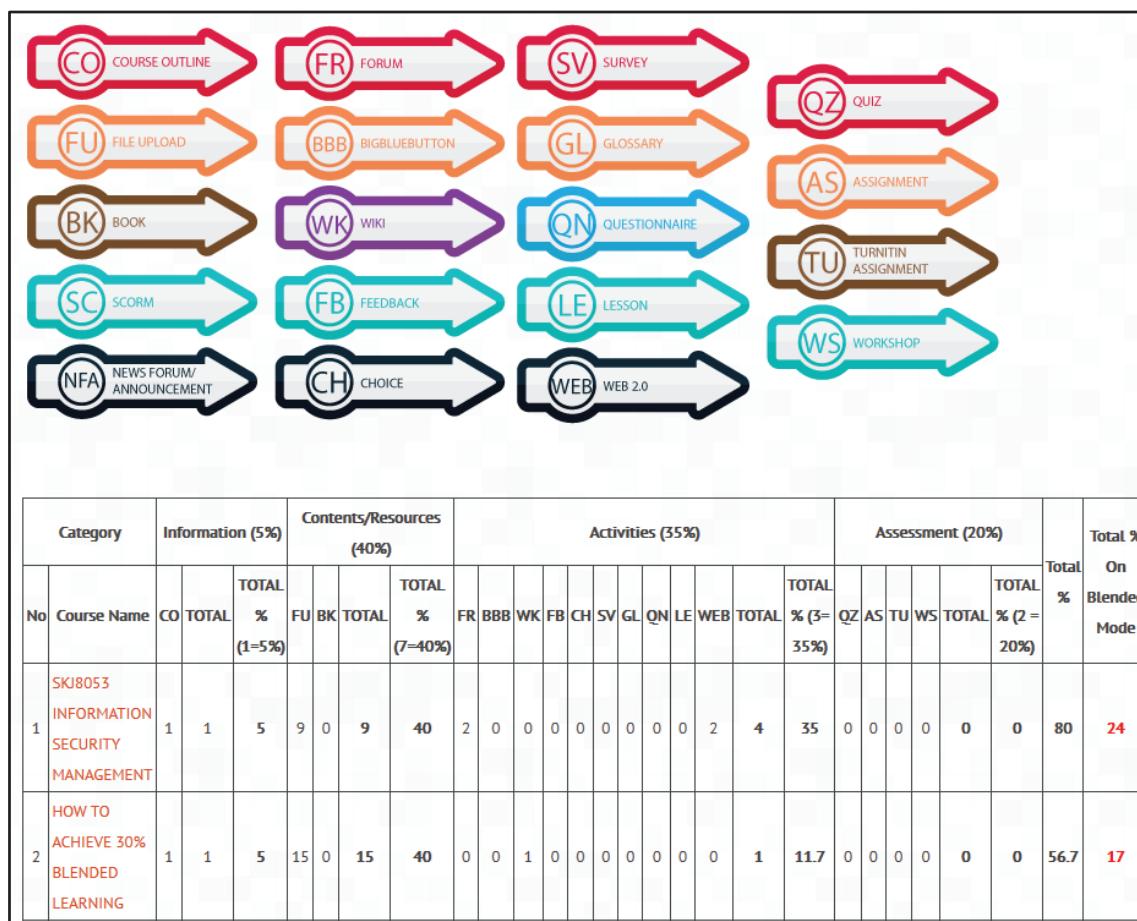


Figure 2: Screenshot of Lecturer's statistic report page

### Advantages of GOALS Reporting Tool

GOALS Reporting Tools was designed with printable feature for purpose of lecturer's promotion, e-portfolio and teaching and learning record. In addition, Reporting Tool has a colour code which are in green (achieve > 30%) and red (achieve < 30%) to notify them about their performance on e-learning usage. In addition, it has long term commercialization prospect as an alternative of automated system in measuring and monitoring progress for teaching and learning achievement in developing Blended Learning course.

## Acknowledgement

The author acknowledges and thank Dr. Najwa Hayaati Mohd Alwi, the Deputy Director at Learning and Teaching and Innovation Sector of Global Open Access Learning, Immersive Technology and Quality Assurance (GOAL ITQAN) in Universiti Sains Islam Malaysia (USIM) for assistance in the discussion of Blended Learning percentage calculation. Besides that, the author also owe appreciation and sincerest thanks to Mr. Mohamad Faiz Taip, the Information Technology Officer at Learning and Teaching and Innovation Sector of Global Open Access Learning, Immersive Technology and Quality Assurance (GOAL ITQAN) who always give his guidance and brilliant idea in developing the GOALS Reporting Tool.

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## SIMPLE VERSION II

**Najwa Hayaati binti Mohd Alwi, Rozhan Mohammed Idrus, Nurhuda binti Ruzlan, Nursyakira binti Redzuan, Mu'azz bin Sahari**

GOAL-ITQAN,

Universiti Sains Islam Malaysia (USIM), Bandar Baru Nilai, 71800 Nilai, Negeri Sembilan  
[najwa@usim.edu.my](mailto:najwa@usim.edu.my), [rozhan@usim.edu.my](mailto:rozhan@usim.edu.my), [nurhuda.ruzlan@usim.edu.my](mailto:nurhuda.ruzlan@usim.edu.my), [nursyakira@usim.edu.my](mailto:nursyakira@usim.edu.my),  
[muazz.sahari@yahoo.com](mailto:muazz.sahari@yahoo.com)

**Highlights:** SIMPLE (Self Instructional Module Template) II is an improved and structured online template that helps the lecturer prepare digital teaching and learning content easily. It comes in package with guideline on how to use it with minimal IT skills. This template allows the teacher to list the learning outcomes and the synopsis of the topics. Furthermore the teaching and learning materials can be arranged by topic using the template. Every topic will have placement for all SIM components such as activities, self-check, exercise, important word and summary. Test, glossary and bibliography will be located at the end of the module. Teachers need to upload learning contents by category provided. SIMPLE II used open source -Moodle as the platform. This novel template embedded with 21st century skill-(4C) namely communication, critical thinking, collaboration and creativity. By having the template outline, the learning content will be more comprehensive and systematic. As an alternative to the teaching and learning process, SIMPLE II has long-term commercialization prospect and relevant to the teachers and learners who want to self learn and access the content anytime and anywhere.

**Key words:** Self-Instructional Module, Template, Digital Content, teaching and learning, e-learning

### Introduction

The lecturers are encouraged to develop a digital content for their teaching and learning courses. However, the development took longer time due to no guideline is provided. Since 2013, the lecturers in USIM are introduced to develop SIM and ensured that the content they developed able to meet 30% blended learning policy. Now, we would like to introduce a new idea named as SIMPLE II- a template for Self Instructed Module (SIM) with step-by-step guideline on how to develop teaching and learning content.

This SIMPLE (Self Instructional Module Template) II is designed to assist lecturers to develop a comprehensive and structured learning module. The objective of SIMPLE II is to increase the number of blended learning courses in a more systematic way. SIMPLE II is the upgraded version with more flexible and structured interface. It is equipped with a step-by-step manual guide for lecturer's revision. This improved version is more interactive, more users friendly and much easier to use. It has been validated by a group of lecturers from various areas.

### What Is Simple II?

1. SIMPLE II consists of two main elements, which are:
  - SIMPLE's folder
  - SIMPLE's template in GOALS
2. Both elements come with 4 main categories that in line with 30% blended mode rubrics from MOE's KPI. Each category represent different needs and used of LMS in teaching & learning. The categories are:
  - Information
  - Content
  - Activities
  - Assessment
3. This template will help teachers to prepare digital content easily without being an expert in IT. Lecturers are required to follow the step-by-step instruction until they complete the entire task. At the end, one final digital content course will be created.

Table1: SIMPLE II Template

INFORMATION													
COURSE OUTLINE							ANNOUNCEMENT						
CONTENTS													
WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10	WEEK 11	WEEK 12	WEEK 13	WEEK 14

## How to used SIMPLE II Folder?

1. Lecturers will be provided with SIMPLE folder by GOAL Centre.
2. Differentiate and save all teaching materials in every category accordingly.
3. For Quiz, Assignment and Forum, lecturers are required to save the entire question in Words and categorized them based on topic in the folder.

## How to used SIMPLE II Template?

1. Upload each folder item into the GOALS topic block (with same name) using drags and drop function.
2. Use any web 2.0 applications to converts any teaching materials to be more interactive.
3. Embed converted materials into GOALS
4. Import Quiz question into question banks
5. Create assignment
6. Create forum
7. Check statistic of 30% blended

## How to SIM?

1. This is an important part of SIMPLE II. Lecturers are required to include a step-by- step guideline or instruction in their course to assist their students on how to study their course throughout the semester.
2. SIM must be written in a communicative way to ensure the interactivity of the content. Your instruction must be synchronized with your teaching material.

\* Optional: Lecturers are required to test their completed-SIMPLE II-course with student and acquire students' feedback on the effectiveness of the course in teaching and learning.

Figure 1: SIMPLE II Element



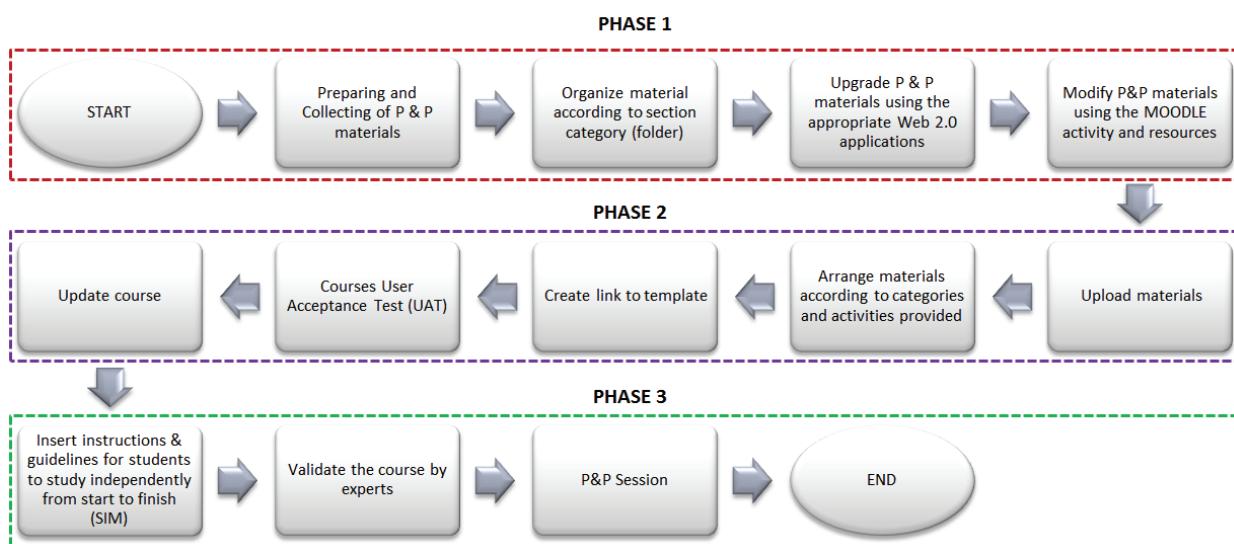
## Value added

1. In line with 21st century skill for educators and students
2. Flexible & Structured interface
3. Easy to Use

## Commercialize

SIMPLE II has high commercialization prospect as an alternative to the digital content development process in preparing educational materials bank.

Figure 1: SIMPLE II Work Flow



## Acknowledgement

The author acknowledges the Global Open Access Learning, Immersive Technology and Quality Assurance (GOAL ITQAN) in Universiti Sains Islam Malaysia (USIM) for assistance in the discussion of SIMPLE II. Besides that, the author also owes appreciation and sincerest thanks to all staff and lecturers that involved in this project and for their cooperation in SIMPLE development.

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## Industrial Training System (eli)

Nooraini A. Manan & Faeza Ramlay

Universiti Sains Islam Malaysia (USIM), Bandar Baru Nilai, Malaysia

[nooraini@usim.edu.my](mailto:nooraini@usim.edu.my), [faeza.ramlay@usim.edu.my](mailto:faeza.ramlay@usim.edu.my)

### Highlights:

The innovation is about the industrial training system (eli) which is developed in house by the technical team of Universiti Sains Islam Malaysia (USIM). The system objectives is to make the process efficient in the industrial training process and indirectly helps to improve the teaching and learning in USIM. With the online features, eli system can easily be used by the group of user inside and outside the campus. Besides, all the manual process previously has been automated to reduce the step especially in application of doing industrial training. It is followed by the log book and evaluation exercises. Grading system also integrated with the academic student record system.

**Key words:** industrial training, industrial training system eli system, system, training experience, USIM log book

### Introduction

Industrial training program aims to equip students with real working experience. Placement of students in industry can also improve their job opportunities because of the possibility to get offered a job at the same place. Thus, the training experience will strengthen the learning process and activities on campus while also providing students with relevant working experience.

Placing students at Universiti Sains Islam Malaysia industrial companies are also part of the effort to bridge the gap between academia and industry. Feedback received from the company can be used to improve the existing curriculum. Previously, all the process is done manually by form and letters to communicate each other.

For the continuation of the objectives, industrial training system (eli) was developed in 2010 to automate the process and to reduce manual operation task.

### Conceptual System

This system was developed through online to facilitate user access from any location. The system was using the open source technology and Sybase database. It is also support the single sign on concept using the Open LDAP. The main process in the system is as follows:

- Application for industrial training
- Industrial training info
- Placement
- Log Book
- Evaluation
- Industrial courses examination result
- Report and statistic

The system design also controlled the integration part within external sources and internal sources. The biggest challenge is to make sure that the integration successful so that the reliability of the data can be happened. With this new idea, eli system is really helps users expedite the student application and other processes.

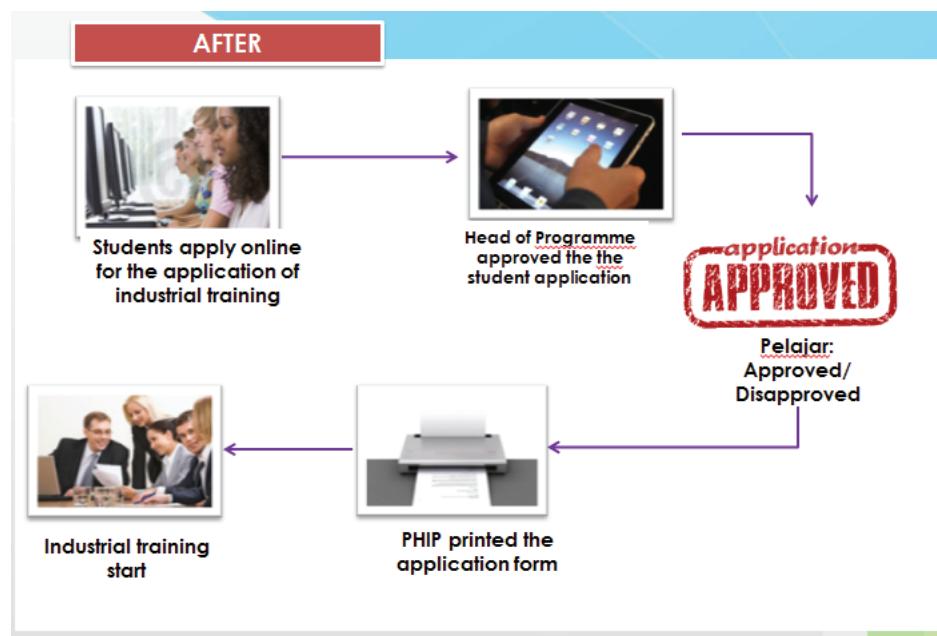


Figure 1 : The new process after using the eli system

There are five (5) group of users that involved in the eli system flows such as industrial training secretariat, Head of Programme in faculty, industrial supervisor, university supervisor, dean and students.

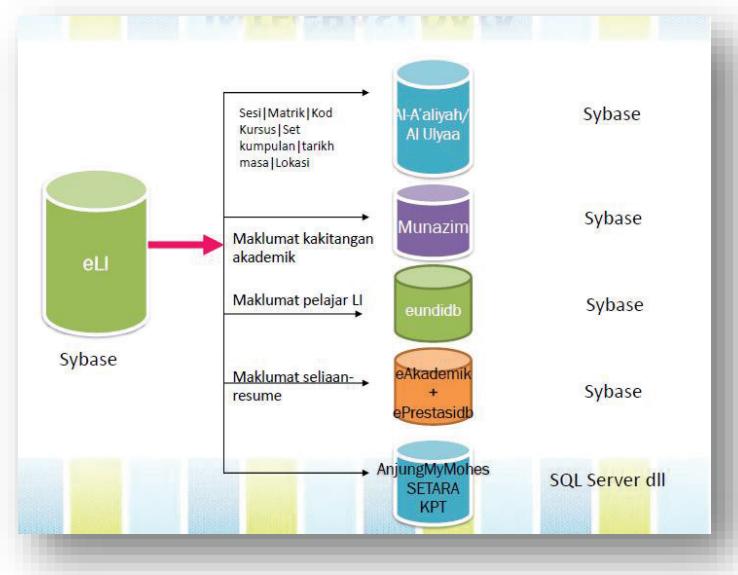


Figure 2: Integration system

### Why important to education

In summary, there are six (6) main objectives of the industrial training program as follows:

1. Provide opportunities for students to apply more organization in many categories to increase their knowledge and skills learned to the real working situations.
2. Provide opportunities for practical learning from practitioners in the field are studied by students.
3. Giving students working experience while they study in their chosen field. Previously, students need to update the log book manually and up to certain day will be checked by their industrial supervisor. After that, their university supervisor will come to see the student in the industry to checked the log book and do some visita activities.

## Advantages of the innovation

There are many advantages in this new innovation. It helps to make the services more efficient especially in monitoring the status in every process such as in the application, placement, evaluation, log book and others. The three (3) communication between student, industrial supervisor and university supervisor can also be established easily through this system. They can comment each other in the student task and make the learning process more transparent with the end users.

Furthermore, the integration helps the users to get the data easily from many sources in a single application. Through this exercises, the university can see the student application trend and the student population in the industrial training. Thus, they can predict and helps the top management in doing the decision making related to the industrial training purposes.

It is also can helps to save time and cost especially to faculty level. Previously the faculty are doing the printing to publisher for the log book. They spend the budget accordingly to the student ratio. The most expensive printing cost is RM 40.00 per book.

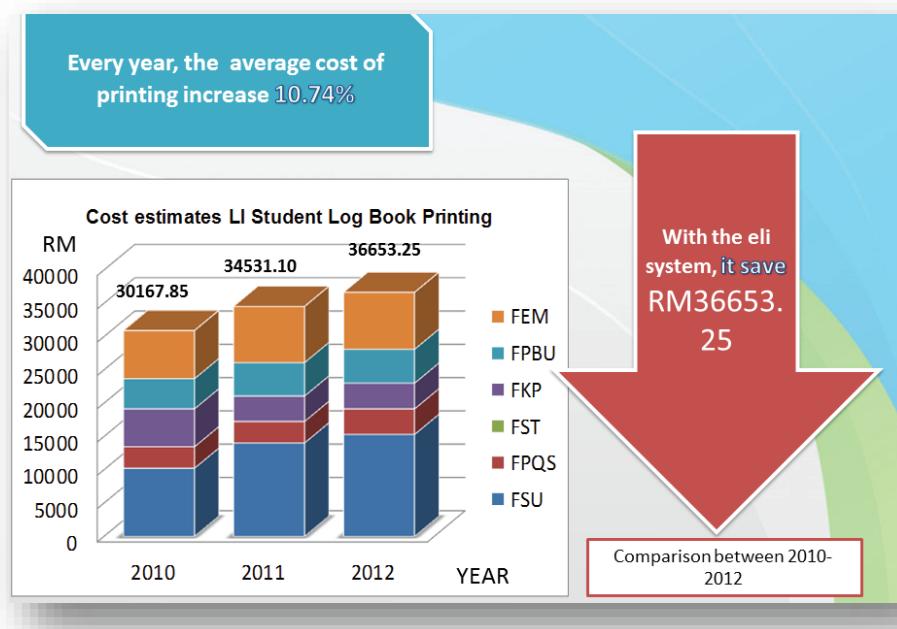


Figure 3: Comparison between 2010-2012

The significant effect through the innovation is more to increase the productivity and the services quality. It improves the teaching and learning activities inside and outside the campus.

## Commercialisation and Profitability

With the web based application using open source technology and flexible in the system design the system can easily be adopted to another organisation related to industrial training purposes. Thus, university can share the application system with others.

## Achievements and Awards

1. Hadiyah Kualiti Inovasi USIM 2012
2. Top five in the myGOSCON open source competition organized by MAMPU

## Acknowledgement

We are grateful for the support of top management for giving a chances and trust to us to do the in house development. Also to the team member of eli system for your full cooperation.

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 Open Educational Resources (OER, undated) - <https://www.oercommons.org/>

## **USIM MOOC : Pengajian Halaqah**

**Dr. Najwa Hayaati Mohd Alwi, Mohd Aizuddin Abd Aziz & Nurhuda Ruzlan,Mohd Faizal Fuaad,**

Universiti Sains Islam Malaysia (USIM),  
71800, Nilai, Negeri Sembilan, Malaysia  
sembilan.goal01@usim.edu.my

**Highlights:** USIM MOOC-Pengajian Halaqah is a course focused on exposing the student with the technique and methods of reading Islamic classical texts (turath). This course is essential to Muslim society, especially to student, due to the content are very helpful to student which a guide to read, and understanding classical material which had been a primary reference once ago. This necessitates not only strong command of Arabic, but also a working knowledge of the Islamic sciences and proper method of studying the classical text. This course is delivered by an expert in this field. The videos and activities allow in depth understanding for this course.

**Key words:** USIM MOOC, Open learning, MOOC, pengajian halaqah, kitab al-turath

### **Introduction**

A massive open online course (MOOC) is an online distance learning program which is had been designed to ease student all over the world to take part some subject that is not available in their campus or university. This platform can support a very large numbers of geographically dispersed students. By using this platform Universiti Sains Islam Malaysia (USIM) introduce MOOC course on Pengajian Halaqah.

USIM MOOC-Pengajian Halaqah adopted a balanced approach between Naqli and Aqli aspect and that make USIM MOOC different from others. Besides, it is not only being used in academic program but it also practiced widely throughout university including in administration and management level. The language use in USIM MOOC is dual language which is English and Arabic. Add on with this, USIM MOOC also implement Self instructor Module (SIM) in each chapter, task, quiz, and activity that exist in MOOC. The use of SIM is to guide participant to every chapter or topic he or she join and also to ease the workflow for every week.

### **USIM MOOC – Pengajian Halaqah**

USIM MOOC-Pengajian Halaqah is non-credit offerings that may be taken by large numbers of learners from around the world for free. USIM participation in Malaysia's MOOC development represented an opportunity for exploring a rapidly evolving online teaching and learning spaces and bring the lessons learned into our on-campus and online courses.

Pengajian Halaqah is one of the courses that been developed under USIM MOOCs, along with Fiqh Ibadat dan Munakahat and Bahasa Arab1. The development of this course is conducted by collaboration with technical team and subject matter expert (SME) and administer by teaching and learning centre. The table below shows the brief structure of this course.

<b>Course Name</b>	<b>Coordinators</b>	<b>Instructors/SME</b>	<b>Faculty</b>	<b>Course Length</b>
Pengajian Halaqah	<ul style="list-style-type: none"><li>• Dr. Najwa Hayaati Mohd Alwi</li><li>• Dr. Nurkhamimi Zainuddin</li></ul>	<ul style="list-style-type: none"><li>• Mohd Aizuddin Abd Aziz</li><li>• Ahmad Norsyafwan Norawawi</li><li>• Rabiah Abdul Rahman</li></ul>	Pusat Pengajaran Teras	8 Weeks

**Table 1:** USIM MOOC – Pengajian Halaqah brief summary

OpenLearning is an online MOOC platform that had been used on delivering the course contents. OpenLearning offers the university great flexibility in how students and their learning can be organised. Course can be setup either to be an open course or run on-demand course. A part from that, learners can learn via various course materials, such as video lectures, PDF, interactive web 2.0 tools, and PowerPoint slides. Learners are assessed through various course activities such as forums, discussions, quizzes and practices.

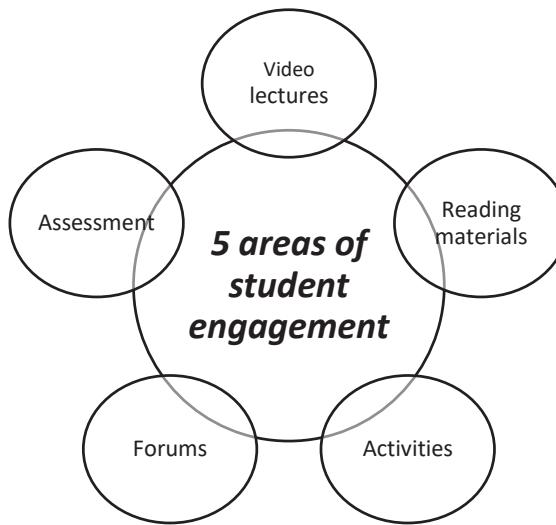


**Figure 1 :** Pengajian Halaqah on Open Learning

### Course design

USIM MOOC are an emerging delivery by virtue of tree and open access. Course design for Pengajian Halaqah was primarily the responsibility of the instructor that took place in a context of course and support teams with a variety of roles and expertise. The Centre which is managing e-Learning content in USIM known as Global Open Access Learning, Immersive Technology and Quality Assurance (GOAL-ITQAN), provides instructional design and project management support, media development support and in-depth production and delivery assistance.

USIM MOOC – Pengajian Halaqah is based on five areas of student engagement :



**Figure 2:** Five areas of student engagement

1. Video lectures – These are, at their most basic, recorded asynchronous sessions of lead academic discussion topics related to the course. Their format is not prescribed by Coursera and as such, a wide array of presentation styles can be used, from talking heads to interviews and picture in picture (for example, when slides are being used). The video recording session can be done whether in USIM compound or outdoor places as requested by the subject instructors.
2. Reading Materials – Students were offered excerpts from textbooks covering the area relevant weekly topics. Copyright clearance was simplified by using text authored by instructors.
3. Activities – A range of formative activities are offered, with the aim of allowing students to further test their knowledge. These activities are not part of MOOC's formal assessment but were attempts to help provide a deeper understanding of the concepts. Video feedback for some of these activities was provided.

4. Forums – USIM MOOC – Pengajian Halaqah forum are the main method of student interaction with content. Forums are typically split into a number of threads, including, but are not restricted to; general discussion, subject specific discussion, course feedback and technical feedback. Instructors can actively participate in these forums or choose to have teaching assistants responds to students, responding to the questions when needed.
5. Assessment – Assessment can be based on automatically-graded multiple choice questions, either as part of video lectures (in-video quizzes) or taken separately. In addition to multiple choice questions (MCQs), course teams could also choose to use auto-graded programming assignments or peer review assessment. Peer review can be used for more open-ended assessment formats and requires students to mark one another's work based on a defined rubric set by the instructor.

### **Course delivery**

All courses produced approximately eight weeks of complete course materials by the time the courses opened. Thus the course teams continue to be in a development phase during the delivery of the courses, providing a "just-in-time" approach to the course development, production, and delivery. During the delivery of the courses, the instructors and GOAL ITQAN support staff are involved in the following activities:

- a. Monitoring course forms.
- b. Responding to students' question and comments in forums.
- c. Revising and refining course materials based on student feedback.
- d. Troubleshooting course materials issues as reported by learners.
- e. On-going production and implementing upcoming course modules.

The scope of the USIM MOOCs allows for very little one-to-one interaction between instructors and learners; almost all course interaction happened in the course's forum. One of the major activities that the academic use is forum monitoring. Across these courses, the academic staffs are subject expertise and are generally encouraged to respond directly to learners in the forums.

### **Acknowledgement**

We are grateful for giving a chance to develop this course by using open learning platform which enhanced our skill and knowledge about online learning in this world. We are pleasure to give a special thanks to Ministry of High Education (MOHE), Majlis E-pembelajaran IPTA Malaysia (MEPTA) Deputy Director of GOAL ITQAN, Dr. Najwa Hayaati Mohd Alwi, all instructors for Pengajian Halaqah, Mohd Aizuddin Abd Aziz, Ahmad Norsyafwan Norawawi, Rabiah Abdul Rahman, IT Assistant Officers from Bahagian Inovasi pembelajaran dan Pengajaran (BIPP) GOAL ITQAN, Mohd Faizal Fuaad, Nurhuda Ruzlan, Muhammad Zarin Mislan, Muhammad Muizzuddin Musa, and lastly thank to all individual or groups that helping us in order to complete this course in open learning. We pray, may Allah rewarded his bless and love to all of us

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## USIM MOOC-Bahasa Arab 1

**Najwa Hayaati Mohd Alwi, Manal Jusoh @ Mohamad Daud, Mohd Faizal Fuaad, Nurhuda Ruzlan & Muhammad Zarin Mislan**

Universiti Sains Islam Malaysia, Bandar Baru Nilai,  
71800 Nilai, Negeri Sembilan, Malaysia.  
najwa@usim.edu.my

**Highlights:** USIM MOOC- Bahasa Arab 1 is a foundation course that aims to provide students with the reading, writing, listening and speaking skills needed for basic proficiency at university level. This course is offered using the mooc concept which allow many students all over the world to learn Arabic. The teaching and learning process in this course is based on blended mode. The assessments are continuous and geared towards developing students to achieve a satisfactory level in Arabic. A variety of activities intended at enhancing student's soft-skills that include practice in problem-solving, critical thinking and team work have been embedded in the overall design of the course. The syllabus is also designed to achieve a balance between each language skills, with a strong emphasis on the usage of basic grammar and vocabulary in context. Naqli (the Islamic perspective) and Aqli (the conventional perspective) elements are embedded throughout the course.

**Keywords:** MOOC, USIM MOOC, e-learning, Open Learning, language, Bahasa Arab 1

### Introduction

Malaysia, is one of the South East Asia country that known for its diverse population. As a multi-ethnic, multi-cultural and multi-religious country, Malaysia can be a platform for learning various foreign languages in order to promote better understanding with regard to different peoples and different cultures, especially in terms of understanding the Muslim culture in Malaysia itself. As Muslims, learning Arabic is a necessity, since most Islamic resources, Al-Quran and Sunnah is in Arabic.

The establishment of Universiti Sains Islam Malaysia (USIM) used Arabic as a medium of instruction in teaching and learning. USIM is one of the higher educational institutions that implement and use Arabic language into the teaching and learning process. For USIM's students, Arabic is an indispensable foundation, or maybe an issues that need to be solved. Most of the students need to master this language well.

### USIM MOOC – Bahasa Arab 1, one of the courses in USIM MOOC

USIM MOOCs are non-credit offerings that may be taken by large numbers of learners from around the world for free. USIM participation in Malaysia's MOOC development represented an opportunity for exploring a rapidly evolving online teaching and learning spaces and bring the lessons learned into our on-campus and online courses.

Bahasa Arab 1 is one of the courses that been developed under USIM MOOCs, along with Pengajian Halaqah and Fiqh Ibadah dan Munakahat. The development of this courses is conducted by the appointed Academic development unit within USIM. Each of them are decides on the structure, membership and responsibilities of their team

OpenLearning is an online MOOC platform that had been used on delivering the course contents. OpenLearning offers the university great flexibility in how students and their learning can be organised. Course can be setup either to be an open course or run on-demand course. A part from that, learners can learn via various course materials, such as video lectures, PDF, interactive web 2.0 tools, and PowerPoint slides. Learners are assessed through various course activities such as forums, discussions, quizzes and practices.

### Course Design

USIM MOOC – Bahasa Arab 1, are an emerging delivery by virtue of free and open access. Course design for USIM MOOC – Bahasa Arab 1 was primarily the responsibility of the instructors that took place in a context of course and support teams with a variety of roles and expertise. The Centre for Global Open Access Learning – Immersive Technology and Quality Assurance (GOAL-ITQAN) is an e-learning centre of USIM that provides instructional design and project management support, media development support, and in-depth production and delivery assistance.

Figure 1: Bahasa Arab 1 on OpenLearning

USIM MOOC – Bahasa Arab 1 format is based on five areas of student engagement:

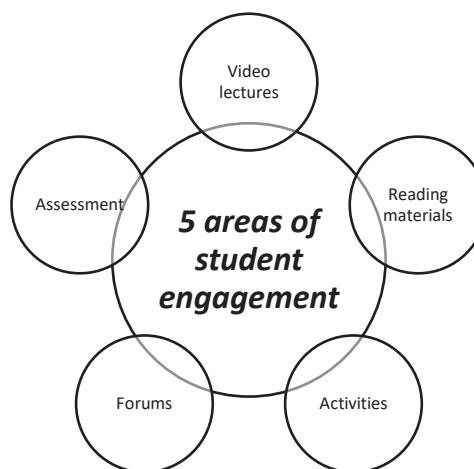


Figure 2 : Five areas of student engagement

1. Video lectures – These are, at their most basic, recorded asynchronous sessions of lead academic discussion topics related to the Bahasa Arab1. Their format is not prescribed by Coursera and as such, a wide array of presentation styles can be used, from talking heads to interviews and picture in picture (for example, when slides are being used). The video recording session can be done whether in USIM compound or outdoor places as requested by the subject instructors.
2. Reading Materials – Students were offered excerpts from textbooks covering the area relevant weekly topics. Copyright clearance was simplified by using text authored by instructors.
3. Activities – A range of formative activities are offered, with the aim of allowing students to further test their knowledge. These activities are not part of MOOC's formal assessment but were attempts to help provide a deeper understanding of the concepts. Video feedback for some of these activities was provided.
4. Forums – USIM MOOC – Bahasa Arab 1 forum are the main method of student interaction with content. Forums are typically split into a number of threads, including, but are not restricted to; general discussion, subject specific discussion, course feedback and technical feedback. Instructors can actively participate in these forums or choose to have teaching assistants responds to students, responding to the questions when needed.
5. Assessment – Assessment can be based on automatically-graded multiple choice questions, either as part of video lectures (in-video quizzes) or taken separately. In addition to multiple choice questions (MCQs), course teams could also choose to use auto-graded programming assignments or peer review assessment. Peer review can be used for more open-ended assessment formats and requires students to mark one another's work based on a defined rubric set by the instructor.

## Course delivery

All courses produced approximately fourteen weeks of complete course materials by the time the courses opened. Thus the course teams continue to be in a development phase during the delivery of the courses, providing a "just-in-time" approach to the course development, production, and delivery. During the delivery of the courses, the instructors and GOAL ITQAN support staff are involved in the following activities:

- a. Monitoring course forms.
- b. Hosting live weekly "office hour" using Facebook page.
- c. Responding to students' question and comments in forums.
- d. Revising and refining course materials based on student feedback.
- e. Troubleshooting course materials issues as reported by learners.
- f. Facilitating platform and technical issues to Open Learning Staff.
- g. On-going production and implementing upcoming course modules.

The scope of the USIM MOOCs allow for very little one-to-one interaction between instructors and learners; almost all course interaction happened in the course's forum. One of the major activities that the academic use is forum monitoring. Across these course, the academic staffs are subject expertise and are generally encouraged to respond directly to learners in the forums.

## Acknowledgement

Our special thanks to Ministry of Higher Education (MOHE), Majlis e-Pembelajaran IPTA Malaysia (MEIPTA), Bahagian Inovasi Pembelajaran dan Pengajaran, GOAL ITQAN (BIPP), Deputy Director of GOAL ITQAN, Dr. Najwa Hayaati Mohd Alwi, all instructors for Bahasa Arab 1, Manal Jusoh@Mohamad, Muhammad Izuan Abd Gani, Haryati Yaacob, Siti Salma Wahiduddin, Ummu Nasibah Nasohah, Asmuni Zumrah, Dr. Azlan Shaiful Baharum, IT Assistant Officers from GOAL ITQAN, Mohd Faizal Fuaad,

Nurhuda Ruzlan, Muhammad Zarin Mislan, and lastly, thanks to all individual or groups that helping us either with consciousness or unconsciously in completing this project. We pray, may Allah rewarded his bless and love to all of us for this effort.

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## USIM MOOC : Fiqh Ibadat and Munakahat

**Najwa Hayaati Mohd Alwi, Dr. Muhammad Aunurrochim Mas'ad Saleh, Nurhuda Ruzlan,Mohd Faizal Fuaad, & Muhammad Muizzuddin Musa.**

Universiti Sains Islam Malaysia, Bandar Baru Nilai, 71800 Nilai, Negeri Sembilan, Malaysia.

[najwa@usim.edu.my](mailto:najwa@usim.edu.my)

**Highlights:** USIM MOOC-Fiqh Ibadat and Munakahat is a course that delivers principles of Islamic Jurisprudence which is deal with the derivation of rulings relating to all matters of worship and marriage issues. In others word fiqh is making guidance from an evidence found in shariah which is located at both Al-Quran and Sunnah Nabi Muhammad SAW. This course is essential to muslim society for all ages, due to the content are very common on daily task and activity of muslim. This course is delivering by expert in this field. The videos and activities allow in depth understanding for this course.

**Key words:** Usim MOOC, Open learning, MOOC, fiqh of marriage, marriage in islam, Islamic Jurisprudence,

### Introduction

A massive open online course (MOOC) is an online distance learning program which is had been designed to ease student all over the world to take part some subject that is not available in their campus or university. This platform can support a very large numbers of geographically dispersed students. By using this platform Universiti Sains Islam Malaysia (USIM) introduce MOOC course on Fiqh Ibadat and Munakahat which about Islam law especially in worship to Allah and Marriage in Islam.

USIM MOOC-Fiqh Ibadat and Munakahat adopt a balanced approach between spiritual and physical aspect and that make USIM MOOC different from others. Besides, it is not only in academic program but it also practiced widely throughout university including in administration and management level. The language use in USIM MOOC is dual language which is English and Arabic. Add on with this, USIM MOOC also implement Self instructor Module (SIM) in each chapter, task, quiz, and activity that exist in MOOC. The use of SIM is to guide participant to every chapter or topic he or she join and also to ease the workflow for every week.

### USIM MOOC – Fiqh Ibadat dan Munakahat

USIM MOOC-Fiqh Ibadat and Munakahat is non-credit offerings that may be taken by large numbers of learners from around the world for free. USIM participation in Malaysia's MOOC development represented an opportunity for exploring a rapidly evolving online teaching and learning spaces and bring the lessons learned into our on-campus and online courses.

Fiqh Ibadat dan Munakahat is one of the courses that been developed under USIM MOOCs, along with Pengajian Halaqah and Bahasa Arab1. The development of this courses is conducted by collaboration among technical team and subject matter expert (SME) and administer by teaching and learning centre. The table below shows the brief structure of this courses.

Course Name	Coordinators	Instructors/SME	Faculty	Course Length
Fiqh Ibadat dan Munakahat	<ul style="list-style-type: none"><li>Dr. Najwa Hayaati Mohd Alwi</li><li>Dr. Nurkhamimi Zainuddin</li></ul>	<ul style="list-style-type: none"><li>Dr. Muhammad Aunurrochim Mas'ad Saleh</li><li>Dr. Norfadhilah Mohd Ali</li><li>Nabilah Yusof</li></ul>	Fakulti Syariah dan Undang-Undang	8 Weeks

**Table 1:** USIM MOOC – Fiqh Ibadat dan Munakahat brief summary

OpenLearning is an online MOOC platform that had been used on delivering the course contents. OpenLearning offers the university great flexibility in how students and their learning can be organised. Course can be setup either to be an open course or run on-demand course. A part from that, learners can learn via various course materials, such as video lectures, PDF, interactive web 2.0 tools, and PowerPoint slides. Learners are assessed through various course activities such as forums, discussions, quizzes and practices.



Figure 1 : Fiqh Ibadat dan Munakahat on Open Learning

## Course design

USIM MOOC are an emerging delivery by virtue of tree and open access. Course design for Fiqh Ibadat and Munakahat was primarily the responsibility of the instructor that took place in a context of course and support teams with a variety of roles and expertise. The Centre which is managing e-Learning content in USIM known as Global Open Access Learning, Immersive Technology and Quality Assurance (GOAL-ITQAN), provides instructional design and project management support, media development support and in-depth production and delivery assistance.

USIM MOOC – Fiqh Ibadat dan Munakahat is based on five areas of student engagement :

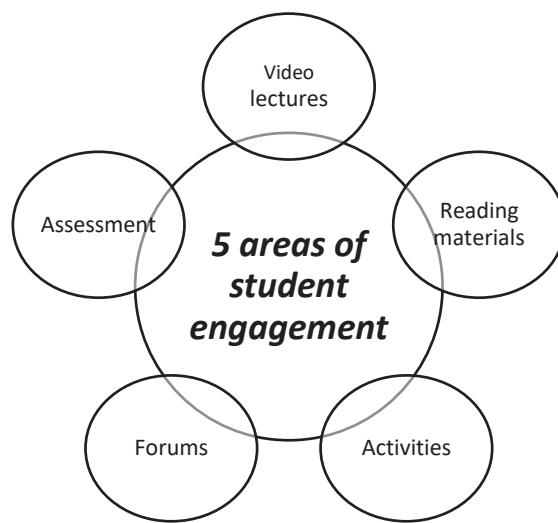


Figure 2 : Five areas of student engagement

1. Video lectures – These are, at their most basic, recorded asynchronous sessions of lead academic discussion topics related to the course. Their format is not prescribed by Coursera and as such, a wide array of presentation styles can be used, from talking heads to interviews and picture in picture (for example, when slides are being used). The video recording session can be done whether in USIM compound or outdoor places as requested by the subject instructors.

2. Reading Materials – Students were offered excerpts from textbooks covering the area relevant mostly topics

3. Activities – A range of formative activities are offered, with the aim of allowing students to further test their knowledge. These activities are not part of MOOC's formal assessment but were attempts to help provide a deeper understanding of the concepts. Video feedback for some of these activities was provided.
4. Forums – USIM MOOC – Bahasa Arab 1 forum are the main method of student interaction with content. Forums are typically split into a number of threads, including, but are not restricted to; general discussion, subject specific discussion, course feedback and technical feedback. Instructors can actively participate in these forums or choose to have teaching assistants responds to students, responding to the questions when needed.
5. Assessment – Assessment can be based on automatically-graded multiple choice questions, either as part of video lectures (in-video quizzes) or taken separately. In addition to multiple choice questions (MCQs), course teams could also choose to use auto-graded programming assignments or peer review assessment. Peer review can be used for more open-ended assessment formats and requires students to mark one another's work based on a defined rubric set by the instructor.

### **Course delivery**

As the gen Y and gen Z filling up the university, the new and exciting teaching and learning should take place. USIM MOOC-Fiqh Ibadat dan Munakahat address the 21<sup>st</sup> century learner need 4c (Creativity, Critical Thinking, Communication, Collaboration).

All courses produced approximately eight weeks of complete course materials by the time the courses opened. Thus the course teams continue to be in a development phase during the delivery of the courses, providing a "just-in-time" approach to the course development, production, and delivery. During the delivery of the courses, the instructors and GOAL ITQAN support staff are involved in the following activities:

- a. Monitoring course forms.
- b. Responding to students' question and comments in forums.
- c. Revising and refining course materials based on student feedback.
- d. Troubleshooting course materials issues as reported by learners.
- e. On-going production and implementing upcoming course modules.

The scope of the USIM MOOCs allows for very little one-to-one interaction between instructors and learners; almost all course interaction happened in the course's forum. One of the major activities that the academic use is forum monitoring. Across these courses, the academic staffs are subject expertise and are generally encouraged to respond directly to learners in the forums.

### **Acknowledgement**

We are grateful for giving a chance to develop this course by using open learning platform which enhanced our skill and knowledge about online learning in this world. We are pleasure to give a special thanks to Ministry of High Education (MOHE), Majlis E-pembelajaran IPTA Malaysia (MEIPTA) Deputy Director of GOAL ITQAN, Dr. Najwa Hayaati Mohd Alwi, all instructors for Fiqh Ibadat dan Munakahat, Dr. Muhammad Aunurochim Mas'ad Saleh, Dr. Norfadhilah Mohd Ali, and Nabilah Yusof, IT Assistant Officers from Bahagian Inovasi pembelajaran dan Pengajaran (BIPP), Mohd Faizal Fuaad, Nurhuda Ruzlan, Muhammad Zarin Mislan, Muhammad Muizzuddin Musa, and lastly thank to all individual or groups that helping us in order to complete this course in open learning. We pray, may Allah rewarded his bless and love to all of us

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dariyah al-izzah , Fiqh Ibadat a'la mazhab As-syafie

## MOOC-ED Engineering Study and Emotional Intelligence

**Se Yong Eh Noun**

School of Engineering, Taylor's University, Selangor, Malaysia

[seyong.ehnoum@taylors.edu.my](mailto:seyong.ehnoum@taylors.edu.my)

**Highlights:** This report is focusing on the Emotional Intelligence (EI) practicing activities that were carried out on Massive Open Online Courses (MOOCs) platform by the student of the school of engineering. As reported in literatures, EI is emerging as the determining factor for a student in their learning experience. By incorporating Daily brain re-wiring and My emotion today activities on a daily basis, we see a great potential in improving the happiness index of student, despite only participating in a relatively short period of time.

**Key words:** emotional intelligence, engineering, MOOCs

### Introduction

In recent years, there has been an increased focus on e-learning. In engineering education, previous studies generally found a positive relationship between traditional learning and e-learning. Online learning is an old occurrence. But with the advent of MOOCs in 2011, free online courses reached another milestone and 2012 was christened as the "Year of the MOOC" by the New York Times. MOOCs allow learners around the world to participate in online instruction through short video lectures embedded with automated MCQs tests, quizzes, peer evaluation and discussion [Iqbal et al. 2016; Wong & Poh 2016].

Emotions are also associated with learning especially in skills that require —high motivation, self-control, and effective self-regulation, along with social skills such as forming constructive learning partnerships and avoidance of damaging antisocial behaviours. Now a day's Emotional intelligence is the one of the major missing parts in the human life. People with high emotional intelligence are likely to be more successful person in real world. Even people with good IQ they not able to succeed. The concept of emotional intelligence captures an extensive collection of individual personal skills, professional skills and dispositions. Emotionally intelligent person is skilled in identifying emotions, how to use the emotions, understanding own & others emotions and regulating emotions. Emotional intelligence is taken as a major factor for career effectiveness, success and satisfaction. In the field of engineering, there are many stressors that affect student performance as results. Academic stressors don't create anxiety directly to students, but when these stressors associated with student's personal perception and personality will result in academic stress. Academic stress is also called as career stopper. So Students have to work more to compete with others. These are the some reasons that make academic stress among engineering college students.

This study will report on the background, EI activities conducted on MOOCs platform and their benefits. We also included a preliminary result from a measure on the Happiness index of student participated in the EI activities as an indicator to the effectiveness of this approach.

### Content

Emotional Intelligence (EI) is one of the components that the School of Engineering at Taylor's University stressed on for the young and future engineers to cultivate before they graduated and entering the working environment. Lectures on the framework of the Emotional Intelligence was delivered to the student at the beginning of the study semester to point out the importance of EI in engineering profession. The mode of lectures was done on both in-class and on Massive Open Online Courses (MOOCs) platform. In order to put theory into practice, the students were instructed to participate in two daily activities: 1. My emotion today and 2. Daily brain re-wiring on the online platform. In short, the first activity is intended to address the self-emotional awareness by recording their emotional state while the latter is intended to address self-emotional regulation through recording the first five things they are grateful for in that particular day. By allowing others to read and comment on their friend's recorded list, these activities will then also address the social-emotional awareness and the relationship-management, and hence completing the all four main aspects in the EI framework as developed by Daniel Goleman. The use of MOOCs platform is essential in this context as it allows student to continuously participating in the activities even after the course has been completed. It paves way to the habitualisation of highly emotional intelligent mindset and behaviour.

The effectiveness of these activities towards EI quality was measured based on Happiness index of students at the end of semester compared to the beginning of the semester. Series of questions attributed to each minor aspect in the EI framework were asked to accurately assess their EI quality prior and after the EI activities. Figure 1 showing the Happiness Index of student from the Foundation in Engineering after 15 weeks of participation in the EI activities. Three out of the four aspects of EI framework recorded incline while the Self-awareness showing a small decline. The result is an encouraging one is coincided with reports from similar investigations elsewhere [SUburaj et al. 2012; Amantha & Jaafar 2012]. It is to be expected that in the long run, we should be able to see a more drastic improvement in happiness index should the student continue to take part in the EI activities. As pointed out by Al-Atabi (2010), a positive and happy mind produces great engineers that are able to influence and to change the world.

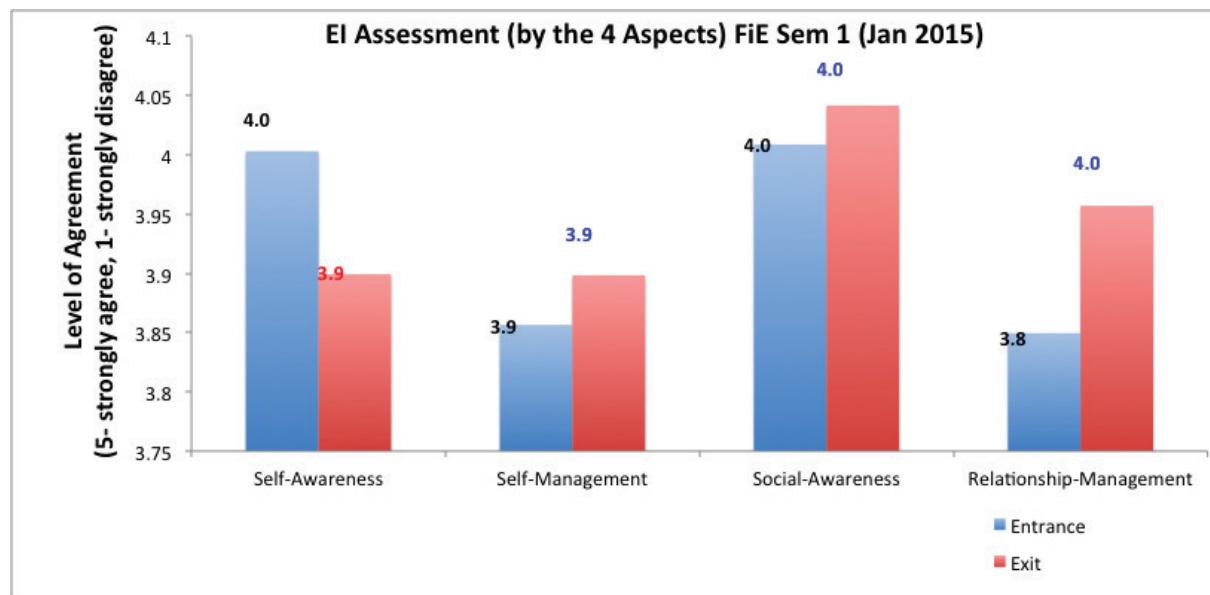


Figure 1 Happiness Index based on EI Assessment

### Acknowledgement

I would like to thank eLA for the funding and arrangement for the conference. I would also like to thank the School of Engineering for accommodating the data collection and experiment.

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## A Systematic Cultivation Process For A Quality E-Contents Development In UTEM Opencourseware (OCW)

**Ahmad Fadzli Nizam Abdul Rahman, Sazilah Salam, Zurina Sa'aya, Ahmad Shaarizan Shaarani,  
Muhamad Azmi Zainal, Nur Fathiah Zulkifli**

Pusat Sumber dan Teknologi Pengajaran (PSTP),  
Universiti Teknikal Malaysia Melaka (UTeM), Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia  
{fadzli, [sazilah.zurina.shaarizan.muhamad.azmi.nurfathiah.zulkifli](mailto:sazilah.zurina.shaarizan.muhamad.azmi.nurfathiah.zulkifli)}@ [utem.edu.my](http://utem.edu.my)

**Highlights:** A systematic process need to be introduce in order to implement a new rules or workflows in any organization. This change management issues need to be tackle earlier, sooner and smarter in order to avoid any unnecessary results or high rate of failure of any reformation execution plan. UTeM has registered with Open Education Consortium since 2013 and is required to develop and established the UTeM Open Courseware (OCW) as one of the terms and conditions. UTeM OCW is a platform where all the e-contents of the teaching and learning materials offered in UTeM can be shared with all the members with certain selected creative common licenses. In UTeM, Pusat Sumber dan Teknologi Pengajaran (PSTP) has been given the responsibility to encourage and monitor the development of the e-contents that will be shared in the platform. In order to manage the e-contents development, PSTP has introduced a systematic cultivation process in order to make sure that the shared contents has its own quality and beneficial to the open education communities.

**Key words:** OER, creative commons license, OCW, systematic process

### Introduction

The term open educational resource, or OER, was coined at a UNESCO workshop in 2002. OER have been defined as educational resources (e.g. lessons, plans, quizzes, syllabi, instructional modules, encyclopaedia entries, and simulations) that were freely available for use, reuse, adaptation, and sharing (Gurell, 2008a). In order to promote, support and advance openness in education or OER around the world, one global network called Open Education Consortium has been established in US. Universiti Teknikal Malaysia Melaka (UTeM) is registered as one of the institutional member in Open Education Consortium since 2013. In fact, currently in Malaysia, UTeM is among ten public universities registered with the consortium. The other universities are Universiti Kebangsaan Malaysia (UKM), Universiti Malaysia Sabah (UMS), Universiti Malaysia Sarawak (UNIMAS), Universiti Pendidikan Sultan Idris (UPSI), Universiti Putra Malaysia (UPM), Universiti Sains Malaysia (USM), Universiti Teknologi Malaysia (UTM), Universiti Teknologi Mara (UiTM) and Universiti Malaya (UM). By joining the consortium, the institutional member is allowed to use all the resources provided by the consortium including all courses developed by the members. The institutional member also need to develop the platform and established their own e-contents course that can be shared by others members.

### Content

i. **Description of your innovation / product development / design / process**

It is not easy to introduce a new processes to the existing ones. Usually, like in all sectors, any reformation or introduction of a new ideas in the comfort zone working environment will have a high rejection rate from majority colleagues as it will burden them and they consider it is as an additional workloads that they need to do and complies. As UTeM has been registered as a member of Open Education Consortium, we need to develop and established the e-contents that will be shared among the members. A new systematic cultivation process need to be innovate in order to achieve the objective of OER and also to cater the resistance (if any).

ii. **Background of innovation**

In UTeM, Pusat Sumber dan Teknologi Pengajaran (PSTP) has been given the responsibility to encourage all academic staffs to produce a quality e-contents in a courses offered. This e-content will be shared to the communities through the platform UTeM OCW. To date, UTeM have eight (8) faculties/centre with 719 active academic staffs as shown in table 1. With the capacities, UTeM currently offering thirty (30) undergraduate's programmes (diploma and degree) not including the

Table 1: Total active academic staff in UTeM

<b>PTJ</b>	<b>Academic Staffs (Active until July 2016)</b>
FKEKK	79
FKE	89
FTMK	114
FKP	81
FKM	84
FPTT	38
FTK	172
PBPI	62
<b>TOTAL</b>	<b>719</b>

In order to cultivate the OER movement and encourage development of many quality e-content for OCW, PSTP has introduced a systematic cultivation process that adopted the change management theory. Lewin's Change Management model has been chosen as a guidance for the innovation of systematic cultivation process. Lewin's change management model has three stages commonly referred to as **Unfreeze**, **Change** and **Refreeze** as shown in figure 1.0.

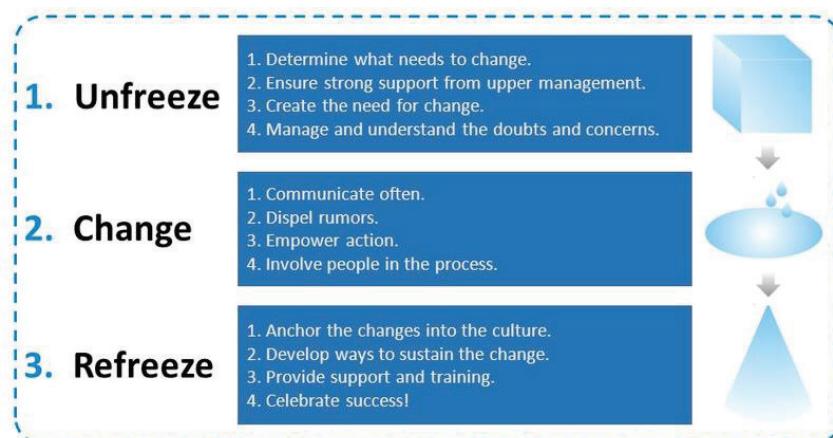


Figure 1.0: Lewin's Change Management Model

PSTP has modified the systematic cultivation process based on the Lewin's Change Management model. Further details will be put in the poster.

### iii. Why Important

Time and communication are the two keys to success for the changes to occur. In our case, in order to change the organization and academic staff perception about the OER, it will need a really good systematic process plan. On top of that, we also use the change management model as the required changes involve humans.

### iv. Advantages

The innovation will save a lot of time of planning. It will guide PSTP to monitor any progress and offer any courses/training related to the OER/OCW. Furthermore, it will help PSTP to do the continuous quality improvement (CQI). Academic staffs also will have a clear picture of what they are doing and this will reduce any resistance if there is.

### v. Commercial Value

Other institutions that would like to take part in OER will have a benefit from the proposed systematic process flows. It is easier to follow the proposed systematic process and they are able to modify or make some changes as required to suit their environment or needs.

## Acknowledgement

We would like to express our gratitude to Universiti Teknikal Malaysia Melaka (UTeM) for giving us financial supports to execute our workshops and trainings related to the OER/OCW.

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## **Dr. Diet Android Application**

**Rashidi Bin Abd Rashid**

Universiti Teknologi Malaysia (UTM), Johor Bahru, Malaysia  
mrrash91@gmail.com

**Highlights:** Health and diet is an important things as a human being. One of the ways of maintaining a good health is by tracking daily nutrition intake. Unfortunately, Malaysian awareness in calories and nutrition intake is still lacking. "Dr. Diet" android application provide information or learning approach to raise awareness about having a good diet to its user. This include BMI calculator, tracking calories intake, food library, and information portal as a way to promote a healthy lifestyle.

**Key words:** Healthy, Diet, Android Application, E-Learning.

### **Introduction**

Malaysian is a multicultural country consist of Malays, Chinese, and Indian as well as native people. As such, Malaysian have a wide range of food and delicacies. Unfortunately, not all of Malaysian diet is actually healthy. Moreover, Malaysian awareness on having a balance diet is lacking. Using an android application, user can input their diet to calculate the optimum daily intake based on their BMI. User can track daily calories using the application so that user can have a balance diet.

There are a lot of Android healthy diet application that is available on the market nowadays. However, most of them not including the diversities of Malaysian food. The contents of the diet application such as meal, menu, and calories are lacking proper information. Some of the food suggested is not available or hard to find in Malaysia and some of them are not halal food.

Android diet application named as "Dr. Diet" focus on bringing application suitable only in Malaysia. Application are developed to solve the issues the lack of halal and healthy food that are good for Malaysian citizen. It's also included learning and information function to educate its user on the importance of having stable and balance diet.

### **Content**

The main objectives of developing "Dr. Diet" Android application is to provide a healthy diet meal plan that is suitable for Malaysian users including Muslim halal diet. The application provide a genuine nutritional fact for each food contains in the application food library based on research by professional dietitian. User can also customize and choose different option for their diet based on their preferences. It also include useful healthy tips and information portal.

There are a lot of benefits of using the application. Users can gain huge benefits by using this application in term of healthiness, effectiveness, and accurate information. The benefits of using the application includes promoting a healthy diet among Malaysian user and raise awareness about user's food intake. Diet including halal Malaysian food for Muslim community in Malaysia. User can define its own meal plan according to their choice with the limitation of having healthy daily nutrition and calories intake. The application also catalogue variety of food in the application food library.

Using a healthy diet application can provide huge benefits among users. Since the total Android user in Malaysia as well as worldwide is extremely high, the penetration rate of such application is effective in spreading awareness of maintaining healthy diet. The accuracy of the information provided have been consulted with professional dietitian to avoid any misinformation and risk to the users. Thus, the developer emphasizes on providing a valid and accurate fact about diet, food and drink, and healthy meal plan based on nutritionist and medical professional advice.

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## Mobile Apps : Kembara Nombor

**Nur Sakinah Mohd Isa, Mohd Shafie Rosli, Norah Md Noor, Rafidah Omar, Alwee Shamrin**

Universiti Teknologi Malaysia, Malaysia

[nursakinah\\_83@yahoo.com](mailto:nursakinah_83@yahoo.com), [shafierosli@utm.my](mailto:shafierosli@utm.my)

**Highlights:** Kembara Nombor was developed for the purpose of offering an interactive learning to the students with edutainment, constructivism and gamification as its fundamental elements. The mobile application was equipped with interactive applications for its user. User interacts with the application via touch gesture using simple touch, drag and drop as well as higher interactivity through the application of accelerometer. All of these elements render the mobile application fun to be explored and learned.

**Key words:** mobile application; mathematics

### Introduction

This mobile application was developed in order to facilitate the learning process of primary school students. It embrace constructivism as it main pedagogical overlay, rendering an interactive and engaging mobile application development. The principle of gamification was emphasized in its design. To further boots gamification, edutainment element was embedded. As mobile application offer a number of different activities than computer based application, this mobile application was equipped with accelerometer arrangement. Learning is fun as well as entertaining via Kembara Nombor.

### Content

#### 1. Description.

The application was authored using Adobe Flash CS6 using AIR as its main programming language. Accelerometer, touch interaction as well as touch gesture were also implemented.

#### 2. Background of the innovation

Mathematics education on numbering

#### 3. Important to education.

It is engaging and entertaining to be learned by students and it has high level of gamification.

#### 4. Advantages of your innovation towards education and community.

Creating a resourceful and highly literate community.

#### 5. Commercial value

The application can be sold through Google Play

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## eProject: Educational Research Study Management System

**Megat Aman Zahiri Megat Zakaria, Noraffandy Yahaya, Mohd Nihra Haruzuan Mohamad Said, Johari Surif, Norasykin Mohd Zaid & Abdul Halim Abdullah**

Universiti Teknologi Malaysia, Johor Bahru, Malaysia

[megataman@utm.my](mailto:megataman@utm.my), [p-afandy@utm.my](mailto:p-afandy@utm.my), [nihra@utm.my](mailto:nihra@utm.my), [johari\\_surif@utm.my](mailto:johari_surif@utm.my), [norasykini@utm.my](mailto:norasykini@utm.my), [p-halim@utm.my](mailto:p-halim@utm.my)

**Highlights :** eProject is an educational research study management system that plays a significant role in managing important educational research study documents. Hence, this study emphasizes the importance of educational research study management system through web to solve problems within a short period of time while improving the performance and productivity of an organisation. The eProject management system is also seen as an important tool in consolidating Faculty management resources in the long run and helps administrators in making decisions without the limitation of time and place as the system can be accessed online.

**Key words:** System, Web-based Learning, Research Study, Education, eProject, Records.

### Introduction

Document record management systems are also seen as an important tool in consolidating organizational management resources in the long run (Kao & Liu, 2013) and helps administrators in making decisions without the limitation of time and place as the system can be accessed online. The development of a document record management system is needed in order to overcome and provide solutions to the traditional document management problems which is in line with the findings of case studies undertaken by Xiaomi (2009) in the United States. The study shows that the use of computerised record management system promotes a more effective administrative records information management and increases organisational performance. According to Yanli (2011), document record management systems play an important role in college administration, but this system should be regularly updated in order to maintain its current records system. A study conducted by Kardash and Frid (2011) also shows that a computerised management system can help reduce mistakes caused by 'human errors' and provide accurate information and results. A document record management system designed by Kao and Liu (2013) was applied in a case study which involved several primary and secondary schools in China. Feedback received from teachers revealed that the system facilitates the sharing of teaching materials directly among other users. The system could also be accessed on multiple devices.

### eProject System

The development of eProject system is needed in order to overcome and provide solutions to the traditional physical article or thesis submission. The study shows that the use of computerized record management system promotes more effective information management and increases organizational performance. The eProject system plays a significant role in managing educational research study documents and replaces the human role in extracting information and making decisions (Rizal, Jusoff, and Christon, 2011), and; to solve problems within a short period of time while improving the performance and productivity of an organisation (Ding, Levin, Stephan, & Winkler, 2010; Ismail, 2007). The eProject system is also seen as an important tool in consolidating the faculty management resources in the long run (Kao & Liu, 2013) and helps administrators in making decisions without the limitation of time and place as the system can be accessed online. Figure 1 shows the eProject system that manages all educational research study, ranging from undergraduate project management until postgraduate research study.



Laman web ini adalah untuk memudahkan pengurusan projek di Fakulti Pendidikan...

Bil	Sistem Maklumat	Link	Status
1	Postgraduate Research Study Sesi/Sem 2015/2016 2	<a href="#">Link</a>	Buka
2	Projek Sarjana Muda Sesi/Sem PSM 2015/2016-II	<a href="#">Link</a>	Buka
3	Projek Sarjana Muda Sesi/Sem PSM2015/2016 - I		
4	Penyeliaan Sarjana Kerja Kursus Sesi/Sem DATARS2015/2016 - I		

Sebarang masalah/cadangan/komen berkaitan boleh berhubung terus dengan kami.  
No Telefon: 07-5534120 (Dr Nihra - p-nihra@utm.my) No fax: 07-5560542

Sistem ini telah dibangunkan oleh  
Megat Aman Zahiri  
([megataman@utm.my](mailto:megataman@utm.my))  
[How to use: eProject Guide](#)

Figure 1: eProject System

The application of eProject management system plays a pivotal role in educational institutions' management (Xuemei, 2010). According to the Ministry of Education, based on the model presented in JNJK Roadmap 2010-2015 (JNJK, 2009), good management of educational institutions are among the major factors that contribute to students' learning process. Thus, proper emphasis should be given to the administration and strategic management of educational institutions to bring impact to students' learning process.

## Acknowledgement

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## **Implementation of Authentic Learning Strategy For Web-Based Development Course Through MOOCs**

**Juhazren Junaidi, Noor Azean Atan, Hasnah Mohamed, Mohd Nihra Haruzuan Mohamad Said, Noor Dayana Abd Halim, Norazrena Abu Samah**

Universiti Teknologi Malaysia, Johor, Malaysia

[juhazren@utm.my](mailto:juhazren@utm.my), azean@utm.my, hasnah@utm.my, nihra@utm.my, noordayana@utm.my, norazrena@utm.my

**Highlights:** This project implemented authentic learning strategy onto the Web Based Multimedia Development course for UTM-MOOCs. The design is based on elements that involve student engagement in authentic learning that will allow them to create a meaningful, useful shared outcome. The structure of the UTM-MOOC begins with the course's introduction video that is about three minutes of length. The development process for a UTM-MOOC module is shown in diagrammatic steps. There are five steps namely: course setup, course design, course development & implementation, and maintenance & benchmark. Benefits of the implementation are also presented.

**Key words:** *Massive Open Online Courses, Authentic Learning, UTM-MOOC Development Process*

### **Introduction**

The number of people who seek for a university degree, skill enhancement or lifelong learning has increased tremendously. Universities and tertiary learning institutions are urged to discover new ways to provide education to the growing number of learners. Current developments in digital technology, and Internet have enabled universities to cater to the demands by the delivery of web-based courses via open course Massive Open Online Courses (MOOCs) (Koutropoulos, et al., 2013). Many institutions have initiated projects to employ MOOCs, with the goal to provide free learning accessible at anytime and any place (Roth, 2013).

MOOCs is an online learning systems which provide a complete learning environment including various features of course materials such as video learning, online reading, online activities, evaluation instruments as well as communication and collaboration tools (Kirschner, 2012). The mentioned features allow MOOCs to be considered as a new form of providing education. The features also provide different experience from what can be obtained in the traditional classroom. Furthermore, MOOCs offers many additional opportunities for achieving enhanced and enriched learning outcomes through the use of the web for effective instruction and can be a promising alternative to traditional settings (Conole, 2013). Therefore, Universiti Teknologi Malaysia (UTM) had took the initiative to develop UTM-MOOCs as a platform for the university to become a globally connected higher education player that is renowned for its academic and research expertise.

As part of the New Academia initiatives, UTM-MOOCs incorporated Blended Learning as an approach to complement the traditional teaching and learning methods in higher learning institution. It is an innovative and competitive effort to increase institutional visibility within the global higher education. In this regard, the Web-Based Multimedia Development course was designed and developed for UTM-MOOCs based on Authentic Learning Strategy to allow students to create a meaningful and useful shared outcome. The course yields real scenario tasks that present the learner with opportunities to connect directly with real world situations.

The benefits of the UTM-MOOC based on authentic learning strategy are as follows:

- Students are more motivated and more likely to be interested in what they are learning.
- Students learn to assimilate and connect to new knowledge.
- Students are exposed to different settings, activities, and perspectives.
- Transfer and application of theoretical knowledge to real world situations.
- Students get the opportunity to collaborate, produce products, and to practice problem solving.
- Students are able to practice higher-order thinking skills.

As a guideline, the UTM-MOOC development process for each course should follow diagrammatic steps as shown in Figure 1 below:

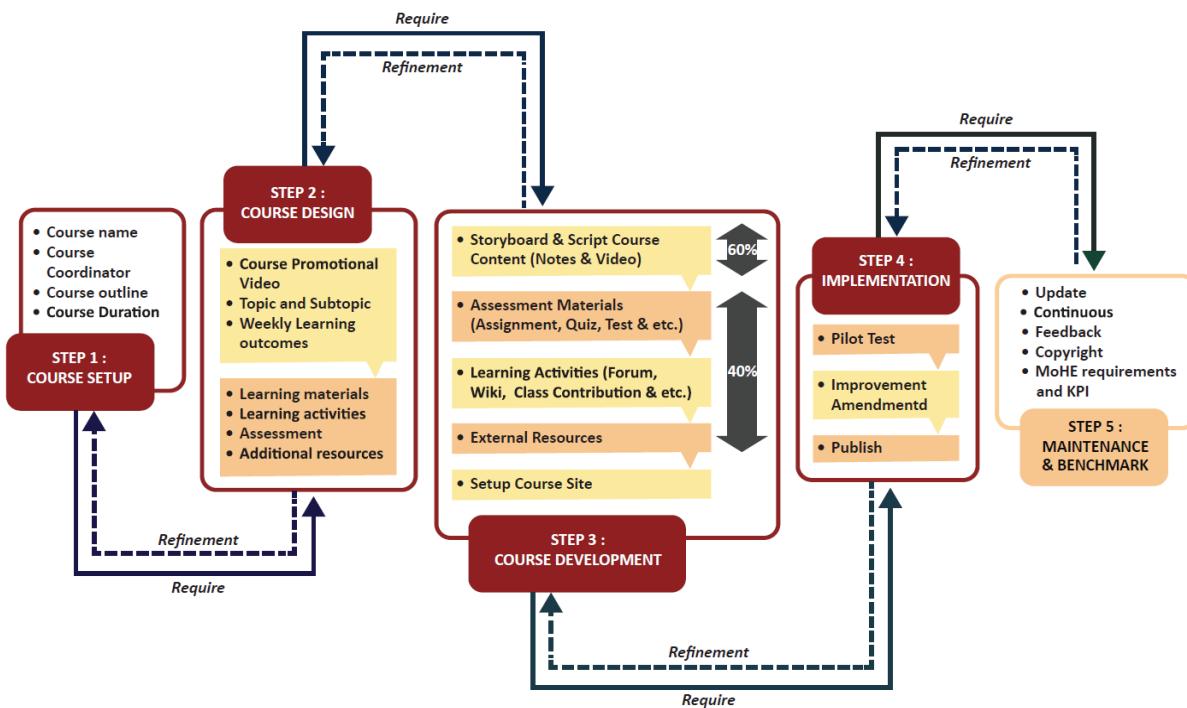


Figure 2: UTM-MOOC Development process

## Acknowledgement

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## Integration of MOOCs as Blended Learning in Learning Research Methodology Course

**Sanitah Mohd Yusof, Noor Azean Atan, Mahani Mokhtar, Adibah Abdul Latif, Zainudin Hassan**

Universiti Teknologi Malaysia, Johor, Malaysia

[azean@utm.my](mailto:azean@utm.my), azean@utm.my, p-mahani@utm.my, p-adibah@utm.my, p-zainudin@utm.my

### Highlights:

As part of the New Academia Learning Innovation (NALI) initiatives, UTM-MOOCs incorporated Blended Learning as an approach to complement the traditional teaching and learning methods in higher learning institution. Blended learning is a growing instructional trend, and based on this approach, the course is delivered in a partly online format, where the material is often presented in a way that encourages asynchronous learning. Refer to this blended learning approach, this study was adopted one-group pretest-posttest design to examine students' perception of integrating MOOCs for Research Methodology course.

**Key words:** Massive Open Online Courses, Blended Learning, UTM-MOOC Development Process, Research Methodology Course.

### Introduction

Massive Open Online Courses (MOOCs) is a free web-based learning course designed for the large numbers of geographically dispersed students. Therefore, Malaysia MOOCs was introduced by the Malaysia Ministry of Higher Education (MOHE) in 2014, for higher learning institution (HLI). Since the launching of Malaysia MOOCs, it has been widely accepted as a new methodology and modality for teaching and learning with exciting new possibilities through technology which enable higher learning institution (HLI) to easily build and host courses for the world to take. MOOC is not just a web-facilitated course but a medium to utilize blended learning. Blended learning is a growing instructional trend and many educators agree that the blended learning approach is beneficial for HLIs (Garrison D.R & Vaughan N.D, 2008). Based on this approach, the course is delivered in a partly online format, where the material is often presented in a way that encourages asynchronous learning. It delivers a flexible experience and supports learning by allowing students to learn at their own pace. Thus, based on blended learning approach, this study was adopted one-group pretest-posttest design to examine students' perception of integrating MOOCs for Research Methodology course. Through this research, a recorded blended learning activity for 55 undergraduate students from (UTM) enrolling in the Research Methodology course as a course credit requirement over for one semester was done. The finding showed that students with different pretest scores change differently during the course of their program. Those with the lower pretest scores showed significant gain at the posttest, while students with the higher pretest scores demonstrated a significant decline at the posttest. Overall, the findings obtained there was a significant improvement in the learning outcomes, particularly with low performance. The study results would give recommendations to improve the course and improve blended learning approach.

The data were obtained by questionnaire and it was analyzed through SPSS to find its percentage, mean and standard deviation. The quantitative questionnaire contains (a) background information, (b) Students' perception were divided into five sections which are students perception regarding (i) internet capabilities (ii) course design (iii) content delivery (iv) individual learning process (v) students interaction with the lecturer (vi) students interaction their peers; and (vii) students satisfaction of the online platform and pedagogical learning approach. One of the results as below:

**Table 1:** Students perception regarding course design

No	Statement	M	Standard Deviation	SD	D	N	A	SA
				Percentage (%)				
1.	It was easy for me to find the information I needed for my learning	3.62	.968	0	9.1	27.3	56.4	7.3
2	I can easily navigate without any problem.	3.55	.790	0	5.5	41.8	45.5	7.3
3	The content is well structured in a clear and understandable manner.	3.44	1.021	0	9.1	43.6	41.8	5.5

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## Introductory Mandarin 1 via MOOC for non-native speakers

**Goh Chin Shuang, Low Hiang Loon, Goh Suat Bee, Teo Ai Min**

Universiti Teknologi Mara, Shah Alam , Malaysia

cassgoh04@yahoo.com

hiangloon2004@yahoo, [sbgoh@hotmail.com](mailto:sbgoh@hotmail.com), teoaimin@salam.uitm.edu.my

**Highlights:** The *Introductory Mandarin 1* is an interactive multimedia E-learning courseware for the teaching and learning of Elementary Mandarin I via MOOC platform. It is a Mandarin e-learning courseware that caters to the needs of learners of different learning styles. This e-learning courseware can be used as a self-access learning or autonomy learning for learners. In addition, *Introductory Mandarin 1* is designed based on learning theories and instructional design approaches attempt to connect learners with one another to answer questions, share and gain knowledge and /or collaborate with each other.

**Key words:** *Introductory Mandarin 1*, e-learning courseware, MOOC, self-access learning, learning theories, instructional design approach

### Introduction

Learning a third or a foreign language has become immensely popular in Malaysia's universities since students are increasingly aware that knowledge of foreign languages facilitates travel and enhances career opportunities (Morris, 2005). One of the most popular foreign languages taught in Malaysian schools and universities is Mandarin, which is also one of the United Nation's official languages. In a multiracial country like Malaysia, mastering a third language certainly opens up more opportunities for jobs and career advancement.

### Content

The advent of technology has made it possible for lessons to be conducted via the Internet and other digital media. Thus, the foreign language teacher or practitioner can transform teaching materials or contents into a different format for use on a variety of portable devices or platform such as via MOOC (Massive Open Online Course) as well as diversify their teaching method such as conducting online communication activities via MOOC platform after classroom teaching.

The teaching course *Introductory Mandarin 1* which is developed by using e-learning and m-learning authoring tools such as Adobe master software, ispring, Camtasia and movie maker, html 5, mobile apps etc. In the other words, multimedia features such as audio, video, image, text, graphic, animation etc. are employed. Students/Learners can study Mandarin via their mobile phones or laptops. Besides that, In terms of interacting purposes, several facilitators are appointed to conduct and handle online communicative activities through the MOOC platform.

### Development of the multimedia e-learning materials

The researchers began designing and developing the *Introductory Mandarin 1* multimedia e-learning courseware in 2015 with cooperation from i-Learn, UiTM. Prior to that, the researchers had planned a storyboard for the e-content, approached some Malay students with Chinese education background who were willing to participate in the multimedia e-learning courseware development project. Before the video shooting and audio recording for multimedia e-learning materials began, the researchers had set up a time schedule with all participants. The researchers prepared scripts, recruited participants and determined location for video shooting. The final step was editing the videos. The whole process to develop the multimedia e-learning courseware took almost one year. The e-content was developed with the help of i-Learn staffs and a vendor hired by i-Learn for the layout design of the e-learning courseware. The multimedia e-learning courseware was then implemented for selected Mandarin I classes taught by the researchers and some UiTM lecturers in semester March-July 2016. The e-learning course can be viewed from the Open learning Platform URL (Universal Resource Locator) <https://www.openlearning.com/courses/introductorymandarin>. Survey questionnaires were distributed to students to obtain feedback of the multimedia e-learning courseware via MOOC platform.

### Introductory Mandarin 1 multimedia e-learning courseware

The multimedia e-learning courseware was developed based on the prescribed Mandarin 1 text book with 13 topics intended for one topic per week. All materials developed were uploaded via "openlearning.com" platform. The Multimedia e-learning courseware included various aspects to enhance the Mandarin learning as described below:

a) **Course Introduction video:** the video for brief introduction intends to help learners to familiarize with the content that learners will be learning throughout the 14 weeks and thus learners will be able to manage their own study plan.

b) **Hanyu Pinyin:** Hanyu pinyin note, exercises and Hanyu Pinyin Internet links resources had been provided for students to do revision at their own time and pace.

c) **Study materials (Topic 1 to Topic 13):** Every topic had the following features and contents:

i) **Learning objectives:** The learning outcome that the learner should achieve after completing the topic.

ii) **Video Teaching:** each topic consists of more than two video teachings. From video teachings, learners will be taught about the learning focuses in the topic. After mastering the learning focuses, learners can continue to gain more knowledge from other parts of the courseware.

iii) **Teaching notes:** These were used to train learners how to use a particular language structure to express intentions. All the teaching notes had multimedia features such as image, animation, audio and translation features. The main aims of the audio files were to enhance the learner's listening and speaking skills, and to increase their knowledge of grammar.

iv) **Grammar:** Notes given on Mandarin grammar were text based and image. In addition, typical grammatical errors made by students were emphasized and explanations were given to highlight the differences between English and Mandarin grammar.

v) **Vocabulary:** Vocabulary practice and drills were provided in each chapter. The vocabulary on the chart had visual-verbal-auditory features. These were for learners to read, verbalize and listen to the pronunciation of each word and compare their pronunciation with that given. With the aid of the vocabulary charts, learners could grasp the contents of the various situational dialogues in each chapter. With a click on the "speaker" icon, learners could listen to the pronunciation of each new word in the target language.

vi) **Dialogues & video:** Each topic had at least two different dialogues. Each dialogue was in a text file with audio and video clips. All video clips had Mandarin subtitles in Romanized Hanyu Pinyin and the Chinese characters. Representation of the sample dialogues in the form of video clips were found to be very useful to students, particularly helping them to practice listening, speaking and reading. With movie clips, the textual contents of the book were dramatized and learners could listen to the digital audio of native speakers' voices, in particular, the pronunciation of words and intonation of phrases and sentences.

vii) **Quiz:** With the drill and practice quiz for each topic, students could see or listen to the information at any time by pressing a button or icon on the screen. Furthermore, all quizzes included could strengthen the students' four learning skills of listening, reading, speaking and writing.

viii) **Internet link:** Links to Internet resources relevant to each theme were included in each topic for students to increase their vocabulary through the extra information related to the themes being learned.

This *Introductory Mandarin 1* courseware is designed to utilise the advantages of electronic or digital devices and technologies, especially due to its visual-audio capabilities in enhancing the learners' ability to distinguish the different tones and pronunciation, as well as acquiring usages of different phrases, sentence patterns and general grammatical rules. It is hoped that the establishment of effective interactive e-learning courseware via MOOC will create a flexible, enjoyable, flip and active learning environment for learners who learn Mandarin as foreign language or third language.

With the China's rapid economic growth has encouraged many who are interested in doing business with the Chinese and exploiting economic opportunities in China to take up Mandarin, the researchers strongly believe that the courseware can be commercialised into the market.

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## **Strategies for Implementing MOOCs in Built Environment (Quantity Surveying) Educational Framework**

**Sarajul Fikri Mohamed, Zakaria Mohd Yusof, Mohd Saidin Misnan, Norazam Othman & Zuhaili Mohamad Ramly**

Department of Quantity Surveying, Faculty of Built Environment, Universiti Teknologi Malaysia, 81310 Skudai, Johor, Malaysia.

[sarajul@utm.my](mailto:sarajul@utm.my), [b-zyusof@utm.my](mailto:b-zyusof@utm.my), [b-saidin@utm.my](mailto:b-saidin@utm.my), [b-azam@utm.my](mailto:b-azam@utm.my), [zuhaili@utm.my](mailto:zuhaili@utm.my)

**Highlight:** Malaysian Higher Education is experiencing a major transformation in terms of teaching methodology, learning environment and technological innovation. Hence, built environment educational framework still in the midst of a philosophical shift from a behaviourist to a constructivist framework. At the same time the introduction of MOOCs in the higher education has profound implication for the built environment education process ranging from technologies application in dealing with key issues of access, efficiency, pedagogy and quality. According to Peansupap & Walker (2006), the opportunities offered by the open learning programmes of the College of Estate Management UK has long given quantity surveyors around the world the chance to qualify as Chartered Surveyors in their own countries. Currently, there is little evidence showing the efforts undertaken by Malaysian higher learning institutions to develop open learning materials in the quantity surveying educational framework. Therefore, the developed MOOC is seek to investigate the opportunities and challenges of MOOCs implementation in the quantity surveying educational framework, with reference to teaching methodology, students perception, and instruction. The potential benefits of developed quantity surveying related MOOCs are to create new model of project-based learning and also make it possible for industry practitioners to engage in learning at the university level.

**Key words:** Built environment, quantity surveying, measurement, project-based, framework

### **Introduction**

The developed MOOCs for Mechanical and Electrical Works Measurement is an innovative and systematic approach using computer-based online system to enhance students' understanding and engagement in the classroom activities. The developed MOOCs are inherited from common quantity surveying course that conducted using project-based learning approach. Blumenfeld et. al (1991) defined project-based learning is a comprehensive approach to classroom teaching and learning that is designed to engage students in investigation of authentic problems. In the global context, there was a trend to develop online quantity surveying education and RICS accredited courses were developed in such countries as Australia, Hong Kong, New Zealand and South Africa (RICS, 2003). Currently, there is little evidence showing the efforts undertaken by Malaysian higher learning institutions to develop open learning materials in the quantity surveying educational framework.

MOOCs for Mechanical & Electrical Works Measurement was developed to support an argument for why project-based learning have the potential to help people to learn and present opportunity on how online computer-based learning can support students and instructors as they work on projects, so that motivation and thought are sustained. The main aim of this online learning is take advantage of MOOCs features to be adopted in quantity surveying education framework. In this context, this study is to recognize the benefits of online learning via the MOOC platform creates both opportunity and challenges for higher learning institutions in Malaysia. In addition, openness in sharing knowledge to address achievement gap and to break academic barriers is vital to allow everyone to engage in learning at the university level. The developed MOOC for Mechanical & Electrical Works measurement are expected to provide a strong indication for the improvement of current teaching methodology in implementing MOOC in quantity surveying educational framework.

The implementation of MOOC for this project-based courses can helps students for easy access and collaborating participation by means of the Web. It is also provides applicant with course resources that are usually used in conventional learning setting - such as problem sets, examples, videos, lectures, study materials and. Aside from this, MOOCs propose interactive customer forums, which are extremely suitable in building a community for instructors, students and industrial practitioners.

### **Impact**

MOOCs for Mechanical & Electrical Works measurement was developed based on systematic investigation that integrate project-based learning and online technology. The implementation of MOOCs in quantity surveying educational framework is a process of providing global access to informational including project-based learning opportunities. The developed MOOC have been registered and tested to more than 800 active students. The students will review the lesson in the form of video, slides and participate in the course activities such as forums,

quizzes and problem solving. The most important impact of developed MOOC is to provide students with a wider variety of knowledge resources so that they build on their strength, allows for a more cost efficient delivery of content and allows instructors to handle a large cohort than would be possible using a face to face teaching methodology. MOOCs are in core a reaffirmation of online knowledge atmospheres that have been in use for some time and accessible in different geographical areas. The target market for the developed MOOC will be categorised into three targeted users; students, instructors and industrial practitioners. Based on RISM record, there is 143,000 practising quantity surveyors in construction industry and 9600 students in Malaysian and Asia Pacific higher learning institutions. The registration fee for student is RM5 per student per module and industrial practitioner they need to pay RM30 per module.

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## **Student's Performance in Blended Learning Versus Online Learning Environments**

**Norazura Ismail, Nurliyana Moh Hussin, Abdullah Ibrahim, Mohd Shahril Abu Hanifah, Norhidayah Abdull, Ezrin Hani Sukadarin**

Universiti Malaysia Pahang, Kuantan, Malaysia

[zuraismail@ump.edu.my](mailto:zuraismail@ump.edu.my)

[nurliyana@ump.edu.my](mailto:nurliyana@ump.edu.my), [abi@ump.edu.my](mailto:abi@ump.edu.my), [mohdshahril@ump.edu.my](mailto:mohdshahril@ump.edu.my), [hidayahabdull@ump.edu.my](mailto:hidayahabdull@ump.edu.my),  
[ezrin@ump.edu.my](mailto:ezrin@ump.edu.my)

**Highlights:** A Massive Open Online Course (MOOC) was developed to enrich online learning environment. Its effectiveness was tested through experimental investigation among 89 undergraduate students in Universiti Malaysia Pahang. Group 1 which consists of 50 students was exposed to only MOOC and another 39 students in Group 2 were exposed to blended learning (face-to-face plus MOOC). Those who underwent blended learning scored higher in assessments (Assessment 1 = 80.0%; Assessment 2 = 87.5%) than those who underwent MOOC only (Assessment 1 = 60.0%; Assessment 2 = 68.75%). It shows that blended learning environment contributes more significantly in enhancing student's performance.

**Key words:** MOOC, online learning, blended learning.

### **Introduction**

Currently, education institutions provide various platforms for people to pursue their lifelong learning although this revolution proceeds without clear vision and master plan (Ikenberry, 1999). Therefore, there are people who argue that e-learning still at low growth rate (35.6%) and considered failures to exist due to several factors such as learner computer anxiety, instructor attitude toward e-Learning, e-Learning course flexibility, and e-Learning course quality (Sun et al., 2008). Nevertheless, many education institutions still provide access to the public through various ways including introducing open educational resources (OER) project in many unique forms such as repositories, portals, Massive Open Online Courses (MOOC), Open Course Ware (OCW), open textbooks (e-books) and tutorials (Mohamed Amin and Zaid, 2013). Although these forms of online learning are not yet widespread but the growing number of higher institutions resorting to this innovation seems to be growing exponentially (Anderson, 2008).

Means et al. (2013) indicated that advantages over face-to-face classes were more significant for blended learning than purely online mode. Garrison and Kanuka (2004) defined blended learning as complimenting face-to-face classes with web-based materials. Such technology, when combined with effective pedagogy and reflective teaching will transform higher education (Garrison and Anderson, 2011). Therefore, this study is intended to evaluate the effectiveness of blended learning as compared to online learning. A Massive Open Online Course (MOOC) on Occupational Safety and Health Fundamentals (OSHF) course was developed as an alternative tool for promoting dynamic communication through fun and interactive learning communities, where students can discuss and reflect on experience, share relevant and meaningful media, and connect with their peers. The effectiveness of this tool was tested among 89 undergraduate students with similar education background. They were divided into two groups with different learning methods in Occupational Safety and Health Fundamentals class. The first group which involved 50 students has been exposed to only online learning (MOOC) method and 39 students in the second group were exposed to blended (face-to-face and MOOC) methods. Then, same series of formal assessments were done for both groups for continuous evaluation. Results showed those who underwent blended learning approach had significantly ( $p < 0.05$ ) greater score (Assessment 1= 80.0%; Assessment 2 = 87.5%) in two formal assessments as compared to those who underwent online learning only (Assessment 1= 60.0%; Assessment 2 = 68.75%). It shows that blended learning environment contributes more significantly in enhancing student's performance.

### **Description of innovation**

Current technology allows various innovations in terms of teaching and learning unexceptionally online learning. This study takes the opportunity to innovate teaching and learning strategy focusing on Occupational Safety and Health Fundamentals (OSHF) course. A Massive Open Online Course (MOOC) was developed to establish an innovative system of higher level education which is flexible and open in terms of method and pace of learning. MOOC can provide more options for strengthening teaching delivery for online learning environment other than face-to-face environment. Materials used for developing this MOOC include I-Spring software, video and audio recorder. Focus group discussion was initially done to finalize contents in the module before developing the storyboard. Then, several locations were selected for video shooting. Audio recording was done in the studio and the final edition was uploaded making it accessible worldwide. Finally, one experiment using cross-over control trial approach was carried out to investigate the effectiveness of MOOC in terms of student's performance using two quizzes for two modules. Eighty nine students were selected to undergo two different learning approaches. They were divided into two groups whereby the first group was the treatment group who has been exposed to both blended learning environments (MOOC and face-to-face). While the second group as a control group has been exposed to only online learning environment (MOOC). After completing the first module, students in both groups were required to sit for a quiz. Students in both groups were crossed over to experience both learning environments

and only the online learning environment for the second module before sitting for the second quiz. Then, a comparison of scores obtained from both quizzes was made among students. Further statistical analysis was done using the latest version of Statistical Package for Social Sciences (SPSS) to assess the effectiveness of the two types of learning environments.

## Background of the innovation

Malaysian Government has acknowledged the contribution of learning technologies towards improving student outcomes by aiming to convert common undergraduate courses into MOOC and advocates the use of blended learning models for up to 70% of the programs. Therefore, it is imperative for UMP to develop MOOC on Occupational Safety and Health Fundamentals course to compliment the government's initiatives. This new teaching and learning practice is based on a blended learning approach that combines online (MOOC) and in-class activities to form deeper understandings. This MOOC was introduced considering the needs of people in enhancing their knowledge with different learning style through various ways with less cost.

## Why are they important to education?

This educational package (MOOC) equips student with thorough knowledge and understanding of OSHF. It is flexible and open in terms of method and pace of learning which provides opportunities for continuing and developmental education to interested learners. The nature of this educational package is interdisciplinary whereby it is applicable to all other field of interest.

The module for this MOOC is extensive that can help in any company or individual to comply and conform with OSH Act and Regulations and provide the basis for the development of a sustainable safety and health culture in the organization. It is recognized and used by government agencies, colleges, schools, business and individuals across the globe. Therefore, it is necessary to develop online educational package in order to give access to all students in UMP in particular as well as other people at large.

## Advantages of the innovation towards education and community

The main purpose of MOOC development is to provide free education and borderless in order to increase the quality and accessibility of higher education to the public. This MOOC benefits the recipients since it is flexible; no travelling required, less time, convenience and casual wherever you have internet access. Therefore, it can maximize engagement, comprehension, and retention in a dynamic style of learning. Moreover, MOOC development can foster inter-university collaboration where it can improve the country's tertiary education to a much higher level.

For the community level, MOOC on OSHF course will be exposed to individual worker in any organization since workplace accidents are increasing. The contents of the subject in MOOC are also suitable for beginners who plan to gain basic understanding on safety and health, and this creates the opportunity for the community to understand safety aspects of their surroundings.

## Commercial value in terms of marketability or profitability of the innovation

The cost of accidents is tremendous either directly or indirectly. In terms of economic benefits reduction of accident cost will increase profitability of any organization. Even though there are no direct marketability benefits and profitability in terms of monetary but the result can be measured through increasing OSH awareness in human capital sector. The development of educational package will enhance the knowledge, attitude and practices in OSH for community at large. By increasing the public awareness on OSH, accident could be reduced hence economic benefits could be achieved.

## Acknowledgement

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## **Journey of MOOC creation in Hotel Housekeeping Operations**

**Ruth Sabina Francis**

Taylor's University, School of Hospitality, Tourism & Culinary Arts  
[ruthsabina.francis@taylors.edu.my](mailto:ruthsabina.francis@taylors.edu.my)

**Highlights:** The Massive Open Online Course (MOOC) bug bit the Taylor's University School of Hospitality, Tourism and Culinary Arts and in November 2016 the school launched the one of its kind MOOC in Hotel Housekeeping Operations. MOOC in the field of Hotel Housekeeping provides a wider platform to showcase the module that is really not very well embraced by the students. The course was designed for anyone who wants to pursue a career in the Housekeeping department in the hospitality industry.

**Key Words:** MOOC, Housekeeping, Hotel, Hospitality Industry

### **Introduction:**

The Hospitality Industry is bigger, richer and constantly changing. It is growing tremendously. Competition for both talented employees and technical educators are on the constant rise. Rooms division in the hospitality industry comprises of both Front Office Operation and Housekeeping Operations. They form the most important operations section of the hotel. As a housekeeper you should go to work each day feeling proud of the vital role you play to keep your property clean and aesthetic. You will have to ensure that your rooms are impeccable for guests. Helen Blinkhorn, housekeeping manager at the Golden Tulip hotel Manchester says " Housekeeping just doesn't get a profile at colleges, we've been left in the background for such a long time that a lot of students don't even consider the sector", (Caterer & Hotelkeeper, 2006). Nick Gamble, Director of Operations at Malmaison, cited that among the large group of hotels in London the contract-out of housekeeping operations has even more weakened the profession, (Caterer & Hotelkeeper, 2006). Many International Chain groups in Malaysia have also contracted out housekeeping operations paving way for fewer candidates to apply for a job in the department. Considering the above facts the creation of MOOC in the area of Hotel Housekeeping operations really has the prospective to attract more learners to understand that though the department is not glamorous but it is the backbone of any hotel.

### **Content:**

#### **The Description of the product:**

The course is on a self-paced mode introducing the learners the Accommodation Product explaining on the Types of hotel rooms and the rate options and various practical tasks. The learners have the flexibility to learn from anywhere on their own devices. As a Housekeeper for more than five years I have always had the passion for the housekeeping hence this course will teach the basic skills of hotel housekeeping operations. At the end of the course the learners would be able to demonstrate the housekeeping practical tasks of guest room cleaning such as Bed Making, Turn Down service and Housekeeping Maid Trolley Packing.

#### **Background and Importance of the product:**

The housekeeping department has been unappreciated in many countries by removing the housekeeping modules from college courses and exploitation of under skilled contract workers and as a result there is a dearth in the housekeeping staff. (Caterer & Hotelkeeper, 2006). One of the top five concerns of the hotel departments is employee retention since 2008 (Wise, 2008). Responding to the prevailing conditions of lack of employees in the department this course is a sincere initiative to create awareness about the department and the various practical tasks and activities developed would build up interest among the learners. The MOOC would also be a revision platform for the existing students enrolled with the Taylor's University School of Hospitality, students enhancing their performance in the Rooms Division module.

#### **Advantages of the product:**

Out of the four major reasons for enrolling in a MOOC course the top most reason is to "gain specific skills to do my job better" was established in a survey of MOOC users in developing countries (G Christensen et al, 2013). Donald Clark (2013) has reported that Internal Students on course and professionals were few emerging targeted audiences

for MOOC courses. The MOOC created by the Taylor's University, School of Hospitality, Tourism and Culinary Arts not only focuses on the internal students but also the professionals who would like to refine their technical skills according to the established Standard Operating Procedures. Downes and Siemens (Siemens, 2009) suggests that the whole education phenomenon has to be revamped from the traditional, closed groups, highly structured course where students are totally relied on the teachers to open – networks of self-directed learners. Hence this course captures a structured lesson plan with step-by-step pictures of the tasks and video of the practical task for self – directed learner. The activity based assessment at the end of the course would amuse the learner to gauge their level of understanding of the practical tasks and as well to implement it in their job or at home.

### **A cut above the rest:**

The MOOC project by the Taylor's University has been recognized under the Best MOOC Award for its Project Methodology in the National University Carnival on E-Learning in 2014 organised by the MEIPTA. Taylor's University being recognized in the Top 179 universities in the QS Asian Universities Rankings 2016 has always strived for excellence and Tier 6, Setara rating School of Hospitality, Tourism and Culinary Arts has emerged with a series of successful MOOCs in Culinary Arts, Food and Beverage, Wine studies and Housekeeping. The student's endorsements about the eminence of MOOCs created at Taylor's University have never failed to ascertain that MOOC is an accepted and welcomed pedagogy in e-learning.

### **Limitations:**

It has been observed that in MOOC courses many incomplete learners emerge aiding to a fact that it is not necessary to complete the course assignments, (Alexander et al, 2010). Fini (2009) proved that out of 83 respondents in a particular MOOC course only 15 had completed their course requirements. The same scenario prevailed in this MOOC with students not completing their course since it is a non-financial module.

### **Future Research:**

The MOOC course currently created is a very a basic module that was initiated to create more awareness about the module among the students. A detailed manual with more topics to enhance the Housekeeping skills should be developed to add in the commercial factor to the course.

### **Acknowledgements:**

I am entirely grateful to the immense motivation from the School of Hospitality, Tourism and Culinary Arts and the intensive support from the e-LA e-Learning department of Taylor's University.

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## **Classcraft led Multi-Platform Applications as Pedagogy in the Tertiary Education Classroom**

**Charles Sharma Naidu**

The Design School, Taylor's University Lakeside Campus  
Charles.Sharma@taylors.edu.my

**Highlights:** High creative engagement in the tertiary classroom. Enhanced motivation producing better assignment and project outcomes. Better feedback system using reaction and response videos and the Classcraft platforms. Using Classcraft, gaming and video platforms to motivate and shape learning behaviours in tertiary level education.

**Key words:** Role-playing Simulations, Gamification, Reaction, Response

### **Introduction**

Gamification is also fast becoming a trend in the classroom and now is being introduced at the tertiary level as well as being studied more seriously about its impact the teaching and learning process. Classcraft is a role-playing game used in class for the purpose of infusing fantasy, and storytelling as part of a simulation to reinforce the learning interests and motivation for producing better assignment and project outcomes (Young, 2011). Classcraft was founded and created by Shawn Young based in the United States and it is specifically designed for e-Learning and to create an exciting learning environment. Students' affinity for gaming and playing was used as an advantage to better control the classroom and to instill a sense of achievement when rewards are provided as they fulfilled quests and events. Each student is enrolled into Classcraft and is provided opportunities to customize their avatars and assist in collaborative efforts for their specific teams. Classcraft as a leading pedagogical tool provides students with different backgrounds and abilities with the motivation to achieve their assignment objectives consisting of different requirements. This is attributed to the element of projecting themselves as more than what they can be in an analogical sense and using a fictitious element. Thus this product can be innovated to be used in a multidisciplinary setting and applicable for any forms of lesson and discipline. Nothing changes with the lesson except the possibility of gamified achievements and re-interpretation of the scoring system, which makes it relevant and marketable. It has the means to make every lesson interesting and rewarding. In this case all gamified tasks, assignments and projects, will contribute to the progress and leveling up of the characters. The three character classes assumed by the students upon selection will benefit the members of their team. In this class, the students play the protagonist of the lesson adventure and Mr. Black (the lecturer) will play the antagonists. Mr. Black's aim is to ensure the difficulties in tasks, assignments and projects, will cause the students to lose points/scores. But the character class abilities and leveled up powers, would protect them from penalties implemented from the lecturer.

Therefore this platform provided the ambience, which was needed to drive the students to use the secondary platforms. The main secondary platforms in the multi-platform applications are, Taylor's University TIMES LMS platform, Open Learning MOOC site and YouTube.

### **Description of Innovation:**

#### **Multiplatform Applications**

Based on the module, which I am currently teaching, which is, Creative Thinking Skills (CTS), I have used the University TIMES CTS module site and integrated it with the gamification site called Classcraft, Open Learning MOOC site and YouTube. The integration allowed students to seamlessly switch between sites for knowledge acquisition, project and assignment briefs, rewards/assessment and live feedback/reactions.

#### **Gamifying the classroom**

Classcraft is the primary gamification site reinforcing the students' need to pursue quality assignment outcomes using a fantasy role-playing game as a motivational method. Students are rewarded within the site and the points accumulated will contribute to assignment and project scores. Open learning became the real-time interactive feedback and response channel to quick exercises and online tutorials. Scoring and assessment in Open Learning was carefully mapped out with the CTS scoring rubric as well as the classroom reward and assessment framework. In addition to the Open-Learning platform, YouTube also became an important source of live feedback and reactions. YouTube embedding and posting were done when live video feedbacks were a necessity. However, based on the frequency and accessibility, YouTube platform became a prime source of common video sharing and feedback and is easily posted in TIMES, Classcraft and Open-learning platforms.

Reactive feedback helped in conveying actual thoughts as assignments are viewed spontaneously. Viewing the reaction and feedback videos by the lecturer provided off-campus feedback and flexibility in obtaining feedback outside of class schedule. Open learning became my primary channel to study flip-classroom methods for my module. The main product highlighted in this submission is Classcraft as an innovative e-learning method, which produced high creative engagement with tertiary students using gamification methods.

### **Context and Background**

The core aspect of using multi-platform applications, led by Classcraft; is as a determinant factor for e-learning for the students; which is the use of fantasy role-playing game familiarity and its popularity, which is the novel method of infusing storytelling and role-playing elements into the classroom and out of classroom environment for the module Creative Thinking Skills (CTS). This platform also has the potential to be implemented for different subjects. Why is this so and why is this special? It is because of the implementation of gamification and this is an effort to do so in the tertiary education level. The methodology of using Classcraft to motivate students to access module sites and to encourage learning contributed to the innovative initiatives concerning the pedagogy of CTS. The main issues concerning assessment and quality student outcomes were the prime factor which contributed to the main problem question such as 'how do we make teaching in the classroom more interesting drawing from the students' interests?' However making the lesson interesting using the novel methods of Classcraft weren't enough. Classcraft had to complement the present assessment system of the main module/subject with other platforms and with live responses as well as reactions.

### **Advantages**

Drawing from the need to work in teams for every semester, this site provided the ideal team-based mechanism to ensure that every member of the team contributes as positive and negative rewards, which affect the entire team. They would also have the opportunity to repel negative rewards from the teacher or facilitator who is the 'antagonist' of the entire game. This facilitated the need to produce quality outcomes for assignments and projects became a priority and students who were less participative were motivated to pursue better scores.

The simulation of role-playing game within the classroom parallels that of the actual journey a student would take in real life, thus this analogical equivalent is ideal to convey the classroom environment from a different perspective. This added more value to life-long learning, knowledge acquisition and critical thinking as well as effective cooperative learning sessions. There is also great potential for multi-disciplinary applications using such a novel methodology.

### **Impact**

The attempts to use classcraft led multi-platform applications as pedagogy in the classroom were received with positive results and elicited high creative engagement from the students. This led to a developed assessment framework complementing the novel methods of content delivery. This means students were motivated to understand their content better. Classcraft led multiplatform applications have been recognized by Taylor's University and this attempts have obtained two awards. First a bronze at the Taylor's University SPARK awards and a silver medal at the National University E-learning Carnival held at a renowned educational University in Malaysia UPSI – University Pendidikan Sultan Idris – (Sultan Idris Educational University) in 2015 (C. Naidu, 2016). These attempts were made known to the developers of Classcraft in the US, and effective 2016, I have been made a Classcraft ambassador representing Taylor's University and have begun collecting more data as to how this platform and be further integrated to enhance the impact of E-learning for tertiary level education in Malaysia.

### **Acknowledgements**

None of my attempts to implement this multi-platform application would have borne fruit if it weren't for Taylor's E-Learning Academy for providing the technical support and necessary funding as well as The Design School for providing the much needed flexibility in developing new teaching and learning pedagogies. Further attempts to develop this method are currently underway through further observation of current and future student cohorts.

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## **Integration of iPad and apps in Food and Beverage Service Praxis to create a new dining experience (Going i-restaurant)**

**Kandappan Balasubramanian**

School of Hospitality, Tourism and Culinary Arts, Taylor's University, Subang Jaya, Selangor, Malaysia  
Kandappan.bala@taylors.edu.my

**Highlights:** The integration of Tablet personal computer (TPC) such as Apple iPad in university classroom, since the use of recent technology among the student community is rapidly increasing. The information technology has provided educators and learners an innovative learning environment to generate exciting new paths in the learning process by using the iPad apps. This style of learning integrates traditional classroom methods to transform into blended learning methods by engaging the students with online activities. Benefits of TPC and apps in educational settings show the access to engage students fully and it extends their learning beyond the school. The use of iPad apps as one of teaching aid in the food and beverage service praxis to enhance the student-centered learning. The theory of experiential learning has been applied for the transformation in teaching with iPad apps to create a responsible learning environment, enhancing interaction and collaboration among the students at university level.

**Keywords:** iPad apps, Food and Beverage service, Responsible learning environment

### **Introduction**

The development of mobile technology creates a new opportunities for enhancing the learning experience of students at university level education. In this paper we explore the adoption of tablet devices, such as iPad apps as a relatively new consumer product, in university level education. Although tablet personal computers have existed for some time, Weider (2011) noted that their size and cost proved prohibitive to adoption by educators, and by consumers generally. It has only been since 2010 that portable, easy-to-use, and relatively inexpensive tablets have become widely available. In education, the application of computer technology in collegiate classroom can improve teaching when used appropriately (Barak, Lipson & Lerman, 2006). TPC's changed the practices of learning concept by developing, analyzing, publishing knowledge content by providing user flexible applications. The TPC apps can equip the students to organize their learning process independently and help them to share among their group. Experts suggest that these personal devices can increase motivation, organizational skills, active learning and self-directed learning. (Fadel & Lemke, 2009). Several App's store has developed with the precise aim of teaching applications. A large number of apps available in the TPC-iPad help the students to excel in their learning process. There are many apps related to the food and beverage service practical and theory (praxis) which chaperons the students to perform well when the educators give assessment or activities based on experiential learning.

### **Description of the Innovation**

As a educator, I always believe that the transformation in teaching and learning always happens as there is changes in generation. My teaching passion is to engage, collaborative and inspire my students inside my classroom environment by integrating the technology as a right teaching tools. I started using iPad and the below apps to make an Paradigm shift in the Food and Beverage Praxis (RESTAURANT OPERATIONS) IN THE TRAINING RESTAURANT TO CREATE AN ENGAGING AND A NEW DINING EXPERIENCE TO THE CUSTOMERS.

- **Socrative:** Used to replace the traditional customer feedback with interactive online customer feedback.
- **iPhoto and iMovie:** A video was created by covering the kitchen and restaurant operations work flow and cooking process and played the video to the customer during the dining time as an initiative to engage them on waiting time.
- **iMessage/whats up:** Used for ordering taking and placing food orders.
- Traditional paper-menu was replaced by **iPad** menu

### **Implementation of the innovation**

**iPhoto and iMovie:** This app helps me to create a short video to show the hygiene factors and set-up of restaurant in kitchen and food service team to provide a new dining experience to the customer with the touch of culinary skills.

**SOCRATIVE:** THE CUSTOMER WERE VERY EXCITED WHEN IT WAS EXECUTED TO USE IN THE RESTAURANT PRACTICAL FOR GETTING THE FEEDBACK FROM THE CUSTOMER AND ALSO FOR LIVE ONLINE CUSTOMER FEEDBACK PROJECTED ON THE SCREEN IN THE RESTAURANT, AND FOR DISCUSSION FORUM IN THEORY CLASS.

**IPAD APPS:** I USED IPAD APPS TO PRACTICES I-MENU (INTERACTIVE MENU) PRESENTATION IN MY FOOD AND BEVERAGE SERVICE PRACTICAL AND FEW APPS SUCH AS TOP WINES, NAPKIN FOLDING, WSET GAME, MOCKTAILS, ETC., THE WSET AND TOP WINES APPS REALLY GRABBED THE STUDENTS ATTRACTION, SINCE THEY ARE KEEN INTEREST TOWARDS WINE AND RELATED TOPICS.

### Impact of the innovation

- Students improve their creativity level by creating a new dining experience to the customer by integrating the technology in the restaurant.
- The usage of imessage/whats up for ordering system helps to reduce the over-crowding of students in the kitchen to place order and also to collect the customer food. Using this way of ordering system also helps the student to be in customer visible area and improves the efficiency of the food service.
- The integration of technology helps the students to know the recent trends happening in the real World.
- The online customer feedback was also had a very positive impact among the customers as their comments about the food, service is real-time and shared by projector inside the restaurant.
- Students use own device for learning purpose (BYOD concept): Socrative can be used for warm up questions to get your students thinking in the beginning of class, and also to take a general survey for class opinions. (Collaborative learning)

The interactive i-restaurant concept will provide an opportunity for them to learn the recent scenarios and practice to equip them as per the Global market expectations.

### Acknowledgement

We are entirely grateful to the immense and continuous motivation from the School of Hospitality, Tourism and Culinary Arts and the intensive support from the e-Learning (eLA) department of Taylor's University.

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## Flip teaching using ReWIND by Taylor's University

**Yeo Siok Koon, Farhan Che Soh**

Taylor's University, Subang Jaya, Malaysia

[siokkoon.yeo@taylors.edu.my](mailto:siokkoon.yeo@taylors.edu.my), [Farhan.CheSoh@taylors.edu.my](mailto:Farhan.CheSoh@taylors.edu.my)

**Highlights:** The main objective of this innovation is to initiate a self-directed learning which offer students with more flexibility. This innovation is unique because the lecture recording (ReWIND on the Go) not only allow the learners to access learning (knowledge) at anytime and anywhere, it also set as a prior knowledge before they apply it in classroom and out of classroom activity. This teaching approach promote critical thinking and addresses different learning style among students. 90% of the students revealed that they understood and can relate the relationship of the lesson activities to learning objectives and learning assessments through this innovation.

**Key words:** Flipped teaching, lecture recording, ReWIND, reinforcement activity

### Introduction

Diversity is a nature of human species, and students have always been different from each other in various way (Banks et al., 2005). This indicates that teachers/ lecturers must be prepared to teach a diverse community of students. Previous studies have demonstrated that effective learning for this diverse group of students in this era has shifted from conventional recipient of knowledge to self-directed or active knowledge acquisition. This will enable a diverse group of students to acquire higher order thinking and develop a wider range of skills (Arends, 2004). As an effort to promote active learning, many institution has encourage the use of flipped teaching. Flipped teaching is a teaching/ learning approach where typical lecture and reinforcement activity (homework) is being reversed. In a flipped classroom, lecture is being delivered outside classroom/ at home via video or other reading materials. On the other hand, classroom time is being used for reinforcement activity such as discussion, problem solving activity or project. This type of teaching and learning approach would create a more active and self-directed learning environment instead of conventional passive recipient of knowledge. Flipped classroom learning environment also allows the students to work collaboratively, acquiring interpersonal skills and ability to critically think and reason with their peers and instructor.

Although this approach may sound promising and effective, there are many challenges for using such approach. One of the main challenges is to select suitable materials to be used in the flipped classroom. Technological advancement in this era has prompted the demand for online materials which allow more flexibility for the students. Certainly, this online materials must be beyond reading material with incorporation of explanation in video format. However, online lecture (video) in several field is not always readily available. Therefore, most institution must adopt certain technological instrument to allow effective implementation of flipped teaching. The main objective of this innovation is to implement an effective flipped-teaching approach using a lecture recording system (ReWind on the Go) in Taylor's University, Malaysia.

### Content

This innovation describes the effective utilization of ReWIND on the Go (lecture recording system in Taylor's University) together with classroom/ out of classroom activities to enhance active learning. This innovation was implemented for the module MIC2104/ FSC60304 Food Microbiology in Taylor's University, Malaysia for Science students. This innovation can be applied with any laptop equipped with AcuConsole 8 software. AcuConsole 8 is a tool adopted by Taylor's University, Malaysia which allows lecturers to record their lecture (video) at anytime and anywhere. This convenience tools provide flexibility to the lecturers and at the same time allow students to access the material at the time and place most convenience for them to learn. This will also allow the students to acquire prior knowledge at their own pace before coming to class while the dedicated class time is used for knowledge reinforcement. Knowledge reinforcement can be done through activity (within and out of classroom). This prior knowledge that they gained through the ReWIND on the Go video allows them to participate actively in the activity during class time, which will allow further development or reinforcement of the knowledge (deeper memory). Each students will play their roles in the discussion while some weaker students may also benefit from this activity as they learn from their peer during activity/ discussion.

In a conventional lecture, the attention of most students starts to decrease after fifteen minutes (Wankat, 2002), so flipping the class can help to keep students focused and learn for the whole period. Considering the attention span of students, the lecture were also recorded using ReWIND in byte size which lasted only for about 5-10 minutes. The video will then be uploaded to Taylor's Moodle system few weeks before the actual class activity. Students can access and download the video with any gadget, allowing students to learn at anytime and anywhere. In addition, flipping the classroom with online lecture recording would means that students have more time to process and reflect on concepts and increase their prior knowledge before coming to class to apply their learning. The ability to rewind and listen to a presentation or explanation repeatedly can also help some students to make more meaningful notes or overcome language fluency issues.

During the classroom time, various activity (classroom or out of classroom activity) that suits the nature of the modules/ topic will be conducted. Students are usually sub-divided into small groups to discuss on case studies (using real food products) which is related to the topic. The case studies will require the students to critically think and analyze based on their prior knowledge (ReWIND on the Go video). The activities or discussion which happen in the classroom provide a platform for the students to add meaning to the knowledge, apply the information and construct new knowledge. Generally, their discussion outcomes will be presented in the form of video, text and photo which were then uploaded to the Padlet wall and lecturers are able to assess the students work immediately/ simultaneously from their laptop. Feedback would then be given by the lecturers to enable the students to improve further. Considering that the discussion outcomes and feedbacks were uploaded to the Padlet wall, students can also easily access to the materials while doing their revision for future assessment. Lastly, online quiz were conducted to gauge the understanding of individual student. Such teaching approach will allow lecturers to deliver the lecture, implement the reinforcement activity and assess individual student's performance effectively.

In addition, it can also be applied to classes with large number of students. Each students can learn on their own pace without affecting others through the online lectures and activities can be done based on small groupings which ensure sufficient attention given to each and every students. In addition, such approach can efficiently cater for heterogeneous group of learners (learners with diverse multiple intelligence). Often, the conventional face-to-face delivery method focuses only on the verbal/ linguistic which may not cater for all the learners. On the other hand, this innovation is design to address the need of students with various types of multiple intelligences (Table 1). Therefore, clear benefits of this innovation is that learners can control their learning pace and learn according to their preferred style.

Table 1: Activities in flipped teaching that cater for multiple intelligence

Multiple Intelligence	Activities
Kinaesthetic	Holding, feeling and tasting real food products, or involved in picture taking and searching for answer during out of classroom activity
Visual	View the real food products and watch the lecture recording
Auditory/ linguistic	Discussion as part of the group activity/ Listening to the lecture recording
Logical	Students discuss based on reasoning
Interpersonal	Work in a team during activity time
Intrapersonal	Learn individually based on their own pace through the lecture recording

Therefore, this innovation can be transferred to any modules with students of diverse learning styles. About 88% of the students revealed that this type of teaching approach addresses their differences and help to promote teamwork and group performance. The students (94%) also felt that the activity conducted is relevant and enable them to relate the subject matters to the real world. Approximately, 90% of the students understood and can relate the relationship of the lesson activities to the learning objectives and learning assessments.

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## RELMARK: An Innovative Tool for Preprocessing of Transactional Data

**Izwan Nizal Mohd Shaharanee, Jastini Mohd Jamil**  
Universiti Utara Malaysia, 06010 Sintok, Kedah, Malaysia  
[nizal@uum.edu.my](mailto:nizal@uum.edu.my) [jastini@uum.edu.my](mailto:jastini@uum.edu.my)

**Highlights:** Association rule mining is a popular research topic in data mining subject due to many useful applications. The initial task in producing association rule is to ensure that only suitable data formats are fed into the mining process. Providing a correct data format for association rule mining is an essential and crucial task as wrong data will yield wrong results and interpretations. In this work, an efficient tool for converting relational data format into transactional data format is presented. This transactional data format suited the SAS Enterprise Miner Software for association rule mining technique.

**Key words:** association rule mining, relational data, transactional data, data preprocessing

### Introduction

The Data Mining course deals with the extraction of useful information from data. Getting insightful information from large amount of data is also the essence of many sub-areas of computer science, as well as the field of statistics, data mining can be referred to lie at the intersection of statistics, machine learning, databases, pattern recognition, information retrieval and artificial intelligence [1]. In teaching and learning data mining course, one of the most important task is in preparing suitable data for data mining application. Data directly taken from the source will likely have inconsistencies, errors or most importantly, it is not ready to be considered for a data mining process. Furthermore, the increasing amount of data in recent science, industry and business applications, and calls to the requirement of more complex tools to analyze it. The main idea of data pre-processing is to ensure that data fed into the data mining phase is clean (high quality of data) and only appropriate data are selected [2]. Data from different sources are often converted into a common format for processing and some data may be encoded or transformed into more usable formats.

In general, the association rule mining searches for interesting relationships among items in a given data set under minimum support and minimum confidence conditions. The problem of finding association rules  $x \rightarrow y$  was first introduced in [3] as a data mining task of finding frequently co-occurring items in large databases. The first step is to find all frequently occurring items, typically referred to as frequent itemsets. Each of the itemsets will occur at least as frequently as a predetermined minimum support count. The second step is to generate strong association rules from the frequent itemsets. These strong rules must satisfy the minimum support and minimum confidence.

RELMARK is a tools developed to ease the burden in preparing the data for association rule mining analysis. Association rules mining analysis require transactional data format to be fed into the system. RELMARK is an efficient tool for preparing correct data format for mining frequent itemsets. This tool is capable to change the relational data format into transactional data format. For teaching and learning purposes, RELMARK offer the students a simple point and click approach in changing data format that suit the association rules analysis. Students only required uploading the relational data into the RELMARK. The build-in algorithm in RELMARK will convert the data automatically into transactional data that suit for the association rules mining analysis. This offers a faster and systematic ways for the student in generating association rules. Additionally, increases their knowledge in understanding the importance of preparing right data format for specific data mining application. The RELMARK was developed using JAVA, which is open source software. Thus, its capable to be integrated with various data mining software such as SAS Enterprise Miner, Python, WEKA and Clementine.

For an illustrative example, a relational database is recreated as shown in Figure 1. There are four attributes name; Attr. = {Race, Sex, Marital, Income} and three transactions  $T_{db}$  ( $n=3$ ). Table A shows all 3 transactions with their values. Table B shows the Adult dataset in transactional data format; with their corresponding  $tids$ . The transactional dataset obtained by identifying the attribute name and for each transaction a specific values will be assigned. Hence, referring to Table A and Table B in Figure 3, id "0" will be assigned with item "whiteRace, maleSex, divorced Marital and lowIncome".

Generating frequent itemsets by basing the transactional data from relational data is an important task in mining association rule. Association rule discovery finds all rules that satisfy specific constraints such as the minimum support and confidence threshold, as is the case with the Apriori algorithm. It consists of two main phases: frequent itemsets discovery and association rule generation, of which the former task is more complex. The Apriori-based algorithm has been useful for frequent itemsets generation as it performs well on sparse data in discovering frequent patterns that are comprised of rather smaller itemsets.

RELMARK has uniqueness especially in terms of the used of open source software that is platform-independent. One of the most significant advantages of this feature is its ability to move easily from one computer system to another. The ability to run the same program on many different systems is crucial to World Wide Web software. The algorithm developed with the RELMARK tool is easy to integrate into various data mining software. This system can be utilized by most of the lecturers/students at higher learning institution as the user interface for the system is easy to use and navigate. RELMARK has a very good potential to be commercialized, as it is practical to solve the problem of converting relational data format into transactional data format.

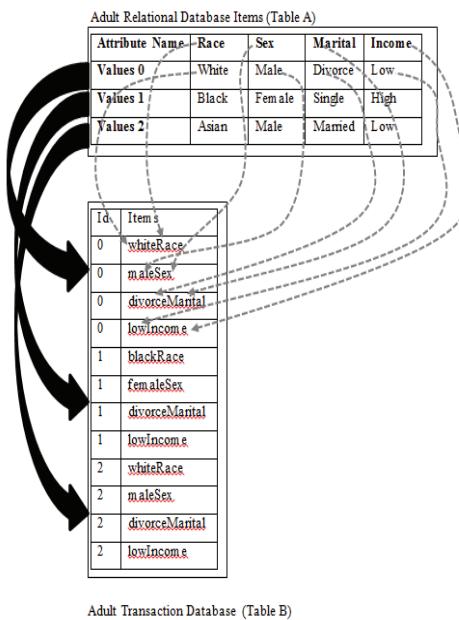


Figure 1: Illustrative Example from Relational to Transactional Format

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## **Microtopia Land Game Board with AR**

**Siti Farhana Bajunid, Amira Fathini Azman, Amirul Idzham b Ramdzan, Ameerul Adib Bin Mohd Zainul Arifien & Dr. Wan Zuhainis binti Saad**

Universiti Putra Malaysia, Serdang, Malaysia

hanamel16.co@gmail.com, amirul.amirul.am57@outlook.com, adib\_0107@yahoo.com, zuhainis@upm.edu.my

Segi University, Kuala Lumpur,Malaysia

amel16.co@gmail.com

**Highlight:** Gamification or game-based learning is for capturing learner's imagination and creativities. The Microtopia Land Game Board brings learners to a journey to explore and learn about microbes in a very fun, interesting and imaginative way. A game board that provides learners the learning adventure they will never forget because learning is supposed to be fun.

### **Keywords:**

Augmented Reality, Board Game, Game-Based Learning, 3D image

### **Introduction**

Microtopia Land game board is a game-based learning designed for students to play and learn Microbiology using Augmented Reality on a traditional game board. The purpose of Microtopia Land is to educate students as young as 11 years old until 18 years old about Microbiology by using the current technological development called the 3Dimensions Augmented Reality in a traditional game board.

The Microtopia Land game board is not a typical game board that player needs to throw the dice and play. The pop up design characters on the board with large castle in the middle is one of the most attractive props that make the game board unique on its own. The concept of using the fairytale storyboard, fancy pop up design, heroes' characters and colorful play cards are created to attract children to learn Microbiology in fun and in the most interesting way. In order to make this board consistent with the current technology development, instead of creating an application, The idea on Augmented Reality technology is to integrate technology in the traditional game board but with a twist of a 3D technology. This game board must be use with the smartphone to detect the 3D images and videos that will assist them by giving tips and useful information throughout playing this game board. The game board is known as Microtopia Land with fairy tales theme and prince as the heroes played by the players that have to save a sick princess that suffered from a rare infectious disease. The goal is for the prince to collect as many potion as possible to cure the sick princess in the castle. Along the journey to the castle, the prince will encounter obstacles that give the player the thrills to play until the end. This game has three levels. Level 1 novice, only target for primary schools and Level 2 is intermediate and Level 3 is expert basically these two levels are between 13 to 18. The topic of Microbiology covered in this game board is consistent with the General Science and Biology of the latest syllabus in Malaysian primary and secondary school.

The importance of using Augmented Reality (AR) in education is to endorse 'active' teaching method using technology approach, encourage critical response and to learn Microbiology with different perspectives. This method is in contra to traditional didactic methods that are predominantly teacher led in class (Bhartie, 2014; Nesloney & Minock, 2013). When student playing the normal game board without AR, players will only have retained a discrete amount of the information that is being delivered, and a slightly larger percentage of what has shown to them in the form of written sentences, but when they become actively involved in the game and experience it using the AR technology, such interaction will prone to increase memory and critical thinking as students are going through process of experiential learning based on what they see and listen. Besides remember things that their learnt, this encourage students to understand better and retain the majority of the information presented to them (Rampolla, 2012; Smith, (2013). This game based learning with Augmented Reality is made simple for students to learn Microbiology and to memorize the facts easier than studying text books.

### **Impact**

Certainly AR is much simpler to use than the virtual technology because it easier to bring into the classroom without needed the use of Virtual Reality 3D glasses or other costly accessories Misshumblebee (2014). The students only need to download free apps Zappar to view AR images and videos. Using AR technology in game board allows the seamless assimilation between the real world and the virtual world. The use of AR can expand the learning experience from the use of 2D materials by using 3D special learning when applied to things like images.

It can expedite special learning especially for those who are challenged in translating concepts from 2D to 3D throughout playing the game. Besides that, player may experience the concept of "sense of presence" or "embodiment" when using AR in a learning context. That is, participants have an actual experience and remember it as an actual event thus making connections to previous knowledge much stronger and memorize information better.

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## Interactive and Engaging Module Sites: The RASA Model

**Wong Yau Hsiung**

Taylor's University, Subang Jaya, Selangor, Malaysia

[YauHsiung.Wong@taylors.edu.my](mailto:YauHsiung.Wong@taylors.edu.my)

**Highlights:** In Taylor's University, TImeS is the platform that instructor use to manage module site. An innovative model known as R.A.S.A (Resources, Activities, Supports, and Assessments) was introduced. It provides the students with engaging and interactive resources that motivate the students to learn. The activities are designed in both facilitated and self-paced. The game, simulation and scenario-based activities are fun and they engage the student's intellect and imagination, allowing them to learn by doing. These activities are supported by synchronous and asynchronous tools such as communication tools for students to collaborate and assessment tools for instructor to check on student learning.

**Key words:** Moodle, Interactive, Engaging, Module site

### Introduction

In recent years, many studies have shown that e-Learning enhance learning among students. As e-Learning starts to gain popularity, consideration needs to be given to the delivery system to be used and the instructors. All institutions of higher education in Malaysia are using one form of e-Learning tool or another. The most common tool that all major institutions have is a Learning Management System (LMS) namely Moodle or Blackboard. LMS is used to disseminate learning content, assessment and communication via posting and announcements.

In Taylor's University, Taylor's Integrated Moodle e-Learning System (TImeS) is adopted by all lecturers for these purposes. Nowadays students are often characterized as digitally literate, socially connected, experiential, independent and valuing collaboration. They learn on things that are meaningful for them, they learn by doing and experience it, and they like to share and collaborate with others. Instructor must effectively tap on students' existing familiarity with technology to engage them in learning to become a lifelong learner. To do this, innovative and engaging module site is important to facilitate the students in achieving academic excellence. This shifts the paradigm from teacher-centred to learner-entered. Besides traditional roles as lecturer and advisor, instructor must now able to utilize innovative technologies.

An engaging e-Learning module site should include the following 7 elements: (1) visually engaging learning content, (2) storytelling, (3) interactive lesson, (4) game-based learning, (5) real-life scenario problem solving, (6) social interaction and (7) collaboration. Therefore, R.A.S.A. (Resources, Activities, Supports, and Assessments) model was initiated and this innovation was integrated into the module site.

### Content

TImeS is a mobile learning platform. It is easily access anywhere and anytime on a laptop, tablet or mobile phone that connected to internet. This means that students can access all the materials in this module easily and learn at their own pace (self-directed learning). The module site is organized into chapters for easy navigation. Each chapter is split into 4 parts: Resources, Activities, Supports, and Assessments. Students will be assessed at the end of chapter by multiple assessments. This bite-sized learning enables students to reflect more quickly on the learning process and hence enhance their learning effectiveness.

Before the face to face lecturing of the chapter, the students are required to explore the online resources in TImeS. This helps them to recap their prior knowledge. During lecture, several visual presentations such as PowerPoint, Prezi and Nearpod are used in delivering the lesson. Student Response System (SRS) such as Kahoot, Padlet, Socrative, and Poll-Everywhere are used during class for student discussion and feedback. After the lecture, the students are required to attempt all the online activities in TImeS, such as quiz, assignment, mind mapping, forum etc. The students have to construct a mind map of the chapter using "X minds". Mind mapping helps students to express and relate the chemistry concepts visually through images and pictures. This helps students reflect what they have learned in class. Help and support such as peer tutoring are there for continuous reinforcement. The learning process will be evaluated by assessments (formative and summative) that are aligned with the learning objectives.

In these modules, the content is visually designed to get the students' attention and attract their interest. A variety of e-resources and activities are designed using TImeS. This including interactive study guide, slideshow, LAMS lesson, SCORM, recorded lesson, worked examples, forum, online assignment, QR code, online quiz, video (powtoon, youtube and khan academy), mind map, animation, simulation, etc. These online activities consist of questions associated with response and feedback. The question formats used include true false, multiple choice, multiple

responses, matching, ordering, fill-in-the-blank and short answer. Visually powerful web calculators, graphing utilities and search engine such as Wolfram Alpha, Mathway provide step-by-step solution for a particular problem. Experiential learning such as interaction lesson, simulation, virtual lab, scenario and game-based activities engage student's intellect and imagination to foster deep understanding. The simulation creates a scenario where the students have to use the information that they have just learned in order to solve a problem. This will help them to adapt the information to real-life scenarios, while also reinforcing what they have already learned.

For formative assessment, a variety of SRS are used to check the level of understanding among the students. These technologies are easy to use and the users only need to download the apps on mobile device and connect to WIFI. They engage the students and provide real-time assessment. Forum, Padlet and Todays Meet are used to promote collaborative discussion among students. These tools encourage the student to discuss and share ideas to solve the problem. Teacher-student communication is possible with the use of Remind apps and the message function in TIMeS and Facebook. Technology such as Augmented Reality (AR) is also used to illustrate the 3D structure of molecule by using the Ipad apps known as "Aurasma".

The R.A.S.A model approach requires the students to access the online electronic resources in TIMeS before the F2F class begins. This includes the attempt of a pre-class quiz or assignment. The results will be reviewed and this helps instructor to plan teaching strategies by focusing more on knowledge and skills gaps. This approach has several advantages. It forces students to come prepared to the classroom, allows the design of more efficient classroom activities which are tailored to the specific needs of students and reduces the total time in classroom, which reduces costs. In this model, students' progress is assessed at 3 stages: before each chapter starts, at a certain point in the chapter (with the use of SRS during F2F class) and after the completion of the chapter. This ensures that the students achieve the learning objectives.

Table 1: The R.A.S.A. (Resources, Activities, Supports, and Assessments) model

Resources	Activities	Supports	Assessments
Lecture notes	Assignment	TIMeS	Formative (quiz, project, assignment)
Interactive online lesson	Practice Quiz	SRS	Summative(Final Exam)
Slide show	Game	Peer tutoring	
E-book	Forum	Social Apps Remind	
Mind map	Learning sequence	Facebook	
Glossary	SCORM		
Word cloud	Crossword puzzle		
Videos and Animation			
Simulation			
Recorded lecture			
Vitual Lab			

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## **Developing self-directed learners in science**

**Chua Lin Lin & Phelim Yong Voon Chen**

Taylor's University Lakeside Campus, Subang Jaya, Malaysia

[Linlin.chua@taylors.edu.my](mailto:Linlin.chua@taylors.edu.my), [Phelim.Yong@taylors.edu.my](mailto:Phelim.Yong@taylors.edu.my)

**Highlights:** It is a challenging task to produce Science graduates who are not only successful academically, but are also competent in various life-long skills that are needed for a successful career. To innovate the learning process and promote skill development, we have used several tools such as Padlet and PowToon to promote and document self-directed learning. Students have the opportunity to be involved in the process of searching for new knowledge and documenting their learning based on their own creativity, using these tools. Students can also engage in collaborative learning and this translates to increased student engagement in the classroom.

**Key words:** Self-directed learning, Padlet, PowToon, documentation, student engagement

### **Introduction**

Self-directed learning describes a learning process whereby students take the initiative and responsibility for their own learning. It is an essential skill that every science graduate needs to be equipped with for several reasons. It is impossible to teach students every piece of knowledge relevant to their fields, some knowledge available today may become obsolete in the future and there is an exponential growth of knowledge at every moment (Ramnarayan & Hande, 2005). Therefore, science students not only have to learn about current scientific theories, they also have to develop the skills involved in acquiring and applying new knowledge on their own.

Self-directed learning can be a challenging process, especially when students are already accustomed to being passive learners throughout their primary and secondary education. In contrast to the traditional teacher-centered approach, students have to put in much more effort in the learning process. Self-directed learning is known to be a four-step process, where the students have to first be ready for learning, then they have to set their own learning goals, be engaged in the learning process and lastly, be able to engage in self-evaluation to ensure that learning has taken place (The Centre for Teaching Excellence, n.d.).

To guide the students through self-directed learning, we have identified several important strategies and e-learning tools that can be applied. To enable students to set their personal learning goals, clear instructions have to be given to the students from the beginning so that they are aware of the general learning outcomes and expectations of the course. In addition, to engage the students, they are usually given real-life problems or cases to solve. This promotes authentic learning, which requires the integration of their existing knowledge and new knowledge that they should search and synthesize from the internet. To enable self-evaluation, learning evidences need to be documented and reflected upon. To enable this, two main platforms, Padlet and PowToon, were used to as self-publishing tools, where students can share their ideas and work within and beyond the classroom. The published materials can be further used as revision materials.

### **Content**

Padlet is a free and easy way to create content and promote collaborative learning (Institute for Teaching and Learning Innovation, 2014). Students can present different types of materials such as texts, pictures and videos on the Padlet wall. They can share these materials with their peers and teachers, who can further add comments and follow-up discussion questions on the wall. This application works across multiple devices including mobile phones, thus everyone with a mobile device will be able to participate in either creating content or discussion. To further use the materials for revision purpose, students can also export the Padlet wall into various formats such as pdf or image.

PowToon is a free software available for creating videos and presentations. It is an easy to use application that comes with many templates that students can immediately add their subject content into. This platform allows students to express their creativity through multimedia and transform their learning into a visually interesting and stimulating format. In the process, they also develop organisational and critical thinking skills as they have to plan how to organise the content and troubleshoot along the way to learn the additional functions of the video-making application. The use of Powtoon to document learning evidences also allows the students to articulate their thoughts and improve their communication skills, which is a key skill needed to be successful in Science.

Realising that both of these tools are effective tools in supporting and documenting self-directed learning, we have included them in our lesson plans. Self-directed learning takes place at two levels, the first is the mastering of subject content and the second is the mastering of problem-solving skills as they navigate through the various e-learning tools. To prompt students to engage in active and self-directed learning, they are usually divided into groups and a leader will be elected to ensure full participation of all students. Working in groups promotes collaborative learning, information sharing and increases the motivation to learn. Depending on their level of study, whether first, second or

final year, they will be given topics or case studies at different difficulty levels. Students have to thoroughly research on the topic, and then learn to analyse and synthesise new knowledge. Along the way, teachers will be present as facilitators to check on content materials and provide guidance on how to properly seek the right information from the internet. To achieve self-directed learning, students have to be engaged in self-evaluation. The documentation of self-directed learning via Padlet and PowToon enables students to reflect on their own piece of work and their learning journey.

Using these tools, we have an effective way to evaluate students' learning and to know if they are capable of self-directed learning. We were also able to promote the development of skills beyond discipline-specific knowledge, as students also become proficient in digital literacy, critical thinking, communication and interpersonal skills. Student engagement is obvious as everyone has to contribute to produce a tangible piece of work. For the students, they can also have a better sense of self-satisfaction in the learning process when they physically produce a piece of academic work. Their published work can be shared and they can receive feedbacks from teachers and their fellow peers, to further improve learning.

This approach is highly engaging, interactive and fun where students will be actively learning within and between their peer groups. Through this adoption of self-directed learning, our students are more motivated as they are involved in the co-creation of their own learning materials and this has transformed their paradigm from a passive learner to "partners in learning" in the new learning environment. Nevertheless, this effort should be further enhanced and encouraged among students and lecturers through effective transformation of culture to produce autonomous lifelong learners in our students.

### Acknowledgement

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## Creating a collaborative learning platform using Moxtra

**Yap Wei Hsum**

School of Biosciences, Taylor's University, Subang Jaya, Malaysia  
weihsun.yap@taylors.edu.my

**Highlights:** Conventional collaborative learning requires a physical learning environment to engage students in active discussion and collaborative work. Through Moxtra, students would be able to collaborate and communicate on group activities anytime and anywhere. It is a collaborative learning platform which allows students to collaborate using instant messaging and multimedia annotations. Small teams can be created for group discussion and students can create or upload files, annotate on uploaded files and share within the team. Active discussion based on the shared content allows students to learn collaboratively and collectively.

**Key words:** Collaboration, Communication

### Introduction

Collaborative learning is based on the understanding that knowledge is a social construct where learners work in groups. Piaget (1929) argued that collaborative learning and constructive cognitive development occur together. Subsequent research by Russian psychologist Vygotsky (1978) showed that there is a causal relationship between social interaction and individual learning. American psychologist Bruner (1986) pointed out that learning is an active, social process where students construct new ideas and concepts based on current knowledge. Taken together, many of them stress the importance of interaction in cognitive learning. Collaborative learning can occur peer to peer or in larger groups. Peer learning or peer instructions is a form of collaborative learning in which students work together to discuss concepts and/or find solutions to problems. Platforms supporting collaborative learning have emerged as the learning space to discuss concepts and/or find solutions to problems. New communication technologies which incorporate collaborative functions have transformed teaching and learning.

### Content

Moxtra is a new app launched in 2013 by a group of former WebEx employees working on the virtual binder-based social collaboration product. The app is free and compatible with Apple, Android and Web-based platforms. Moxtra is a particularly interesting platform owing to their built-in collaborative writing and social communication functions. One can set up a binder group by sending email invites from within the app, invite friends through Facebook, view contact info for everyone participating in the binder, and change their role from Editor to Viewer (can view but not change anything), or remove them altogether. The platform allows synchronous and asynchronous communication which provides additional flexibility in collaborating and communicating anytime and anywhere. In addition, Moxtra is able to integrate with many other applications that automatically bring updates, alerts and notifications directly into the Moxtra workspace. Considering the multiple integrated functions in the platform, the landscape of technology may be used to support central activities of collaborative student learning. This paper describes the application of Moxtra as a collaborative tool for student learning activities.

The collaborative activities that are designed include group-based problem solving and real-time meetings. First, students in a tutorial class are separated into a few sub-groups consisting of 4-5 people. Each of the sub-group is given the same set of questions in separate labeled files, for example Tutorial 3\_group 1, Tutorial 3\_group 2, etc. Students within the sub-group are able to work collaboratively on the same document by annotating and/or commenting on the questions using the built-in notation and mark-up tools. All users within the same binder will be able to view answers from other sub-groups and learn collectively. Discussion among the facilitator and learners based on the shared content within the binder allows students to communicate their ideas and to justify their answers. Meanwhile, Moxtra also serves as a virtual meeting platform for discussion. At times where face-to-face tutorial classes are not possible especially during class cancellation due to university closure, the platform allows facilitators to start a real-time meeting where the students and lecturer can communicate their ideas in a collaborative platform with text, voice, and multimedia group chat. The platform becomes a single workspace for messaging, content collaboration, screen-sharing, white boarding and real time meetings.

Overall, Moxtra has the built-in features for supporting collaborative learning. Coupled with pedagogical design that integrates Moxtra into tutorial classes is essentially important for successful implementation of the learning activities. The binder-based grouping in Moxtra allows the development of a learning community which supports knowledge construction and enabling cognitive learning. Students generally expressed positive attitude towards the use of Moxtra as a collaborative platform to improve their content knowledge learning. Well-designed activities that incorporate the communication functions and multimedia annotations tools from Moxtra will enrich student educational experiences, leading to active, social, contextual, engaging, and student-owned learning.

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## Improving in-depth learning with iPad integrated project in practising CDIO project-based learning

Hoo Choon Lih

Taylor's University, Subang Jaya, Selangor, Malaysia

[ChoonLih.Hoo@taylors.edu.my](mailto:ChoonLih.Hoo@taylors.edu.my)

**Highlights:** Project-based learning is effective in boosting student learning experience and performance. Incorporating blended learning approach, the use of iPad has been integrated into engineering project in Taylor's University. The innovative teaching and learning aspect lie on consolidating the student's interest in playing with their iPad into productive learning and solving engineering challenge through conceive-design-implement-operate (CDIO) framework. The project requires the students to build a robocar to complete a certain challenge. iPad was used for learning, designing, brainstorming, preparing project management documentation and controlling the robocar. The practice has raised the in-depth learning skill while creatively solving an engineering challenge.

**Key words:** project, CDIO, constructivism, iPad, blended learning

### Introduction

By referring to the 2012 PISA report, Malaysia stands in the 52<sup>nd</sup> position with a score of 421 out of a total of 65 countries that participated in the study. In the meanwhile, the TIMSS 2011 shows that Malaysia has dropped from a score of 519 in the year 1999 to 440 in 2011, which leads to 26<sup>th</sup> place among the 42 participated countries. The number of students who performed below the minimum in TIMSS was more than double that of Organisation for Economic Co-operation and Development (OECD) countries. This was an alarming factor as this will delay the progress of achieving vision 2020. The statistic reflects the student's inability to apply the Mathematical knowledge into problem-based application, which means there is a lack of in-depth learning (Ramlı et. al., 2013) in Malaysia education system. This is supported by the fact that Malaysia has less number of students with high level of thinking skills (2%) compared to Singapore (40%) (Reforming National Education).

The development of in-depth learning skill can be achieved by designing a constructivist learning platform. Rather than spoon feeding or teacher-centered learning, student-centered learning can bring constructivism into the picture where learners create their own knowledge from experience and interaction. Frequently, constructivism was implemented through problem-based learning (PBL) which also promotes life-long learning. Students will immerse into the teaching through self-experiencing in solving problem that activates the medium level of thinking skill in Bloom's Taxonomy. Many educators incorporate project-based learning as an element for PBL. Diverse projects have been demonstrated to achieve constructivist and effective learning outcome (Efstratia, 2014; Lasauskiene & Rauduvaitė, 2015; Pelech, 2008). The application of project can go into real world application such as investigating the role of building information modelling (BIM) in managing the sustainability of living design (Wua & Hyatt, 2016). The approach allows students to understand the reason to learn by applying the knowledge into the real world application.

Nowadays, blended learning is a common teaching medium in many institutions. Blended learning is highly emphasised as the combination of online learning and face-to-face in many works and its importance in realising the variation theory to the learners (Oliver & Trigwell, 2005). Kaur (2013) believes that blended learning serves as a guide in evaluating and integrating the different components (learning environment, instructional and media) by finding the balance point between the components to enhance the effective in learning. Variation theory states that learner learns better when they feel the variation or something different on the critical aspect of teaching delivery (Oliver & Trigwell, 2005).

According to Wannapiroon (2014), blended learning enhances graduate students' research competency and critical thinking skills in the Information and Communication Technology in Education courses. The success of using blended learning also shown in computer engineering education. Yigit et al. (2013) noticed that there was an improvement when conducting blended learning approach in computer engineering course with a better result in algorithm and programming class. Blended learning can promote the collaboration from industries and educational partners around the world (Pavla et al. 2015). Unfortunately, if misused, blended learning or bring your own device (BYOD) could promote distraction among students that may results in loss of attention in class.

This project intends to expand the use of technology, iPad into solving engineering challenge by practising CDIO framework. CDIO is a framework consisting of conceive, design, implement and operate stages that entail the process of developing a solution for a challenge. Incorporating iPad into innovative CDIO project will increase the interest within students while raising their in-depth learning skill throughout the whole project.

## **Content**

### **Description and Background**

Project-based learning is well known for its effectiveness in boosting student learning experience and performance. In par with the advancement of technology, students are too engaged into their devices for games specifically. Being the only foundation in engineering course that actively utilises iPad as the teaching tool in Malaysia, the thought of integrating the use of iPad into the engineering project has emerged in Taylor's University since 2012. The innovative teaching and learning aspect lie on consolidating the student's interest in playing with their iPad into productive learning and solving engineering challenge through conceive-design-implement-operate (CDIO). iPad was used for learning in class through the ibook, interactive apps for designing, brainstorming, preparing project management documentation and controlling the robocar. The project requires the students to build a robocar to complete a certain challenge. Depending on the challenge introduced, the iPad will play a significant role in the design of the robocar. iPad was used to wirelessly maneuver and control the activity of the robocar through some simple programming in solving the challenges. This practice has raised the fun and excitement with the use of technology to creatively solve engineering challenge.

### **Materials and Methods**

The project requires the students to build a robocar for automatic line tracking and iPad gripper control to collect and place a ball at a designated location. Following the CDIO framework, the project activities and outcomes were structured based on the elements in CDIO. Each description accompanied by the engaged Bloom's Taxonomy thinking level.

Lecture: Learning the fundamental (low)

Conceive: Understanding the challenge and gathering possible ideas in solving the challenge. (low and medium)

Design: Apply the ideas with the use of engineering design skills and tools. (medium and high)

Implement: Making the prototype of their robocar. (medium and high)

Operate: Perform and compete during the competition day. (medium and high)

### **Values Added**

The innovation has raised student's interest in doing engineering project and developing student's critical thinking and design skill that cater for different engineering challenges. Concluding from 2012 PISA report (PISA 2012 Results in Focus, 2012) and TIMSS 2011 (TIMSS Mathematics Achievement, 2011), there is a lack of in-depth learning (Raml et. al., 2013) in Malaysia education system. With this initiative, we will be able to raise the Malaysia students' in-depth learning skill. Instead of just memorising the knowledge, they are trained to apply and innovate to solve any challenge.

The students have gained better in-depth learning skill when they enter their first year of the degree. They show better presentation skill, critical thinking skill, and psychomotor learning domain as compared to the other students coming from other pre-university programs. Implementing this in other level of education will support the move to improve our STEM, PISA and TIMSS score in the near future.



(a). Testing robocar on the competition course



(b). Testing manual control with iPad

Figure 1: Students working on their iPad integrated project

## Acknowledgement

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## **MOOC: Lean Technopreneurship**

**Lee Chia Ping**

Taylor's University, Subang Jaya, Malaysia  
ChiaPing.Lee@taylors.edu.my

**Highlights:** The MOOC course named 'Lean Technopreneurship' is the initiative by Taylor's School of Engineering to expose its engineering students to the incorporation of blended learning in their entrepreneurship core module. As the course is online, on-campus students are given the opportunity to collaborate with the online students of various disciplines to work on their entrepreneurial project, in which crowdfunding is done to complete the course. The course is aligned with the effort in promoting global education while incorporating technology in the curriculum.

**Key words:** MOOC, entrepreneurship, online course, crowdfunding.

### **Introduction**

There has definitely been an obvious shift as to how Malaysia aligned herself with the global education standard. Based on Malaysian Higher Education Blueprint (2015-2025), it is expected to produce graduates who would be well-rounded global citizens, equipped with ICT skills and entrepreneurial skills, as well as having sound financial literacy. The blueprint was set in the right direction in contributing to several elements; employability, quality assurance and English competency.

Taylor's School of Engineering aligned one of its core modules by incorporating MOOC course for its engineering students. Using the OpenLearning platform, the course was named Lean Technopreneurship (C.P. Lee, 2015), in which it uses the Lean Startup principles to test technologically driven entrepreneurial ideas which would then be funded via a crowdfunding campaign. The course allows students to appraise the prospects of E-commerce project, particularly on raising fund for their project via crowdfunding. Besides, they are given the opportunity to collaborate with online students from all over the world to work on their project. The entire curriculum is delivered using the platform, thus giving students the resources to equip themselves with soft skills aligned with the blueprint.

### **Content**

#### Description

The 'Lean Technopreneurship' course explores the use of lean startup principles based on CDIO (Conceive, Design, Implement and Operate) framework to work on a technologically driven entrepreneurial idea. Students are to work on a project that could add value or make a difference in making lives better. The channel for the project funding would be crowdfunding, which is a way of getting funds through the internet from online community. The project idea must go through a validation test to prove the project's worth, so students are required to do a market research, after which a presentation would be done to summarize the feasibility study. Once the project is assessed and approved, the team would work on the crowdfunding campaign, in which a one-page project summary and a short video are posted on the crowdfunding platform to convince online community to support their cause by pledging for them. Upon the success of the crowdfunding campaign, they are to be committed to execute the project as promised on the crowdfunding platform.

#### Context / Background

It is interesting to see that entrepreneurship is gaining more attention nowadays, especially with the initiatives by the government to fund SMEs (Small and Medium Enterprise). Instilling entrepreneurial skills in graduates also encourages startups, which in turn creates job vacancies in the market. Several organizations such as CradleFund and Magic provide financial support and training to entrepreneurs. Those who do not start their own business would still benefit from having an entrepreneurial mindset to take leadership roles in companies (Kriewall & Mekemson, 2010). Since Malaysia is geared towards becoming the center of education excellence and the education hub of Southeast Asia (Grapragasem et al., 2014), this MOOC course serves as an innovative tool as part of the digital education, which is aligned with the government initiative in integrating ICT in schools.

#### Significance / Importance

This course entails the crucial components needed to produce well-rounded graduates with ICT and entrepreneurial skills. The course serves as a stepping stone for students to learn about entrepreneurship while utilizing the skills that they have learnt in their tertiary education. Students would be exposed to mastering their soft skills, for instance, presentation and communication skills. This course, offered as MOOC, allows the collaboration with online students

who are experts in their specialization, thus allowing knowledge sharing within the community. The activities designed adhere to different Multiple Intelligences, so that students could explore and refine the skills such as Interpersonal (teamwork), Verbal/Linguistic (presentation) and Bodily-Kinesthetic (project execution).

### Advantages

While this course is made compulsory for engineering students in Taylor's University, it is open to anyone of different backgrounds. Since all content are posted online, students are able to get feedback and opinion from both lecturer and the online community. For instance, the video posted on the crowdfunding campaign should be very enticing to the pledgers, thus the video content could be improved based on feedback from the community. Students could also get help from online students who possess video editing skills to contribute to perfecting the video quality. Thus, this provides a paradigm shift to how learning could be fun and engaging, contrary to the traditional approach. Since the course has been offered as MOOC, flipped classroom method is also used by getting students to view videos captured from the previous cohort, after which the class session focuses on in-depth discussion. Overall, the course focuses on learner-centered approach, in which more freedom is given to students to learn, besides the fact that they could view the course materials at their pace for revision, after lecture is over.

### Commercial value

As the course content is posted online, it explores the opportunity for modern teaching approach such as flipped classroom. Recorded lectures from previous semester could be used as lesson material for students before coming to class. In the class, discussion would be carried out to share and establish the highlights of the lesson. Besides, MOOC courses are in the infancy stage of the possibility of being offered as credit-transfer courses.

### Acknowledgement

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## **Education and Entertainment Elements in Agriculture Mechanization Edutainment**

**Mohd Hudzari Haji Razali, Syazili Roslan, Mohd Nizam Haron, Kamarul 'Ain Mustafa and Mat Atar Mat Amin**

Universiti Sultan Zainal Abidin (UniSZA), Tembila, 22200, Besut, Terengganu, Malaysia  
mohdhudzari@unisia.edu.my

**Highlights:** This paper introduced the development of hoary tractor as edutainment in e-learning tool at Universiti Sultan Zainal Abidin's farm. It include the development of virtual teaching tractor as an interactive learning program in Agricultural Mechanization subject for semester four students, Bachelor of Agriculture Biotechnology, Faculty of Bioresources and Food Industry, UniSZA. This study is divided into two parts which are to develop visual tractor inscriptions using Quick Response (QR) code generator and virtual tractor multimedia as a teaching's tool. The QR Code is a two-dimensional barcode that is readable by smartphones. During the time of teaching and learning process, student can use their smartphones to scan QR code that labeled on the tractor model in order to explore more for the knowledge of internal engine mechanism. The benefit of this teaching tractor development is for helping student to do their revision. In this case, the students will be able to study with video of related topics at their own pace whenever they want. The virtual tractor edutainment is the combination of multimedia element of video, text, animation graphic interactively. The combination of those features will increase student's interest to grab more knowledge about the parts inside the tractor especially for engine mechanism that cannot see visually. This study also was conducted to provide the accessibility of virtual tractor edutainment to link and broadcast to the public education widely through Open Course Ware (OCW) in UniSZA academic system.

**Key words:** QR Code, virtual tractor, smartphone application, agriculture technology, edutainment

### **Introduction**

The term Edutainment mix from the concept of education and entertainment [1]. This term is used to describe various forms of entertainment that also to educate. Edutainment is a computer system that allows a user to access the information. Integration of technology allows edutainment to perform a wide range of functions, evolving into self-service Edutainment. An Interactive Edutainment is a computer terminal featuring specialized hardware and software designed within a public exhibit that provides access to information and applications such as for communication, commerce, entertainment and education [2]. So, this project is specialized for education as learning tool by using hoary actual tractor and virtual tractor software application. Virtual tractor is referring to the combination of multimedia elements which is graphic and interactivity [3]. The user can click to the Edutainment application to explore the content or information in this university course of Agriculture mechanization. The interactivity means the relation between the user and Edutainment itself, which is the user free to click to any buttons or image that they want to display in the Edutainment [4] and the students also can use their smartphones and view an animation multimedia of related syllabus. In order to do that, the students need to download into his smartphones, the QR code Scanner and Generator Apps that can get freely available in website. The virtual tractor which is in graphic multimedia (Edutainment) will attract students to explore and learn more about the tractor. It is because by the combination of multimedia element like graphic and interactivity, it will attracts students to learn and explore more about the specifications and all about the parts of tractor.

This teaching tractor whether in virtual or actual way will be useful for students to know better about all the parts of tractor and the functions as well. Rather than old tractor that was in farm, the existence of virtual tractor will be more helpful to the all students in Agriculture field because of the Edutainment can be linked to internet. The students and peoples that want to know about the tractor especially on internal engine mechanism, so it can get the information through multimedia elements by accessing the internet. Therefore, this study was designed in order to focus towards the tractor as a learning tool at a farm. Besides, Edutainment was developed in which of combination of multimedia elements between graphic and interactivity by using suitable software in order to develop interactive learning program.

### **Result and Discussion**

The virtual tractor (Edutainment) has an accessibility to link to internet and everyone will have the chance to explore it at World Wide Web by using their mobiles. Table 1 shows the development of teaching tractor's study for achieving the project objective.

Table 1. The result from the development of teaching tractor's study

Result	Description
Actual teaching tractor	New teaching model at UniSZA's farm was introduced by the presence of actual tractor as attractive teaching tractor
Virtual teaching tractor	Graphic virtual tractor as interactive teaching tractor (Edutainment) was developed
Internet	The Edutainment has an accessibility to link in internet
QR Scanner & Generator Apps links	<ol style="list-style-type: none"> <li>1. <a href="https://play.google.com/store/apps/details?id=me.scan.android.client&amp;hl=en">https://play.google.com/store/apps/details?id=me.scan.android.client&amp;hl=en</a></li> <li>2. <a href="http://www.qr-code-generator.com/">http://www.qr-code-generator.com/</a></li> <li>3. <a href="http://www.qrstuff.com/">http://www.qrstuff.com/</a></li> </ol>

### **Virtual Teaching Tractor (Edutainment)**

The virtual teaching tractor Edutainment is the complementary for the actual teaching tractor [5]. The Edutainment is more interactive rather than actual teaching tractor because of the information and tractor's part in Edutainment is much compare to actual teaching tractor. Then, for actual teaching tractor only certain part was labeled, but for the virtual Edutainment, all the part including main part, part's type, control and instruments part were included. The teaching of fundamental tractor engine that cannot see visually because it is in the tractor engine now can learn virtually which assist by multimedia element. Nowadays, the student has their own smartphone to access this technology. The combination of element for education and entertainment that make attractive dynamically and more understanding compare static information. The virtual tractor edutainment is the combination of multimedia element of video, text, animation graphic and interactivity will attracts students to learn and explore more about the specifications and all about the parts inside the tractor especially for engine that cannot see visually. This study also will provide to publish through Open Course Ware (OCW) in UniSZA academic system.

Figure 1. The QR codes marked on tractor engine model are contained multimedia link to tractor engine mechanism that can be viewed in student smartphones.



Edutainment is a computer system or computer network that allows a user to access the information, perform data transfer or just for entertainment [6]. In this project, the virtual tractor (Edutainment) that was developed is purposely for education which is learning and teaching in virtual way. Before interpreting the information about the tractor in this Edutainment, draft the information that wants to include in this Edutainment first. After that, prepared the images of tractor's part that needs to put in the Edutainment. One of the software that was used to create Edutainment is

Adobe Flash CS3. This software is popular because of this program can be optimized for the web. In addition, flash provides for streaming content over the internet [7, 8]. So, the information is not stuck if the internet connection is low. The Edutainment will be loading and stream fast than usual web site. By this special feature of this software, Edutainment will able to publish in internet. Actually there is three buttons in the Edutainment that was display the different part which are parts for main part of tractor which is outer part of tractor, second is the type's part. The third button is display the control and instrumental part of tractor such as clutch, brake, foot throttle and so on. The other three buttons is transmission, safety and contact information. The advantage of this project is towards completing the Android Apps that can individually install to smartphones for students to browse the UniSZA's Tractor Encyclopedia without any internet access. The students and peoples that want to know about the tractor can get the information from this Edutainment by the easy access through internet. The learning via internet is called as E-learning. According to [9] defined E-learning as the entire technological, organizational and management systems that facilitates and enables students learning via internet. E-learning systems characteristics are defined as the attributes (or features) associated with e-learning systems [10].

## **Conclusions**

The actual teaching tractor and the virtual teaching tractor (Edutainment) is two approaches that was used for education which is for teaching and learning in actual and virtual way. The Edutainment is virtual way of learning by adding some value of attractive and interactive with the combination of graphic (images). The difference between actual and virtual is the actual teaching tractor located at UniSZA's farm and virtual teaching tractor (Edutainment) is in computer program and can publish to internet. The development of this teaching tractor will give benefits to students even to the human being which purposely to educate for using properly of machinery equipment that only for sustaining their food for living in this temporary live while carrying reward in hereafter of Akhirat.

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## Resource Architecture in The Virtual Digital Learning Landscape (RAVD)

**Prof. Dr. Rozhan M. Idrus & Mohamad Faiz Taip**

Universiti Sains Islam Malaysia (USIM), Bandar Baru Nilai, Malaysia  
rozhan@usim.edu.my

**Highlights:** As technology becomes pervasive, the teaching and learning landscape is now capable of presenting an interoperable and seamless learning architecture to connect, integrate, and share learning resources. Although we have a plethora of learning resources, searching for specific content is not easy and takes time to view and identify the content being searched. As such a tagging metadata mechanism is envisaged that will facilitate for content search. The tagging of these learning objects will lead to an intelligent virtual content selection environment that will facilitate for any content to be searched based on each of the elements of learner, subject, pedagogy and technology via the Resource Architecture Metadata Input (RAMI). Ultimately, a content directory is envisaged to accentuate the digital learning landscape resulting in the Resource Architecture in the Virtual Design environment (RAVD).

**Key words:** Technology, Resource, Architecture, Ubiquitous Framework, Metadata, Tagging.

### Introduction

The term 'eLearning' is now 17 years old. For sure, the e-learning of 2015 and the virtual digital learning landscape is not and will not be the same as e-learning of the 1990s. We are now looking at the 21st century educational landscape where the realities of learning are now technology 'enhanced' in a 'connected' world, where the learning is always in 'motion'. The characteristics of the learners are very different from the last century .. and now the learner, the environment and content has a different orientation altogether. The 21st century learners are now 'mobile' learners. They are always on the move, as such content must now come directly to the learner, giving rise to a personalised content and environment. Conversely, this has implications on content design where the personalised content is now chunked to facilitate for access via mobile devices and for a more conducive social learning activities. In its eventuality, we now approach a ubiquitous teaching and learning landscape, where the educational transaction can take place anytime and anywhere and this will give the learners enrichment in their learning experience and we should also ensure the elements of enhanced knowledge retention in the teaching and learning process.

### Technogogy

The power of technology, as portrayed in a convergent mechanism via multimedia computing and the Internet must go beyond presenting facts with more razzmatazz, colour, audio, visual, simulation and animation, but must have the capability to converge in the educational environment transaction, the function of the teacher, the needs of the students, the learning styles, the learning theories and the various pedagogies and the different functioning technologies. Technogogy [1] was initially presented as the transformative use of technology to foster learning to describe the focus on technology-driven pedagogy in the learning environment. Nonetheless, it seeks to address the pivotal role of technology in presenting a learning object that has taken into account the relevant pedagogies and learning modalities. Insofar as content is concerned, technogogy is defined as the convergence of technology, pedagogy and learner-based content where the three components have a three-dimensional relationship resulting in a specific learning object design [2].

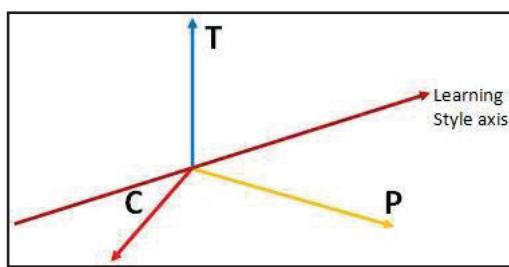


Fig. 1. Technogogy Framework

Although we talk about a personalized learning environment and learner-centeredness, we have not even analyzed the learning styles and preferences of students; let alone incorporating learner needs in our lesson design. Technogogy can be applied in any area or discipline as it forces the consideration of the three components in the design of the lesson plan and subsequently enrich the learning environment with more specific learning objects the

subjects taught. Technogogy was also illustrated [3] in action in engineering education in order to strengthen the unique needs of engineering students and the design for their instruction. This will give rise to new paradigm in the design of the learning environment and experiences in technogogy that pivots on technology for the presentation of a pedagogy-rich learning environment.

Hence, based on technogogy, the lesson design is 'forced' to consider the elements of the **content, learner, pedagogy and technology**. Most of the time, the learner is ignored and one is left to wonder for whom the lesson was designed. As such, any content design can now be tagged, making the content searchable based on the four elements.

## Seacrhing for Content

Although we have a plethora of content and multimedia resources, searching for a specific item may not as easy as it looks. For example, a quick glance at the Directory of Open Resources of the Commonwealth of Learning only revealed resources tagged as audio, undergraduate, lecture and video. Any academic or learner searching for content related to the types of learner and the pedagogy of the content will need to actually view the content to ascertain the nature of the content.

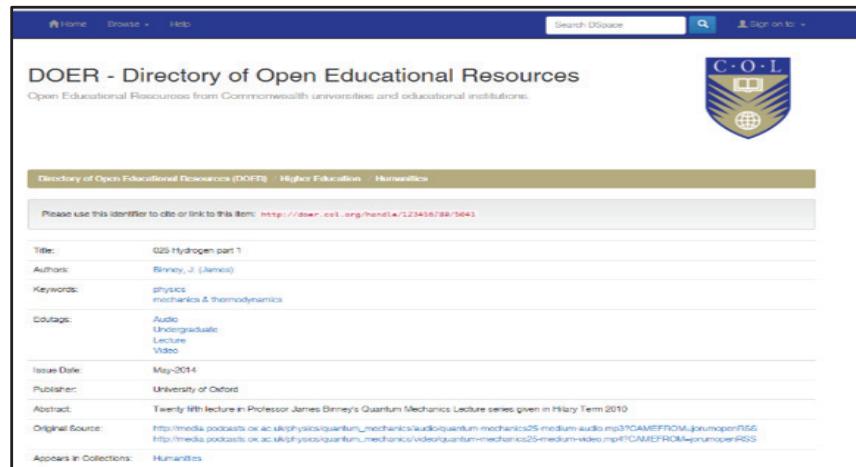
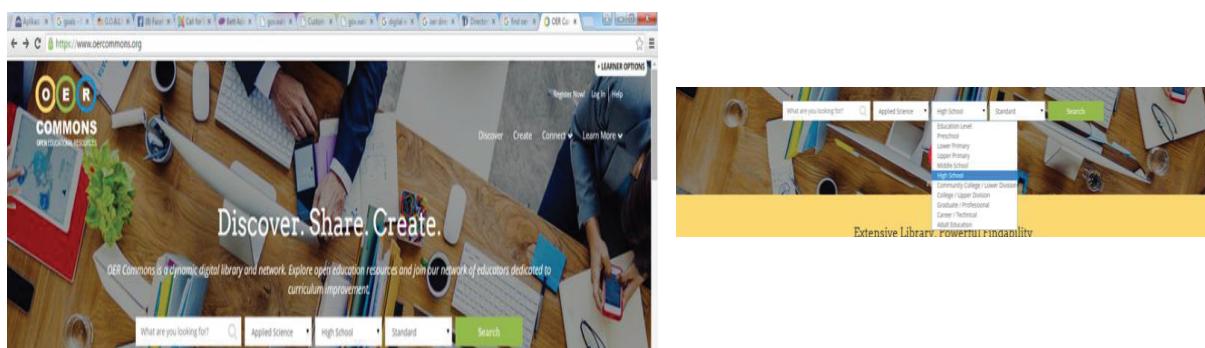


Fig. 2. Resource directory of COL

Another attempt to locate a resource searched under "physics animation pendulum" in the Open Course Library [4] was not successful. Further, scrutiny of the OER Commons [5] digital library and network revealed that the contents were searchable from the elements of subject, education level and standards. Critical elements such as the learner characteristics and pedagogy or learning activities were not listed as a search parameter.

## Resource Architecture

In view of the current scenario of the lack of specific search mechanism for content, this paper presents a Resource Architecture for the Virtual Digital Learning Landscape, commencing from the design of learning itself.



The content design has to be pedagogically articulated and by virtue of the concept of technology, the subject matter expert (SME) has to take into account the elements of Learner, Content, Pedagogy and Technology (LCPT). For the purpose of documentation and henceforth, a search parameter, the components in the design could be expanded to include the subject and topic, duration (length of video or audio file) language (customisable), location, institution and author.

Basically, the content developed has been tagged with the stipulated parameters. Subsequently the resource constructed and labelled will be stored via the definition of metadata material based on item type which will be channelled to a repository and stored in the database.

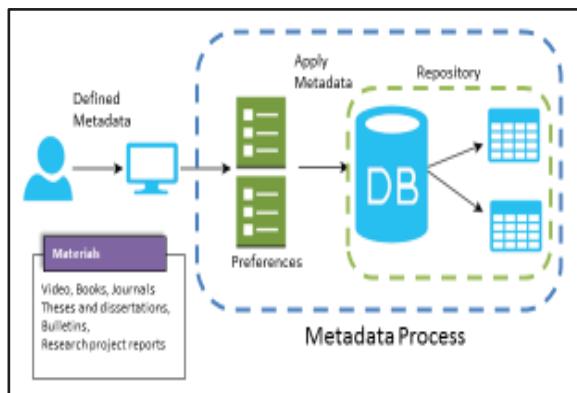


Fig. 4. Metadata materials and repository

Finally, when a learner goes through the process of content search, the resource designed specifically can now be made available to the learner based the tagging parameters.

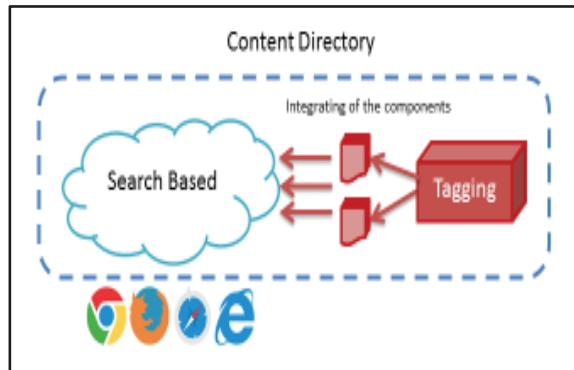


Fig. 5. The content directory

The resource architecture observe a simple protocol in its design, viz,

- Creates metadata content (Pre-defined Learning Design)
- Defines metadata material based on item type
- Applies metadata (item type & index tree) in Repository and will be store in database
- Use of index tree and item management for search based

A framework of the resource architecture presented will facilitate for the construction of pedagogically articulated content based on the concept of technology and the tagging parameters that will subsequently be applied in metadata into a repository will then be accessed by the searcher from the database. The complete resource architecture framework is shown in Figure 10.

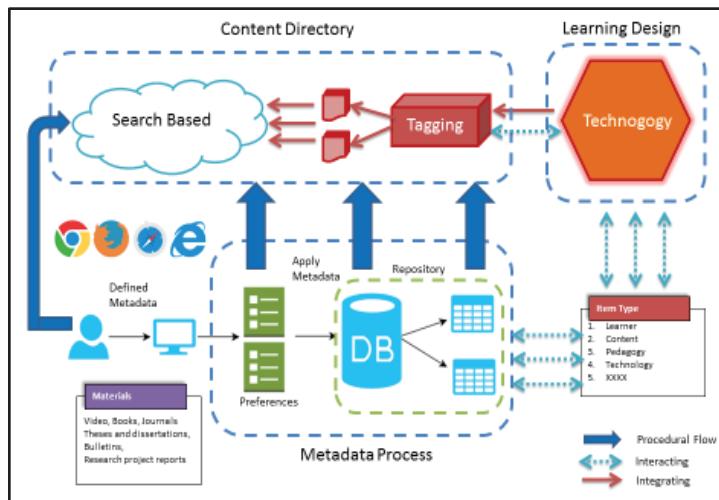


Fig. 6. The resource architecture framework

The Resource Architecture for the Virtual Digital Learning Landscape will now make content from any database searchable based on the tagged parameters. Further, this give rise to an opportunity for customisation of the resource in terms of activities and different languages as well the re-modification or re-purpose and re-use of content that will lead to the enrichment of the repository.

### Commercialisation and Profitability of RAVD

Intellectual Property (IP): Resource Architecture in The Virtual Digital Learning Landscape (RAVD) is successfully registered Intellectual Property (IP) for Copyright. LY2016001233

International Collaboration: USIM is having collaboration with National Institute of Informatics (NII), Japan in developing Resource Architecture in The Virtual Digital Learning Landscape (RAVD) and NII, Japan is ready to offer support in migration and to the end-user community. Url: <http://usim.at.nii.ac.jp/>



## Achievements and Awards

**Gold Medal Award**- Innovation and Invention in Education Competition (2iec'16), Universiti Pendidikan Sultan Idris (UPSI), Perak.

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## **ME-C App: Enhancing Legal Knowledge via Smartphone**

**Ahmad Sharif bin Haron & Prof. Dr. Zuhairah Ariff binti Abd Ghadas**

Universiti Sultan Zainal Abidin, Kuala Terengganu, Malaysia

[asharifharon@unisza.edu.my](mailto:asharifharon@unisza.edu.my), [zuhairahariff@unisza.edu.my](mailto:zuhairahariff@unisza.edu.my)

**Highlights:** Knowledge and advancement in technology are indispensable in today's living. One of the most popular products of the advance in technology is the smartphone. As smartphones continue to grow in popularity, it is important to look into how legal education and understanding could be enhanced via the applications (apps) which are available in the smartphone. This paper discusses a new invention of smartphone applications which could enhance the understanding of the public, academics and legal practitioners on Malaysia Federal Constitution. The app, named as ME-C contains all provisions of the Constitution and can be utilized for educational purposes and without any payment. ME-C contains the features of Contents; Provisions; and Other Links, which can be downloaded for free. Users may also subscribe to additional features such as cases summary; professional reviews; other documents; and other useful functions: search; share; and settings, via in-app purchase. This paper involves a multidisciplinary research of IT and law.

**Key words:** application, smartphones, constitution, law, Malaysia.

### **Introduction**

In today's technology driven world, legal professionals need the ability to access legal information and documents while away from the office (Emily, 2010). LexisNexis (2012) concluded that the intersection of three emerging technology trends – mobile technology, digital books and social media – is fundamental changing the day-to-day workflows of every legal professional. Thus, it is important to look into how legal education and understanding could be enhanced via the mobile applications (apps) which are available in the smartphones.

At the moment, there are fewer legal apps associated with Malaysian laws available on mobile apps stores, e.g. Apple App Store and Google Play Store. Malaysia E-Constitution (ME-C) is a mobile app that contains provisions of the Federal Constitution of Malaysia developed for educational purposes to enhance public knowledge on law. Apparently, it can be utilized as a source of information for everyone, be it students, academics, researchers, legal practitioners, policy makers, or laymen.

ME-C is built on an online-based app maker software namely the Appy Pie at [appyPie.com](http://appyPie.com). It is a mobile app platform released on Android and iOS platforms that allow users to create different types of mobile apps which can be released to the public and monetized. The programme is launched in 2013 and designed to be accessible to people without experience about computer programming and coding skills to develop an app. The creation of the app using the Appy Pie is indeed simple and facile. There are three basic steps to start with: firstly, selection of a category of apps; secondly, designing the contents and customize accordingly; and finally, publish the app to the web or install it on the device. Nonetheless, publishing the apps would need developer to subscribe to one of four plan options ranging from Free Plan, Silver Plan, and Gold Plan to Platinum Plan.

### **Content**

Please address as many of the following sections as possible in your paper, as relevant.

1. Description of your innovation / product development / design / process.

Malaysia E-Constitution (ME-C) is a mobile app that can be categorized under native productivity app, whereby it lives on mobile devices and has all the contents that can be accessed offline. The ME-C app comes at the right time and at the right place since currently there is no mobile app on the Malaysian laws available in the Google Play Store or Apple App Store. The app offers the contents of the Malaysia Federal Constitution that can be a reference for students, academics, researchers or anybody who are interested to learn it.

2. What is the context or background of the innovation / product development / design / process?

The app is developed for educational purposes to enhance public knowledge on law, specifically the Malaysian laws. The development of this app is basically to ease Malaysians in general to understand the contents of the Federal Constitution, the supreme law of Malaysia. Objectively, it can be utilized for educational purposes or as general information by anyone, be it students, academics, researchers, legal practitioners, policy makers, or laymen.

3. Why are they important to education?

The popularity of digital knowledge is growing together with the emerging of new technology that accommodates users to enjoy reading e-books and other reading materials using mobile devices. The way people learn is not limited to chalk and talk anymore, but more to digital contents such as e-books, apps, animation and video. Hence, this app is important to help people in the learning process and useful for

everyone to understand the Malaysian law and legal cases related to the Federal Constitution. With its latest features and functions, it is believed that the app can make a change to the society, not just for educational purposes, but also to encourage people to think further in legal terms and therefore creating a law-abiding society.

4. Advantages of your innovation / product development / design / process towards education and community.

The app has basic features such as Contents; Provisions; and Other Links, which is very helpful to get the legal information as it is handy and can be accessed anytime, anywhere. It is built user-friendly with simplicity at its best. As compared to e-book, mobile app is far more interactive and creating less problems to handle with. Thus, app is highly relevant and helpful for users to get information fast and convenient in lieu of the e-books, especially for educational purposes regardless in a formal class or informal learning.

The ME-C app contains, among others, 15 parts with 230 articles and 13 schedules of the Malaysia Federal Constitution. It means the entire content of a physical constitution book is translated into an interactive mobile app. Building an app without interactive element is a no go. Hence, the ME-C app offers its users to access full authoritative judgments of legal cases related to the constitution. Selected provisions will be annexed via hyperlink with popular and important cases, so that people can read and understand the cases well. For instance, when users tap on "Freedom of Religion" (Article 11 in Part II), they will be directed to the judgment case of Lina Joy v Majlis Agama Islam Wilayah Persekutuan & 2 Ors 2005 [CA], so on and so forth. The selection of cases is based on the importance of that particular cases to the public and are commonly discussed in the classrooms. Therefore, further discussion is highly encouraged among law students and academics.

5. Commercial value in terms of marketability or profitability of your innovation / product development / design / process.

To make it friendly and useful for everyone, the app also features Cases Summary; Professional Reviews; and Related Documents, with other functions: Search; Share; and Settings. However, for the time being, these additional features are still under research and development, and that is to be embedded in the app in the next build. Tentatively, users may subscribe to the additional features at a reasonable fee via In-App Purchase (IAP). The subscription allows users to get accessed to thousands of legal documents from paid online databases, for instance The Malayan Law Journal (MLJ) – LexisNexis Malaysia; The Current Law Journal (CLJ); eLaw; Common LII; et cetera. The subscription fee would be charged at reasonable price according to one-time, monthly or yearly subscription options.

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## **FlexiMode: Flexible Approach for Effective English Training Practice**

**Muhamad Fazil Ahmad & Ahmad Puad Mat Som**

Universiti Sultan Zainal Abidin, Kuala Terengganu, Terengganu, MALAYSIA

[mfazilahmad@unisza.edu.my](mailto:mfazilahmad@unisza.edu.my), [puadms@unisza.edu.my](mailto:puadms@unisza.edu.my)

**Highlights:** The Flexible Approach or Flexible teaching has been part of teaching strategies for quite some time, but the application of this approach in training and development program is relatively new. The purpose of this study is to develop a Flexible Approach for effective English Training practice for non-English speakers. The Flexible Approach is actually very useful for most informative needs and it has been used extensively in the development of self-training materials or modules for trainees in Training and Development program (T&D). The word "Flexible" refers to Flexible learning that can occur anywhere, anyhow, anyway. However flexible learning in itself is complex, and not as simple as this definition implies. The interaction of four components - technology, pedagogy, implementation strategies, organisational framework - can lead to learner-centred experiences when they are well integrated (Collis & Moonen, 2001). Also there are five dimensions which can impact: time; content of the course; entry requirements; instructional approaches and resources; delivery and logistics - each with several aspects (Casey & Wilson, 2005). In this project, we are going to focus on the Flexible Approach in the Effective English Training Process. It is applicable to all training-development situations without being merely restricted to self-instruction or distance training. For those of you who are not familiar with the Flexible Approach, e.g., those who have always been training in face-to-face/fieldwork situations, they may wonder why and when why we use it would be practical to use the Flexible Approach. Consider the case of a trainee who can train on his/her own for certain subjects, thus decreasing the demand for a trainer. Or another case, where a missed training session that does not have to be replaced because the material is already there. What about the time constraints that can sometimes limit face-to-face interaction? Or simply, the case of a trainee who takes a little longer than the other trainees to comprehend certain concepts/materials. In all the above scenarios, the Flexible Approach for training and development can be used as a very realistic alternative.

**Key words:** Flexible Approach; English for Communication; Training; Flexible Conceptualization.

### **Introduction**

How many times did you have to miss delivering training due to unavoidable circumstances, such as having to be away on official business or due to some personal reasons?

Or have you faced a situation where some of your students are giving the impression that you are going too fast or too slow in your training program? They want a slower or faster pace but you have to cater to everyone.

Or consider this rather familiar scenario: some of your trainees are having problems with a certain subject in a training program that you are training. They lack the background knowledge or they have conveniently forgotten what they have learnt in the first year. You would like to do some revision or give a refresher course but as usual, time is not on your side.

There are just too many matters to cover. Short of having an extra two or three modules, the problem will linger. You see many empty stares in your class but you are unable to do everything. So you thought.

The Flexible Approach can help solve these very typical problems.

What if, based on your years of training experience, you can already predict some of the potential problem areas in the course that you are going to impart, e.g., the model of communication etc. Or the concept of accuracy and precision in measurements. Or the difference between the concept of administration and management in an organization.

How about you preparing some materials in advance that the students can go through before they proceed to the more advanced topics that would require their comprehension of the basic concepts aforementioned? That preparatory COMPONENT will probably do wonders for the students and your training of the more advanced material.

And we have not talked about catering to trainees learning at different paces. All these familiar scenarios can actually benefit from the Flexible Approach of training concept.

## Content

### Novelty & Inventiveness

- The first formation training concept and the application of this approach in training and development program is relatively new in Malaysia.

### Practicality & Usefulness

- T&D process takes a large topic task and breaks it down into smaller parts (also known as chunks) with each smaller part being addressed individually.

### Status of Innovation

- The Flexible Approach was pre-tested for the simulation process with the professional communication T&D and the IP will be registered with university's RMC.

### Commercialization

- The Flexible Approach Framework will be proposed to and realized by many organizations/institutions and can be further expended to all field of T&D.

### Contribution to Community

- In-house knowledge sharing is growing in popularity as a mean to continuously disseminate knowledge and share best practices.

## Acknowledgement

Faculty of Applied Social Sciences UniSZA

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## **EZ-Arabic 2.0**

**Mohd Firdaus Yahaya, Mohd Shahrizal Nasir, Mohd Fauzi Abdul Hamid & Muhammad Sabri Sahrir**

Universiti Sultan Zainal Abidin, Terengganu, Malaysia

[mohdfirdaus@unisza.edu.my](mailto:mohdfirdaus@unisza.edu.my), [mohdshahrizal@unisza.edu.my](mailto:mohdshahrizal@unisza.edu.my), [mohdfaazi@unisza.edu.my](mailto:mohdfaazi@unisza.edu.my)

Universiti Islam Antarabangsa Malaysia, Malaysia

[muhdsabri@iium.edu.my](mailto:muhdsabri@iium.edu.my)

**Highlights:** EZ-Arabic 2.0 is a web based learning. It's develop for learning Arabic Language and focuses to beginners' level particularly in primary school. It starts with theoretical model Nation (2003), Prensky (2001) and Mayer (2001). It also promotes learning Arabic language through game-based-learning. This prototype developed using design principle by Muhamad Sabri (2011).

**Key words:** ezarabic, bahasa arab, self directed learning, learning arabic

### **Introduction**

The use of technology in teaching and learning is a new phenomenon in education field. Learning Arabic is also not an excuse regarding this matter due to some work and research have been done, in line with the existence of technology facilities in a more effective and attractive. For this purpose, the development of EZ-Arabic 2.0 websites is to solve a number of problems to students in mastering Arabic language. This site is developed to take benefit from various virtual materials (virtual tools) related to the learning Arabic in the internet and collected in EZ-Arabic 2.0 site. This paper will describe some of the features in this site, which will help primary school students master in the Arabic language. All materials contained in EZ-Arabic 2.0 are arranged systematically and attractively in order to create an interactive way between this site and its users from both students and teachers. This paper also analyzed some of the suggestions and comments from visitors of this site as proposed to the improvements and upgrades in terms of contents, multimedia applications, usability, and so forth. Based on comments and suggestions obtained from users, EZ-Arabic 2.0 site can contribute in solving some of the problems faced by primary school students in learning Arabic language, besides it also able to cultivate a culture of learning independently through the use of this site.

It consists of several components such as video, audio, language games, exercises, e-book, chatting room and comments. EZ-Arabic 2.0 also can be accessed either using computers, tablets or smart phones. The links for EZ-Arabic 2.0: [www.ezarabic.net/v2](http://www.ezarabic.net/v2).

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2. **Gold** Medal in "Innovation and Invention Competition Through Exhibition 2014", organized Politeknik Sultan Abdul Halim Mu'adzam Shah (POLIMAS).
3. **Silver** Medal in "The Word Exhibition on Invention, Research and New Technologies (INNOVA 2014)", organized by The Belgian and International Trade Fair for Technological Innovation.
4. **Silver** Medal in "International Syariah Compliant Idea, Invention, Innovation & Design 2014 (ISCIID2014)", organized by Universiti Teknologi Mara (UiTM).
5. **Silver** Medal in UniSZA Innovation Week (MPI 2014) organized by Centre of Research and Innovation (CRIM).
6. **Bronze** Medal in "5th Exposition on Islamic Innovation 2014 (i-Inova 2014)", organized by Universiti Sains Islam Malaysia (USIM).
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## Learning Video: Mobility Aids

**Hanisah Binti Azahari, Marhasiyah Binti Rahim, Nor Azizah Binti Hussian & Norzulaika Binti Alias**

Faculty of Health Sciences (FSK), Universiti Sultan Zainal Abidin (UniSZA), 21300 Kuala Terengganu, Terengganu, Malaysia

[hanisahazahari@unisza.edu.my](mailto:hanisahazahari@unisza.edu.my), marhasiyah@unisza.edu.my, azizahhussian@unisza.edu.my,  
[norzulaikaalias@unisza.edu.my](mailto:norzulaikaalias@unisza.edu.my)

**Highlights:** Targeted group for this project are the one who need fast, attractive information about mobility aids including the users, relatives, and general public worldwide. We provide an interactive medium of knowledge for them to give feedback or response, direct to the healthcare provider / academicians specialised in Physiotherapy at UniSZA. The main aim of this project is to ensure the evidence based knowledge is imparted to the general population in an attractive way. This project will provide a good platform for the public viewers to know more about mobility aids and its correct technique of application instead of acquiring wrong information from unknown sources.

**Key words:** mobility aid, crutches, wheelchair, stick

### Introduction

The growth and advances in technology provide the educators and trainers with unique opportunities to enhance learning and teaching in corporate, government, healthcare, and higher education sectors. Open learning is an online learning platform that goes beyond content delivery to focus on community and student engagement. Open learning is an innovative movement in education and evolved into fields of practice and study. Learning in fun filled, cheerful environment, and getting deep understanding of the subject are the hopes of everyone. These elements are eliminated in learning topics that are complicated and difficult to comprehend. Through open learning, it can be easily accessed anywhere and can be used to promote dynamic communication through fun and interactive learning communities.

We would like to share people, close related topics which is regarding the usage of mobility aids. A mobility aid is a device designed to assist walking or otherwise improve the mobility of people with mobility impairment. There are a few types of mobility aids such as crutches and wheelchair. These aids are useful for an individual who sustained fracture, paralysis, weakness or immobility after a stroke attack. The mobility aids are easily found and purchased commonly at a pharmacy and rehabilitation center. However, the proper techniques to use them are not taught in a right way. The appropriate technique must be implemented while using the mobility aids to prevent any compression of the nerve and to decrease the risk of falling thus avoiding secondary complications.

Thus, this article intends to impart knowledge regarding the usage of mobility aids through a video demonstration that was also uploaded on a learning website.

### Content

Exercise therapy is one of the online course in which the video demonstration was used. The video is targeted to anyone who is interested in this online course. The video we created aims to increase knowledge on mobility aids. The video presentation used in this course is simple and easy to understand.

The concept of this online course is the brain child of the academic staffs in the field physiotherapy. As a team, we developed this course based on the curriculum used in the field of physiotherapy at Universiti Sultan Zainal Abidin (UniSZA). The online course is prepared in a way that it is suitable for a professional and a non-professional. In UniSZA, there is an Academic Quality and e-Learning Centre (AQEL) which monitors and enhances academic quality and activity. With the valuable inputs from this center, we have learned how to upgrade this video from an elementary level to an advanced level. With the help of media personnel from UniSZA, we developed the video according to our intentions.

The video presentation is about mobility aids. At first, the video consisted of basic details about mobility aids we usually used in clinical setting; crutches, sticks, tripod, quadripod, and walking frame as well as wheelchair. In each unit we showed each of its component and its functions. The video showed the usage of these mobility aids and their advantage and disadvantage. In addition, the video demonstrated how to adjust and use the mobility aids correctly which is the most important element in the usage of mobility aids. The video also showed the correct pattern of walking using walking aids and usage of the wheelchair.

The video is a practical presentation which made the learning process easier. Public viewer who does not have basic health science background could understand it. This video is important in community education because it helps many people understand more about each of these mobility aids. Most of the public viewer will be assisted on how to use and adjust the mobility aids correctly without having an appointment with a physiotherapist.

The video has two commercial values. First, the video is an educational video which is uploaded on a learning website. This will assist public viewer to enroll in the learning website. Second, the video will assist people who buy

any product of mobility aids to use it correctly without waiting for physiotherapist appointment. Hence, they can refer to the video many times if they still do not understand how to use it correctly. It is really helpful in a way since one time learning is not enough for people to understand the usage of the mobility aids.

### **Acknowledgement**

We would like to thank Universiti Sultan Zainal Abidin (UniSZA) for its financial assistance on this project. We sincerely and wholeheartedly acknowledge the contribution of Academic Quality and e-Learning Centre (AQEL) by providing us the beneficial courses and guidance to finish this project. We gratefully acknowledge our faculty, Faculty of Health Sciences (FSK) for its excellent advice and support. We wish also to express our appreciation to all the media personnel for their outstanding work, suggestions and assistance to produce the video in a best possible way. We would also thank all the persons who made this project possible. We would like to extend our sincere thanks to our family, for their endless patience and moral support.

## 'VirSbud' as a Tool for Enhancing Students' Confidence to Speak

**Dr. Radzuwan Ab Rashid, Assoc. Prof. Dr. Saiful Bahri Mohamed, Mr. Mohd Fazry A. Rahman & Dr. Syadiah Nor Wan Shamsuddin**

Universiti Sultan Zainal Abidin, Terengganu, Malaysia

[radzuwanrashid@unisza.edu.my](mailto:radzuwanrashid@unisza.edu.my), saifumoh@unisza.edu.my, syadiah@unisza.edu.my

Kolej Komuniti Shah Alam, Selangor, Malaysia

fazryrahman@kksa.edu.my

### Highlights:

- Innovative application to enhance English-speaking confidence.
- Engaging learners in task completion whilst retaining their interest.
- Integrating the concepts of learner autonomy and fun learning.
- Learning through authentic voice.
- Providing opportunities for self-assessment in speaking
- A tool for teachers to conduct assessment and monitoring.

**Key words:** Virtual buddy; speaking confidence; less proficient students; second language learning.

### Introduction

Good speaking skills are crucial for everyday situations and career opportunities. In Malaysia, English has long been considered as another important language besides Bahasa Malaysia as it is widely used in various aspects of life, such as business, education and administration. However, most people experience some levels of speaking anxiety when they have to speak in a second language (Woodrow, 2006), especially if they have low level of proficiency (Rashid, 2011). This speaking anxiety can lead to the 'social phobia' (Pertaub, Slater and Baker, 2002: p.2) which is the fear that they will act in a humiliating way and that other people will judge them negatively. The presence of speaking anxiety in each individual explains why many second language learners are able to perform well in reading, writing and listening but having problems to orally use the language confidently. In Malaysia, inability to speak in English confidently is not only faced by primary school students but also the degree holders which become one of the contributing factors to their unemployment (see Cheong, Hill, Chung and Leong, 2015). VirSbud project is designed to propose a possible solution to overcome students' lack of confidence to speak in English.

### Project Description

The Virtual Speaking Buddy (VirSbud) is an innovative desktop application which is aimed at enhancing English-speaking confidence. VirSbud engages learners in task completion whilst retaining their interest. It is designed based on two interrelated concepts: learner autonomy and fun learning. Having the application installed on their desktop, the students can take charge of their own learning in the sense that they can decide on the 'what, when, where and how' to talk to the speaking buddy. This learning process is made fun as the students can choose their preferred interactive animated characters to be the buddy. VirSbud application records the students' authentic voice as they talk and the students can rehearse and record as many times as they want until they are satisfied to show the recording to the 'more-knowledgeable other', preferably their English language lecturer, for feedback and comments. In this sense, the student can undertake a self-assessment in speaking while the lecturers can use the application for assessment and monitoring.

### Theoretical Background of the Innovation

Speaking anxiety occurs mainly due to the desire to create a positive social impression (Horwitz et al., 1986). Students with high level of speaking anxiety fear that having incomplete linguistic and pragmatic knowledge will make them being perceived as inferior than other second language learners. In other words, inability to speak English fluently is perceived as a face-threatening failure. Most of the time, these students decide not to speak at all in order to avoid embarrassing themselves. As revealed by Rashid, Vethamani, and Basree (2010), this is one of the main challenges faced by English language teachers in Malaysia. Couto (2010) and Johnson (2006) suggest that the anxiety can be gradually reduced by engaging the speakers in the interactions which provide more personal space. This can be done by engaging them in the interactions which do not require face-to-face meeting, such as through the use of blogs, podcasts and video chats (Guzel and Aydin, 2014). In other words, speakers with the language anxiety problem should not be engaged in face-to-face conversations until they have developed higher level of confidence. VirSbud is designed based on this theoretical principle that the students will be talking to their virtual speaking buddy until they have fully developed their confidence to speak face-to-face with other individuals.

Vygotsky's (1981) semiotic mediation suggests that knowledge is not something directly internalized but rather, is developed through the use of socially-created 'psychological tools' (John-Steiner and Mahn, 1996, p.193).

Vygotsky's notion of semiotic mediation contributes to the understanding of how the practice of developing students' confidence to speak in English explored in this study is mediated by the discourse that the participants engage in. Hence it is reasonable to hypothesize that providing a platform, such as VirSbud for the students to talk to their virtual speaking buddy can gradually develop their confidence level to orally use the language. Once they have greater control of their confidence, the students will no longer feel anxious to use the language in face-to-face setting.

### **Why VirsBud? – Advantages & Originality**

VirSbud is not something that is totally new. There are several similar applications, such as the Talking Tom and Second Life which allow students to talk to their virtual buddy. However, the existing applications have their own limitations which make them inappropriate to be used as a tool to develop speaking skills among school children. The Talking Tom, for example, will modify the students' voice and this raises difficulties for the teachers to keep track in the progress of students' confidence level. The teacher will not be able to identify whether the students are slightly nervous or extremely nervous when listening to the recorded voice in the Talking Tom due to nature of the app which does not present the authentic voice. As for the Second Life, it requires internet connection and some other high-tech systems thus is not practical enough to be used by the teacher as many students in this country especially those living in rural areas still do not have access to the internet.

All the limitations of the existing apps were taken into consideration in designing VirSbud. Unlike the Talking Tom, VirSbud will record and play the authentic voice of the students thus any wrong pronunciations and development in the confidence level can be easily identified by the teacher. In comparison to Second Life, VirSbud is much less complicated to be used as it only requires the students to click on one of the animated characters presented to them and start talking.

### **Commercial values**

- 1) Students can use VirSbud as a tool for self-directed learning as they can decide on the 'what, when, where and how' to talk to the speaking buddy.
- 2) Teachers can use VirSbud in the classroom as a teaching aid as the prompts in the Virsbud are designed based on the text-book syllabus.
- 3) Teachers can use VirSbud as an assessment tool to evaluate the progress in students' confidence level.
- 4) VisrSbud can be further developed as a commercial mobile application to be used in iOS or Android gadgets.

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## Exploring the Use of Online Multiliteracies Project Approach (e-MULPA) in an English as a Second Language (ESL) classroom: A Blended Learning Module

**Fariza Puteh Behak, Yurni Emilia Abd Hamid, Suzanah Selamat, Suraini Mohd Ali, Norhaili Massari**

Universiti Sains Islam Malaysia, Bandar Baru Nilai, Malaysia

fariza@usim.edu.my

**Highlights:** In the wake of online learning paradigms, many people resorted to using online tools in their teaching, but some may use technological tools with traditional learning process. e-MULPA is a learning framework that highlights the cultivation of 21<sup>st</sup> century knowledge processes alongside the usage of online tools. This framework has been implemented in English for Communication course in Universiti Sains Islam Malaysia (USIM) for two semesters in 2015-2016, involving 120 students. Data was collected through interviews and personal reflections and analysed using thematic analysis. The findings show that the learners had a positive learning experience which include enhancement in terms of English language, communication, collaborative and technological skills. Findings suggest that e-MULPA can be used in other learning contexts and not specific to the English language learning context.

**Key words:** multiliteracies project, 21<sup>st</sup> century learning, ESL learning, blended classroom.

### Background of e-MULPA

The 21<sup>st</sup> century witnessed the boom of technology and the rise of online learning paradigms. More and more people are turning to using technology in their teaching. The main challenge here is not having necessary technological knowledge to operate technological equipment such as computers and the Internet, but on cultivating the knowledge process that is supposed to accompany the use of these technological tools. Some people who use technology ended up using technological tools as a platform to upload their learning material in a digital form, and resorted to traditional teaching approaches. In addition, the 21<sup>st</sup> century also has taken a new turn due to the transformations caused by globalisation and advent of technologies that requires learners to possess a different set of skills such as communicational skills, technological skills, creative and critical thinking skills as well as collaborative learning skills. Malaysia is now under the threat of unemployment among university graduates, in which 161, 000 graduates were reported to be unemployed (Bernama, 2015). Studies (Hairuszila, Hazadiah, & Normah, 2009; Yahya, 2006; Morshidi, Chan, Shukran, Seri Rahayu and Jasvir Kaur, 2012) indicated that the issue of unemployment among Malaysian university graduates may be caused by the lack 21<sup>st</sup> century skills among the graduates.

Hence, with two pertinent issues mentioned above as a background, e-MULPA was developed. e-MULPA is a learning framework that combines 21<sup>st</sup> century knowledge processes with the use of online tools to cultivate 21<sup>st</sup> century knowledge processes among Malaysian university graduates. In addition, e-MULPA also highlights the interconnectedness of lessons to provide meaningful learning experiences.

### The product: e-MULPA module

e-MULPA is a module that uses e-MULPA framework in the teaching of ESL. It combines three established teaching approaches : multiliteracies approach (Puteh-Behak 2013), task-based language teaching (Darmi 2013) and project-based learning. The fundamentals from these three established teaching approaches were extended to create a new teaching model. E-MULPA not only focusses on the use of multimodal (print, audio, , digital) resources but also focuses on the cultivation of 21<sup>st</sup> century knowledge processes such as applying, analyzing and creating something new based on existing knowledge. It also highlights interconnectedness of lessons in completing an online multiliteracies project. This is to ensure students to be involved in meaningful learning experiences.

All lessons in the classroom are connected to the completion of the main multiliteracies project, in which the students will be involved in a variety of knowledge process such as communicational skills, technological skills, creative and critical thinking skills as well as collaborative learning skills. The project-based lessons are specifically designed to equip the students with the necessary skills to be effective graduates. Specifically, e-MULPA can be illustrated in Figure 1:

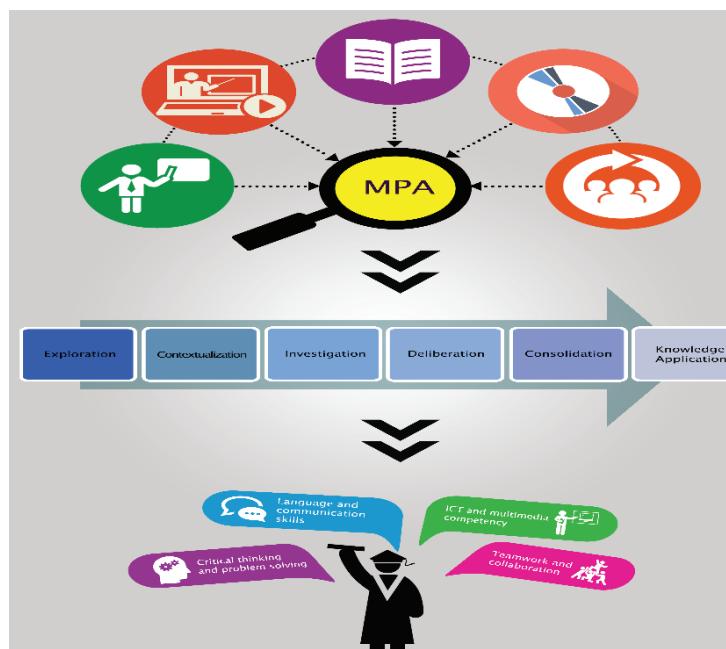


Figure 1: e-MULPA framework

### Importance towards education

Learning in the classroom are often segregated into disconnected pieces causing learners to have a distorted view of the subject matter. In addition, some practitioners use technological tools in the classroom but remain to use traditional approach in the teaching and learning process. The current e-MULPA module will address both issues by providing a guideline for teachers to set and plan a language learning classroom that highlights the combination of 21<sup>st</sup> century knowledge processes and online tools in cultivating 21<sup>st</sup> century skills. With this module, teachers would be able to plan a suitable online multiliteracies project to be used in their classroom with consideration of the syllabus required as well as the required knowledge processes.

The current e-MULPA module has been implemented in English for Communication course in USIM for two semesters in 2015-2016 academic session, involving 120 students. Data was collected through interviews and personal reflections and analyzed using thematic analysis. Data shows that the learners reflected that learning using e-MULPA module as something new and different from their regular examination-based English language classroom. Some students described their learning experience as challenging and adventurous as evidenced in the following excerpt from the students' journal reflection:

"Yes, I do the learning experience through research and survey. And producing video presentation because it is challenging to me" (BS1).

In addition, most students provided positive feedback on their experience in conducting mini-research and producing videos as evidenced in the following excerpts:

"I like learning about research survey using Google Form because before this I have never use it. I like producing video because I have a deep interest on video editing and such. Thus, this experience help improve my video producing skills for future use" (BS3).

In short, most students claimed that they have learnt so many aspects other than the English language skills including communication skill, technological skills, problem-solving skills as well as teamwork skills.

e-MULPA module is also currently used in two ESL classrooms in the matriculation centre in USIM involving 1 teacher and 60 students.

### Commercialisation and Profitability of e-MULPA

1. IP application for e-MULPA is in process.
2. E-MULPA module has been initiated and will be published as a book.
3. Teaching kit containing e-MULPA components is in the process of development.

## Achievements and Awards

1. Silver Medal Award- International Invention & Innovation Competition (InIIC 1/2016), 28/5/2016. Port Dickson.
2. SSCI/Scopus indexed journal:  
Puteh-Behak, F., Darmi, R., & Mohamad, Y. (2015). Implementation of a Western-based Multiliteracies Pedagogy in Malaysia: A Socio-cultural Perspective. *GEMA Online® Journal of Language Studies*, 15(1).
3. Indexed journal/ Proquest:  
Puteh-Behak , F.; Harun, H. and Massari, N. (2015). Learning with a sense of adventure through a multiliteracies approach in an examination-oriented learning context. *Frontiers of Language and Teaching*. 6.
4. Conference Proceeding MICOLLAC 2016, 16-18 August 2016. Penang.
5. Book Manuscript: Online Multiliteracies Project Approach (e-MULPA) Module: Theories and Practices
6. e-MULPA Teacher's Kit (manuscript)
7. e-MULPA Student's Kit (manuscript)

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## **Interactive Application: Asian Civilization**

**Azilawati Rozaimee, Norkhairani Abd Rawi, Syadiah Nor Wan Shamsuddin, Wan Malini Wan Isa, Maizan Mat Amin**

Faculty of Informatics and Computing, Universiti Sultan Zainal Abidin, Besut Campus, Besut, Terengganu, Malaysia.  
{azila, norkhairani, syadiah, wanmalini, maizan}@unisza.edu.my

**Highlights:** Interactive applications: Asian Civilization is an interactive application specifically for university students who took the Islamic and Asian Civilization (TITAS) subject. General knowledge of the subject TITAS taken by all students in public universities (UA) and private higher education institutions (HEIs) throughout Malaysia. This subject focus TITAS historical values of civilization embodies the role of science in building a society based on the principles of civilization for the spirit of mutual respect and interact within the various religious communities in Malaysia. Generally, students have difficulty understanding and remembering facts and chronology that have taken place in human civilization as a conventional delivery methods that are often static and less in visualization. This application can provide a solution to these problems because of the use of interactive applications that can enhance the interactivity between students compared to conventional teaching and learning process. The content in this application comprise of the entire contents of the syllabus Asia Civilization and delivered using the multimedia application approach which consists of various multimedia elements such as video, animation, audio, text and images so that students can easily understand since they can highly visualized the information. In addition, students can also do self-paced learning outside the normal class hour since this interactive application does not only includes complete Asian civilization syllabus, but also equipped with a variety of activities to enhance students' understanding.

**Keywords:** civilization, self-pace learning, interactive application

### **Introduction**

Effective learning environment is crucial for the accomplishment of learning aims and objectives in which learners are involved in interaction and discussion process with expert guides and tutors (Harashim 1993). The technological advancement has also revolutionised the basic learning paradigm and presentation of learning material used by students all over the world (Hisyam et al. 2006) with an increase in digital learning content as an alternative to physical textbook (Beetham & Sharpe 2013). Recently the Ministry of Education moving towards global online learning with the implementation of blended mode learning and Massive Online Open Source Courseware (MOOC) where it has become a compulsory in teaching and learning in public higher institutions. Therefore most of courses has been offered conventionally plus with MOOC and blended mode. Four main courses that are compulsory for first year student in all public higher institutions has started to use MOOC as part of their learning. However MOOC courses totally depends on internet connection. Thus sometimes, student failed to connect to the module when the traffic is congested or the network is not available. Hence there is a need for backup tools to support the learning process. This is the motivation towards the development of Interactive Application: Asian Civilization.

### **Contents:**

#### **1. Description of your innovation / product development / design / process.**

This interactive application was developed based on commonly used framework for developer and instructional designer namely ADDIE model. This model that consist of 5 different phases which are (1) Analysis, (2) Design, (3)Development, (4) Implementation and (5)Evaluation.

In order to create an effective learning, Asian Civilisation application comprised of two (2) main modules which are Information module and activities module. Information module include the entire contents of the Asian Civilisation module and all the information is convey through the use of various suitable multimedia elements. While the activities module includes the exercises to provide better understanding regarding the discussed topics.

#### **2. What is the context or background of the innovation / product development / design / process?**

The Ministry of Education had announced the ten big ideas in education where one of the ideas is emphasizing on global online learning. As we know, online learning involves with digital based contents that available to be retrieved through internet connection. However, the limitations of internet provisions in Malaysia should be considered to enable it to be successfully achieved. This interactive application was developed in digital based contents without dependence for internet connection; therefore students can use the application as long as they have their laptops. Yet it still supports the other approach such as flipped classroom.

#### **3. Why are they important to education?**

This application is important in assisting learning process due to several reasons. Firstly the use of current technology as an alternative way to help better teaching and learning process either in normal classroom or outside classroom. The use of technology also can change the direction of this normal practices in conducting the class since this would lead to new approach in learning environment. This application can also make student learning time more fun and enjoyable.

**4. Please write any advantages of your innovation / product development / design / process towards education and community.**

There are several advantages that can be obtain from the use of this interactive application. To name a few, this interactive application can promote self-paced learning among the students, whereby they can use this application to study on their own or during study group session, useful as references, can help them for revision and many more since this interactive application promotes 2 way communication among the users and the application. While for the lectures/instructors, they can used this application during the class session as teaching aid so that easier for them as an assisting tools in providing understanding by having contents visualization.

**5. Please add any commercial value in terms of marketability or profitability of your innovation / product development / design / process if any.**

In terms of the application commercialization, we already done heuristic evaluation by experts for this application to judge its compliance with recognized usability principles as part of the testing before we proceed to usability and acceptance testing among the target users.

The target market for this interactive application will be the both public universities (UA) and private higher education institutions (HEIs) throughout Malaysia since they are following the same Malaysia Qualification standard.

**Acknowledgement**

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## **Small Ruminant i-Tutor (SRiT)**

**Norkhairani Abdul Rawi, Maizan Mat Amin, Azilawati Rozaimie, Wan Malini Wan Isa, Syadiah Nor Wan Shamsuddin**

Fakulti Informatik dan Komputeran, Kampus Besut, 22200, Besut, Terengganu  
{khairani, maizan, azila, wanmalini, syadiah}@unisza.edu.my

**Highlights:** SRiT is an interactive learning software to help the learning process undergraduates in Animal Science, regarding the subject of small ruminants. SRiT emphasizes four main topics, namely feeding, reproduction, health and housing. The main issues in each sub topics are presented using various methods such as the use of striking images, animations and videos which ever appropriate in delivering the contents. Apart from the students, general public who are interested in breeding goats can also use SRiT to obtain the knowledge. This software provides the opportunity to increase the skills and knowledge for self-learning and prioritizing interactive concept that allows users to control the software and have the freedom to choose their favorite page. Users are also provided with activity module to test their understanding of the contents in this interactive application. SRiT is expected to provide a learning environment that is attractive and effective to the public in our country particularly to students of Animal Science Program.

**Key words:** Interactive multimedia; animal science; i-tutor

### **Introduction**

Small ruminant is defined as any of various hooved, usually horned mammals, such as cattle, sheep, and goats, that have an even number of toes. Small Ruminant is one of the subjects taught in Faculty of Bio Resources and Food Industries (FBIM) in UniSZA. Currently, students are learning this subject in conventional way which is face to face approach in a classroom. For animal science students, the university provides a farm as an aid for teaching learning purposes. However, it is located around 20 kilometers away from the campus making it made difficult for the students to have an actual experience in small ruminants study. Therefore, SRiT has been developed to assist the lecturers and students in teaching and learning small ruminants where multimedia elements are used to convey the subject contents.

### **Content**

#### **1. Description of your innovation / product development / design / process.**

SRiT applied four modules namely feeding, reproduction, health and housing. Target users for SRiT are those who studied animal sciences and publics who are interested in agribusiness related to small ruminants. SRiT combines various types of multimedia such as images, animation, text, audio and video for effective delivery of the contents. Activity module is also provided to test users understanding towards the contents of the application. In order to ensure the contents successfully are delivered, some learning theories have been embedded along the development process. Since the target users are among universities students and adults, self-exploratory approach has been implemented through the usage of easily recognized icons.

#### **2. What is the context or background of the innovation / product development / design / process?**

The Ministry of Education had announced the ten big ideas in education where one of the ideas is emphasizing on global online learning. As we know, online learning involves digital based contents that can be retrieved via internet connection. However, the limitations of internet provisions in Malaysia should be considered to enable the success of the digital based contents without dependence for internet connection; therefore students can use the application as long as they have their laptops. Yet it still supports other approach such as flipped classroom.

#### **3. Why are they important to education?**

Currently, in FBIM, the subject on small ruminants used reference books and power points slides provided by the lecturers as teaching and learning materials in classroom. This made the learning process is not interesting and boring. Some of the sub topics need visualization to be better understood by the students. The visualizations provided in current approach are statics and could not successfully convey the actual message. An interactive application is able to provide better visualizations through animations and videos hence serves as an important aid to enhance learning process.

**4. Please write any advantages of your innovation / product development / design / process towards education and community.**

SRiT was developed as a new tool in learning the subject on small ruminants and served as alternative study method for animal science students. It encourages self-paced learning and makes the learning process more interesting through interactive exploration of the subject matter. It also makes it easy to the students in doing revision through the activities provided.

**5. Please add any commercial value in terms of marketability or profitability of your innovation / product development / design / process if any.**

In terms of the potential for commercialization, we have done heuristic evaluation by the experts for this application to judge its compliance with recognized usability principles as part of the testing before we proceed to usability and acceptance testing among the target users. The target market for this interactive application will be the students studying animal science in both public and private higher learning institutions throughout Malaysia.

### Acknowledgement (if any)

Authors would like to thanks Mohd Nur Atharie for helping us in developing the application with our guidance and FBIM for their cooperation. Special thanks goes to both the Faculty of Informatics and Computing and UniSZA for their support in the project.

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## **TutoReal: Mobile Learning Application for End-user (Do-it-yourself) to increase proficiency and mastery in Easy Math Learning Process**

**Muhamad Fazil Ahmad & Norizan Abdul Ghani**

Universiti Sultan Zainal Abidin, Kuala Terengganu, Terengganu, MALAYSIA

[mfazilahmad@unisza.edu.my](mailto:mfazilahmad@unisza.edu.my), [norizabd@unisza.edu.my](mailto:norizabd@unisza.edu.my)

**Highlights:** The purpose of this study is to develop a Smartphone application for end users (Do-it-yourself) to increase proficiency and mastery in Easy Math Learning Process. A major barrier to the uptake and integration of new technologies in teaching and learning is the lack of personal experience of mobile learning on the part of those involved in teaching and in the preparation of materials and methods of learner support. Our project addresses this by introducing forty end-users to the use of smartphones to support their own learning, within a semi-formal community structure and with a focus on their proficiency and mastery in Easy Math Learning Process. We set out to explore whether the smartphone would act as a catalyst, heightening interest in professional development, encouraging exploitation of relevant resources, and promoting dialogue amongst the end-users members involved. The paper considers the idea of 'DIY' education, whereby learners are in charge of what they want to learn but may still require some form of support. The peer learning community aspects of the project are foregrounded, consisting of workshops, clubs, a buddy system and online environment. A two-stage process gave us the opportunity to reflect on one group's experience and rethink arrangements before a second group started. We show how fine-tuning a particular professional development opportunity gives insights into the best ways to make use of limited resources.

**Keywords:** Mobile Learning Application, Do-it-yourself, Easy Math Learning Process.

### **Introduction**

DIY Education – What is it?

As a DIY learner, you take control of your own education and decide what subjects and skills you want to study. The availability of relatively inexpensive online courses through sites like E-Learning Project (KeLiP- UniSZA) helps make it easy for DIY-ers to explore new knowledge areas without the expense of a traditional college course.

Many respected universities, including UniSZA, offer MOOCs for free as a way of promoting democratic education and bringing new learning opportunities to the public. These noncredit courses can be found in subjects ranging from computer programming to ancient civilizations, and they are typically a risk-free way to try out a prospective major, develop new skills, or simply expand your general knowledge.

Another feature of the do-it-yourself learning community is hackerspaces: open workspaces where hackers and makers can come together to learn and collaborate, typically in fields like science and technology. Hackerspaces may offer knowledge sharing, social activities, and group projects, much like a more traditional learning environment. The difference is, hackers and makers decide what projects and initiatives are meaningful to them, determining their own curriculum. This is not unlike flipped classrooms, a new approach to education that allows students to guide themselves.

Who is it for?

The best part of DIY learning is that almost anyone can benefit from it. For some students, self-directed learning is an alternative to a formal education at a college or university. For others, it's a way to give college-level courses a try and see if a particular major or discipline is for them. Still, others may choose to take self-directed learning initiatives after college in order to develop new professional skills or simply to enrich their lives.

Pros of a DIY Education

Pursue only what you want and need to know. You can choose to study just the subjects that directly apply to your personal interests and professional goals.

You may be able to save money. If funding a traditional college education is not an option, DIY learning may offer a free or relatively low-cost way to enhance your knowledge.

It is a great way to test-drive college. Not sure if college is for you? MOOCs can give you a taste of what to expect. DIY learning lets you take a stand against the commercialization of learning. DIY movements like UniSZA's MOOC project encourage students to think independently and to rebel against the influence of government or corporate agendas on education.

## Cons of a DIY Education

DIY learning typically does not culminate in a degree, which is a necessary credential for many career paths.

Self-directed learning is not applicable to every profession. While many computer programmers may be DIY-ers, you're unlikely to find a self-taught neurosurgeon.

A DIY education requires a great deal of independence and personal drive. You will need to be familiar enough with your chosen discipline to plan and carry out your own course of study, and you'll need to hold yourself accountable for reaching the goals you have set.

Self-directed learners do not have ready access to professors, tutors, and counselors. While support for DIY-ers is available, you will have to work harder to find a group of knowledgeable peers and mentors to help you develop in your studies.

DIY learning can be a great alternative to traditional learning methods. However, the reality is that in the majority of career paths, employers require some sort of formal college degree. In some cases, online degree programs can offer the best of both worlds, blending the tried-and-true curricula and resources of a college or university with the DIY flexibility of learning at whatever time and place you choose. Whatever your stance on DIY education, it is impossible to deny that this movement has led to increased accessibility for students, innovation in course delivery, and a new world of possibilities for independent learners.

## Content

### Novelty & Inventiveness

- The first interactive for End-user (Do-it-yourself) to increase proficiency and mastery in Easy Math Learning Process in Malaysia
- A significant migration from conventional education resources e.g.; books, posters, flips cards etc.

### Market Potential and Commercialization

- Children
- Officers
- Schools
- Collages
- Universities

### Usefulness and Application

- Interactivity – Capture attention and promotes sustainability of information
- Animation – Stimulates interest and inquisitiveness
- Portability and Flexibility – permit self-directed learning and allows information updating
- Android-Based Operating System – Supported by most mobile devices/gadgets

### Methodology

Choosing the correct methodology and methods is the first step and the key in relation to project procedure. For developing this application, the application development platform must be firstly determined and one suitable development model is chosen. Object oriented programming and modularized programming are adopted in this project. After testing the application, it is evaluated according to its user-friendliness, and other principles are discussed. The concerning technology and methods are introduced in this part.

### Selection of development platform

In relation to the popularity and availability of the user end application, a suitable platform was chosen. Based on the years of efforts by our project team, the system has been successfully established on a PC platform. The new requirement is its establishment on mobile devices such as smartphones and tablet PCs. Currently, the most popular operating systems on mobile devices are Android, iOS, and Windows phone. In this project, the Android platform was been chosen due to the dominances described below.

A software stack is adopted in the Android platform with Linux core providing the basic functions and various programmers developing diverse applications. Openness, independence from a service provider, abundant hardware options, no developer restriction, and supporting Google Play are the notable advantages of the Android platform over any of the other available options. Android allows any mobile end manufacturers to join the developing platform, which leads to the diversity of novel applications. This also gathers a wide user base for itself. The internet service is not restricted to the Android platform and the choice of hardware is also significantly plentiful. Manufacturers promote all sorts of products with different features and specialties, but this does not affect the

compatibility of software or the data synchronism. Choosing the Android platform minimizes the problems that occur in the programming process, simplifies the developing procedure, and lays the foundation for future popularity of the user end application (Chang et al., 2010).

### **Selection of development model**

Over the years, a large diversity of application development models, such as agile methodology, waterfall methodology, extreme programming, and rapid action development have taken shape. While each model has its own advantages and disadvantages, based on the requirements, scale, and urgency of different mobile application development projects, particular models are able to be applied. For example, as for agile methodology, the whole development procedure is divided into several parts. This approach makes it easy to alter the project and reduces the overall risk in relation to the whole project. The waterfall model is best suited to steady and static projects for which the main emphasis is in relation to schedule planning and for which there are no significant changes throughout the entire process. If the application requires a quick delivery, the best choice is rapid action from the developer.

This project is a function-oriented application development aimed to realize an Android application with concrete functions (Lee, 2012). Hence, the waterfall model is adopted in this project. The project starts with the gathering of related information and background searching. Once the general goal has been settled upon, the move is then towards schedule planning after which the whole project course is completed step-by-step.

Before the design and implementation are initiated, it is important to have knowledge of the background and the current situation. This information is gained by reading the previously reported paper regarding the Android apps in the team, as well as studying the paperwork of other Electronic education systems.

To accomplish this task, the first aspect to be considered is the required functions. The user population of this application is the app users, who require education information data. Without a doubt, a great deal of effort is required to be put into the data interaction. The data from the brands index do not come directly from the database. Firstly, the developers upload different data to the server, which would process and save the data. When the user clicks into the application, it will send a requirement to the server for data and information. The remainder of the process is displaying the data in a user-friendly manner. However, it is not sufficient for the user end to merely possess this function. This application should also enable interaction to take place between the users and learning process. As the function of this application is now clarified, the realization of the application is based on these functions.

### **Acknowledgement**

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## An online system for Malaysian dietary index for risk of breast cancer – MyDietRisk (BCa)

**Mohd Razif Shahril, Syarilla Ahmad Saany, Fadzli Syed Abdullah, Noor Salsabila Amir Hamzah, Sharifah Wajihah Wafa & Suhaina Sulaiman**

Universiti Sultan Zainal Abidin, Kuala Nerus, Malaysia

[razifshahril@unisza.edu.my](mailto:razifshahril@unisza.edu.my), [syarilla@unisza.edu.my](mailto:syarilla@unisza.edu.my),

[fadzlihassan@unisza.edu.my](mailto:fadzlihassan@unisza.edu.my), [salsabilamir93@gmail.com](mailto:salsabilamir93@gmail.com), [sharifahwajihah@unisza.edu.my](mailto:sharifahwajihah@unisza.edu.my),

[suhaina.hjsulaiman@ukm.edu.my](mailto:suhaina.hjsulaiman@ukm.edu.my)

**Highlights:** Breast cancer is a major global health problem and the leading cause of death among women of all ethnic backgrounds. Therefore, an online system named MyDietRisk (BCa) ([www.mydietrisk.com](http://www.mydietrisk.com)) was developed to help Malaysian users rapidly estimate their risk of breast cancer in one year time. This successfully developed, reliable and valid online dietary screening system can easily classify individuals into high or low breast cancer risk groups. As a rapid, simple, non-invasive and interactive system, MyDietRisk (BCa) can be used for early screening and at the same time educate Malaysian users on breast cancer risk.

**Key words:** breast cancer; risk; diet; online; system; education

### Introduction

Breast cancer is a major global health problem and the leading cause of death among women of all ethnic backgrounds (Yip 2009). Each year, an estimated 1.6 million new cases are diagnosed worldwide (Ferlay et al. 2010). Breast cancer incidence in Malaysia, a developing Asian country, is at an Age-Standardized Rate (ASR) of 29.1 per 100,000 population (Zainal Ariffin et al. 2011). In short, 1 in every 19 Malaysian women will develop breast cancer in their life-time. Every year, around 5,000 Malaysian women are diagnosed with breast cancer, most of them aged between 30 and 60 years, where nearly half of those affected are under 50-years of age.

### Development of MyDietRisk (BCa)

Early detection and screening with or without clinical breast examination could increase the survivorship of cancer. In Malaysia, 50-60% patients come in late for diagnosis and treatment of breast cancer because they are afraid of invasive diagnosis procedure besides having negative perception, denial, poor attitude and knowledge regarding cancer screening (Taib 2007). This scenario contributes to lower survival rate after cancer among Malaysian women compared to other developed countries. Therefore, an online system named MyDietRisk (BCa) ([www.mydietrisk.com](http://www.mydietrisk.com)) was developed to help Malaysian users rapidly estimate their risk of breast cancer in one year time. The aim of MyDietRisk (BCa) is to classify users into two groups' i.e. high risk or low risk of breast cancer. It was previously developed in paper-pencil format among 746 women consisting of 373 pairs of breast cancer (cases) – healthy women (controls) to identify both modifiable (diet, body weight, physical activity) and non-modifiable (age, ethnicity, reproductive history, family history) risk factors for breast cancer (Shahril 2014).

### Context of MyDietRisk (BCa)

MyDietRisk (BCa) which is a non-invasive screening system, eases user in early detection and prevention of breast cancer from anywhere and anytime. This interactive online system also educates users and guides them in making healthy changes on their modifiable risk based on their risk estimation. The system allows user to answer a series of questions regarding their menopausal status, family history of breast cancer, pregnancy history and outcomes and as well as their dietary habits. Based on the user's response, the system calculates the scores to determine the risk of getting breast cancer in one year time (Colditz et al. 2000). MyDietRisk (BCa) has high reliability in terms of response accuracy for diet components with 90% to 99% correct classification and a maximum of 10% gross misclassification when compared with reference method i.e. food frequency questionnaire (Shahril 2014). It also has good stability with Pearson correlation coefficient value of 0.873 and a high internal consistency with Cronbach's alpha value of 0.871 in reliability assessment. Finally, in the fourth study the MyDietRisk (BCa) was then tested for its validity in assessing breast cancer risk among 377 women undergoing fine needle aspiration cytology (FNAC) procedure which was later confirmed by histopathological report. Results showed that the MyDietRisk (BCa) has good sensitivity (79-80%), specificity (85-91%), positive (66-83%) and negative (89-92%) predictive values and acceptable agreement ( $k=0.611-0.704$ ) in assessing breast cancer risk besides demonstrating a high construct validity ( $p<0.001$ ) in differentiating the high and low risk group for breast cancer risk. It also has a discriminative accuracy with ranges between 0.836 and 0.891 (Shahril 2014).

## **Educational Elements of MyDietRisk (BCa)**

The main educational elements of MyDietRisk (BCa) is interactivity in learning where there is a 'dialogue' between the user and the system. By incorporating interactivity element in MyDietRisk (BCa), users become engaged and involved in the learning process on their risk of breast cancer and how to manage and prevent them (Jibaja-Weiss et al. 2006). MyDietRisk (BCa) involves forms of response by user based on the questions asked, in order for them to identify their risk for breast cancer. A series of advices will be provided to educate them on how to reduce their risk tailored to their current dietary pattern and lifestyle. This will also help users to deepen their understanding on their risk and how to manage them for cancer prevention (WCRF/AICR 2007).

## **Advantages of MyDietRisk (BCa)**

MyDierRisk (BCa) is the first detection and prevention screening system based on Malaysian dietary habits. It is user friendly, has wide coverage and easy access, provides fast results and proven as effective in screening breast cancer risk among Malaysian women. MyDietRisk (BCa) is highly reliable in the aspects of response accuracy, stability and internal consistency. It was also proven valid in terms of construct and criterion validity with standard diagnosis procedure of Fine Needle Aspiration Cytology.

## **Acknowledgement**

We are grateful for the breast cancer patients and healthy controls involved in the development and validation phase of MyDietRisk (BCa).

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## A Novel Multimedia Interactive Application to Support Road Safety Education Among Primary School Children in Malaysia

**Norkhairani Abdul Rawi\*, Abd. Rasid Mamat, Mohd Sufian Mat Deris, Maizan Mat Amin, Normala Rahim**

Fakulti Informatik dan Komputeran, Universiti Sultan Zainal Abidin, Kampus Besut, 22200 Besut, Terengganu

{khairani, arm, sufian, maizan, normalarahim}@unisza.edu.my

**Highlights:** The interactive multimedia is considered as a very promising potential to aid primary school pupils in learning and teaching method in introducing road safety education. Although web based applications for road safety education are available, they are based on overseas countries where the rules and environment settings are different from Malaysia's environment. An effort to help pupils in interactively learning on road safety education in Malaysia has motivated this study. A framework encompasses of learning theories, modules, multimedia elements and, usability and acceptance, has been developed and applied in an interactive multimedia prototype on road safety education called "FIQIR Road Safety". The prototype has been developed based on a primary school textbook "Cermat Tiba Selamat" by Malaysian Ministry of Education (MOE). FIQIR Road Safety has been designed and developed by utilizing multimedia elements to give an immersive experience to the user. It employs Watch, Learn and Play as the modules where the animations and activities represent actual traffic environment in Malaysia. It also has been reviewed by experts. The proposed framework hopefully can be a guide in developing interactive multimedia application such as FIQIR Road safety.

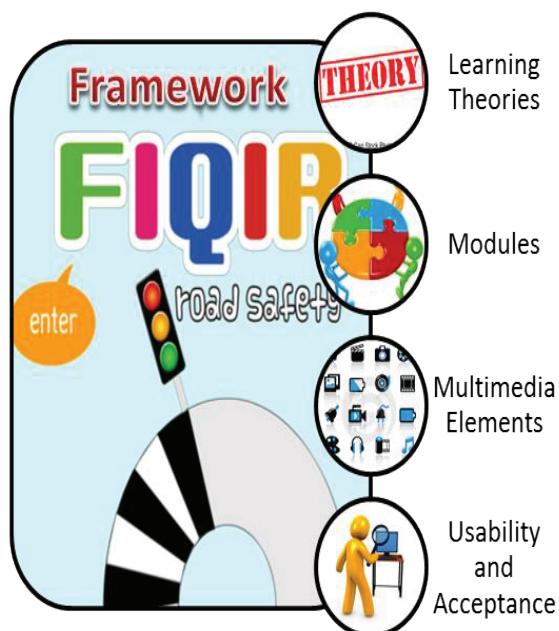
**Key words:** Interactive multimedia; primary school education; road safety education

### Introduction

Road safety is an important issue around the world. Therefore it has been debated among participants in Global Ministerial Conference on Road Safety [1] during United Nation Conference 2010 that led to a declaration of a decade Global Action Plan for Road Safety [1]. As for Malaysia, Road Safety Plan 2006-2010 has been executed and lots of experienced has been undergone.

### Content

Description of your innovation / product development / design / process.



This project applied four components namely learning theories, modules, multimedia elements and usability & acceptance. These components are hopefully can be implemented as guidelines to the others to develop an interactive multimedia application.

### **3.1 Learning Theories**

The theories of teaching and learning, road safety curriculum and related models were also studied in developing the ID model for FIQIR application. The design process that involves cognitive and constructive aspects of learning also been implemented using the cognitive theory of multimedia learning. The contents will be presented in a learning modules task based. The lesson scope will be on the introductory of road safety and basics of road signage in Malaysia.

### **3.2 Modules**

Modules within the application include interactivity that involves the use of active texts and graphics connected to definitions, further information, other modules and so forth. Three learning modules were adopted through interactivity to ensure the children can learn regulations and good practice about road safety.

FIQIR merges the idea of actual environment with multimedia functionality to produce lively and interactive application to exercise learning by watching, playing, exploring, and having fun. This application is made up of three modules:

#### **1. Watch**

This module introduces the users on the road in Malaysia. The application integrates graphics, audio and animation in promoting the introductory part.

#### **2. Learn**

The module consists of two parts – the basics of road signage and categories of road signage. The users can explore these interactive sub topics and interact with the application to get more information.

#### **3. Play**

This module is designed and developed with the objective of testing and evaluating the children on their overall understanding of topics presented in the previous learning modules. The users were tested with three different forms of activities to ensure the understanding of the users – Guess Me, Fill Me and Drag Me. Children themselves can thus monitor their achievement and performance based on the feedback acquired from the tests or quizzes.

### **3.3 Multimedia Elements**

Multimedia elements are one of the components in FIQIR application. Multimedia elements can be described as variety types of media used in presenting information to the audience including text, graphic, video, audio and animations. In this project, the author applied all the multimedia elements.

FIQIR application incorporates a variety of media such as text, audio, graphics and animations in presenting the modules. The modules are able to motivate children due to the multimedia approach and hyperlinks provided in this application. The words and sentences used are easily understood and are based on children's reading ability. The application also adopted interactivity and navigation approaches to make sure children can interact with the application easily.

### **3.4 Usability and Acceptance**

Usability is a concept in Human Computer Interaction (HCI) that refers to create any computer applications that easy to learn and easy to use through User-centered Design (UCD) process [18] [19]. UCD is considered especially important when creating new applications that need to be accepted by users.

According to [20] the usability concept consists of five main criteria namely easy to learn, easy to use, easy to remember, contain few errors and satisfaction. Meanwhile, [21] describe the usability criteria as effectiveness, efficiency, safety, utility, learnability and memorability. For this project, the authors have chosen usability criteria as learnability, efficiency, memorability, errors and satisfaction.

#### **What is the context or background of the innovation / product development / design / process?**

Road safety is an important issue around the world. Therefore it has been debated among participants in Global Ministerial Conference on Road Safety [1] during United Nation Conference 2010 that led to a declaration of a

decade Global Action Plan for Road Safety [1]. As for Malaysia, Road Safety Plan 2006-2010 has been executed and lots of experienced has been undergone.

"Setiap hari, lebih daripada 3,500 pengguna jalan raya terkorban dan 137,000 lagi mengalami kecederaan akibat kemalangan jalan raya di seluruh dunia. Di Malaysia, angka kematian sebanyak 6,877 dicatatkan pada tahun 2011 yang telah membawa kerugian hampir RM9.0 bilion kepada ekonomi negara. Secara purata, 19 orang terkorban setiap hari di Malaysia, menjadikan kemalangan jalan raya sebagai cabaran kesihatan yang serius kepada negara. Ini juga menunjukkan keperluan satu dasar tindakan yang berkesan"[1].

The statement in the above paragraph had shown urgent needs of efforts towards road safety. The government had spent a lot of efforts in planning the road safety action plan that will be derived from five (5) main pillars:

- Strategic pillar 1 – the management of road safety
- Strategic pillar 2 – mobility and a safer road
- Strategic pillar 3 – a safer transportation
- Strategic pillar 4 – a safer road user
- Strategic pillar 5 – the post accidents management

This application purposely developed to support the strategic pillar 4 (a safer road user) where this tools can help in road safety education among students.

#### **Why are they important to education?**

Currently, in Malaysia, students is taught about road safety using a textbook named "Cermat Tiba Selamat"[4]. Road safety education in Malaysia also supported by a few private companies program such as Shell that sponsored Shell Traffic Games and Petronas with StreetSmart Program. However, both of these programs are carried out in physical environment where learners need to be at the place that has been set up for the practices. It also gives different focus where Shell is more to school children aged 9-12 while Petronas is more to adult user.

In computer based invention, a group of researcher has published a virtual environment for road safety education named ViSTREET [5] that focused on kids aged between 12-14 in a few aspects on pedestrian skills such detecting dangerous situations, gap timing and finding safe place in a virtual settings.

So, there are still loopholes in multimedia interactive application for road safety education for standard two students that emphasis on daily routines of students with Malaysian environment in terms of object representation (sample of vehicles, signage, attire etc). Therefore, an application named FIQIR Road Safety has been developed to fulfill the loopholes.

Besides that, there is no monitoring process of exercises in the textbook provided by the government. Most of students did not bother to do it at all. By using FIQIR Road Safety, students learn in a fun way and the activity provided encourages them to learn things related to road safety. Plus it is provided in animation that tries to mimicking the actual road environment in Malaysia with the character presented also wearing common school student in Malaysia.

#### **Please write any advantages of your innovation / product development / design / process towards education and community.**

FIQIR Road Safety can be easily installed in any type of PC to be accessed personally by any students throughout the world. It is based on the text book and can be run without dependence towards internet connection. It was developed using English so users also able to improve their English proficiency. It also applicable to be distributed among international students so the coverage of usage will be higher compared if the government only used the textbook. The cost of production also lower compared to printed books because it can be reuse every year after each of the batch completed. The most important thing, it is the first interactive application for road safety in Malaysia.

#### **Please add any commercial value in terms of marketability or profitability of your innovation / product development / design / process if any.**

FIQIR has been registered with MyIPO. It can be easily used by students, parents and teachers to cultivate safety road user among the school pupils. The attractive design of the interface plus the lower price of this product make it affordable for all. It also can be used by Jabatan Keselamatan Jalan Raya (JKJR) in their roadshow to improve public awareness towards road safety.

## Acknowledgement

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## Certified Digital Educator (CDE): Crafting the 21<sup>st</sup> Century Teaching Capabilities through the Byte-Sized Training Modules

**e-Learning Academy, Integrated Teaching and Life-long Learning Centre at Taylor's (INTELLECT)**

Taylor's University, Subang Jaya, Malaysia

[ela.helpdesk@taylors.edu.my](mailto:ela.helpdesk@taylors.edu.my)

**Highlights:** The Certified Digital Educator (CDE) program is developed with the aims of providing the academics with an on-going training that will lead to the e-Learning certification. Formulated as part of Continuous Professional Development program for academics at Taylor's University, CDE will provide opportunities for the academics to equip themselves with related e-Learning skills through the byte-sized training modules offered in addition to the blended learning face-to-face session. Upon completion of this program, the participants will be awarded the Certified Digital Educator certification that certify them as a competent e-Learning practitioner.

**Key words:** e-Learning Certification, Online Training, Byte Size Modules,

### Introduction

Recent technology advances have affected many aspects of our lives, including the way we teach. Teaching in the 21<sup>st</sup> Century is an altogether a different phenomenon, never before learning could be happening the way it is happening now; anywhere, anytime, accessible on multiple platforms and supporting any possible learning style or preference (Palmer, 2015). The big questions are, how do we prepare the academics to be the 21<sup>st</sup> Century Teacher and how do we certify that they have the required competency to teach in the technology-rich learning environment?

Acknowledging the importance of preparing the academics for the 21<sup>st</sup> Century teaching, e-Learning Academy (eLA) at Taylor's University has formulated the Certified Digital Educator (CDE) program with the following aims:

- To ensure that the participants have relevant skills and competency to design, develop and apply the technology in their class through a structured e-Learning training package.
- To certify the participants as competent e-Learning practitioners.
- Add value and provide direction to the training attended.
- Act as the mechanism to measure the application of the technology in the classroom.
- Increase the usage of the e-Learning facilities.

Benchmarked against the e-Learning certification worldwide, CDE will be a turning point to the academic training program conducted at Taylor's University as it will leverage on byte-sized training modules in providing a structured training program that will certify them for their competency in applying the technology in the classroom.

### Content

#### 1. Description of the innovation

The Certified Digital Educator is a competency certification program that will recognize and certify the participants as competent to design, develop and apply the technology effectively in their class. It consists of 2 parts; a) **the training modules** and b) **the certification**.

##### i) Training modules

The first part of CDE will focus on providing structured e-Learning related training to the academics, delivered via two (2) modes, byte-sized module and blended learning, which are divided into 4 e-Learning packages which will be :

- e-Learning Essentials – this package will introduce the academic to modules that cover the basic of e-Learning.
- Learning Design – this package will introduce the participants to technology-driven instructional materials and strategies for adult blended learning environment.
- Learning Platforms – this package will introduce the participants to the hands-on experience in creating learning activities at the common learning platforms used in the institution.

- d) Learning Engagement – this package will deal with learning activities that promote interactivity & student's engagement

Each of these learning packages will offer different related training modules in which the participants are able to pick and choose to make up the required training hours. The participants are also required to perform the allocated tasks and demonstrate their understanding of the modules.

**ii) Certification**

The participants will be evaluated at two different levels:

a) **Foundation Level (Pre-requisite for Practitioner Qualification)**

The participants will need to demonstrate that they have sufficient knowledge and understanding of e-Learning. At this level they are required to obtain the required points in order to complete the level.

b) **Practitioner Level (e-Learning Competency Certificate)**

At this level the participants should have demonstrated sufficient understanding in applying e-Learning in their teaching by submitting six (6) learning evidences of how the technology learned being applied in the classroom.

**2. Context of the innovation**

In our effort to support the academics, series of e-Learning related training sessions are made available through the yearly academics calendar. These sessions will form parts of the overall training modules offered to them, and as an academician, they will have a compulsory of 40 training hours that they need to complete every year. However, despite the increasing numbers of e-Learning related training sessions offered, the number of takes up among the academics varies, and the followings have been observed:

- a) Imbalance takes up for the e-Learning related training among the academics. The more technology-savvy will take up more sessions, whereas the non-technology savvy will just comply by attending the compulsory e-Learning session as they also have options of choosing the other non e-Learning related session to make up their compulsory 40 hours training. Some may not even meet the 40 hours training requirement as they find it difficult to find suitable time to attend the face-to-face training session as it clashes with their teaching timetable.
- b) There is also no clear direction of which the crucial training sessions are and which course to choose from. Most academics will choose the training based on their preferences and liking and there is no clear guidance as to which training modules are crucial for them. Some will just attend the training to make up the training hours as there is no follow up or mechanism to measure the effectiveness of the training and how it has been applied by the academic in the classroom.

Certified Digital Educator program has been introduced with the aims to address the issues mentioned above. It will provide a structured training path for all academics no matter what their technology levels are. It is offered through 4 different e-Learning packages which signify the 4 crucial elements in e-Learning. It will guide the academics on what are the crucial elements need to be covered while giving them the flexibility of choosing from the number of training modules offered within each of the learning packages. It will also be delivered via byte-sized self-directed modules and will be conducted fully online, so this will enable the academics to go through the training modules at their own time.

To ensure that the academics are fully engaged in their learning activity, the byte-sized modules have been developed according to 7 different components:

a. **Introduction**

– To introduce the facilitator and to welcome the participants to the module.

b. **Module Objectives and Learning Checklists**

– To set the participants for the learning objectives as well as to communicate what is expected from them in the module.

c. **Module Overview**

– To introduce the participants to the module.

d. **Learning Content**

- The part where the participants will explore the topics which consist of various learning activities.

e. **Discussion Lounge**

– A place where the participants are able to ask questions related to the training modules and discuss with other participants

- f. **Submission Lounge**
    - a place for the participants to submit their work.
  - g. **Learner's Evaluation Survey**
    - to get feedback from the participants, for future improvements.
- 3. Why are they important to education?**
- The Certified Digital Educator is important as it makes avenue and set direction for the training modules to be acknowledged and certified. To the academics, this certification program will provide a clearer direction of their training; i.e which module to take. It will also provide recognition to the academics, and will differentiate between the certified and non-certified educators. To the institution, CDE will provide a mechanism to measure the competency of the academics in utilizing technology in the classroom as well as the effectiveness of the e-Learning related project implementation. It will indirectly provide an indication of e-Learning facilities utilization. This will help the organization in their future planning.
- 4. Commercial Value**
- Being the first certification program of its kind in Malaysia, we are confident that CDE will have great potential to be marketable to the other higher institutions, and to be offered as part of their institutional professional development program. The structure of the training program is flexible enough for it to be adapted to any organization despite whichever platform being used will enable it to be marketed individually as well as the full certified package.

## Acknowledgement

We are grateful for the support rendered by Taylor's University Management for their direction and unconditional support and the e-Learning Academy colleagues who have been the crucial part in making this Certified Digital Educator program and the byte size self-directed modules a reality.

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## **USIM OER (Open Educational Resources)**

**Dr. Najwa Hayaati Mohd Alwi, Dr. Nurhamimi Zainuddin, Mohamad Faiz Taip, Mohd Faizal Bin Mohd Fuad, Nurhuda Ruzlan**

Universiti Sains Islam Malaysia (USIM), Bandar Baru Nilai, Malaysia  
najwa@usim.edu.my

**Highlights:** Open Educational Resources (OER ) is an educational materials that being set in the public domain or introduced with an open license .USIM OER is the integration of Naqli and Aqli not only in the academic programmes , but also widely practised throughout the university . USIM OER is a collection of resources with integration of Naqli & Aqli. As a part of the preparation for digital content , the implementation of Open Educational Resources (OER ) is increasing , hence USIM OER provide the holistic resources in many domains , where these collections is open and free to be access by the public . These collections captures / captured the discussion of / about / on any area of studies highlighting the Tauhidiq concept (Allah is 1). These trends provide educators the opportunity to fully utilize digital instructional materials to improve teaching and learning

**Key words:** OER, Naqli & Aqli, High Quality Materials, Free Access, Open Access, Human Progress, Islamic Content, Holistic

### **Introduction**

Universiti Sains Islam Malaysia (USIM) is fostering academic excellence among ummah in contributing to human progress, nation building and the advancement of the world. With the idea of Islamic studies as the foundation for all academic programmes, U.S.I.M committed being the leading centre of Islamic studies that utilizes advanced approaches and ICT to explore issues for the well-being and harmony of society and Islam. By following this approach, U.S.I.M can provide solid platform in developing a holistic individual, which lead to the growth of a balance nation and will play an important role in the world advancement. USIM Open Educational Resources is a collection of educational material used in our formal campus courses, and seeks to provide people around the world with an opportunity to access high quality learning opportunities. USIM OER has started since 2011 and the number of resources increasing by year.

### **Content**

1. There for an action taken to gather / collect learning materials that have been integrated with Naqli and Aqli knowledge. USIM as one of Malaysian public universities has determined to be a university that is ahead in both disciplines the revelation knowledge (the Naqli knowledge) and rational science (Aqli knowledge) with philosophy –pioneering Islamic science and spearheading knowledge.
2. Our aim to produce high quality learning materials that are free and open that can be used for research, teaching and learning, and the objective is to share knowledge with local and international community which at the same time, positioning USIM in the world, transforming USIM as a global education provider and as a platform to serve the Ummah. There are 9 categories such as : Information Technology, Fiqh of Medicine, Fiqh of Food, Fatwa & Kedudukannya di Malaysia, Islamic Science : Theory & Practise, Friday Sermons, Fiqh of Women, USIM e-Learning Colloquium & Triz : A Systematic Innovation Tool.
3. OER allow make every student has access to course materials, with cost taken out of the equation. More important it provides affordable material to students, allow faculty to enhance their work and provides faculty with content for classes. Its also help the student to grants access to more quality choices of materials
4. Advantages for using OER include, fosters pedagogical innovation and relevance that avoids teaching from the textbook, broadens use of alternatives to textbooks while maintaining instructional quality and lower costs of course material for students.
5. Development process for USIM OER materials requires cooperation from all parties, especially involving the technical part and the subject matter expertise (SME) itself. The development consist of three phases :

1. <b>Phase 1:</b> Preparation of recording and collecting existing material.
2. <b>Phase 2:</b> Video recording development. Four video targeted to be record each month
3. <b>Phase 3:</b> Post editing (video, audio, content, graphic, etc)

Table 1 : Development phases

## Media Production Methods

Each of the materials developed using different models. Table 2 provides an overview of different models for the media production.

Type	Description
Intensive Studio Production Model	Authors work with a video director/producer for filming; studio post production team created animations, graphics, and other dynamic postproduction effects.
Hybrid Instructor / Studio Produced Model	Studio films "head shot" introduction and conclusion per lecture; used desktop model to record lecture material segments, which are voice-over screen captures of a programming environment. Instructor does editing and postproduction, including annotations.
Light Studio Production Model	Instructor filmed lectures in front of a green screen, slides captured through tablet. Slide and instructor will be checked in post-production. No graphics or animations; post-production editing is minimal.
Instructor Produced Model	Instructor and course teams produced all video content using desktop equipment (external HD webcam, tablet for slide annotation, lighting and sound equipment). Instructor and course team did all pre- and post-production for the videos using screen capture software (e.g. Camtasia, Screencast-O-Matic and Jing)

Table 2 : Different models for media production

Validating each edited OER will be extend to the coordinator for the purpose of review before publish (upload) in USIM OER website and iTUNES U website. The OER could be delivered by Malay, English or Arabic language depending on the SME.



Fig. 1. USIM Open Educational Resources (OER) website



Fig. 2. USIM iTUNES university page

USIM OER material will be labeled as a Creative Commons Attribution – NonCommercial – ShareAlike 4.0 International (<https://creativecommons.org/licenses/by-nc-sa/4.0/>) as one of the measures to avoid distortion of the material.

## Acknowledgement

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## Interactive Mobile Augmented Reality Applications for the Architectural Buildings and Wildlife in Malaysia

**Tan Tse Guan, Hanisa Binti Hassan, Anuar Bin Mohd Yusof, Mohammad Dzulsyafiq Bin Mohammad Yusof, Mohammad Syukran Bin Kamal Ruzzaman<sup>4</sup>**

Faculty of Creative Technology and Heritage, Universiti Malaysia Kelantan, Bachok, Kelantan, Malaysia  
[tan.tg@umk.edu.my](mailto:tan.tg@umk.edu.my), [hanisa@umk.edu.my](mailto:hanisa@umk.edu.my), [anuarmy@umk.edu.my](mailto:anuarmy@umk.edu.my), [dzulsyafiq@umk.edu.my](mailto:dzulsyafiq@umk.edu.my), [syukran@umk.edu.my](mailto:syukran@umk.edu.my)

**Highlights:** The main objective of this project is to produce the Augmented Reality (AR) books for introducing the architectural buildings and wildlife in Malaysia. In the project, each object was created by using Three-Dimensional (3D) modeling software such as Blender or other 3D software. After that, to build the AR applications by Unity3D and Vuforia for generating the AR markers and attached in the books. The main outcome from this project is the produce the AR books by using cutting edge technologies. In addition, the significance of output from this project is to enhance the reading and learning experiences of public, especially for the young generation.

**Key words:** Mobile Augmented Reality, Mosques, Three-Dimensional Modelling, Wildlife

### Introduction

Recent developments in Augmented Reality (AR) have heightened the need for education, entertainment, medical, engineering, military and others. There are various AR applications that exist nowadays that can help improve the learning and teaching experience. In this project, the AR will use to enhance the learning experience and helps readers to study Malaysia's buildings and wildlife in a more effective and comprehensive way than ever before such as printed books. It aims to design and build AR applications for 3D architectural visualization of the mosques and wildlife in Malaysia. Through this technology, several mosques in Kelantan state and wildlife in Malaysia will be transformed into Three-Dimensional (3D), then embed into markers and published in the printed books. Users can view the virtual objects in the real world through their devices such as smartphone. It will increase the understanding of people towards mosques in Kelantan state and the wildlife in Malaysia.

### Content

#### 1. Methodology

Stage 1: Requirements analysis - In this stage, the scope of the AR books were defined and a set of requirements was derived. Several surveys were conducted on the architectural buildings and wildlife in Malaysia by interview, reference books, online resources and observations. The 3D and AR software were determined.

Stage 2: Design - The AR books were designed to meet the requirements specified as the result of the previous phase. The output of this phase will be a blueprint that was used by AR book respectively and to implement the hardware and software components for the books. In this stage, the layout and content of the AR books were designed. Furthermore, the objects were sketched.

Stage 3: Implementation - In this phase the AR books were actually built. The hardware and software were installed, and data was written into the books. The objects were created by using 3D software and then the objects were imported into AR software as shown in Figure 1. Finally, the generated AR markers were attached in the books.

Stage 4: Testing - Once the AR books were fully completed, they should be thoroughly tested to ensure that all of the specified requirements have been met. The books were tested by using the smartphone or tablet to ensure the all objects were correct and functional.

Stage 5: Maintenance - Elements in the AR books will need to be replaced or upgraded, and the need for additional functionality. The books were reviewed and updated from time to time.

#### 2. Project Background

The effectiveness of using printed book for study purpose is relatively weak if compared to AR book. The transformation from ordinary paper book, to online e-book, then to AR book, has enhanced the creativity and effectiveness of the learning process. This application is used to introduce Malaysia's buildings and wildlife with added interactive digital elements to improve the traditional learning experience. Therefore, users are able to explore the virtual objects more comprehensively through this method. This study will help users to have a better understanding about the effectiveness of AR book.

**3. The Importance of AR in Education**

Nowadays, AR technology is widely utilized in the field of education. It opens a novel realm for people to learn and teach in an innovative way. The AR books allow user to view the virtual objects in real world and to interact with the content by using smartphone or tablet devices (Dias, 2009). AR has changed the way people learns. It contributes in higher effectiveness of pedagogical and educational achievements.

**4. The Advantages of Project**

The first advantage is to introduce the architectural buildings and wildlife in Malaysia by using AR technology. The second one is to promote the architectures and wildlife to the public especially young generation. Also, to increase the reading interest. Additionally, to integrate the heritage knowledge with the cutting-edge mobile technologies.

**5. Commercialization**

It will commercialize the outcomes of project conducted in AR books, AR postcards, AR flashcards or related products.



Figure 1: The AR Applications

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## Malaysian Architectural Heritage iBook-An Innovation Tool for Teaching and Learning

**Mhd Hafiz Karami Bin Mhd Zain**

Universiti Malaysia Kelantan(UMK), Bachok, Kelantan

[hafiz.k@umk.edu.my](mailto:hafiz.k@umk.edu.my)

**Highlights:** Utilizing technology in teaching nowadays is a must because of the trend of gadget fever by the current student in their daily life. Development of digital content in teaching and learning using iBook will be enhancing the effectiveness of teaching and learning in the university. By integrating the dynamic instructional design and technological pedagogical content, it will be resulting an iBook which is relevant, interactive and catchy.

**Key words:** iBook, Digital Content Development, Dynamic Instructional Design, Interactive Teaching and Learning, Technological Pedagogical Content.

### Introduction

iBooks is an interactive e-book build by instructors or lecturer using iBooks Author for their students to enhance learning experience by utilizing flipped learning and personalize learning. The interactive widgets in iBooks which can be customized by users is the uniqueness of this Apple application. Using iBook with the iPad is the most suitable way to make it interactive and touchable. According to a research about wireless writing project using iBook for grades 6 and 7 students writing assignment conducted by Dr. Sharon Jeroski, researcher of Horizon Research & Evaluation in collaboration with Apple Canada found that iBook improved 22% of student writing achievement and teacher, parent and student are all extremely enthusiastic about the use of iBooks and their impact on student achievement, motivation, and attitude.

The iBook is one of the best material for teaching and learning nowadays because of the nature of the student which are most of their time using the electronic gadget such as tablet and mobile phone. A research about how long can students pay attention in class mentioned; "Contrary to common belief [references to this belief are cited], the data in this study suggest that students do not pay attention continuously for 10-20 minutes during a lecture. Instead, their attention alternates between being engaged and nonengaged in ever-shortening cycles throughout the lecture segment" (Bunce, D.M., Flens, E.A., and Neiles, K.Y.,2010). Therefore, teacher should use various method to engage student to their teaching by using a variety of instructional approaches including iBooks.

Creating an interactive iBook should involve designing suitable widget and material or content in order to make them relevant and engaging. So the teacher or lecturer must know the suitable approach for their target user and these need the integration between technological pedagogical content and dynamic instructional design.

### Content

#### 1. Description of the process and product development

The Malaysian Architectural Heritage iBook created as the continuity of UMK Digital Content Development Workshop last year. The participant following the instruction via iTunes U created by instructor Wei Sen Lai from Universiti Teknikal Malaysia, Melaka. This iBook is not yet being used by UMK student but it is predicted to help student engagement and achievement for Architecture & Heritage course. The process involve in the making of this iBook is shown in the figure 1.



Figure 1: Development Process or Malaysian Architectural Heritage eBook

This process follows Dynamic Instructional Design Model (Level et al, 2011) which include following phases which are:

- a) Analyze the **learner characteristics**, task to be learned, etc. – In this phase, instructor must identify their learner about:-
  - i. Study Behavior - student will use the eBook to study alone with or without instructor. In this case the eBook was designed for both with and without instructor.
  - ii. Background of the student - their origin from science or art. In this case, targeted student are more to art background
  - iii. Subject Background – In this case, architectural heritage more to historical and characteristic of architectural heritage in Malaysia. So the eBook designed by having a lot of picture, video and diagrams of spaces and its functions.
- b) Design **learning objectives**, choose an **instructional approach**. The learning outcome of this eBook is by completing this eBook, student will be able to identify the characteristic of the architecture and heritage in Malaysia such as Malay Architecture, Chinese Architecture and Colonial Architecture.
- c) **Develop** instructional or eBook **materials**. This include:
  - i. Digital storyboard for contents, media and activities. It is important to plan the contents of eBook to make it relevant, simple and well integrated among contents, media and activities.
  - ii. Choose the best **template** for overall eBook and start writing. For this eBook, Photo Book template has been chosen because it is suitable for showing the pictures of architecture of heritage building.
  - iii. Choose the right **widget** for interactivity to extend into deep level of knowledge understanding. For this eBook, the widgets were being used such as follow:
    - **Gallery** – Slide-able picture gallery being used to show the pictures of spaces, elements and overall heritage building.
    - **Media** – Contains introduction video of the book and video of the heritage building for student to get the real picture of the heritage building
    - **Review** – This review or short quiz have been inserted in every chapter to make sure the student can recall of what have they read. The review has been designed in various forms such as multiple choices, match etc.
    - **Interactive Image** – This feature designed to show the element and spaces of heritage building, integrated with diagrams, building plan and building perspectives. It was also being used to show the location of the house in the Malaysian map according to each state.
    - **Scrolling Sidebar** – This feature helps to explain more information in a diagram.
    - **Pop-Over** – An information pop-over being used for show the information in particular point such as space in a picture, diagram, plan and etc.
- d) **Implement** and **deliver** or distribute the instructional materials – For eBook, it is meant to publish it in eBooks Store which can be download by user from 51 countries. It then can also be used in iTunes U for blended Classroom.
- e) **Evaluate** to make sure the material achieved the desired goals. This will be the future action after first batch of student using it.

## 2. Why are they important to education?

According to Burt Lo and Joe Wood about 7 Reasons to Learn Apple eBooks Author Now in thejournal.com, they identified seven reasons why people especially lecturer should consider adding eBooks Author to their knowledge base:-

- a) **Curate learning** - eBooks Author provides a powerful tool for teachers to use when curating instructional materials. Unlike many web-based resources, these materials can be organized into a book-like format while still incorporating interactive features, such as hyperlinks, video clips, presentations, 3-D objects, and photo galleries. eBooks Author is designed to make quick use of materials you already have, including text documents, spreadsheets, and presentations.
- b) **Publish easily** - eBooks Author gives teachers and students a free and accessible tool for creating digital texts. In addition, schools and districts have expressed a great deal of interest in publishing their own materials for staff for both professional development and information updates.
- c) **Share for free** - Free and fee-based books can be shared directly with the world through the eBookstore

- d) **Create interactive objects.** - iBooks Author provides a variety of interactive objects authors can embed into their digital texts. This allows books to become truly multimodal, providing content to readers in multiple formats.
- e) **Transition simply** - it can be slide smoothly via ipad and make learning more engaging and portable.
- f) **Update quickly** - Whether you choose to share files locally or through the iBookstore, e-books created with iBooks Author can be easily updated and made available for your readers through a quick download.
- g) **Learn anytime,anywhere** - Since books published with iBooks Author are self-contained files, teachers can develop resources that can be accessed anytime and from anywhere. Interactive graphics and videos are built right into the document and do not require an internet connection to operate. Additionally, as students read through the text they can highlight key sections, add notes, and create flashcards that will stay on their iPad, available for use with or without an internet connection.

In this case, this iBooks will become and helpful material to support in and outside class learning especially for Malaysian Architectural Heritage course. It can be class material not only for UMK student, but also for all student in Malaysia.

### 3. Advantages of innovation towards education and community.

This iBooks can be publish in iBooks store and can be viewed by 51 countries all over the world. It is not only promoting our diverse Malaysian architectural heritage for Malaysian people, moreover promoting it to the world. Therefore, indirectly this iBooks will enhancing Malaysia tourism and economy as well.

### 4. Commercial value in terms of marketability

In iBooks store, the iBooks developers can sell their iBooks base on agreement with Apple on the price in worldwide. So it already easy to sell and because of this iBooks have unique value of Malaysian Architectural Heritage, it can be sold in reasonable price for extended version. But because this product is for educational purpose, it is free for everyone to purchase it.

## Acknowledgement

I am very thankful for UMK Centre of Learning and Teaching especially Associate Professor Dr. Suria Binti Baba for giving me the opportunity to develop this iBooks through workshops and a lot of support from her staff. I also want to give my attitude to my iBooks mentor, Mr. Wei Sen Loi and Dr. Nurulfajar Abd Manap form Universiti Teknikal Malaysia Melaka for guiding me for making my own iBooks.

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## **Physic is Fun : Video Based Learning Embedded with Persuasive Theory for learning Physics**

**Radhiah Ab Rahim, Norah Md Noor\*, Nurul 'Izzati Hamizan**

Universiti Teknologi Malaysia, Johor Bahru, Johor , Malaysia

\* norah@utm.my

**Highlights:** In line with current technological developments of web 2.0, digital video material of varying quality and content can now be freely available to students and educators. Research shows that suitable theory embedded within the video developed might have a positive influence to the user. A video with an entertaining element might be able to encourage learners to be motivated and interested to learn physics. This video based learning has been developed with a Persuasive theory that able to attract students to watch the video from beginning until the end. The persuasive theory embedded in the video integrate five factors which are sourced facts, receiver factors, channel factors, message factors and situational factors. The developed video has been proved to be able to enhance student's interest towards Physics subject.

**Key words:** edutainment, video based learning, Physic, Persuasive theory

### **Introduction**

Results from the Trends in Mathematics and Science Study (TIMSS) report had shown that Malaysia's Science score fall below the international mean. 20% of students in Malaysia does not reach the minimum level for Science in 2007. The TIMSS data analysis gives details about system performance in mathematics and science education. TIMSS assesses students' proficiency in the three different types of cognitive skills of remembering the knowledge, apply knowledge in problem solving and reasoning abilities in solving problems. Results showed that Malaysian's students understand the basic concepts of science, but they cannot apply this knowledge to the real problem or common situation.

One of the reasons for student's lack of interest and motivation towards learning science subject is because they claim that it is a difficult subject; especially physics. Student motivation is an important thing because it is the students' own desire to achieve success in their respective fields. Students agree that teaching strategy can influence their motivation in learning. Therefore, instructional teaching strategies must base on a concept that can stimulate students' motivation (Fischer & Horstendahl, 1997).

### **Description of the product**

The purpose of this project is to develop the educational and entertaining (edutainment) video entitled: Scalar and Vector Quantity based on Persuasive Theory in order to help students change their perception toward learning physics. Instructional design model used for this video development is ADDIE Model. The persuasive theory embedded in the video integrate five factors that are sourced facts, receiver factors, channel factors, message factors and situational factors. Source factor is all about presenter credibility and attractiveness. Receiver factor is classifying the user characteristic. Channel factor used to deliver the content is video. Situational factors is how to minimize distraction and maximize the quality of the video. The persuasive theory was selected because it can give natural implication towards changes of minds or attitude toward (Moyer-Gusé & Moyer-Guse, 2008).



Figure 1: Presenter in the video attractively explained the topic.

The video developed was tested by experts to confirm the validity of the content. They were also asked to evaluate the video developed regarding the appropriateness of the Persuasive Theory applied within the video and their perception towards the video using evaluation forms. Data collected is used to improve the video quality and content. The modified version of the video was tested by 6 students from Form 3 to identify whether the video had a positive influence on their interest in physics. Results show that most of the students agree that it can stimulate their interest in taking physics subjects (Norah & Radhiah, 2013).



Figure 2 : Two children give encouragement on learning Physics

Video that developed by using persuasive theory are perfectly motivated to persuade students to get interested in the physics subject. Other than that, it increased students' motivation to study deeply about physics. As a result, students' performance in physics will be better.

### **Advantages of the product**

The video developed support the government initiatives to encourage teachers to use blended learning strategies (Shift 9, Malaysian education Blueprint 2015 - 2025 (Higher Education)). The video developed had won second place in the Video Edutainment 2016 Competition held by Universiti Teknologi Malaysia. The persuasive theory embedded provide an entertaining elements (Yoo & Tian, 2011) that promotes positive attitudes among students in learning physics. A similar strategy can be used by other teachers in developing their own video based learning.

### **Conclusion**

This video for learning Scalar Vector and Quantities embedded with persuasive theory does attract student to watch the video from beginning until the end. This is based on encouraging response by all the respondents after using the video. The finding showed that video is very helpful and they will use the video again when they take Physics in Form 4. Many secondary school students are not interested in taking physics because it is a boring subject, but all respondents either neutral or positive to further their study in science stream which necessary to learn physics after viewing this video (Norah & Radhiah, 2013). Hopefully, more video like this will be developed which can help to encourage students to love Physics.

## Acknowledgement

The authors are deeply indebted and would like to express our gratitude to the Universiti Teknologi Malaysia Student to Student Edutainment Club and UTM GUP Grant Vot R.J130000.7331.4J159 for supporting this product innovation development.

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## Engagement with Physics Laboratory Work – Better by iBook

**Asanah Radhi**

Universiti Malaysia Kelantan, Kelantan, Malaysia  
asanah@umk.edu.my

**Highlights:** Laboratory work is an essential component in most of the science courses. In physics class, lab is central. It is in the laboratory Physics students learn to practices the activities of scientist – develop critical thinking and skills. Students are required to performing procedures, collecting data, analyzing data as well as summarize the findings. However, unlike Biology class where student could see the practical reasons, students often found Laboratory Physics is not fun and hard to relate to everyday life. This becomes more boring and not fascinating when it comes to the Physics laboratory handbook. The traditional laboratory handbook always comes with a lengthy procedure which dominates the landscape.

**Key words:** Laboratory work, engagement, video, interactive methodology, active viewing.

### Introduction

Engagement with Physics Laboratory Work – Better by iBook are designed to help teacher/lecturer/laboratory demonstrator to improve their teaching and instruction during the laboratory work session. This iBook integrated text, pictures and interactive video in one landscape. This iBook embedded video directly into the book. So after reading the text, student can have additional view on performing the procedure. This iBook is not only helping teachers to demonstrate procedures but also assist students in mastery learning since they can view the procedure as many times as they need to. Furthermore, the video can be used to promote 'active viewing' approaches with students. Other videos that relates the physics theory with real phenomenon in everyday life is added to enhance student understanding. This iBook is suitable to be used at various level of education including university level.

### Content

#### Description of your innovation.

This iBook is design to replace the traditional laboratory handbook that always comes with a lengthy procedure. This iBook integrated text, pictures and interactive video in one landscape. This iBook embedded video directly into the book.

#### Important to education

Engagement of student with laboratory work is essentials as students are expected to acquire critical thinking and skill. This iBook is not only helping teachers to demonstrate procedures but also assist students in mastery learning since they can view the procedure as many times as they need to.

#### Please write any advantages of your innovation

This iBook is not only helping teachers to demonstrate procedures but also assist students in mastery learning since they can view the procedure as many times as they need to. Furthermore, the video can be used to promote 'active viewing' approaches with students.

#### Marketability or profitability of innovation

This iBook is suitable to be used at various level of education including high school, pre-university and university level. Pre-laboratory videos are valuable asset in the classrooms as it can improve laboratory techniques. In order to get full student involvement, educators can ask student to provide video reports as an assessment.

### Acknowledgement

I would like to thank students from Material Technology Program, Nurul Zawani Zainal Abidin, Nurnazhatul Azwina Dolah, Wan Nur Hidayah Wan Hassan and Atikah Ab Ghani for the contribution of the videos.

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## **Reporting, Scaling and Scoring Student Holistic Performance, Enhancement System**

**Suria Binti Baba, Rozidaini Mohd Ghazi, Mohd Nazree Abu Bakar, Mohd Ihsan Bazli Abdullah**

University of Malaysia Kelantan, Kota Bharu Kelantan, Malaysia

[suria@umk.edu.my](mailto:suria@umk.edu.my), rozidaini@umk.edu.my, nazree@umk.edu.my, ihsan@umk.edu.my

**Highlights:** ICGPA serves to drive the practices of constructive alignment in ensuring quality curriculum design, delivery and assessment at the course level and the programme level.

**Key words:** spider web, CLO, PLO, Constructive Alignment, ICGPA, CPA, CGPA

### **Introduction**

A system or mechanism for assessing and reporting learner's integrated development and learning gains of their ethic and values (ABAD), their declarative and functional knowledge and their disciplinary skills and technical abilities. The reporting illustrates attainment of attributes outlined in the six student aspirations stipulated the MEB (HE) as well as the eight domains of learning outcomes listed in the Malaysian Qualifications Framework. Hence, ICGPA reports the learner's holistic performance and their program learning outcome achievement throughout their study period.

### **Content**

#### 1. Description of the process.

The delivery methods used during teaching and learning processes must be aligned to the CLOs that need to be attained. The Teaching methods during lecture sessions must meet the set of CLOs. The CLOs attainments should be measured using assessment tasks that are suitable to the CLOs. To materialize the PLO mapping, each CLO is set with an appropriate measurement and assessment weightage. These information is summarized in a course assessment plan as shown in this step.



## 2. The context or background of the process

To measure the CLO attainment, each assessment component must be measured using rubrics that are appropriate to the targeted taxonomy domain and level of rubrics and scores for students' achievement. The scores for each assessment component will be used to calculate the grades for each CLO and the overall course grades. The grade point for each CLO is summed-up according to the weightage-credit of the course and the alignment of the course to the PLO and then the attainment of each PLO obtained through the course assessment is projected in a spider web. The spider web is to visually demonstrate the GPA achievement in the current semester and the overall CGPA.

## 3. Important to education

This is in line with the objective of the National Education Philosophy that focuses on the efforts to produce holistic graduates who are spiritually, physically, intellectually and emotionally balanced and also to produce holistic, entrepreneurial and balanced graduates in line of Shift 1 of the MEB (HE) 2015-2025.

## 4. Advantages of process towards education and community.

Through this spider web, students will be aware of their achievement levels based on the PLOs that embed all three learning domains (cognitive, psychomotor and effective) and not just a CGPA that represent the primarily cognitive learning domain. In these situations, at any semester student, who obtained a GPA or CGPA below the minimum level for any PLO, will be able to intervene and enhance those PLOs before they graduate.

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## **Accelerating Pedagogical Hierarchy Model In Context With Student Centred Learning Using Animation**

**Suria Binti Baba, Muhammad Al-Amin Bin Mohd Fadeli, Syafiqah Filza Binti Ismail**

University of Malaysia Kelantan, Kota Bharu Kelantan, Malaysia

[suria@umk.edu.my](mailto:suria@umk.edu.my), alamin.maher@gmail.com, fieqa\_fielza@yahoo.com

**Highlights:** Pedagogical Hierarchy Model have six stages where we are focusing on the techniques which covers few examples here such as case study, brainstorming, case analysis and ecetera. This involve few authoring tools like Sparkol, Powtoon, GoAnimate, Animaker and ecetera as a medium of interaction. This may help to populate an interest and an engagement in increasing participation that will help to lead into a well-articulated student centredness. From this kind of medium of interaction will draw students attention towards a fun, active and creative classroom and importantly serve to contextual environments. Hence, with proper teaching and learning design, educators able to embed and infuse brain based learning theory principles to create an engaging and lively classroom.

**Key words:** Pedagogical Hierarchy Model, Student Centred Learning, Brain-based Learning, Theory, Animation Tools.

### **Introduction**

Pedagogical Hierarchy Model has six stages (Theory, Approach, Method, Strategy, Technique, and Procedure). We want to share some of how we adapt a student centred learning been articulate and we are focusing on proper techniques and strategy used in teaching and learning. There are various techniques that can be propose example case study, brainstorming, case analysis, demonstration ecetera. The task given should focus within and between different techniques as in Pedagogical Hierarchy Model.

Brain Based Learning theory principles' align with the chosen techniques specifically on the structure and the function of the brain which is divided into three parts (Orchestrated Immersion, Active Process and Relaxed Alertness) (Caine and Caine 1998). These will help to activate brain based approach.

The objectives of this project are:

1. To enhance student centred learning
2. Enhancing SCL underpinned by pedagogical hierarchy component model and brain based learning theory.

Teaching and learning pedagogical model comprises; techniques approach methods strategy teaching and procedure. Hence, to understand this pedagogical hierarchy will able us to improve teaching and learning towards student centred learning (SCL).

### **Content**

#### **Description of the process.**

In our project we involve in using animation application which is PowToon, Sparkol, Animaker and Goanimate.



A software for creating animated presentations and animated explainer videos. Create world's most minimalist, user friendly and intuitive presentation software that allows someone with no technical or design skills to create engaging classroom.



A whiteboard animation or video scribing software that allows you to do whiteboard animation or stop motion easily. It also can use for attracting student learning.

A simple DIY video making app to create amazing personal animated video for presentation on task given as an assignment. A cloud-based animated video creation platform. It is designed to allow people with no background in animation to quickly and easily create animated videos. Generally, all these applications are using to create animation where we can pick any character and create background effects with stunning design base on what to deliver.

**The context or background of the process**

Background process - we use case study, case analysis, project based-learning and demonstration as the techniques on how student centered learners take plays according to the pedagogical component model.

- 1) Case study - An account of an activity, event or problem that contains a real or hypothetical situation and includes the complexities that would encounter in the workplace. Case studies are used to help to see how the complexities of real life influence decisions.
- 2) Case analysis - Can analyze the management problem and make a recommendation for solving that problem. By applying concepts to actual cases, it can improve ability to think analytically when identifying problems and creating solutions.
- 3) Project based learning - a model that organizes learning around projects with complex tasks, based on challenging questions or problems, which involve students in design, problem-solving, decision making, or investigative activities. It also may give students the opportunity to work relatively autonomously over extended periods of time and culminate in realistic products or presentations.
- 4) Demonstrations of learning are typically designed to encourage students to think critically, solve challenging problems, and develop important skills and work habits such as written and oral communication, public speaking, research, teamwork, planning, self-sufficiency, goal setting, or technological and online literacy.

In conclusion, we used all these techniques to deliver information regarding Malaysian Airlines, illegal immigrant, obesity, Agro Park and veterinary using few altering tools and process that has been mention before.

**Important to education**

1. Interesting to learn

By using the kind of animation software, the students will get interesting into their learning. This is because the animations are one of the attractive way to cultivate the learning.

2. New way to learn

Animation can replace the traditional learning method such as by using papers or power point to present. They can choose a lots of unique characters to make a creative movie or presentation.

3. Help to understand and remember

Animations can help the students to learn and get the faster information. They are also a smart tool to help the teachers when it comes to explain the difficult subject or concept.

4. Utilizing brain based learning theory in context with SCL

To make the animation, we should have a creative idea to create the animation because all the information can understand to the students.

**Advantages of process towards education**

1. Fun and easy to understand

Animations can help people to get the simple information with the interactive way and fun. We can create the animation such as demonstration, forum, public speaking and many more.

2. Full utilization of the technology.

Nowadays, technology is using in all sector including the education sector. We need to use the technology because it is the fastest way to give or get the information.

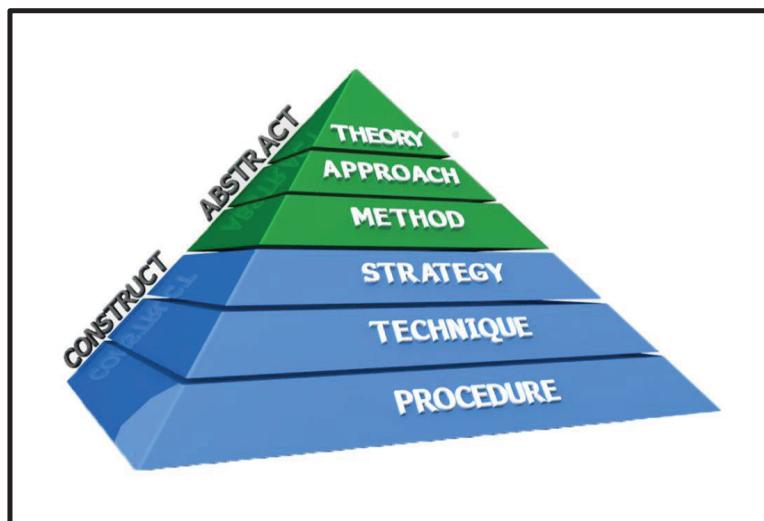


Figure 1: Pedagogical Hierarchy Model

### Acknowledgement

First of all, we feel appreciate and thanks to our lectures who spend their time to guide us and give their advices and opinion on this project. All the notes and guidelines are given by them also useful tool for us to finish this project. Next, we would like to thank to University of Malaysia Kelantan which provided change for us to build the platform for idea creative. Besides, a big appreciate to our parents and other friends to their cooperation, encouragement, constructive suggestion and full of support.

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## Edutainment Apps For Learning History Topic : VISTORY

**Liyana Abdul Ghafar, Nashasha Nabila Sulaiman, Nurul Faizah Rozali, Ahmad Fathur Rahman Hasmiy,  
Norah Md Noor\***

Universiti Teknologi Malaysia, Johor Bahru, Johor , Malaysia

\* norah@utm.my

**Highlights:** VISTORY is an educational tool that is specifically designed for learning Malaysia's history among Form 4 students in Malaysia. This product was developed for Edutainment Competition that was organized by UTM. The unique features of VISTORY include pedagogical agent called Ariff, that will guide student throughout the journey of learning Malaysia's history and historical timelines which will help student prefigure of what will happen and understand the chain of events. This product can enhance students' motivation and interest towards History subject. VISTORY is a market-ready product with a copyright and looking forward to be commercialized.

**Key words:** edutainment, mobile apps, learning history

### Introduction

History is one of the compulsory subject for SPM examination. Sadly, there are still a lot of student could not perform well in it. Based on investigation done by (Nor Azan, Azizah, Wong Seng Yue, 2009), the two main problem faced by students in learning history are difficulties in remembering historical facts and basically they are not interested in learning history subject.

Traditional teaching methods where teacher talked all the time, while student didn't do anything is not relevant anymore. Some students even doze off during lessons. Forcing too many facts to be memorized on students would kill their analytical, critical, and reflective thinking skills where these skills are the main elements in learning history (Khairunnisa 2013). Recently, a Paper 3 for history subject was introduced to be included in the SPM. History Paper 3 is an open book examination where students' reflective and analytical thinking skills are tested. Things could be worrisome if we don't do anything in reviving the love for learning and analyzing history into students. Therefore, teachers need to find another way to ensure their students' engagement during the learning process.

These younger generations are mostly surrounded with technology and mobile devices. (Rashidah, Parilah, Rosseni, & Juhaida, 2011). Students are now more attached to gadgets like cell phones and computers. (Jamaludin & Sidek, 2005) expressed that student learn best through visual description because it can help students acquire the five types of things: the procedures, concepts, facts, processes, and principles. This illustrates that the visual can provide a variety of information that only require observation from students. Information is more easily explained by visual than reading, understanding, and portraying a text himself.

Presently, technology is heavily used in education as teaching aid, mainly in STEM subjects. Following this current trend, there are a lot of suggestions and encouragements on integration of technology and multimedia in history learning and teaching in order to increase students' engagement. However, there is still lack of multimedia courseware development especially the one that tailored according to Malaysian history syllabus for Malaysian students.

### Description of Innovation

We have try to apply the concepts of time-travelling history student who go back in time to watch history in the making. All character and environment were design to mimics the actual phenomena to give student more sensation in understanding the story. The character named Arif act as pedagogical agent, to guide student throughout the journey of learning Malaysia's history. Time machine gives user the sense of time-traveller who goes back in time to watch history in the making. Interaction involve where user are allow to enter their own name. Chapter's title and subtopic's title display in full sentences to avoid any confusion with the textbook version. User could go back to either chapter selection page or main menu.

Before commences the adventure, subtopic selection page provide user timeline to convey the story chronologically. Historical timelines will help student understand the chain of events. Along the way of choosing which subtopic by clicking on the year button, student will learn about the important people in that year. Selected year button will be highlighted and preview on who is the influential character are given as prefigure of the events. A graphical notes that summarizes the historical event will appear after the animation or video. This can help students recall the flow of the events in a glance. In other word, Vistory act as a compress animated note for a quick reference. Graphic and animation is a great way to get today's media-savvy students interested in the curriculum.



Figure 7: Screenshot of VISTORY Apps

The quizzes session acts as interactive medium along the learning session. Multiple choice questions regarding the topic chosen will be asked to test user understanding. If user answers correctly, a green right mark will be displayed and the one mark will be added. While, if the user answers the question wrong, a red wrong mark appeared beside the correct answer. At the end of the quiz, a total marks collected by user will be displayed. User can reattempt the quiz by tapping on the back button. Through watching video and answer quiz repetitively, user will be able to recall information from the lesson.

### **Important to education (novelty and uniqueness)**

Learning and teaching (L&T) process is a time for students to master their knowledge and skills. L&T process should be carried out with proper methods to facilitate student mastery the subject. Students whom are given a sufficient stimulus will be more interested in learning. The subject of History contain the facts, which consists of the names, dates, events, places, and so many things that need to be understood and remembered. Therefore, with the invention of this mobile apps, it can help facilitate the process of learning and teaching. This mobile apps can be used as a teaching aids that help to save teachers time in term of preparing materials, instead he/she can focus on diversify or activities among students and give them pleasure while learning.

### **Potential to be Commercialization**

VISTORY android application package (APK) will be used for distribution and commercialization purposes. APK file can be installed on any Android devices by downloading the Vistory application from the online apps store (Google Play). VISTORY is a market-ready product with a copyright and looking forward to be commercialized. In term of marketability value, this product has the potential to be used not only for student learning History in school but also for public self-learning.

### **Acknowledgement (if any)**

The authors are deeply indebted and would like to express our gratitude to the Universiti Teknologi Malaysia Student to Student Edutainment Club and UTM GUP Grant Vot R.J130000.7331.4J159 for supporting this product innovation development.

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## Discreet World of Microbes

**Syarah Izzati Abdul Razak, Fitratul Azimah Idris, Azny Bt Azmi & Dr. Wan Zuhainis binti Saad**

Universiti Putra Malaysia, Serdang, Malaysia

[ara\\_syarah95@yahoo.com](mailto:ara_syarah95@yahoo.com), fitrazi95@gmail.com, aznyazmi@gmail.com, zuhainis@upm.edu.my

### Highlight

Children are always curious about everything. Let's get the kids to be curious on what's on them or what are they living with through playing a board game about microbes, Discreet World of Microbes will bring the children to the new adventure of learning microbes in a fun and engaging way.

**Keywords :** Game board, Microbes, Microbiology, World of Microbes.

### Introduction

Discreet World of Microbes is a game board based on microbes. Gamification is an application of game dynamism and system to real-life problem-solving (Zichermann & Cunningham, 2011). This game is created for children to explore more about microbes and improve their social skills. It includes template for adding pictures, characters and description of the microbes with an application that contains information related to the game. This game also tests the player's logical thinking skills and the ability to relate microbes to their daily lives. It also teaches kids to use technology for learning and at the same time having fun. This game can be used as a tool to increase their curiosity towards microbes in an interactive way so that it won't limit their knowledge and they will not get bored easily.

### Content of the games:

- Board game:

Each player will take turn to throw the dice. The player with the highest total starts the game: The token is placed on the corner marked "START", the dice is thrown and the token is moved in the direction of the arrow the number of spaces indicated by the dice. After one player completed his turn, the turn passes to the left. The tokens remain on the spaces occupied and proceed from that point on the player's next turn. Two or more tokens may be placed on the same space at the same time. Based to the space your token reaches, you may be entitled to buy the microbes/food related to microbes or obliged to pay rent, draw a Foreseen Card etc. If the dice is thrown double, the token is moved as usual, the sum of the two dice, are subjected to any privileges or penalties pertaining to the space on which you land. Each time a player's token lands on or passes over "START", whether by throwing the dice or drawing a card, they are able to receive money. Whenever a player lands on an unowned property, the individual may buy those microbes. Any player, including the one who decline the option to buy it at the printed price, may bid. Bidding may start at any price. When you land on property owned by another player, the owner collects rent from you. When you land on either of these spaces, take the top card from the deck indicated, follow the instructions and return the card face down to the bottom of the deck. In this board game, the rules of playing are made easy as its target the primary school student. Therefore, a simple rules is necessary so that the game would not be complicated for the kids.

- E- learning:

An app is designated which an individual can take a look first at the picture of each microbe or applied microbes by clicking on the picture, and then the description of the microbes chv osen will be shown. This app is helpful as the kids can explore and get to know what they are playing on the board game. The descriptions given are simple and related to the daily life so that the kids can remember the information and relate it on their daily life too. Not only that, the app developed is made simple, interactive and informative for having fun learning.

**Impact:**

Children are always curious about anything and everything. This game will be able to pique their curiosity to explore more about microbes. As microbes are ubiquitous in nature, it would be wonderful and amazing for children to be able to understand the important roles of microbes in their daily life. As microbes and its applications are rarely being discussed, this board game including the application can drive learning and instil interest in microbiology. This game has high potential to be commercialized as it is fun, informative and attractive that can engage players to learn. This board game provide knowledge on the roles and importance of microbes in daily lives and at the same time develop their interest to explore and discover the amazing world of microbes.

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## UMTMOOC-AR: A New Technology For Innovative Learning

**Noraida Haji Ali, Mustafa Man, Rabiatul Addawiyah Hanim Mohd Rosli, Mohd Hafriz Nural Azhan**

School of Informatics and Applied Mathematics, Universiti Malaysia Terengganu  
Centre for Academic Planning, Development and Quality  
Universiti Malaysia Terengganu

**Highlights:** UMTMOOC-AR is a mobile application that makes learning more innovative. Augmented Reality technology is changing the way video-based learning to be more exciting, interactive and innovative. With this technology enable students to view course content via any devices. Videos related to the content can be played directly from the application UMTMOOC-AR. This technology can also be used even without internet connection especially in rural areas to make learning more flexible. This feature makes the digital gap among students can be overcome.

**Key words:** MOOC, Augmented Reality, innovative learning, rural area.

### Introduction

The Massive Open Online Course (MOOC) is a new online medium for course delivery and learning. It offers 100% online teaching and learning with free or paid course. UMTMOOC-AR (UMT Massive Open Online Course with Augmented Reality) developed based on video and 3D components. Component video and 3D in selected AR technology to create more interactive learning and innovative. UMTMOOC-AR is a mobile application that can help students to better understand the course content. Students can learn with 'live content' which can give more understanding than with text only. With this AR technology, students do not have to worry about internet line because UMTMOOC-AR can be used even without internet. UMTMOOC-AR application must first be downloaded to the device either a smartphone or tablet or any other suitable device. This advantage can help students or people in rural areas who do not have an Internet connection for feel with more innovative learning experience.

### Background

Augmented Reality (AR) is primarily aligned with situated and constructivist learning theory, as it positions the learner within a real-world physical and social context while guiding, scaffolding and facilitating participatory and metacognitive learning processes such as authentic inquiry, active observation, peer coaching, reciprocal teaching and legitimate peripheral participation with multiple modes of representation (Dunleavy and Dede, 2013). While AR offers new learning opportunities, it also creates new challenges for educators (Hsin-Kai Wu et.al 2013). Ángela Di Serio et.al (2013) found that augmented reality technology has a positive impact on the motivation of middle-school students. Motivational factors of attention and satisfaction in an augmented-reality-based learning environment were better rated than those obtained in a slides-based learning environment. According to an interesting background about the virtues of this AR technology, UMTMOOC-AR was developed for the same purpose, to make learning as an exciting thing and can be used without geographical limitations.

### Importance

UMTMOOC-AR development based to ensure the learning process is more innovative to face the new generation of students. Students are now more interested in the form of digital interactive and 'live content'. Learning content that only use text is no longer relevant with the growing technology. UMTMOOC-AR believe that can motivate students to learn something better.

### Advantages

The advantages of UMTMOOC-AR can be viewed from several aspects:

1. Learning - creating a new learning experience with the new technology.

2. Access - access to surf MOOC courses offered by UMT not only through url: openlearning.com/umtmooc, but can also be achieved through UMTMOOC-AR with appropriate device. It as an additional channel for users to gain knowledge.

3. Borderless World - usually an area with an internet problem is in rural areas, in terms of speed and no Internet connection. This situation can lead to students who are in this area will continue to lag through online learning experience. UMTMOOC -AR can be considered as a solution to this problem. With the cooperation of the authorities ministry or organization, can provide a certain space and innovative learning tools for student use in this area. Through UMTMOOC-AR, innovative learning can be used by students or anyone regardless of their geographic area.

For demonstration how UMTMOOC-AR works, here the simple step:

a) Download UMTMOOC-AR from url provided below (use smartphone or tablet - Android only):

<http://apps.epembelajaran.umt.edu.my/mooc>

b) Click on Install button and wait until the installation process is complete. UMTMOOC-AR logo will be displayed on your device.

c) Click UMTMOOC-AR icon on your device. Follow the following instructions:

- i) Press the ' Start ' Button
- ii) Double Tab to enable Full Screen view (change to ON).
- iii) Bring your device to the image provided in figure 1.
- iv) Click the ' Play ' icon displayed. Related video will be played.

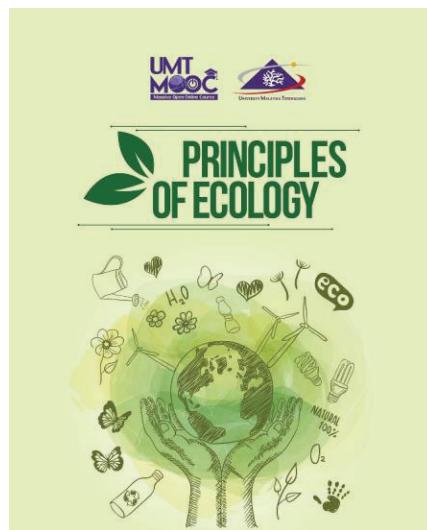


Figure 1: Image for UMTMOOC-AR Demo

## Commercial Value

UMTMOOC-AR was developed in two forms; physical books and digital books. These books can be sold to anyone interested as a collection of innovative learning. AR technology-based video approach can be applied in any appropriate field such as education, advertisement, organization and so on. This widespread use in any field, provides an opportunity for commercialization in the future.

## Conclusion

The Massive Open Online Course (MOOC) is a new online medium for course delivery and learning. It offers 100% online teaching. The main concept of MOOC is integrated with accessible via networking, sharing the learning resources via online, and are facilitated by educators. UMTMOOC is Massive Open Online Course at Universiti Malaysia Terengganu, depending on the nature of courses offered, a UMTMOOC will be design quite different. Depending on what our target audience, we can use those any type of course materials and social media tools as

well. AR technology is one of our innovation for innovative learning. This advantage can help students or people in rural areas who do not have an Internet connection for feel with more innovative learning experience.

### **Acknowledgement (if any)**

We thank to the UMTMOOC team including all lecturers involved in the development of course UMTMOOC subjects for their commitment and excellent cooperation during the UMTMOOC development. Also great thanks goes to Ministry of Higher Education and UMT for moral and financial support.

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## Fun Revision through Games

**Anealka Aziz Hussin, Tuan Sarifah Aini Syed Ahmad & Eliyas Sulaiman Mohandas**

Universiti Teknologi MARA (UiTM), 40450 Shah Alam, Selangor  
anealka@salam.uitm.edu.my

Universiti Teknologi MARA Negeri Sembilan, Kuala Pilah Branch, Pekan Parit Tinggi, 72000 Kuala Pilah, Negeri Sembilan

tsyaini@ns.uitm.edu.my  
Universiti Teknologi MARA (UiTM), 40450 Shah Alam, Selangor  
eliyas9154@salam.uitm.edu.my

**Highlights:** Every student wants to do well in their assessments. They will spend hours doing revision. This process can be tiring and boring but they are left with no choice. Apart from the conventional way to do revision, students can use online revision activities prepared by their learning instructors which are made available in MOOC, OCW, OER or in the institution LMS. Learning instructors can add variety and make the revision process less stressful by introducing game design techniques in the activities. ClassTools.net offers free game templates for those who are into creating games but with no programming background.

**Key words:** assessment, revision activities, online games, game templates, immediate feedback.

### Introduction

Revision is a process of studying lessons which were studied earlier. Students revise previous lessons before an assessment. They will read their notes several times and draw concept maps based on their understanding. After that, they will try to answer old exam papers. Students usually repeat the process until before the assessment. This process is usually done individually and can be boring. Furthermore, there is no one to give feedback on the students' preparation for the assessment. Beside this conventional approach to doing revision, students can also use online revision activities prepared by the instructors. These online activities are usually available in the instructors' Massive Open Online Courses (MOOC), Open Courseware (OCW), Open Educational Resources (OER) or in the institutional Learning Management System (LMS). Some of these online activities are self-checked while others still require feedback from the instructors. Learning instructors can improve the process and add variety to make it less stressful by introducing game design techniques in the activities

The concept of integrating game design techniques in non-gaming context is known as gamification. Gamification can make people more engaging and motivated to perform various types of activities which are considered as boring or routine (Deterding et.al., 2011). There are many game design techniques but the most common ones are "points, badges, levels, leader boards and challenges" (Fitz-Walter, 2013).

Gamification can be integrated in the process of revision. It makes the revision process fun as students are usually motivated to learn in new ways (Hanus & Fox, 2015). There are many online game creators for beginners which do not require programming knowledge such as Scratch, Construct 2 and many more. Despite having these tools, designing revision activities with gamification is still not an easy task especially for those who are not techno savvy. Many learning instructors would still shun the idea of creating their own instructional games for their students despite knowing the advantages and suitability of such approach to the students nowadays. However, the availability of online game templates provided by ClassTools.net has made it possible for many learning instructors to create fun and interesting instructional games for their students. It is the purpose of this proposal to demonstrate how learning instructors can utilize the game templates provided by ClassTools.net to create revision games on terms and concepts for their students.

### Content

#### 1. What is ClassTools.net?

ClassTools.net is a website that assists learning instructors or anyone interested to create games, quizzes, activities and diagrams within minutes. ClassTools.net does not require signup and password. It allows the users to host their games, quizzes, activities and diagrams in their own blog, website or intranet for free.

#### 2. Types of game templates offered by ClassTools.net

Currently, ClassTools.net has not less than 40 ready-made templates for games, quizzes, activities and diagrams. Five of the templates are chosen to demonstrate this purpose. The templates are:

- a. Arcade Game Generator
- b. Dustbin Game Generator

- c. Connect Four Quiz Generator
  - d. Mission: Map Quest
  - e. Pac Man Quiz Generator
3. What is the innovation?
- Students are more motivated to do revision activities as the activities are fun and yet still challenging. There is a display of students' individual performance immediately after completing the activities. It also shows ranking of performance among students.
  - Learning instructors with no programming knowledge can create many interesting games as revision activities for the students using the templates. The games can be testing different cognitive levels such as knowledge, comprehension, application and analysis depending on the creativity of the learning instructors to design items of the activities.
  - Learning materials in MOOC, OCW, OER and in individual LMS can be improved in terms of the variety of activities. Having games as revision activities can cater students with different learning styles.
4. Advantages of using game templates in ClassTools.net
- Students
- Students can have fun while revising their lessons.
  - Students feel more motivated to do revision as there is element of competition such as marks, timer and ranking.
  - Students can do revision anytime and anywhere as long as they have the device and internet connection.
  - Students can do revision repeatedly.
  - Students can see how well they do at the end of the revision process by comparing their own scores or by comparing their score with other students.
- Learning Instructors
- The game templates help learning instructors create interesting activities or revision activities for students.
  - The game templates help learning instructors to create games, quizzes, activities and diagrams.
  - The game templates are easy to use. No programming skills required.
  - The game templates are free.
  - The game templates use multimedia which can attract different types of students (sound, colours, images, texts)
  - Games created from the templates can be embedded in other learning platforms such as MOOC, OCW and OER.
  - Games created from the templates can be hosted in personal blogs, websites or intranet.
5. Why are they important to education?
- Games can motivate students to learn (Hakulinen & Auvinen, 2014; Seaborn & Fels, 2014; Hanus & Fox, 2015; Mavletova, 2015; Osipov, Volinsky, Nikulchev & Prasikova, 2015).
  - Games can cater the need of students with different learning style (Clark & Mayer, 2011).
  - Games can cater the need of the Gen-Y students who prefer online learning which are more interactive, social and student-centred (Lau & Phua, 2011) and have shorter learning segments to help them stay focus (Schofield & Honore, 2010).
  - Games can make the students feel special by rewarding the winners for participating in the learning activities (Lau & Phua, 2011).

## 6. Commercial values of the product

The games can be embedded in other learning platforms such as MOOC, OCW and OER. Besides that, the games can also be hosted in personal blogs, websites or intranet. This function enables learning instructors to promote their e-learning materials commercially. Subscription to ClassTools.net is required to remove advertisements from the game interface, or else, GameTools.net can still be used for free.

## Acknowledgement

LG240 Semester 1 students for introducing the website and trying out the games.

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## Dr. Diet Android Application

**Rashidi Bin Abd Rashid**

Universiti Teknologi Malaysia (UTM), Johor Bahru, Malaysia  
mrrash91@gmail.com

**Highlights:** Health and diet is an important things as a human being. One of the ways of maintaining a good health is by tracking daily nutrition intake. Unfortunately, Malaysian awareness in calories and nutrition intake is still lacking. "Dr. Diet" android application provide information or learning approach to raise awareness about having a good diet to its user. This include BMI calculator, tracking calories intake, food library, and information portal as a way to promote a healthy lifestyle.

**Key words:** Healthy, Diet, Android Application, E-Learning.

### Introduction

Malaysian is a multicultural country consist of Malays, Chinese, and Indian as well as native people. As such, Malaysian have a wide range of food and delicacies. Unfortunately, not all of Malaysian diet is actually healthy. Moreover, Malaysian awareness on having a balance diet is lacking. Using an android application, user can input their diet to calculate the optimum daily intake based on their BMI. User can track daily calories using the application so that user can have a balance diet. There are a lot of Android healthy diet application that is available on the market nowadays. However, most of them not including the diversities of Malaysian food. The contents of the diet application such as meal, menu, and calories are lacking proper information. Some of the food suggested is not available or hard to find in Malaysia and some of them are not halal food. Android diet application named as "Dr. Diet" focus on bringing application suitable only in Malaysia. Application are developed to solve the issues the lack of halal and healthy food that are good for Malaysian citizen. It's also included learning and information function to educate its user on the importance of having stable and balance diet.

### Content

The main objectives of developing "Dr. Diet" Android application is to provide a healthy diet meal plan that is suitable for Malaysian users including Muslim halal diet. The application provide a genuine nutritional fact for each food contains in the application food library based on research by professional dietitian. User can also customize and choose different option for their diet based on their preferences. It also include useful healthy tips and information portal. There are a lot of benefits of using the application. Users can gain huge benefits by using this application in term of healthiness, effectiveness, and accurate information. The benefits of using the application includes promoting a healthy diet among Malaysian user and raise awareness about user's food intake. Diet including halal Malaysian food for Muslim community in Malaysia. User can define its own meal plan according to their choice with the limitation of having healthy daily nutrition and calories intake. The application also catalogue variety of food in the application food library. Using a healthy diet application can provide huge benefits among users. Since the total Android user in Malaysia as well as worldwide is extremely high, the penetration rate of such application is effective in spreading awareness of maintaining healthy diet. The accuracy of the information provided have been consulted with professional dietitian to avoid any misinformation and risk to the users. Thus, the developer emphasizes on providing a valid and accurate fact about diet, food and drink, and healthy meal plan based on nutritionist and medical professional advice.

## A Low Cost 3 – Axis CNC Milling Machine

**Zammeri Abd Rahman, Saiful Bahri Mohamed, Radzuwan Ab Rashid, Mohamad Minhat, Mohd Shahir Kasim**

Universiti Sultan Zainal Abidin (UniSZA), 21300 Kuala Nerus,  
Terengganu Darul Iman  
zammeri@unisza.edu.my, [saifumoh@unisza.edu.my](mailto:saifumoh@unisza.edu.my), radzuwanrashid@unisza.edu.my

Universiti Teknikal Malaysia Melaka, Hang Tuah Jaya, 76100 Durian Tunggal,  
Melaka, Malaysia  
mohm@utem.edu.my, shahir@utem.edu.my

**Key words:** Low Cost, Milling Machine, CNC, Open source

**Highlights :** A low cost 3- Axis CNC Milling Machine has been developed by incorporating the features of standard PC interfaces with Open source Arctsoft Mach-3 CNC Controller as the main software and supported by the off-the-shelf hardware components, such as stepper motors with drivers, spindle with speed controller, interface board and other components. It is more an open structure so that the construction and development of the machine are clear and understandable to the students as well as low maintenance cost.

### Introduction

CNC Technology Workshop at Universiti Sultan Zainal Abidin (UniSZA) is a central laboratory for undergraduates majoring in Manufacturing Technology. This workshop is equipped with very expensive commercial CNC machines, which come with preventive maintenance contracts. Every time machine break down occurs, it is time consuming and costly to repair the machines. Recently, Faculty of Innovative Design and Technology (FRIT) plans to offer new undergraduate and postgraduate programmers related to manufacturing technology. This means that the use of CNC machine is expected to increase in the next few years as it will be used by students in their learning process and research activities. Hence, it is essential to develop a low cost CNC Milling machine with an open structure so that the construction and development of the machine are clear and understandable to the students. The maintenance cost of the machines may be minimized by using inexpensive yet sufficiently powerful off-the-shelf component parts to construct the machines. The lower cost is achieved by incorporating the features of standard PC interfaces with Open source Arctsoft Mach-3 CNC Controller as the main software and supported by the off-the-shelf hardware components, such as stepper motors with drivers, spindle with speed controller, interface board and other components. Such machine, however, is not intended for a series of production and precise machining, but they could effectively replace high cost conventional machines and improve student learning by providing better access and insights into the operation and the use of CNC mills.

### Acknowledgement

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## A Case Study of Clouddesk Implementation

**Khadijah Chamili , Thuraiya Uda @ Budah, Mohd Hatta Md Hassan**

Universiti Sains Islam Malaysia, Nilai, Malaysia

khadijah@usim.edu.my, [thuraiya@usim.edu.my](mailto:thuraiya@usim.edu.my), [hatta@usim.edu.my](mailto:hatta@usim.edu.my)

**Highlights:** Education is increasingly going online with students and faculty able regularly utilizing learning management systems and ever more complex applications. CloudDesk's solutions provide for the mobility students and staff expect, help schools maximize their existing infrastructure and improve control over IT resources while minimizing the overall technology footprint.

**Key words:** Clouddesk, Virtual Desktop Infrastructure (VDI), virtual Application (vApps), virtual Desktop (vDesk)

### Introduction

Virtual Desktop Infrastructure or VDI is a computing model that adds a layer of virtualization between the server and the desktop PCs. By installing this virtualization in place of a more traditional operating system, network administrators can provide end users with 'access anywhere' capabilities and a familiar desktop experience, while simultaneously heightening data security throughout the organization. USIM has been implemented VDI in helping managing computer labs, solving software compatibility issues, controlling user access to ICT hardware and helping in ICT financial strategy. USIM has been started explore VDI technology in year 2014 by attending few products demo in market such VM Horizon @ Zero Client, Phantosys and Clouddesk (formerly known as VDI@Serverpark). We then conducting Proof of Concept (POC) session for each of products, get approve of ICT Technical Committee and decided to choose Clouddesk as our VDI implementation. We start implement in year 2014 with small scale to ensure the capability of products before implemented in big scale in year 2015 for 500 licenses.

### Why Clouddesk?

IT Center is the main ICT provider in USIM. We centrally manage ICT procurement, asking budget from government to ensure we provide better ICT services to staffs and students. In Malaysia Rolling Plan 10, around 2010 up 2013, USIM fail to get any funded capital from government. Students suffered with legacy PCs at computer labs. Working without any capital funded plus shrinking operational budget, push us on looking alternative way to serve our students better. With VDI technology or Clouddesk, allow us leverage all software used for teaching and learning (T&L) on existing legacy PCs without expense big money on buying new hardware. Another big chunk in managing computer lab is purchasing software to support demand from 8,000 students for T&L. University is prohibited to used pirate software and software asked by Faculty is used by industrial such as SPSS where most Faculty asking to buy the same software. Question is, how do existing licenses enough and fully utilized by Faculties? Using Clouddesk, we manage to answer this question and monitor the utilization of software usage. Besides financial issue, we are facing software compatibility issue. Many times when software is installed, upgraded or removed, it results in one or more applications not functioning. End-user productivity suffers and calls for help from IT service desk. There are few compatibility issues has been resolved by using Clouddesk. One of them is where 3<sup>rd</sup> party software we are using is no longer supported by new operating system (OS) when upgrading to new hardware. This happen to our eklinikal system which used to support dentistry student experiencing their clinical session. Second is on hardware compatibility issue. Clouddesk can solve hardware compatibility issue where existing and old version thumb drive is no longer support by new PCs attached to the thumb drive.

Another main reason to choose Clouddesk is for security purposes and managing computer lab. Until now, we have around 1,500 PCs to be manage used by 8,000 students. Without Clouddesk, students are allowed to change any setting in PCs at computer labs and this might open to any vulnerabilities e.g student stop antivirus activities. With Clouddesk, the PCs will refresh every time its reboot and every configuration done by students will gone. Managing computer labs, traditionally technician will install each of requested software by lecturer in each PCs. Using Clouddesk, instead of installing one by one, technician will only need to create one image and install in server and then blast to all or selected PCs defined.

Last but not least, growing mobile devices is another demand and reason IICT personnel need to look into. Based on our survey done by end of 2014, 80% students have their own notebook. This will encourage students to access T&L software as they like at anytime and anywhere. To provide each of students with their own software need huge number of budgetary which impossible. For students to have their own software, they might choose to have pirate software. In this case, Clouddesk allow students to access their T&L software thru virtual application (vApp). On the other hand, lecturer can easily access any software from their mobile regardless its android, IOS or windows.

## Clouddesk implementation at USIM

In Year 2014, we studied VM Horizon @ Zero Client, Phantosys and Clouddesk (formerly known as VDI@Serverpark) thru products demo and conducting POC session. Criteria has been defined on choosing the best VDI product and suit with USIM budgetary is listed in Table 1.

Table 1: Comparison between VDI Products

No.	Item	Clouddesk	Zero Client	Phantosys
1.	VDI Concept	Need to supply normal hardware with minimum resource to client	Need to supply zero client monitor with no resource to client	Intelligent Desktop Virtualization
2	License	Concurrent	Concurrent	Concurrent
3	RAM Required	Both (Client/Server)	Server Only	Client
4	Harddisk Required	Yes	No	Yes
5	Work with existing device	Yes	Yes	Yes
6	OS Installation/ configuration	VDesk (image download at client site (first time user)- cache memory) VApp (image access from server)	No OS / No configuration at client site	Image need to be installed at client site (cache memory)
7	Hardware / Software Maintenance (eg : patches)	Need maintenance	Less maintenance	Need maintenance
8	Virus Attack	Less virus attack (reboot)	Less virus attack (no OS – zero client)	Less virus attack (reboot)
9	Support multiplatform	MAC, Android, IOS, Windows	MAC, Android, IOS, Windows	Windows only
10	Support Compatibility Issues (e.g : SPSS v 14 not compatible with Windows 7)	Support	Support	Support
11	Support offline mode	Yes	No	Yes
12	Network Dependency	No	Yes	No
13	Server Dependency	Partial	Full dependency (100%)	Partially
14	Pricing	Mid range	Expensive	Mid range
15	R&D / Support team	Malaysia	USA	Taiwan

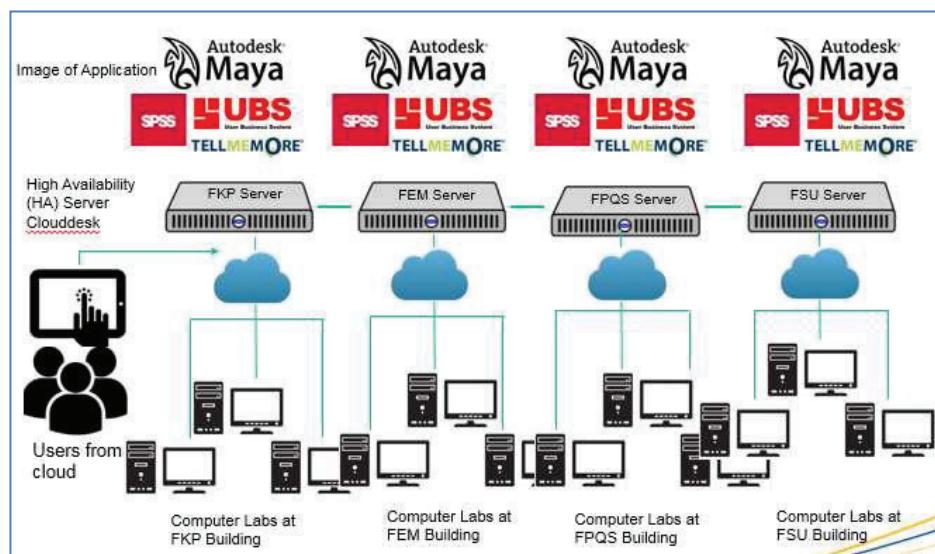
Based on the Table 1, USIM agreed to choose Clouddesk to be implemented as USIM's VDI platform. Our strong point is Clouddesk can support offline mode and working with no network dependency which are very important to ensure all T&L software can be access locally at computer lab without depending on the software image which install in server at data center. We also consider on the pricing and R&D / support team criteria which is important to meet our budgetary and possible to quickly do the R&D locally for any technical issue raised in future.

After getting approval from ICT Technical Committee in year 2014, USIM has started the VDI journey in small scale. Before implemented in T&L environment, USIM decided to have a proof of capability exercise on VDI for administrative application. We bought our first 50 licenses of VDI for MyAKRAB system which is our attendance system. We are facing complaint from user where the system is always down due to connectivity lost to main server and users can change time in clock setting. By implementing Clouddesk, we manage to reduce number of complaint and successfully solve on connectivity and setting control.

Clouddesk has three types of solution. VDesk, Vapp and VDI. At USIM, we only implement VDesk and Vapp. vDesk is a desktop management whereby the client can be managed through a single application. All operating systems, application software, policies and data are stored centrally in server. Whereas Vapp delivers virtual applications from the cloud to your Windows, iOS, Android or even ChromeOS. Each legacy application will be delivered thru the browser without any installation required. vApp enables software metering and license tracking, application provisioning as well as application sandboxing.

After successful implement VDI in MyAKRAB KIOSK, USIM decided to implement VDesk on computer labs. USIM bought 500 license for computer labs in main Campus. This exercise involve 4 Faculties with 43 softwares has been converted into image and using 4 servers with minimum specification which functioning as redundancy to create VDI environment at USIM as Diagram 1.

Diagram 1 - Clouddesk Architecture at USIM



VApp is an Application Virtualization. It allows Windows-compatible applications into self-contained virtual applications. Once virtualized, applications become a single, isolated file that runs instantly from anywhere, including a thumb drive. Unlike traditional installation methods, the single virtual application file does not require a separate setup process, does not rely on external components and runtimes and does not require reboots or administrative privileges. The application is now isolated from other system applications, preventing DLL conflicts and other deployment nightmares, yet the experience for the application's end user is unchanged.

In conclusion, Clouddesk is worth to implement because it helps to centrally-managed computer labs where image desktop were blast from central to PCs in computer labs and create High Availability (HA) of Clouddesk. 90% less work for technician compared to traditional way on installing software. By implement Clouddesk, it also allow any software can be access from other computer labs. It means, engineering student can access their application from language lab and vice versa. Thus, it helps on reducing number of part timers for long run.

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## Feasible Study of Collaborative Learning for Global Classroom

**Syafiq Fauzi Kamarulzaman, Adzhar Kamaludin**

Universiti Malaysia Pahang, Kuantan, Malaysia

syafiq29@ump.edu.my, adzhar@ump.edu.my

**Highlights:** Learning has always been a challenge due to the amount of supervision and practice received, only involves communication between the students and the teacher. By integrating online classroom lecture, practice and supervision will be expanded, where the students are able to refer to the lecture content from inside and outside of the classroom, through communication with students and lecturers from around the world. Here, potential of collaborative learning using online material as a resource in teaching is studied through integration of online classroom lecture through collaboration with an organization outside of the country.

**Key words:** Blended Learning, Collaborative Learning

### Introduction

Learning has always been a challenge due to the amount of supervision and practice received, only involves communication between the students and the teacher. Such conventional method reduces the interest of the students within the lecture gradually, resulting in less effective teaching and learning in the classroom. Exposing the students to a new environment involving new individuals increases the chance of interaction between the students in hope of self-directed, student centered learning. By integrating online classroom lecture, practice and supervision will be expanded, where the students are able to refer to the lecture content from inside and outside of the classroom, through communication with students and lecturers from around the world. Such activities can expand the learning environment, increasing the scope of interest in the students, thus reduces the learning fatigue that deteriorate the interest of the students in the classroom lecture. Here, potential of collaborative learning using online material as a resource in teaching is studied through integration of online classroom lecture through collaboration with an organization outside of the country. In order to evaluate the potential of collaborative learning through integration of online classroom, a study with a number of respondent was conducted. Through the study, it is believed that there is a significant potential for collaborative learning through online classroom based on the respondents.

### Objective

- To assess the effectiveness of Collaborative teaching and learning.
- To discover the potential of collaborative learning in classroom lecture.

### Commercialization Potentials

- Results can be used to justify the requirement for effective collaborative teaching.

### Value Added

- Benchmark of collaborative learning in classroom lecture for teaching.

### Usefulness

- Discover the potential of collaborative learning & Classroom Lecture

### Collaboration Content

- Malaysia side

Universiti Malaysia Pahang Participant: 12 Students and 1 Lecturer, Respondent: 7 Students.

- Japan side

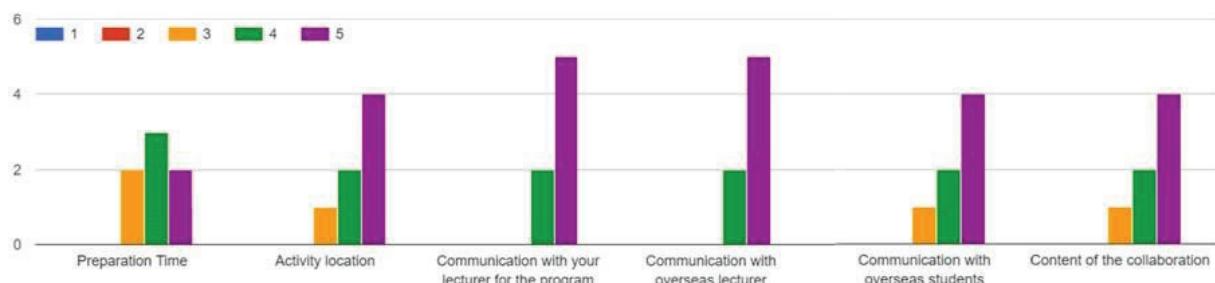
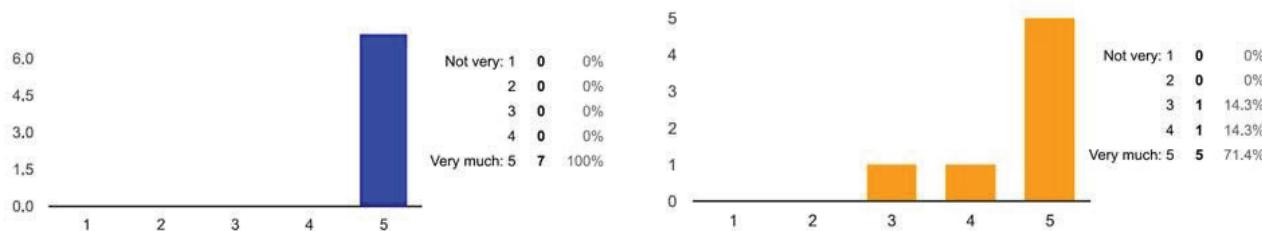
Kansai University Participant: 4 Students and 1 Lecturer

- Tasks Assigned

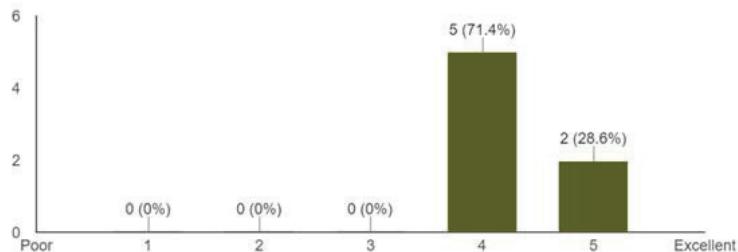
Students was instructed to proposed a programming project, they were given online discussion platform (using Edmodo & Zoom). The students are required to discuss their project proposal with foreign students and identify potential improvement and problem in their project.

## Students' Responses

How helpful do you think it was in teaching and learning?  
How excited are you with the collaboration activities?



How satisfied were you with the session content? (7 responses)



## Conclusion

In this study, potential of collaborative learning using online material as a resource in teaching is investigated through integration of online classroom lecture through collaboration with an organization outside of the country. Several students have been selected to perform a task given while collaborating with foreign students. Based on the task given, the students were asked to answer the survey to evaluate the learning process. Based on the survey, the students have given a positive opinion, encouraging the use of collaborative learning in lectures.

## Acknowledgement

This study was conducted with appreciation to Kansai University, Japan, and Centre of Instructional Research and Elearning (CIREL), Universiti Malaysia Pahang.

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## Adaptation of Aura Colour Interface Content Presentation based on Learner's Emotion in Personal eLearning Environment using Production Rules

**Rahmah Mokhtar, Fauziah Zainuddin, Nor Azhar Ahmad Roslina Abd. Hamid**

Universiti Malaysia Pahang, Kuantan, Malaysia

drrahmah@ump.edu.my , fauziah@ump.edu.my, nazhar@ump.edu.my, roslina@ump.edu.my

**Highlights:** Personalization is a suitable approach to adapt the learner to its learning environment. Adaptation for personalization is based on modality and affective aspects of the learner. Most research into adaptation is focusing on modality aspect, thus adaptation in affective aspect is crucial to be explored. This innovative prototype namely, EmoAPeL was developed to adapt the aura colour interface content presentation based on learner's emotion in Personal e-Learning Environment using an intelligent production rule. EmoAPeL has been tested to 30 Universiti Malaysia Pahang students. The mean results show 88.5% of the students agreed that EmoAPeL motivates their inclusive learning environment. EmoAPeL development concept can be embedded to any eLearning systems.

**Key words:** Personalization, Personal Learning Environment, Emotion Adaptation, Production Rule

### Introduction

Each learner has different characteristics, preference, learning style and emotions. These differences make one size fits all concepts in eLearning is not relevant anymore. Adaptation in Personal Learning Environment (PLE) solves the problem, where the learners have to accept what have been given or deliver to them without considering their differences. The concept of PLEs refers to the environment that each person constructs in order to manage, build and exchange information and knowledge (van Harmelen, M., 2006; Atwell, 2007; EDUCAUSE, 2009) embedding the adaptation in PLE will make the more efficient and interesting learning environment to the learner. Adaptive learning is a system of learning that customizes the structure of learning contents to the desire for the individual learners. Nowadays, the system is said to be modeling the learners base on their personalization. This concept has the high potential to provide individual learners with the best-personalized learning experiences while studying using eLearning (Sonwalker, 2013). There are a few adaptation types such as a context-aware system, which adapted the presentation of the content. Content was presented in a variety of ways based on both students prior competencies (pre-requisite knowledge and skills) and preferences (Glushkova, 2008). The combination of these two aspects will enhance the learner's interests and motivation to eLearning. The objective of this innovative project is to identify the personalization based on student's emotion, to embed the adaptive based on emotion in the developed prototype for adaptive based learning and to test the effectiveness of the developed prototype in enhancing learner learning motivation and acceptance among IHL's students.

### EmoAPeL Development Framework

Emotion Adaptive Personal Learning Environment (EmoAPeL) is developed through the combination of Aura Colour Based Content Presentation and Production Rules Intelligent Technique. Aura Colour Based Content Presentation is used to develop the content in the Multimedia Technology Application subject. Mir Hazil (2010) identified the emotions could be relieved by using the colour aura. Sad emotion can be ease with the design of an interface that has lots of green colour. The green colour will stimulate the emotion to feel happy and be in neutral environment. Furthermore, for happy emotion, the interface must have lots of pink colour. This is because the pink colour will sustain the happy emotion. Recommended for the angry emotion, the design should have lots of blue colour. The blue colour will ease the angry emotion. In order to adapt the emotion to the content, the researcher used production rules. The process of EmoAPeL is simplified in Table 1.

Table 1 Simplified table for Emotion, Aura Colour and Production Rules

Emotion	Main Colour to ease emotion	Production Rules
Sad	Green	<b>IF</b> learner clicks sad emoticons <b>THEN</b> change to sad presentation <b>ELSE</b> Display existing presentation
Happy	Pink	<b>IF</b> learner clicks sad emoticons <b>THEN</b> change to sad presentation <b>ELSE</b> Display existing presentation
Angry	Blue	<b>IF</b> learner clicks sad emoticons <b>THEN</b> change to sad presentation <b>ELSE</b> Display existing presentation

Figure 1 shows the flows where EmoAPeL starts by detecting the emotion respond from the learners. The production rules which match colour aura will ease the student emotion, and this will lead to enhancing the interest towards the subject content that shown in adaptive Personal eLearning Environment application.

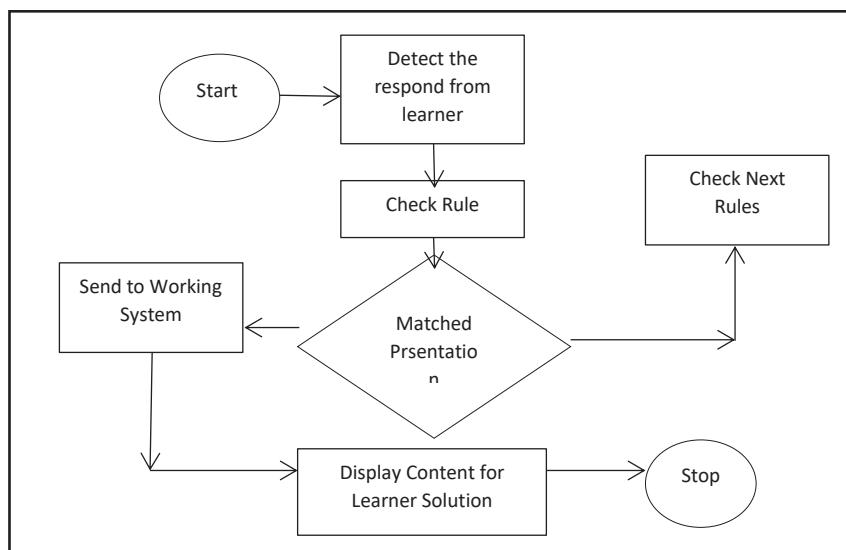


Figure 1 : EmoAPEL Flow Diagram

The adaptive technology based on emotions can help the learner to perceive the knowledge easily. The capability of color aura can ease the learner's emotion and makes their acceptance of learning smoothly without any distraction from negative emotions (Rahmah & Nor Azan, 2016).

## Result and Dicussion

Multimedia Technology Application subject is selected as representing EmoAPEL. The testing has been made to 30 students from Faculty of Computer Systems and Software Engineering, Universiti Malaysia Pahang. A set of the questionnaire is given to the students during the test. The results show 87% of the students agree that EmoAPEL can ease their emotions, and 90% agree of their understanding towards the subjects.

### Advantages to Education and Community

- i. Introduce the new approach of PLE in the education technology field
- ii. Enhance the learning motivation, interests and capability to IHL students, thus will increase the value of excellent student, which will be giving it back to the community
- iii. Increase community knowledge
- iv. It can be applied as the problem solver to problematic students in gaining their knowledge
- v. Implemented as one of the tools, especially for developing eLearning content environment.

### Commercial Values

The technology introduces into EmoAPEL can be sold to the eLearning society and developer, where the process and technique can be adapted and use to solve the problem of the learner while perceive the knowledge. Personalization enhances learner motivation towards their learning.

### Acknowledgement

The researcher would like to thank our students who involve as the respondent for this innovation and CiReL UMP for sponsoring our exhibition participation

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## An Efficient Technique for the Development of more Effective and Secure E-Learning system based on Cloud Computing

**Ali Safa Sadiq, Awanis Binti Romli & Qasim Alajmi**

Faculty of computer systems & Software Engineering, University Malaysia Pahang Kuantan, Lebuhraya Tun Razak,  
26300, Gambang, Pahang, Malaysia [alisafasadiq@ump.edu.my](mailto:alisafasadiq@ump.edu.my)

Faculty of Computer Science & MIS, Oman College of Management & Technology, Oman  
Qasim.alajmi@omancollege.edu.om

**Highlights:** Cloud computing paradigm is considered an avenue that provides elastic, easy to manage, cost-effective and powerful management scheme by using the internet. It improves the abilities of hardware resources applying an optimal sharing strategy which enables the individuals and industries to use applications and services within the cloud environment. Cloud computing is simple to use which ensures that there is enough security to cloud data storage. It helps in providing an easier access to the shared resources that are on demand especially in business and E-learning. Individuals do need to invest a lot in information technology since they use resources that are provided by the cloud for free. Also, the cloud providers have the option of re-using the resources once they are released by the user thus there is a maximum utilisation of resources. The author presents a review on cloud computing in business. On the other hand eLearning can be referred to as an electronic medium of learning that uses the internet to pass and disburse knowledge to learner over the world. E Learning includes passing knowledge in electronic forms which is a fast and efficient way of teaching. It is important to note that e Learning does not replace teachers or the teaching staff but it helps facilitate and improve the learning process in which a class can include students from different parts of the world at the same time. E learning on its own is faced by many challenges in implementation such as security of the system which compromises the system itself thereby raising the question of its credibility. There is a way of implementing a more secure system which includes basing e learning on cloud computing which is a more secure system. The challenges of e learning can be overcome by implementing it on cloud. However, there is limited study available in the adoption of cloud computing in E-learning. This research provides a detailed review of the potential of using cloud computing in e-learning, the challenges faced during its implementation, and the development of more effective and secure e-learning based on cloud computing to overcome them. For this to happen, it is important to put security of the system on the front line and privacy of the system still therefore these are the two main issues to be addressed. In recommendation, the developers of the system should lay down a stable and reliable infrastructure ensuring the system is secure from both internal and external attacks from hackers.

**Key words:** Cloud computing, E learning, Security, LMS, Complexity.

### Introduction

E-learning is considered a fast and efficient way that includes all forms of electronically supported learning and teaching services that are used to spread knowledge to all learners to different parts of the world (Liu 2010). The learning process is implemented by information and communication systems that include both inside classroom and outside classroom educational experiences on technology. E-learning makes use of the internet and other digital information on learning and teaching activities which are key components in the implementation of the modern educational technology. Common abbreviations such as CBT (Computer-Based Training), WBT (Web-Based Training) or IBT (Internet-Based Training) are the most used on e-learning. E-learning enables the transfer of skills and knowledge to learners and reduces the time they spend on learning allowing them to access a broader view of learning materials in accordance with personal competence with no limitation of time and space. E-learning applications include Web-based learning, virtual education opportunities, computer-based learning, and digital collaboration. The content is transferred and delivered through the internet; satellite TV, audio or videotape and CD-ROM. Information transferred in media form include images, text messages, streaming videos, animation, and audios. Furthermore, E-learning has found its place in many platforms today including education, company training, academic courses etc. Students and trainers are the two main entities that are involved in an e-learning system. Students benefit by using online courses, writing exams, sending feedbacks and sending projects. Trainers on the other hand deal with the content, prepare tests, assess the tests, homework, and projects, and communicate the final feedback to the students. The e-learning system is developed as distributed applications. It consists of the client application, an application server as well as a database server to support it. The client hardware can be a mobile device or a desktop computer while the client application can be a simplified web browser or a dedicated application.

Below is Figure 1 illustrating an overview of an architecture E-learning system based on Cloud computing.

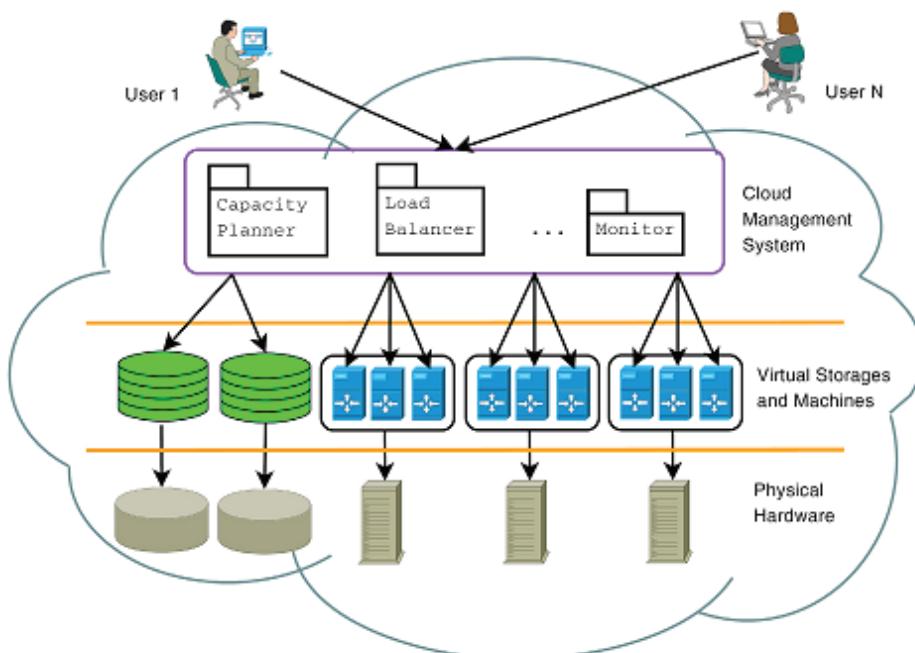


Figure 1. Overview of the architecture of an e-learning ecosystem based on Cloud computing infrastructure. Dong et al (2009).

## Content

Developing an E learning system that is integrated in cloud computing would revolutionize the ordinary E learning system. The current system is hard to extend and lacks a proper curriculum which can be used to facilitate learning. If integrating E learning in cloud computing is possible and has a lot of benefits than the ordinary and current system, then there must be a technique that can be used to develop a secure E learning system based on cloud computing.

## Theoretical framework

E learning is a powerful tool in the education sector where many learning institutions have adopted it for learning processes. On the other hand cloud computing offer great benefits of the cloud since it is secure and offers scalability benefits. E learning in itself is faced with many challenges including lack of proper curriculum and safety problems. Bringing the two together would create a hybrid system that will enjoy both the benefits of cloud computing as well as the benefits of E learning. This paper will find out the benefits of both E learning as well as cloud computing and by combining them will look at the best method and technique to develop a secure E learning system based on cloud computing.

## Methodology and plan

Gathering information on the best technique for the development of a secure e learning based on cloud computing system was not an easy task since it involved going to different learning institutions reviewing on the existing systems and the underlying problems associated to it and asking the relevant questions about the current system as compared to the proposed system. It also included checking if the institutions embraced the idea of cloud computing in which it is one of the newest technologies in the world of computing.

## Acknowledgement

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## Strategic Dashboard Reporting Tools for Managing e-Learning in Higher Learning Education

**Sabri Ahmad Hisham, A.Fairuzullah, A.Azhar, Suzana Z. Syahrizal Z.**

Universiti Malaysia Pahang, Pekan, Malaysia

[sabrihisham@ump.edu.my](mailto:sabrihisham@ump.edu.my), fairuzullah@ump.edu.my, amirazhar@ump.edu.my, suzana@ump.edu.my,  
syahrizalz@ump.edu.my

**Highlights:** Universiti Malaysia Pahang (UMP) continues to embed the latest technology into business including teaching and learning management. One of the innovations that have been created to support the teaching and learning activities is by developing a dashboard platform called Strategic Dashboard Reporting Tools. Strategic Dashboard Reporting Tools will ease the management of blended learning initiative of an institution by providing real time course content and filtering the unrelated courses to achieve blended learning status. It also provide a better integration between learning management system with student and staff portals as well.

**Key words:** Blended Learning, Reporting Tools, Dashboard, Web Technologies, E-Learning

### Introduction

When the Malaysian Government initiated 'Government Transformation Programme (GTP)' which was also driven by the 10th Rolling Malaysia Plan, education has been appointed as one of the National Key Result Areas (NKRA) of focus. The Ministry of Education responded to the initial efforts through the establishment of the National Higher Education Strategic Plan (PSPTN) in four phases beginning 2007, which have set a number of critical agenda projects (CAP) - One of the initiatives is e-learning. The launching of Dasar e-Pembelajaran Negara (DePAN) in 2011 has indirectly enforce higher education institutions in Malaysia including Universiti Malaysia Pahang (UMP) to deploy e-learning initiatives. One of the main approaches in e-learning in any institution of higher education is through the implementation of blended learning. CAP E-Learning and DePAN describe the front, the shape of the material and technological base to be used by higher education institutions in implementing blended learning, but there are no fixed measures in assessing the performance of the business concerned.

Blended Learning is a hybrid of classroom and online learning that includes some of the conveniences of online courses without the complete loss of face-to-face contact (Rovai, 2004). The education institution needs to have a strategic dashboard reporting tools to analyse and monitor the Blended Learning performance. Dashboard is a visual display of the most important information needed to achieve one or more objectives; consolidated and arranged on a single screen so the information can be monitored at a glances. (Few, 2006)

Strategic Dashboard Reporting Tools is an integrated expansion innovation from UMP's current KALAM E-Learning system (Knowledge And Learning Management). It is a dashboard system with a multi-functional features designed to support online learning processes. Strategic Dashboard Reporting Tools is incorporated within UMP staff and students' portal with a single sign-on feature. This reporting tools is also able to generate accurate reports by filtering the unrelated courses for Blended Learning and multimedia contents report.

By using Strategic Dashboard Reporting Tools, lecturers are able to monitor their Blended Learning performance as well as their content of teaching resources while assisting them to achieve the BL status for their subjects taught for any particular semester. They are also able to retrieve their contents from previous semesters by using the archive feature in this dashboard. MasterView feature is granted to the Board of Senate and UMP administrators for teaching and learning activities, are also for Center for Academic Innovations and Competitiveness (CAIC) for them to monitor the overall BL performance from every faculties at UMP.

Strategic Dashboard Reporting Tools is a fully open source system hence it can easily customizes the contents and reports to fulfil the current teaching and learning needs. It is being developed on open web technologies such as HTML5, CSS, JavaScript and Bootstrap technology and open source system, therefore it can be accessed at anytime and anywhere by using any mobile gadgets. It is also compatible with all browsers and accessible on the cross-platform and devices.

This Strategic Dashboard Reporting Tools has a potential value to be commercialized as other Blended Learning platform such as Hapara Dashboard, Moodle Course Checks and Moodle (GSB) Gold Silver Bronze. The commercialization can be arranged by providing unlimited users, unlimited servers and online documentation including one year technical support.

Table 1: Comparison Between Strategic Dashboard Reporting Tools and Other Platforms.

Comparison Features	Hapara Dashboard	Moodle Course Checks	Moodle (GSB) Gold Silver Bronze	Strategic Dashboard Reporting Tools
Moodle supported	No. Only for Google Apps (GAFE)	Yes	Yes	Yes
Device support	Web Mobile Support	Web Mobile Support	Web on desktop only	Web Mobile Support
Depth of detail	For lecturer/teacher level only	Very minimal	Very minimal	Very detail. Up to 3 levels (lecturer, faculty and university)
Originality	Source code is not available. No customization	Source code is available but difficult to customize	Source code is open but no longer supported since 2012	Source code is available and easy to customize.
Pricing model	Per user and recursive every year.	Free and without support	Free and without support	Per site and relatively cheap.

## Acknowledgement

We would like to thank our department Pusat Teknologi Maklumat dan Komunikasi (PTMK), our sponsor - Centre for Instructional Resources and e-Learning (CIReL) as well as all UMP staff who had contributed to this innovation initiative.

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## Integrating Task-Based Blended Learning Approach in Teaching Public Speaking

**Ainol Haryati Ibrahim, Hafizoah Kassim, Nik Aloesnita Nik Mohd Alwi, Zailin Shah Yusoff**

Universiti Malaysia Pahang, 26600 Pekan, Pahang, Malaysia

ainol@ump.edu.my

hafizoah@ump.edu.my; aloesnita@ump.edu.my; zailinshah@ump.edu.my

**Highlights:** Public speaking is a sustained formal presentation made to an audience. For the English as a Second Language (ESL) learners, practice enables them to identify and address speech-related concerns prior to delivery. As such, it is highly encouraged for the students to engage in practice to promote skills training. In skills training for public speaking, the speech planning process is divided into specific skills that can be mastered, first, in isolation, and then together. Task-based instruction is an ideal tool for implementing the principle of skills training especially with the use of technology. Thus, there is potential for employing task-based approach for public speaking in a blended learning environment.

**Key words:** Blended learning; Communication; ESL; Public speaking; Skills training; Task-based approach.

### Introduction

The task-based public speaking model in a blended learning environment (refer figure 1) is a model of a public speaking learning process focusing specifically on the speech preparation process, which uses task-based approach in a blended learning environment. The model includes different types of tasks students are assigned during the preparation process, and the tools they use in completing the tasks. It highlights the integration of tools for students' collaborative and self-access activities, and the face-to-face (F-T-F) time spent with the instructor. This model also demonstrates how the blended learning environment (i.e. student exposure and involvement in technology-based tools and platforms namely Wikispace and YouTube) allows for feedback from instructor and peers, self-paced learning on the part of the students, and integration of various teaching and learning approaches on the part of the teachers and students (Farahiza Zaihan, 2010; Stodel et al., 2006). With public speaking being the most feared communication situation, application of this model would assist learners to reduce their communication anxiety. This model therefore aims to expose students in a self-discovery learning process while encouraging teachers to be creative in their teaching approaches.

Public speaking is an activity involving mental and physical presentations, and an effective speaker requires physical coordination, mental concentration, content organization and skills practice (Fujishin, 2009). For the ESL learners, performing a task in front of the class increases the communicative stress, and is predicted to lead to a reduction in fluency and complexity. Ellis (2003) proposes that ESL learners' problems in production may be reduced if they are given time to plan before they begin to speak. Nation and Newton (2009) suggest that because formal speaking, such as giving a speech in class, involves long turns, learners need to be aware of ways to plan the time they are given to speak. When teaching students to make oral presentations or to give speeches, it is important for the instructor to provide opportunities for the students to practice giving prepared, extended presentations or speeches in class.

Practice enables individuals to identify and address speech-related problems or concerns prior to delivery. Experts recommend that in order to improve performance in public speaking, the practice sessions must be as realistic as possible (Sprague & Stuart, 2005). Smith and Frymier (2006) emphasize that since realistic practice develops skills, practicing before an audience, which is relatively realistic practice, seems more effective than practice methods which do not involve audience. As such, it is highly encouraged for the students to engage in public speaking practice in a real context as it promotes skills training. Skills training is based on the simple principle that the better one knows how to do something, the less anxious one will feel about doing it (Sprague & Stuart, 2005).

Task-based instruction is an ideal approach for implementing the principle of skills training. For example, research has shown that task-based pair and group activities promote students' greater involvement in the learning processes and simultaneously support instructors' monitoring as well as encourage feedback by peers and instructors (Bygate, 2015). Similarly, it has been acknowledged that task-based instruction provides opportunities for learner-initiated learning outside the classrooms, thus encouraging greater learner improvements. Therefore, there is a potential for employing task-based approach in public speaking classroom in a blended learning environment.

This model is advantageous in terms of supporting the Malaysian Education Blueprint (Higher Education) shift number 9 towards achieving a globalized online education and the promotion of multi-disciplinary approaches to learning (i.e. online learning and face-to-face). Such learning experience is able to prepare students in facing the globalized workforce. By mediating teacher-student and student-student interactions for effective task-based blended learning

experience, and providing students with continuous support, assessment and learning experience through web 2.0, this model supports the global efforts towards online education which can be beneficial for all educational institutions and marketed as training and services.



Figure 1. The task-based public speaking model in a blended learning environment

## Acknowledgement

We are grateful to the Ministry of Higher Education Malaysia and Universiti Malaysia Pahang for the fund provided for this project.

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## Design of an Intervention System for Social Media Addiction in Postgraduate Education

**Helmi Norman, Huseyin Dogan, Amen Alrobai, Nan Jiang, Norazah Nordin, Anita Adnan**

Faculty of Education, Universiti Kebangsaan Malaysia, Bangi, Selangor, Malaysia

Faculty of Science and Technology, Bournemouth University, Bournemouth, Dorset, United Kingdom

Doctorate Support Group

helmi.norman@ukm.edu.my

**Highlights:** Facebook addiction has recently become a major concern and has been reported to have negative impacts on postgraduate studies. Although previous studies have studies on the effects of Facebook addiction in learning settings, yet there has been a lack of studies conducted on development of an intervention system for Facebook addiction in postgraduate studies. In an attempt to develop the system, we carried out an investigation on intervention features of a Facebook addiction system on postgraduate studies. The features of the system was studied using surveys distributed to 133 postgraduates in a Facebook support group for postgraduates called Doctorate Support Group (DSG). The survey was based on the Bergen's Facebook Addiction test, which was used to assess postgraduates' Facebook addiction level. The survey also assessed postgraduates' perceptions of intervention features for Facebook addiction, which are: self-monitoring, manual control, notification, automatic control, and reward features. Findings indicated that the two most important intervention features are notification and automatic control features, while the least important ones are manual control and self-monitoring features. The findings is novel to the body of knowledge as it could assist future developers in designing more effective intervention features to control Facebook addiction for postgraduate education.

**Key words:** Postgraduate education, intervention tool, social media addiction

### Introduction

Online social networking sites (SNS) have recently become a ubiquitous platform to socialize in our daily lives where more than one billion people have been reported to use SNS platforms on a regular basis (Ellison, 2007; Andreassen, 2015). One of the most popular platforms used are Facebook and Twitter, where recent statistics by Facebook has reported that as of December 2014, there were 1.39 billion active users who use their platform on a monthly basis (Facebook, 2015) while Twitter reported that 500 million "Tweets" (short messages in Twitter) are sent per day (Twitter, 2015). SNS allow people to socialize online creating virtual connections that remove the distance barrier in facilitating real-time and asynchronous communications among one another (Ellison, 2007; Andreassen, 2015).

Although SNS offer several advantages to its users, SNS have been reported to cause a behavioral addiction termed as "SNS addiction" (Ryan et al., 2014). SNS addiction is defined as an addictive behaviour caused by a high level of motivation to log on or use SNS as well as excessive use of SNS, which negatively affects other face-to-face social activities, studies, jobs, interpersonal relationships, and physical health (Andreassen & Pallesen, 2014). A recent review by Ryan et al. (2014) have reported that SNS addiction (i.e. Facebook addiction) have been reported to cause addictive behaviors including mood alteration such as depression and anxiety (Hong et al., 2014), development of deficient self-regulation (Sharifah Sofiah et al., 2011), as well as task avoidance and procrastination (Sheldon, 2008).

To date, most of the recent research in SNS addiction has been carried out on the factors that lead to SNS addiction as well as SNS addiction measurement scales (Ryan et al., 2014; Andreassen, 2015). Researches in SNS addiction include studies by Hong et al. (2014) and Cam & Isbulan (2012), Hong et al (2014) carried out a study with 241 Taiwanese university students and found out that factors such as self-inferiority and a having depressive character have an influence on Facebook addiction. Meanwhile, Cam and Isbulan (2012) studied the effect of Facebook addiction on gender with 1257 Turkish university students. The study's findings revealed that the male students had a higher SNS addiction levels as compared to female students.

With regards to SNS addiction measurement scales, past literature has also shown that several SNS addiction instruments have been developed across the globe. They include the Norway's Bergen Facebook Addiction Scale (Andreassen et al., 2012), Peru's Facebook Dependence Questionnaire (Wolniczak et al., 2013), USA's Social Networking Website Addiction Scale (Turel & Serenko, 2012), and Australia's Addictive Tendencies Scale (Wilson et al., 2010). These instruments have different theoretical foundations – Norway's scale is based on a general addiction theory, Peru's scale is based on an Internet addiction scale, USA's scale based on a video game addiction theory, while Australia's one is based on general addiction theory and research on excessive instant messaging (Andreassen, 2015).

Although past studies have vastly focused on factors that lead to SNS addiction and SNS addiction measurement scales, there is still a lack of studies that focus on online intervention systems for SNS/Facebook addiction (Ryan et al., 2014; Andreassen, 2015). Moreover, there are also limited studies that focus on SNS/Facebook addiction and interventions for postgraduate education (Koc & Gulyagci, 2013). Past literature that focus on online intervention systems for addiction towards technology includes studies in areas related to smartphone and internet addiction. With regards to intervention systems for internet addiction, Su et al. (2011) carried out a study with 65 university students from China. In their study, an intervention system was developed to assist students in reducing excessive online usage by providing online plans and timely reminder cards based on online usage patterns. The study found out that the systems had a positive impact on online usage, where students' weekly online usage was reduced. As for intervention systems for smartphone addiction, Lee et al. (2014) developed an intervention system for smartphone addiction. The system monitors users' smartphone activities in terms of user GPS location, internet access location, and time. The system then analyzes the smartphone addiction level and performs smartphone addiction interventions based on clinicians' decisions.

In relation to online intervention systems for SNS/Facebook addiction for postgraduate education, there are still limited studies. Recent literature indicated that most of the studies related to addiction to technology in postgraduates studies where either related to Internet addiction or a mixture of postgraduates and undergraduates for Facebook addiction. For internet addiction in postgraduate education, Adiele and Olatokun (2014) investigated 1022 African students who were either at Postgraduate Diploma, Master, or PhD level. They found out that internet addiction was related to factors such as pleasure seeking and social communication. With regards to Facebook addiction in postgraduate studies, Sharifah Sofiah et al. (2011) investigated Facebook addiction motives with 380 postgraduates and undergraduates and revealed that motives that contribute to addiction are factors such as social interaction, passing time, entertainment, companionship, and communication motives. Nevertheless, these studies only focused on motives of SNS/Facebook addiction level but not on online intervention systems for SNS/Facebook addiction. Hence, in an attempt to fill the gaps related to research on online intervention systems for SNS/Facebook addiction, the study develops an online intervention tool for Facebook addiction. The features of the tool are proposed based on the relationship between online features for Facebook addiction intervention systems and Facebook addiction levels in postgraduate education.

## **Content**

**Description of New Design:** The new design produced is novel as there are very limited studies on social media addiction in postgraduate education. The design is based on two studies – a study on factors that contribute to Facebook addiction and another study that developed a smartphone addiction tool. Based on the two studies, a survey was distributed among postgraduates in a postgraduate support group called Doctorate Support Group (DSG) and a PLS-SEM analysis was conducted to identify the strongest and weakest factors that contributed to social media addiction, as well as the most and least important features in development of a social media addiction tool.

**Background of New Design:** The new design produced was based on the Facebook addiction factors and online intervention features. With regards to Facebook addiction, the factors were adapted based on Andreassen et al.'s (2012) SNS addiction measurement scale (Table 1, Figure 1). The scale consisted of six factors, which are: salience, tolerance, mood modification, relapse, withdrawal, and conflict issues as well as 18 respective indicators. The salience construct is related to the mental state of continuously thinking about Facebook, while the tolerance construct is related to tolerance level of Facebook usage (e.g. spent more time on Facebook than initially intended). The mood modification construct is associated with whether Facebook affects current moods of the user and the relapse construct is linked with failed attempts of Facebook usage reduction. The final two factors, withdrawal and conflict are related to negative conditions and effects due to failure of accessing Facebook, where withdrawal is associated with negative conditions such as becoming restless due to failure in accessing Facebook, while conflict is linked with negative effects such as Facebook causing negative impacts on current studies or jobs.

For possible online intervention features for a Facebook addiction system during postgraduate studies, the factors were adapted based on Lee et al.'s (2014) study (Table 1, Figure 1). The five factors of Facebook intervention features are: self-monitoring, manual control, notification, automatic control, and reward. Self-monitoring construct refers to features that track users' Facebook usage including usage time, frequency, locations, and mood while manual control construct is related to features which allow user to manual limit Facebook usage based on indicators that includes manual limiting Facebook usage based time, location, Facebook features, and mood. The third construct (notification) is associated with intervention features with regards to notification of excessive Facebook usage based on time, location, features, and time. Meanwhile, for the automatic control construct, this construct is linked to features that automatically limit Facebook usage based on time, location, frequency of use, and mood. The final construct is the reward construct, where the construct is related to intervention features such as rewards mechanisms based on usage, location, frequency, and mood.

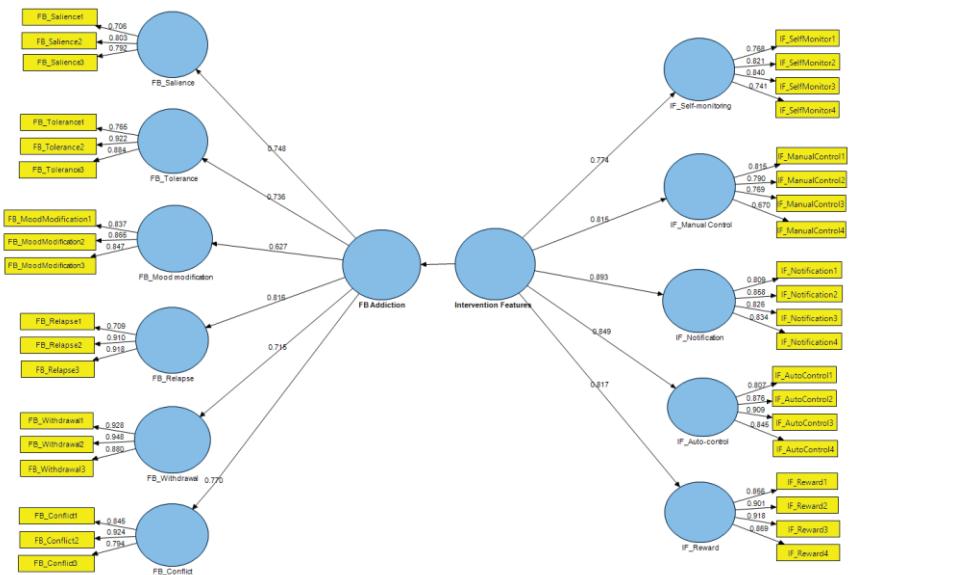
Table 1: The constructs and respective indicators of the online intervention features for Facebook addiction

Construct	Indicator
Self-monitoring feature (IF_Self-monitoring)	Track Facebook usage time Track Facebook frequently used features Track location of Facebook usage Track mood while using Facebook
Manual limit feature (IF_Manual limit)	Manually limit Facebook usage based on time Manually limit Facebook usage based on location Manually limit Facebook usage based on features Manually limit Facebook usage based on mood
Notification feature (IF_Notification)	Notification of excessive Facebook usage based on time Notification of excessive Facebook usage based on location Notification of excessive Facebook usage based on features Notification of excessive Facebook usage based on mood
Automatic limit (IF_Auto-limit)	Automatically limit Facebook usage based on time Automatically limit Facebook usage based on location Automatically limit Facebook features based on frequency of use Automatically limit Facebook usage based on my mood
Reward feature (IF_Reward)	Provide reward based on Facebook usage time Provide reward based on Facebook usage location Provide reward based on Facebook feature frequency Provide reward based on mood using Facebook

\*IF stands for intervention online feature

Findings indicated that the two most important intervention features are notification and automatic control features, while the least important ones are manual control and self-monitoring features. As for Facebook addiction, the strongest contributing factor is relapse while the relapse, while the least contributing factor is mood modification.

Figure 1: The new design of the online intervention system's features for Facebook addiction



**Importance of New Design to Education:** The new design contributes to higher education, particularly in the field of social media addiction in postgraduate education. The two most important intervention features are notification and automatic control features, while the least important ones are manual control and self-monitoring features. This indicates that postgraduates prefer an online intervention system which provides notification of excessive Facebook usage based on time, location, features, and mood. Postgraduates would also prefer the automatic control be included in the intervention system. This feature would automatically limit their Facebook usage based on time, location, frequency of use, and mood. By inclusion of these features in an online intervention system, this would contribute in control of social media addiction in postgraduate education.

**Advantages of the New Design:** The new design could assist future educators and researchers in understanding how social media addiction affects postgraduate education and identify potential solutions for social media addiction control. With regards to system designers and developers, the features identified could assist them in a more effective system for social media addiction.

**Commercial Value of New Design:** The new design is highly commercial as it could be used in design and development for intervention tools for social media addiction in the higher education sector. The new design could be further investigated in primary and secondary educational settings, which could also assist in social media addiction management. Furthermore, the new design could be used in non-educational settings, such as in corporate settings, to prevent social media from affecting work efficiency.

## Acknowledgement

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## i-CHO Kit: Islamik Cakna Hal OKU Kit

**Roslinda Alias (PhD), Nor Aziah Alias (Prof.), Johan Eddy Luaran (PhD), Raiha Shahanz Redzuan,  
Azwadi Mokhtar, Saipol Barin Ramli, Nuzha Mohd Taha**

Universiti Teknologi MARA, Puncak Alam, Selangor Malaysia

linda512@salam.uitm.edu.my, noraz112@salam.uitm.edu.my, johaneddyluaran@gmail.com, missrai\_85@yahoo.com

Sungai Buloh, Selangor Malaysia  
azwadi77@gmail.com

Universiti Pendidikan Sultan Idris, Tanjung Malim, Perak Malaysia  
saipolbarin@gmail.com

Universiti Tun Abdul Razak, Selangor Malaysia  
nuzha@unitar.my

**Highlights:** i-CHO KIT or Islamik Cakna Hal OKU Kit is to give an early exposure to the pre-school Muslim kids on the awareness of the persons with disabilities (PWDs) issues from the Islamic point of view. i-CHO Kit is developed to help teachers or facilitators inculcating the positive awareness on the issues, challenges and barriers faced by PWDs on the pre-schools kids by emphasizing on the Islamic perspectives

**Key words:** awareness, PWDs, pre-schools, teachers, Islamic perspectives

### Introduction

i-CHO Kit is an innovation for awareness inculcation towards persons with disabilities (PWDs) among pre-school children in Malaysia. By emphasizing on the Islamic perspectives, i-CHO Kit is in line with the Malaysian Persons with Disabilities Act 2008 which emphasized on the PWDs equal involvement in the community. i-CHO Kit is the exemplification of the 'Model of Technology Supported Learning for Special Educational Needs (SEN) Learners', which it could be considered the most comprehensive model for PWDs in the Malaysian universities to the date. I-CHO Kit is not only has a big potential as a tool in instilling awareness towards PWDs among pre-schoolers, but also it is also a tool for educating pre-schooler on how to treat PWDs properly.

### What is i-CHO Kit?

Islamik Cakna Hal OKU Kit or i-CHO Kit is an innovation for awareness and positive attitudes inculcation towards persons with disabilities (PWDs) among pre-schools children in Malaysia. The main focus of i-CHO Kit is to demonstrate on how to treat PWDs appropriately as highlighted by Islam. Definitely this is also in line with the Malaysian Persons with Disabilities Act 2008, which emphasized on PWDs involvement in the Malaysian society without discrimination.i-CHO Kit is developed to help teachers or facilitators instill the positive awareness on the issues, challenges and barriers faced by PWDs in pre-school children by emphasizing on the Islamic values modules. i-CHO Kit consists of suitable paraphernalia that will expose pre-schools children to the valuable experience of becoming PWDs. This is indirectly will instill positive awareness and attitudes towards issues related to PWDs, including the barriers and challenges encountered by PWDs in their daily life. The manual of using i-CHO Kit is also included for the guidance for the teachers to use the kit.

For this time, improvisation has been made with the development of the online version manual for teachers or educators on how to use i-CHO Kit effectively.

### Background of i-CHO Kit

One of the major problems faced by the PWD at the university is the negative attitudes towards this group (Roslinda Alias, Nor Aziah Alias, & Abu Bakar Ibrahim, 2016; Roslinda Alias, Nor Aziah Alias, Abu Bakar Ibrahim, Halimaton Attan & Azman L Kadir, 2013; Roslinda Alias & Nor Aziah Alias, 2012; Hasnah Toran, Tajul Arifin, Mohd Hanafi, Mohd Mokhtar, & Nur Hazwani, 2010; Norshidah Mohammed Salleh & DK Hijrah Mahani, 2012). Negative attitudes could take many different forms such as social discrimination, lack of awareness and traditional prejudices (UNESCO, 1994).

Roslinda Alias and Nor Aziah Alias (2012) revealed the PWDs learners encountered challenges in the teaching and learning including the lack of awareness on PWDs needs among academic staff and administrative staff. Thus, knowledge and awareness on PWDs among non-PWDs learners would lead to positive attitudes towards PWDs friends (Roslinda Alias, Nor Aziah Alias & Abu Bakar Ibrahim, 2016; Hafiz Halim, personal communication, May 20, 2011; Hasnah Toran et al., 2010; Fernie & Henning, 2006; Pliner & Johnson, 2004). Positive attitudes and awareness towards PWDs should be inculcated since ones at the young age i.e. during the pre-school age. This is because the pre-school age i.e. from 4 to 5 years old is the critical age of which they form their attitudes about PWDs at this stage (Gerber, 1977 as cited Favazza & Odom, 1997). Favazza and Odom (1997) also stressed that children learned attitudes via direct or indirect experiences "with people, objects and events".

## Why i-CHO Kit?

i-CHO Kit is developed to help teachers or facilitators instill positive awareness on the issues, challenges and barriers faced by PWDs in the pre-schools children by emphasizing on the Islamic values modules. Furthermore, i-CHO Kit could be a useful tool of an exposure for the pre-schools' children on the simple issues related to PWDs including barriers and challenges in their life. It is also the aim of the kit is to educate pre-school children on how to treat and acknowledge the PWDs as a part of the society.

## The Usefulness and Novelty of i-CHO Kit

i-CHO Kit is exemplified through the Model of Technology Supported Learning for SEN Learners that has not been developed for Higher Education (Roslinda Alias, 2016). It is probably the most comprehensive models for SEN learners in Malaysian HEIs. The Model of Technology Supported Learning for SEN Learners has been developed thoroughly to address the needs and challenges faced by the SEN learners in Malaysian HEIs. It is based on the two needs assessments conducted among the public and 66 SEN learners from eight Malaysian public universities. The Model was then validated by a heterogeneous group of 11 subject matter experts (SMEs) from overseas and local via the Delphi Technique. The consensus among the SMEs was achieved at the Round Two of Delphi. This indicates that the Model of Technology Supported Learning for SEN Learners is feasible and accepted to be implemented.

The Model of Technology Supported Learning for SEN Learners comprises 6 components including: 1) Academic Affairs, 2) Student Affairs, 3) Library, 4) University Administration, 6) Community, Industrial Networking and Alumni and 6) Special Department/Unit for SEN learners. i-CHO is one of the components of Special Department/Unit for SEN learners. The first i-CHO proof of concept (POC) has been tried out on 27 February 2015 at one of the renowned Islamic pre-schools at Sungai Buloh for both morning and afternoon sessions. Each session took for about 40 minutes to accomplish. Based on the feedback from the teachers and pre-school kids, i-CHO Kit is found to have a great potential in promoting awareness and creating positive attitudes towards PWDs. In addition, i-CHO Kit also could be used as one of the tools in educating pre-school kids on how to treat, acknowledge and respect PWDs as part the society as highlighted by Islam.

## The Commercial Value of i-CHO Kit

i-CHO Kit is one of the initiatives for the researchers to instill the awareness and positive attitudes to public, especially among the pre-school children in Malaysia. Apart of playing roles in instilling awareness and inculcating knowledge for the young generation to have a well-manner towards PWDs, i-CHO Kit is seen to have a big potential to be commercialized as one of the essential tools for pre-school teachers too. Besides playing a vital role in promoting young children on how to respect PWDs, i-CHO Kit has a great potential to be commercialized as a useful educational tools for pre-school teachers in educating their pre-school kids on appreciating themselves as the best creation of Allah regardless of their backgrounds, races, skin colours as well as physical appearances as stated in Holy Quran:

"Indeed, We have created the human being upon the best of forms" (Surah At-Tiin:4).

And this also in line with the Malaysian Persons with Disabilities Act 2008 that emphasized on the equal treatment and participation of the PWDs in the community so that this will foster the creation of the inclusive society in Malaysia. The product has been registered under the intellectual property (IP) in June 2015 – Akta Hak Cipta 1987 (Akta 332) and Peraturan-Peraturan Hak Cipta (Pemberitahuan Sukarela) 2012 with the reference number: CRYL00002735.

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## **Positioning & Globalising Malaysia Online Learning through Global Access Asia (GAA): UniMAP Experience**

**Salleh Abd Rashid, Siti Azura Abuzar, Siti Amiza Hassan, Amir Farhan Md Saad**

Universiti Malaysia Perlis, Kangar, Perlis, Malaysia

salleh@ unimap.edu.my, azurabuzar@unimap.edu.my, sitiamiza@unimap.edu.my, [amir.frhn@yahoo.com](mailto:amir.frhn@yahoo.com)

**Highlights:** The advancement of technology and the new wave of learning approaches was the impetus for Global Access Asia (GAA). The idea arose during the 12<sup>th</sup> Asian University Presidents Forum (AUPF) 2013 and aiming to increase international learning opportunities for students of AUPF-member universities through a collaborative online platform focusing on the diversity and global role of Asia. Each participating university may offer one or two of its top-notch courses online, which students at other participating universities may take for free to earn academic credits. Thus, the paper describes the involvement and its implementation of UniMAP in GAA online learning platform.

**Keywords:** online learning, Global Access Asia, credit transfer, e-learning, higher education

### **Introduction:**

During the 12<sup>th</sup> Asian University Presidents Forum (AUPF) 2013, a task force with representatives from University Malaysia Perlis (UniMAP), Bangkok University, Dongseo University (DSU) and Josai International University was formed to advise on the project of GAA as an official affiliate of the AUPF with the aims to explore the online learning opportunists in Asian region and increase the visibility of it as the Premier Educational Hub in the world (Abd Rashid, S. & Mohd Zain, Z., 2014). In addition, it was established as an international learning and teaching networking among Asia countries to promote academic collaboration and to create educational opportunities. UniMAP as a participated university in the GAA was utilize the platform through the "Thinking Skills" subjects that created by School of Human Development and Techno Communication (iKOM) that available online for the UniMAP students and for students of other participating institutions.

### **Global Access Asia - UniMAP Experience:**

UniMAP utilized the opportunity to implement the web-based learning or online learning in the teaching and learning activities which is this coming at a time of great transformation in how our students, lectures and institution learn and how we managed to transfer learning into performance in the classroom and online (blended learning), remains as important as ever. The effectiveness of GAA online learning can be measured as it provided the students with different educational resources and various kinds of learning activities which they can use it to improve their education performance.

### **Level of Participations**

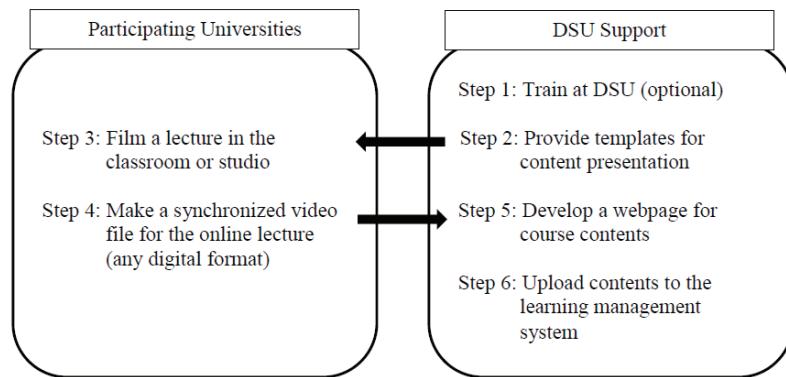
Level of UniMAP participated in Global Access Asia in the following ways:

- a) Promote the GAA online learning platform at the university so that students may audit courses or view non-credit contents.
- b) Sign a multilateral academic cooperation agreement so that students may take credit-based courses.
- c) UniMAP contributed one credit-based course (*Thinking Skills subject*) to be made available to UniMAP students and any participating university students.

### **Credit Based Course Details**

As UniMAP offers one subject that credit based courses, it follows a 15-week schedule, including one week for the midterm and one week for the final exam. Two lectures of at least 25 minutes in length, or one lecture of at least 50 minutes in length, should be offered each week, and the overall coursework load should be suitable for two academic credits (76-96 hours of student work, including lecture periods).

The details guideline for the content creation has been circulated among the participating universities (Spyropoulou, N. et al., 2014). Generally, the content creation may involve the process as illustrated by Figure 1.



**Figure 1:** Process of content creation

### Credit Transfer

Credit-based courses offered by UniMAP through GAA online learning platform handled in the same way as those offered through student exchange programs. Specifically, UniMAP has provided transcripts to each student which takes the subject completely. A multilateral academic cooperation agreement may be used to facilitate credit transfer. It is the responsibility of home universities to assess the applicability of any courses taken by their students.

### How It Works

Below are the steps how the GAA online learning platform works for students to register the course.

#### STEP 1: Find a course

Students those interested to join may search the available course which is '*Thinking Skills*' subject in UniMAP GAA online learning platform.

#### STEP 2: Contact UniMAP GAA Representative

Find UniMAP GAA representative's contact info in the Participating Universities section. Ask about applying course credits earned toward a degree. If the course is suitable, UniMAP GAA representative will help the students to register.

#### STEP 3: Receive student's ID and Password

Once student's registration is completed, UniMAP GAA representative will give to the students an ID and password for logging into the GAA learning management system.

#### STEP 4: Take a GAA Course

Follow the course schedule and contact the instructor with any relevant questions. Transcripts will be sent to the student's home university when the course is finished.

### Quality Assurance

A primary intention underlying GAA involves creating mutual benefits for participating institutions by sharing one another's top-notch educational contents. In order to ensure a high quality of educational contents, only contents endorsed by the Chief Official of the contributing university shall be offered through Global Access Asia online learning platform.

### Benefits and Importance of GAA Online Learning Platform:

UniMAP took the opportunities and taking a first step by joining the GAA online learning platform that has the potential to offer the best experiences of various teaching and learning method for both, students and instructors. The available technologies support operated of the online learning to make a course new and exciting that is always changing and course content can and should be updated quickly to give students the very latest information. This is important in the online learning for UniMAP student's to keep up-to-date with the latest approaches and information of new knowledge related to the subjects.

Surely implementing GAA online learning platform has been proved that it can contribute various benefits to UniMAP and, especially for the students with more flexible learning style and it can be done anytime and anywhere in a short of time that can fit around the student's daily schedule. The mobile approach method of online learning makes the learning process look easier for the students as it always can be done on laptops, tablets and smartphones as mentioned before. Whilst traditional learning is expensive, takes a long time and the results can vary, the online learning is now a given fact and it can offer an alternative that is much faster, cheaper and potentially better for improving the student performances. In addition, through this GAA online learning platform, the

international visibility of UniMAP is increasing, especially in Asian countries to make courses available in online learning systems which anyone can take it to get extra academic credits.

**Conclusion:**

Although it is not yet clear how digital education will evolve in the future, UniMAP very confident that online learning is effective approaches to offer different kinds of learning style and can improve student's quality and performance in their studies. The transition to GAA can set participating universities on a positive path to achievement.. GAA is able to play major role in contributing to the success of such collaboration by focusing on the diversity and global role of Asia.

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## Talk2me: Digital traffic light to monitor students' learning

**Johan @ Eddy Luaran, Jasmine Jain & Roslinda Alias**

Faculty of Education, Universiti Teknologi MARA, Shah Alam, Selangor, Malaysia.  
[johaneddyluaran@gmail.com](mailto:johaneddyluaran@gmail.com)

School of Education, Taylor's University, Subang Jaya, Selangor, Malaysia.  
[jasminejain.soed@gmail.com](mailto:jasminejain.soed@gmail.com)

Faculty of Education, Universiti Teknologi MARA, Shah Alam, Selangor, Malaysia.  
[linda512@salam.uitm.edu.my](mailto:linda512@salam.uitm.edu.my)

**Highlights:** This work focuses on an innovation called "Talk2Me" which is an online tool serves as a backchannel to assist educators in monitoring their students' learning. It is an online tool similar to the use of traffic light cards in a typical classroom. This work further discusses about how it is useful in developing students' metacognition and fosters collaborative classroom. This work also draws upon the use of "Talk2me" in a pilot project involving a small-size class and how it has benefitted the teacher and students when it is used as a medium for formative assessment.

**Keywords:** formative assessment; web tool

### Introduction

Traffic light is a strategy that allow students to assess their progress towards achieving the learning goals set by the teachers, which is made available to them. In a typical classroom, teachers would usually give out an in-class task and while the students are completing the tasks, teacher would walk around to facilitate the completion of the tasks assigned to the students. Typically, traffic light cards are used by the students to indicate their ability to complete the task. "Green" colour infers that a particular student is swift at completing the task given, "yellow" means the student is able to do but is not confident with his or her work while "red" means the student needs help. The teacher would follow this pattern of recognition by offering help to those students who indicated "red" and even get those students who indicated "green" to assist students who displayed "yellow" cards. This strategy allows teacher to focus on students who are really weak, and allow scaffolding to happen intensively among the weak and moderate students in class.

### Content

Talk2me offers an alternative to this strategy, with an additional feature of including how the students perceived about their performance. It is a web-based backchannel where upon inserting their names, students are able to pick either "red", "yellow" or "green" to represent their perceived-ability in performing the task, plus an added advantage where they are able to articulate the concerns they have about the task they are attempting. With the extra feature of how they can put in their thoughts into words, "talk2me" allows more mature learners to communicate the questions they have, and get answered by their teacher in real-time through the same platform.

Getting the students to recognise their own ability is a self-regulating endeavour, which is important for their metacognition (Hattie, 2009). The exercise of getting the students to know where they are at in their learning, and the destination they need to arrive at is one of the most vital ingredient to produce students who are metacognitively sound (Hattie & Yates, 2014). Besides that, the usage of the tool also encourage collaboration among the advanced-students and those who are still struggling in achieving the success criteria of any particular topic. The dynamic of classroom integrating collaboration is really an element which cannot be overemphasized in producing learners of the 21st century.

Talk2me augments the traditional classroom by giving each student a voice, and extend conversation which deepens learning. It would be highly valued as a useful educational tool which enables instant formative assessment and feedback. Talk2me is designed with learners and learning as its crux and is envisaged to have significant impact to those who use it.

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## The Microbes Planet

Siti Farhana Bajunid, Mohd Amirul Faiz bin Zulkifli & Izyan fartini binti Md. Zuri, Harisson anak Kueh & Dr.

**Wan Zuhainis binti Saad**

**Universiti Putra Malaysia, Serdang, Malaysia**

[hanamel16.co@gmail.com](mailto:hanamel16.co@gmail.com), [mrrmirulfaiz@gmail.com](mailto:mrrmirulfaiz@gmail.com), [izyan.fartini@gmail.com](mailto:izyan.fartini@gmail.com), [harissonkueh14@gmail.com](mailto:harissonkueh14@gmail.com),  
[zuhainis@upm.edu.my](mailto:zuhainis@upm.edu.my)

### **Highlight:**

The Microbes Planet is a website full of interactive information specially designed from Malaysian primary and secondary schools for Science and Biology subjects. Together with a YouTube channel called MicrobeBuzz, provide information and interactive activities to enhance learning of Science and Biology among school students. A fun way of learning.

### **Keyword:**

Microbiology world, microbes, microbes channel, interactive website

### **Introduction**

Ever since the Malaysia Ministry of Education has introduced new syllabus and learning system that encourage students to be more IT competence, a website that display a lot of information on science would be the most suitable platform to encourage young learners to explore Microbiology beyond the text book. The topics covered in this website is consistent with the Microbiology syllabus in Malaysian Primary and Secondary Science and Biology text book. This website is not only packed with information but there are also interactive videos, quizzes, images, current issues and experiments that able to help students of 11-18 years old to understand more in Microbiology and makes the learning much more fun. In conjunction with the e-learning trend, this website also introduce Microbiology YouTube channel called MicrobeBuzz comprises of variety of videos such as fun facts, news and real laboratory procedures that students can watch and learn. Students can even ask questions in Ask the expert section regarding Microbiology or share any ideas on our website and email directly to us.

The website consists of three different levels, Level 1 emphasizes on student year 5-6 primary school, Levels 2 and 3 for Form 1-5 and A-level students, respectively. In Level 1, the content would be an introduction to Microbiology and the subtopics consist of types of microbes, morphologies, difference between good microbes and bad microbes and morphologies on agar plates.

The aim for level 1 is to make sure that these students are able to differentiate the types of microbes. Moreover, we also provide reasons why these shapes, sizes and colours are important to know mainly for identification purposes. We explain what Microbiologist in the laboratory do to identify and classify these microbes. Good microbes versus bad microbes are also important for these students to learn because they are able to differentiate the function of microbes and understand the facts of how microbes can be essential in life and not just showing their only pathogenesis or bad impacts in life.

In Level 2, the content consists of differences between unicellular and multicellular, sexual and asexual reproduction, food web and relationship between organisms and introduction to microscope and function. Our aim in level 2 is to clarify the students the basic differences between unicellular and multicellular cells and how it is important in classifying these microbes in groups. In addition, this website also explains the characteristics and differences between sexual and asexual reproduction and relate it how microorganisms are more abundance based on their reproduction characteristics. We also provide a brief explanation and videos on the functions of microscope because we want the students to understand how to use the microscope because some school have already prepared all the slides under microscope without giving the chance for students to explore on how to use the microscope themselves. So, this earlier exposure may help them to properly use the microscope before they enter university.

In level 3, the topics focus on differences of characteristics, structure and function between eukaryote and prokaryotes, factors for microbial growth, staining, microscope observation, movement of microbes and finally treatment and prevention of diseases. Level 3 are suitable for audience of upper secondary school and foundation of science or A-level students because the topics covered for microbial cells are more exaggerating and deeper aspects are focused in this microbiology subject. This early exposure is essential to learn at this stage before they planning to have an honours degree in any of the Biology fields.

This website only covers Microbiology topic because student finds this topic hard to study in school and needs to remember a lot of facts. To make this topic interesting and easy to learn, we spice up with the current issues in E-news, DIY section, downloadable mind maps and variety of videos to watch.

Website has been an e-learning platform for years as it is easy to use, user friendly and pack of information to students. It is important to encourage students to be IT competence by promoting advance learning of

Microbiology beyond the text book using website. The purpose of learning through website is for students to explore Microbiology in world wide web and encourage them to find more information than what have prepared in their text books. It is an alternative way of using technology than only depends on what have written in textbook. The information in the website may also help students to assist their school assignments and projects.

### **Impact**

By promoting learning through websites, certainly we are able to help students to understand the topic of Microbiology in depth using videos, articles, experiments and engaging them to interact actively in the website by providing a platform for them to ask questions and share their ideas through email. This website also can be linked to the game based learning Microtopia Land Augmented Reality game board. Students can experience playing while learning the Augmented Reality game board after learning few tricks that will be shared in this website. In this way, we are not providing only information in the websites but they are also able to experience other interesting features and activities that can be explored in the Microbiology world.

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## **Module Development Strategy of Active Learning Collaborative Online Course Platform Openlearning TITAS MOOC In The Malaysian Public Universities**

**Dr Hj Ahmad Nasir Mohd Yusoff & Nurmahfuzah Ab Razak**

Universiti Putra Malaysia, Serdang, Selangor

ahmadnasir@upm.edu.my

Universiti Kebangsaan Malaysia, Bangi, Selangor

Ezzah\_fuzz@yahoo.com.my

**Highlights :** Teaching modules become an important guide to the lecturer at the millennium to 21. The development of teaching technology and web 1.0 applications and the latest web 2.0 requires mastery of the lecturers especially with the birth of Gen 'Y', Gen 'Z' and now Gen 'Z Alpha'. interest and attraction of learning should be adapted to the climate of this technology. The process of teaching and learning must be a transformation and strategy. Active learning is online for collaboration with the 'tools' must stimulate enthusiasm and motivation in the process of P & P. For TITAS based courses MOOC (Massive Open Online Course) should be in line with the 'tools' to boost the process of P & P.

**Keywords:** module, Instructional technology, MOOC, collaboration tools.

### **Abstract**

Malaysia Education Blueprint 2015-2025 (USA) outline efforts to achieve developed nation by the year 2020. Every public educational institutions (UA) or private (US) to improve access to and quality of higher education. Higher education enrollment increased by 70% to 1.2 million students in 11 years. Ministry of Education recommends that all UA developing OpenCourse Ware (OCW) as the first pilot implementation of Massive Open Online Courses. Create (Council Heads of e-Learning Coordinator IPTA Malaysia) is responsible for ensuring the application of this MOOC realized. Starting semester 2015/2016 all geared towards developing a 20 OCW UA. UPM has 5 main chapters TITAS courses developed involving Islamic Civilisation Malay civilization, Indian civilization, Chinese civilization and Current Issues and Future Challenges Civilization. Exercise of course TITAS (UPM) absorbed in PutraMOOC. KPM and international level it is known TITAS MOOC and developed by UPM Academic Development Centre (CADe) with the Faculty of Human Ecology. The purpose of sharing e-content for free by UPM and the global community as well as to motivate lecturers to develop original course. To strengthen the R & D activities, the application of collaborative tools into practice, so that lecturers have the creativity and students more interested in learning. The objective of building a model of R & D in the implementation of TITAS MOOC courses and practicing the use of collaborative tools in applications such as Blended Learning Tes.Blendspace, Mindomo, Meinsmester, Mind42, Wallwisher, Popplet, Kahoot It, Present Me, Trello and others. The study also aims to investigate the collaborative approach to e-learning courses that are currently using the platform TITAS 'Openlearning'. Lack of R & D, kreatviti and teaching techniques cause the students lose interest in learning. Collaborative learning strategies TITAS online MOOC students are expected to attempt to interact and share views and understanding, the learning period is longer, not boring and flexible, motivating interest in learning during the course taught TITAS, provide faster access to reference sources. Finally will enhance the performance of P & P. This research is expected to contribute and develop teaching and learning strategies in UA MOOC special TITAS and US.

### **Contents**

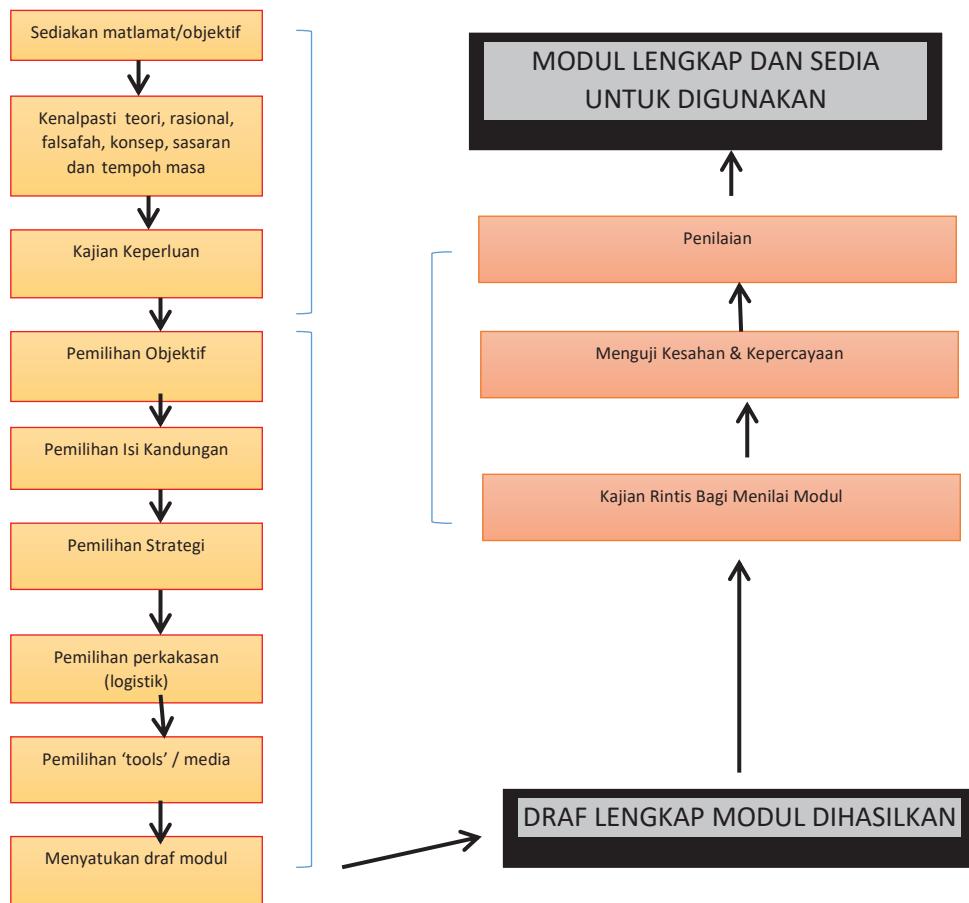
#### **Description Process Innovation**

- a) Sidek Mohd Noah, there are 5 steps to building modules: 1) set goals, 2) identify the theory, rationality, philosophy, concept, targets and time frame, 3) research needs, 4) set objectives, 5) select the content
- b) Jane Othman (2006) -there 4 principles for the development of modules: 1) students must be actively involved with teaching materials-2) activity is provided by detailed chapters, -3) even though the module is provided by a fixed course objectives and student learning styles in -4 ) is a student studying in talents, abilities and skills that are distinctive to the students

### **Design Module**

- a) In developing the module must have a module design. It involves teaching elements, interface design, technical and graphics
- b) The purpose of the design:
  1. Instructional design: the discipline of understanding and improvement of teaching and learning process that systematically to achieve P & P
  2. Interface design: the students can interact with the content via computer
  3. The technical design: related to the programming system / data required in instructional design and interfacing
  4. Graphic design: communication affective through the computer screen

Adaptation model sidek module construction that can be practiced for the development of active learning strategies module for collaborative online courses MOOC platform TITAS openlearning public universities in Malaysia



Note:

Module Development Phase 1 (Draft module)

Module Development Phase 2 (evaluation, trial module)

### The importance of education

- a) To help students interact and voice their opinions in the P & P
- b) change student behavior through different learning techniques
- c) teaching strategy can help students master the knowledge being taught
- d) Students feel more comfortable, confident and there is pressure to present their views and interact online
- e) Students are free to discuss, menguatarkan opinions and ask questions to the lecturer and friend
- f) A belief in the role of technology and applications online and as motivation in learning
- g) Increase the capacity and skills of writing and reading appropriate to make learning styles
- h) Collaborative online learning strategies to help students interact and express views
- i) Increasing the effectiveness of the teaching faculty and to attract students learn better and effective

### The importance of education and society

- a) online collaborative learning strategies to help students interact and produce insights
- b) To facilitate student understanding of the lecturers teaching materials
- c) Establish the P & Pe longer and flexi
- d) Increase the motivation and interest of students to lecturers
- e) Improving access to resources or teaching materials more easily and quickly
- f) Improving student performance and achievement
- g) encourage the students to think at higher levels there is a space to think, and views from various perspectives.

### Commercial value

- a) MOE: intention and design of the Malaysia Education Blueprint 2015-2025 (USA) achieved successfully
- b) Public universities: a module that can be patented and developed areas to generate income through the production of the product in the form of CD / DVD / web / online / ebook
- c) Lecturer: raise the level of R & D-based modules that transform P & P from traditional to modern, fast access and student resources can improve the holistic and dynamic performance

- d) NGOs: to strengthen communication with the university network, using experts to share ideas best education in 21st Century and provides publishing space and generating a good collaboration in improving the quality of education in Malaysia.

## **Appreciation**

Researchers would like to express appreciation to those who motivate, stronger recommend and help you get the hang of researchers about the role and importance of technology practices and collaboration online for process R & D among Dato VC UPM (Prof Dr Datin Aini Idris), Deputy Vice Chancellor Academic and International ( Prof Dr Datuk Md Nasir), Director CADe (Prof. Aida), deputy Director CADe (Prof Madya Dr Alyani), Dean of the FEM (Prof Dr Laily), the ministry of Education and Partners in JPKK that often motivate researchers to continue to explore and master the science this instructional technology. And also the organizer / UTM which provides space and experience sharing and sharing best teaching innovation in the 21st millennium

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## MIGHTY MICROBES

**Muhamad Fadly Shah bin Noor Effendy, Tham May Ling, Tam Xi Yuan, Megat Mohamad Irfan bin Rozilah , Chew Han Hoong & Dr. Wan Zuhainis binti Saad**

Universiti Putra Malaysia, Serdang, Malaysia

[muhamadfadlyshah@gmail.com](mailto:muhamadfadlyshah@gmail.com), [mayling1014@gmail.com](mailto:mayling1014@gmail.com), [VeronicaTx94@gmail.com](mailto:VeronicaTx94@gmail.com), [megatirfanr@gmail.com](mailto:megatirfanr@gmail.com),  
[hanhoong@hotmail.com](mailto:hanhoong@hotmail.com), [zuhainis@upm.edu.my](mailto:zuhainis@upm.edu.my)

**Highlight:** Gamification is used for students engagement, motivation, pique curiosity and instill interest. Once they are engage, highly motivated, they will learn. The Mighty Microbes are designed to engage learners in a form of game cards with augmented reality that facilitate learners in enhancing the understanding about microbes and their importance in daily lives.

### Keywords:

Mighty Microbes, Game Card, Microbes, Augmented Reality

### Introduction

Games usually allow us to master/learn important social skills such as communicating verbally, sharing, thinking and interacting with others. The term gamification was coined in 2002 (Marczewski, 2012). Mighty Microbes is a card games that will not only help you foster these abilities, it is also academically good for you because you are not only having fun, but you will gain basic knowledge about the microbes that live around and within you. Besides, the cards integrated Augmented Reality function to allow players to watch lively the video explanation of the information on the card. It is a new revolution of playing cards which is interactive through smart gadgets.

### Defining the problem

It started off by defining the problem we face about microbiology in society today. The general phenomena is public is less aware of the role of microorganisms in life and they are often stereotyped to be harmful. To really define the root problem, we realize our education system since primary school to high school did not really cover the harms and benefits of microorganisms. So how do we educate the targeted primary and secondary school students on such awareness?

### Problem Statement

The public, from primary school to adults are not well exposed on the knowledge of the world of microorganisms (harms and benefits of microorganisms).

### Ideation

Game is the best way to communicate a knowledge or information as it stimulates people's thoughts through the process (Morris, 2013). Playing card is one of the most popular indoor games shared by every level from kids to adults as they are convenient and can be played anytime. There are very few informative playing card games in the market. We came out with the idea of Mighty Microbes with Microbes cards that are able to educate public on general knowledge about microbes and Mighty cards that focus on the relations of microorganisms that are harmful or beneficial in our daily life.

### Evaluation and Execution

We had high school students to play our card games and feedbacks were given on the function of the cards, how much they could learn from there, the fun level of the cards as well as the design of the card to further improvise the quality of the playing cards. The card is played in a very simple concept by allowing the players to only refer to the colours and graphic to attract the attention of the players. Throughout the process, the players would have to read through the information on the card in order to complete certain 'quest' or 'punishment'. Certain biological terms such as 'mutualism', 'prey and predator' and 'parasitism' are also used in the game with similar concepts with the real definition of those words to get students to easily relate to themselves even more. The Augmented Reality with the use of technology through gadget would attract students as this would be a very fresh concept of combining both traditional indoor game and technology.

Game is always the most efficient way in teaching as a method that has been used to transform a classroom. By playing Mighty Microbes, oneself may be able to understand new concept and take different perspective about microorganism which is not only helping the students who are taking microbiology related courses but for other people it is some kind of general knowledge.

## **Impact**

Microbes are everywhere. They play an important role in our daily life although we don't always realise their existence. As we are also exposed to the real impact of microbiology only in degree level, we realize we also have the accountability to share the knowledge of microorganisms to the society so that they do not have stereotype where microbes are always harmful to us. Most importantly, it introduces this field to the public to raise interest of public on microorganisms, hence attracting more talents into this field in future. The unique selling point of this playing card is that Augmented Reality is being integrated into the playing system to create interaction between players and cards, hence allowing players to explore even further than what are presented on the cards. The modal needed to produce the playing card is low and the designs, information and playing method could be patented as they could not be completely similarly found in the market. The product has also been validated by real market through several times of demo and trials with the real targeted market who are students and parents.

## **Acknowledgement**

We are truly grateful to our advisor Dr Wan Zuhainis Saad all these while for always supporting us mentally and physically since the beginning. We have faced a lot of issues from ideation to prototyping and production, and it wouldn't be made possible without this supporting team and our supportive advisor.

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## Design of an Cross-disciplinary Engaging Learning Environment in Higher Education

**Norazah Nordin, Helmi Norman, Jamaludin Badusah, Wan Muna Ruzanna Wan Mohammad, Nurul Aisyah Kamrozzaman**

Faculty of Education, Universiti Kebangsaan Malaysia, Bangi, Selangor, Malaysia  
drnmn@ukm.edu.my, jhb@ukm.edu.my, helmi.norman@ukm.edu.my, munaruzanna@ukm.edu.my,  
aisyahkamrozzaman@gmail.com

**Highlights:** The World Economic Forum reports that there are 16 essential skills for the 21st century learning and one of the most essential skills are the 4C's, which are critical thinking/problem solving, creativity, communication, and collaboration. Yet, previous literature have reported that collaboration in cross-disciplinary teams at higher educational settings are problematic when learners collaborate in teams. This is due to different backgrounds and expertise of team members and poses several challenges due to differences in ideas, perspectives and viewpoints. Hence, to solve these problems, the study implements a cross-disciplinary learning design using massive open online courses a learning environment for learners from multiple disciplines (science, education, engineering, and humanities backgrounds) in higher educational settings. The study was conducted in a period of four months with 104 undergraduates, where they generated learning products with a cross-disciplinary team. At the end of the four-month period, an online survey was distributed to evaluate learners' perception of the learning environment with regards to learning materials and tasks. The learning design was based on two conceptual frameworks of transdisciplinarity and MOOC's learning materials and tasks design. Our findings revealed that MOOCs can be potential enhance cross-disciplinary learning in higher education.

**Key words:** Cross-disciplinary learning, engaging learning environment, MOOC, learner-generated products

### Introduction

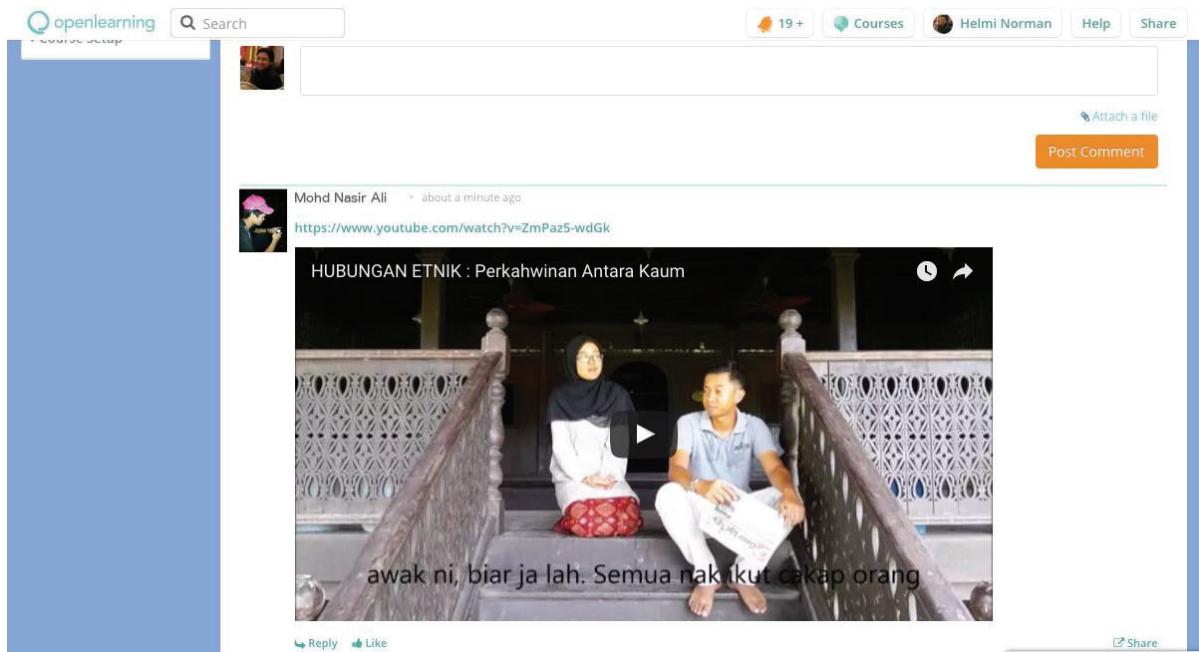
The World Economic Forum (2016) reports that there are 16 essential skills for the 21st century learning. These skills are categorized in three aspects, which are: foundational literacies, competencies, and character qualities. Foundational literacies are skills that are related to everyday tasks, while character qualities are skills needed to approach their learning environment. The competencies, or the most essential skills are the 4C's, which are critical thinking/problem solving, creativity, communication, and collaboration. Yet, previous literature have reported that collaboration in cross-disciplinary teams at higher educational settings are problematic when learners collaborate in teams. This is due to different backgrounds and expertise of team members and poses several challenges due to differences in ideas, perspectives and viewpoints (Jahn et al., 2012; Brandt et al. 2013; Schneider & Rist, 2014; Kagan, 2015). A potential learning environment that could be used for cross-disciplinary collaborations is massive open online courses (MOOCs) (Siemens, 2013; Qiu et al., 2016). Hence, to solve these problems, the study implements a cross-disciplinary learning design using MOOCs as a learning environment for learners from multiple disciplines (science, education, engineering, and humanities backgrounds) in higher educational settings. The study was conducted in a period of four months. At the end of the four-month period, an online survey was distributed to evaluate learners' perception of the learning environment with regards to learning materials and tasks.

### Content

**Description of New Learning Process:** The new learning process produced is novel as there are very limited studies on cross-disciplinary learning in MOOCs (Kop et al., 2011; Liyanagunawardena et al., 2013; Hew, 2015). The MOOC serves as a platform where cross-disciplinary groups discussed their group projects and produced learner-generated learning products (Figure 1). The learning design was based on the works of Jahn et al. (2012) and Nordin et al. (2016). Jahn et al. (2012) was rooted in transdisciplinarity, where they developed a conceptual model consisting of three main phases: (i) formation of a common research problem (societal vs scientific); (ii) production of new knowledge (societal vs scientific); and (iii) transdisciplinary integration (societal vs scientific). We adapted this conceptual framework in our development of our learning design. The second framework that was applied in the study is by Nordin et al. (2016), where it was applied to investigate learners' perception of the MOOC's learning materials and tasks. The study adopts the factors in the development of MOOC learning content and tasks by Nordin et al. (2016). However, in this study, we only focus on the following factors for learning content (i.e. learning material): (i) type of video lectures; (ii) communication style in video lectures; and (iii) humor effect (speech balloons) in video lectures. Meanwhile, the proposed factors for learning tasks, are: (i) structure of learning tasks; (ii) learner

autonomy in learning tasks; and (iii) social settings of learning tasks. Our findings revealed that: (i) Live action videos and animations could be used in video lectures in MOOCs; (ii) Informal communication style in MOOC video lectures are preferred as compared to formal ones; (iii) Integration of humor elements (speech balloons) could increase learners' attention towards video lectures in MOOCs; (iv) Unstructured MOOC learning tasks are preferred by learners as opposed to structured ones.

Figure 1: An example of a cross-disciplinary leaner-generated learning product



**Background of New Learning Process:** The new learning process and environment involved using a MOOC for cross-disciplinary learning about Ethnic Relations and consisted of 11 modules. The learning materials consisted of video lectures in live action and animated video while the learning tasks consisted of closed-structured tasks (e.g. quizzes) and open-structured tasks (e.g. self-reflections). The students were to produce their own learning products (i.e. learner-generated videos) with their cross-disciplinary team members. The study's participants are 104 undergraduates studying the Ethnic Relations course in the National University of Malaysia. The students come from various backgrounds and different faculties, namely: the Faculty of Science and Technology, Faculty of Education, Faculty of Engineering and Architecture, and Faculty of Social Sciences and Humanities. The total number of students of the class was 150 students – and 104 of the students participated in this study. The students were aged from 20 to 25 years old.

**Importance of New Learning Process to Education:** The new learning process contributes to higher education, particularly in the field of cross-disciplinary learning. The study indicated that cross-disciplinary learning in MOOCs could be potentially used to promote collaboration in online and blended learning. Findings also revealed that: (i) live action videos and animations could be used in video lectures in MOOCs; (ii) Informal communication style in MOOC video lectures are preferred as compared to formal ones; (iii) Integration of humor elements (speech balloons) could increase learners' attention towards video lectures in MOOCs; (iv) Unstructured MOOC learning tasks are preferred by learners as opposed to structured ones. By integration of these new learning processes in cross-disciplinary learning, this would potentially enhance learning in higher education.

**Advantages of the New Design:** The new design could assist future educators and researchers in understanding how cross-disciplinary learning affects higher education learning and identify potential learning design improvements for learning enrichments. With regards to system designers and developers, the findings discovered could assist them in a more effective learning environment with regards to MOOCs.

**Commercial Value of New Design:** The new design is highly commercial as it could be used in design and development for cross-disciplinary studies in the higher education sector. The new design could be further investigated in primary and secondary educational settings, which could also assist in cross-disciplinary studies.

Furthermore, the new design could be used in non-educational settings, such as in corporate settings, to promote cross-disciplinary collaboration in team projects.

### Acknowledgement

This research is funded by the Ministry of Higher Education Malaysia and Universiti Kebangsaan Malaysia.

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## **Integrating Affective Domain into MOOC Ethnic Relations e-learning Instructional Design**

**Rozmel Abdul Latiff, Ahmad Zamri Mansor, Fazilah Idris & Rozita Ibrahim**

Pusat Citra Universiti , Universiti Kebangsaan Malaysia, Bangi, Malaysia

[rozmelabdullatif@ukm.edu.my](mailto:rozmelabdullatif@ukm.edu.my), [fazilah@ukm.edu.my](mailto:fazilah@ukm.edu.my), eta@ukm.edu.my

Faculty of Education, Universiti Kebangsaan Malaysia, Bangi, Malaysia

[azamri@ukm.edu.my](mailto:azamri@ukm.edu.my)

**Highlights:** The study aims to highlight an instructional design that integrates affective domain into the context of MOOC-based Ethnic Relations course. In order to accomplish the task, Krathwohl's affective domain taxonomy was used. The taxonomy was presented in five stages: Receiving, Responding, Valuing, Organization and Characterization. Examples of task based activities reflecting the affective domain taxonomy will be presented.

**Key words:** Affective instructional strategies, MOOCs, Ethnic Relations course.

### **Introduction**

This study designs online interactive activities as an integral component that incorporates the affective domain within the framework of TnL of MOOC Ethnic Relation Course. Ethnic Relations course is a compulsory university course in all universities in Malaysia. It serves as a medium that can instill patriotism, national values and moral values towards character building of good citizen among the learners. These values are vital to sustain national unity and nation building in Malaysia. To achieve this, process of teaching and learning of Ethnic Relations course should be designed in such a way that it can fulfil its affective domain.

This poster aims to highlight the affective domain which is embedded in the existing Gagne's Nine Learning Events of MOOC Ethnic Relations course. Gagne proposes five major categories of learning which include verbal information, intellectual skills, cognitive strategies, motor skills and attitudes. Among the five major categories, attitude is recognized as the affective domain.

In the TnL of Ethnic Relation course, the process of shaping the attitude of national identity among learners is manifested in the MOOC activities such as writing reflections, sharing resources and experience and reviewing videos. Affective learning is demonstrated by behaviors indicating attitudes of awareness, interest, attention, concern, and responsibility, ability to listen and respond in interactions with others, and ability to demonstrate those attitudinal characteristics or values. This is achieved by producing teaching materials, interactive learning environment that is conducive to student-centered learning and to enhance the transfer of affective domain and the learning process.

### **Content**

#### **1. Description of Instructional design**

The instructional design was based on the Gagne Nine Events framework. Toward fulfilling the overall objective of learning, instructional strategies are tailored to fulfil the cognitive, affective and psychomotor domains. This paper aims to discuss the affective part. To reflect the affective part the development team designed instructional strategies that can reflect the affective domain. In order to effectively translate the stated objective, the team designed open ended questions which give the learner the opportunity to reflect their experience based on their understanding of the materials presented.

#### **2. The background of the Instructional design**

This product design is initiated in the backdrop of the promotion of MOOC as encouraged by Ministry of Higher Education. Ethnic Relation course is one of the courses that involved in the first phase of MOOC. In order to achieve the learning objective to the fullest, the development team decided to go beyond the cognitive domains as normally done by other MOOC courses. To ensure the effective implementation of instructional strategies based on affective domain, Krathwohl model was used as a guiding framework.

#### **3. Why are they important to education?**

This is important in order to ensure that all domains (cognitive, affective and psychomotor) are achieved. This instructional design process focuses on affective strategies without neglecting the other two domains. This means that a learner does not only understand the learning material presented, he or she also able to internalize the knowledge. The internalization is done through receiving, responding, valuing, organizing and characterization.

4. Advantages of the Instructional design process towards education and community.

The Instructional design process helps to design affective based instructional strategies in the context of MOOC. Among the advantages are the vital roles it play in helping to achieve the national agenda:

1. To instil the spirit of patriotism, national values and moral values towards character building of good citizen among the learners. These values are vital to sustain national unity and nation building in Malaysia.
2. To instil the love of national language and its cultural diversity. This is reflected in the use of Bahasa Malaysia as the language of instruction and the way ethnic cultures are discussed in learning materials and activities.

Table 2: Krathwohl's Affective Domain and Example of Instructional Strategies

Krathwohl's Affective Domain	Verbs	Example of Instructional Strategies
Receiving - refers to the student's willingness to attend to particular phenomena of stimuli (classroom activities, textbook, music, etc.). Learning outcomes in this area range from the simple awareness that a thing exists to selective attention on the part of the learner. Receiving represents the lowest level of learning outcomes in the affective domain.	asks, chooses, describes, follows, gives, holds, identifies, locates, names, points to, selects, sits erect, replies, uses	Listening to discussions of controversial issues with an open mind. Respecting the rights of others. Listen for and remember the name of newly introduced people.
Responding - refers to active participation on the part of the student. At this level he or she not only attends to a particular phenomenon but also reacts to it in some way. Learning outcomes in this area may emphasize acquiescence in responding (reads assigned material), willingness to respond (voluntarily reads beyond assignment), or satisfaction in responding (reads for pleasure or enjoyment). The higher levels of this category include those instructional objectives that are commonly classified under "interest"; that is, those that stress the seeking out and enjoyment of particular activities.	answers, assists, complies, conforms, discusses, greets, helps, labels, performs, practices, presents, reads, recites, reports, selects, tells, writes	Completing homework assignments. Participating in team problem solving activities. Questions new ideals, concepts, models, etc. in order to fully understand them.
Valuing - is concerned with the worth or value a student attaches to a particular object, phenomenon, or behaviour. This ranges in degree from the simpler acceptance of a value (desires to improve group skills) to the more complex level of commitment (assumes responsibility for the effective functioning of the group). Valuing is based on the internalization of a set of specified values, but clues to these values are expressed in the student's overt behaviour. Learning outcomes in this area are concerned with behaviour that is consistent and stable enough to make the value clearly identifiable. Instructional objectives that are commonly classified under "attitudes" and "appreciation" would fall into this category.	completes, describes, differentiates, explains, follows, forms, initiates, invites, joins, justifies, proposes, reads, reports, selects, shares, studies, works Accepting the idea that integrated curricula is a good way to learn.	Participating in a campus blood drive. Demonstrates belief in the democratic process. Shows the ability to solve problems. Informs management on matters that one feels strongly about
Organization - is concerned with bringing together different values, resolving conflicts between them, and beginning the building of an internally consistent value system. Thus the emphasis is on comparing, relating, and synthesizing values. Learning outcomes may be concerned with the conceptualization of a value (recognizes the responsibility of each individual for improving human relations) or with the organization of a value system (develops a vocational plan that satisfies his or her need for both economic security and social service). Instructional objectives relating to the development of a philosophy of life would fall into this category.	adheres, alters, arranges, combines, compares, completes, defends, explains, generalizes, identifies, integrates, modifies, orders, organizes, prepares, relates, synthesizes	Recognizing own abilities, limitations, and values and developing realistic aspirations. Accepts responsibility for one's Explain the role of systematic planning in solving problems. Accepts professional ethical standards. Prioritizes time effectively to meet the needs of the organization, family, and self-behavior.
Characterization - by a value or value set. The individual has a value system that has controlled his or her behaviour for a sufficiently long time for him or her to develop a characteristic "life-style." Thus the behaviour is	acts, discriminates, displays, influences, listens, modifies, performs, practices,	A person's lifestyle influences reactions to many different kinds of situations. Shows self-reliance when working

Krathwohl's Affective Domain	Verbs	Example of Instructional Strategies
pervasive, consistent, and predictable. Learning outcomes at this level cover a broad range of activities, but the major emphasis is on the fact that the behaviour is typical or characteristic of the student. Instructional objectives that are concerned with the student's general patterns of adjustment (personal, social, emotional) would be appropriate here.	proposes, qualifies, questions, revises, serves, solves, uses, verifies	independently. Uses an objective approach in problem solving. Displays a professional commitment to ethical practice on a daily basis. Revises judgments and changes behaviour in light of new evidence.

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## Google Apps for All

**Nor Azlina Abdul Rahman, Mohd Sharhan Abd Ghani, Suzita Awaludin, Wan Aziaris Wan Aziz, Siti Norliza Ibrahim, Nur Atikah Othman, Siti Aini Zahari, Hanilah Hasan, Syazlina Osman, Nor Rizan Kadri & Rosseni Din**

Universiti Kebangsaan Malaysia, Bangi Selangor

[norazlina@ukm.edu.my](mailto:norazlina@ukm.edu.my), [sharhan@ukm.edu.my](mailto:sharhan@ukm.edu.my), [suzita80@ukm.edu.my](mailto:suzita80@ukm.edu.my), [aziaris@ukm.edu.my](mailto:aziaris@ukm.edu.my),  
[sitinorliza@ukm.edu.my](mailto:sitinorliza@ukm.edu.my), [atikshothman@ukm.edu.my](mailto:atikshothman@ukm.edu.my), [ainizahari@ukm.edu.my](mailto:ainizahari@ukm.edu.my), [hanis@ukm.edu.my](mailto:hanis@ukm.edu.my),  
[syaz@ukm.edu.my](mailto:syaz@ukm.edu.my), [rizan@ukm.edu.my](mailto:rizan@ukm.edu.my), [rosseni@ukm.edu.my](mailto:rosseni@ukm.edu.my)

### Highlights:

Google Apps for All is a MOOC course that includes eight (8) topics covering eight (8) Google Applications in the form of video tutorial and activities. Among the activities are self-reflections, quizzes to test understanding of the participants and participants' evaluation of the whole course to make the course more interesting. In addition, the activities were meant to provide two (2) way communication between participants and teachers for a more engaging social learning experience.

### Key words:

Google Apps, MOOC UKM, Tutorial Google Apps, Google for Education, PTM MOOC

### Introduction

Google Apps for All is a new course on MOOC platform consisting of eight (8) modules. Although there are many tutorials on YouTube, most are not structured. UKM offer similar course in conventional Professional Development Program. However the courses are only available three times a year for UKM employees. Therefore, not all staff can attend as places are limited. Thus this course can be a solution to the problem. The course provides step-by-step tutorial on how to use google applications ranging from GMAIL, Google Calendar, Google Drive, Google Docs, Sheets and Slides Google Forms, Google Classroom, Google Hangouts and Google Sites. All of these applications are easy to use and can be used at anytime and anywhere. At the end of this course, participants will be able to learn how to communicate quickly and easily over GMAIL, Google Calendar, and Google Hangouts. In addition, participants will be able to collaborate and share files with friends or assignment without the use of paper through Google Drive, Google Docs, Google Sheets, Google Slides, Google Sites and Google Forms. Teachers also can hold a virtual classroom and communicate with students through Google Classroom.

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## Integrating Open Learning MOOC on Geometry with GeoGebra Software

**Saidatuna Miftahul Jannah Azizul & Rosseni Din**

Universiti Kebangsaan Malaysia, Bangi, Malaysia

[smjannah2@gmail.com](mailto:smjannah2@gmail.com) & rosseni@ukm.edu.my

**Highlights:** Mathematics Form 4 MOOC was developed designed, developed and tested based on Model Reka Bangun SPP IV. Three learning theories were applied during which are social learning theory, cognitive load theory and minimalist theory. Open Learning is the MOOC platform.

**Key words:** UKM MOOC, GeoGebra, Form Four Mathematics, RekaBangun SPP IV

### Introduction

Malaysian Ministry of Education encourages teachers to do enhancement of teaching materials with the use of technology in teaching and learning. The aim of this study is to develop Mathematics teaching materials for Geometry topics based on GeoGebra software for Form Four students. The design and development of the study was based on Model RekaBangun SPP IV. Three learning theories were applied during the design, development and implementation phases of the study. The theories are social learning theory, cognitive load theory and minimalist theory. Twenty three students from Form 4A of SMK Bandar Behrang were involved during the implementation phase. Data was analysed descriptively by using SPSS ver22 to identify if the module is usable for further implementation. Findings showed positive outcome. Not only the module was found to be usable but findings also showed that the respondents had acquired basic knowledge about MOOC functions. Therefore, it can be concluded that the teaching modules developed in this study can be a resource for Form Four Mathematics teachers as well a helpful supplementary materials for students to understand more about Geometry. These teaching modules are integrated to MOOC via OpenLearning platform for the purpose of sharing knowledge globally. Thus whoever interested to learn about this is welcome to learn and make learning socially fun and engaging.

### Content

1. Module of Mathematics Form Four related to geometry integrated with GeoGebra software. The software is suitable for learning Mathematics especially geometry topics.
2. The module was developed based on Model RekaBangun SPP IV. Topics included in the modules are Straight Lines, Circle III and Trigonometry II.
3. The modules are an alternative ways for teacher to use in teaching and learning so that learning will be more fun and meaningful. Besides that teaching and learning Mathematics using technology or software is encouraged by Ministry of Education.
4. The modules are shared via MOOC many other learners that interested with the course can join and participate ubiquitous.
5. Other learners from all over the world that interested to learn Mathematics using GeoGebra especially topics related to geometry can easily join as the course it is online course, free and open to everyone.

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## **Inculcating Social Cohesion Among Technical and Engineering Students through Integrated Ethnic Relations Altruistic Team (*i-E.R.A.T*): Entice, Embed and Engage .**

**Munira binti Abdul Razak, Ahmad Fazullah bin Mohd Zainal Abidin & Wan Marzuki bin Wan Ismail**

Universiti Malaysia Pahang, Pekan, Malaysia

[munira@ump.edu.my](mailto:munira@ump.edu.my), [fazullah@ump.edu.my](mailto:fazullah@ump.edu.my), [wanmarzukiey@gmail.com](mailto:wanmarzukiey@gmail.com)

**Highlights:** The constructive alignment to embed and engage the university core courses of Ethnic Relations in teaching and learning technical and engineering students in University Malaysia Pahang (UMP) lead to both technical and operational challenges. Edmodo is one of the e-learning platform used to enhance the teaching and learning of university non-engineering core courses in UMP. Despite enticing students' learning interest through the adaptation of Edmodo in *i-E.R.A.T* it also supports the university's educational outcomes on team working, leadership and problem solving; which reflect National Education Policy on social cohesion while simultaneously produces graduates equipped with knowledge, skills, ethics and morality.

**Key words:** **Constructive alignment, Ethnic Relations, e-learning, engineering students, learning interest, and social cohesion.**

### **Introduction**

The constructive alignment (Pathak, 2016) of the 3 in 1 package of ***i-E.R.A.T*** in which to entice, embed and engage is a comprehensive integrated e-learning modular approach in teaching Ethnic Relations to UMP technical and engineering students. ***i-E.R.A.T*** aims to inculcate social cohesion and complies with the university educational outcome (UEO) of UMP, Engineering Accreditation Council (EAC) and supports Integrated Cumulative Grade Point Average (iCGPA) simultaneously. This extended abstract describes the **design, background, significance, advantages and commercial values of *i-E.R.A.T*.**

### **Design**

***i-E.R.A.T***. is an innovative initiative of the existing model of constructive alignment by Biggs (de Hei, Strijbos, Sjoer, & Admiraal, 2016) . ***i-E.R.A.T***.is design by observing input, process output format (I.P.O.) (Pimmer, 2015) of the service, quality and performance model. It focuses on how the input which is university, EAC and Ministry of Higher Education policy can be delivered (known as process) through teaching and learning with integrated and intended outcome (known as output) simultaneously.

### **Background**

The background of ***i-E.R.A.T*** is an effort to response to the challenge of teaching non-engineering core courses such as Ethnic Relations to the technical and engineering students of UMP (Nordin, Norman, Embi, Mansor, & Idris, 2016). The instructor exerts to meet the all the requirements of the teaching and learning process but at the same time to create a conducive learning ambiance that suits the learning interest of these students. The innovation fundamental principles is based on how to optimize the student retention of the Learning Pyramid(Hamat, Embi, & Hassan, 2012). The highest score of 90% is by teaching others. Thus, ***i-E.R.A.T*** is designed based on this principle.

It applies integrated approach in teaching and learning rather than conventional segregated approach with three objectives. Three objectives of ***i-E.R.A.T***: first is to entice the learning interest of the technical and engineering students to learn Ethnic Relations. For instance the optimization of Edmodo as an integrated and modular e-learning platform suits their learning interest. Secondly is to embed the academic requirement and policies of the university, EAC and ministry comprehensively. For example all teaching and learning activities for the 14 academic weeks observed such as lecture and assessment are policies compliant. The third objective is to engage both students and instructor within 14 academic weeks via real and virtual platforms. ***i-E.R.A.T*** allows more flexible time and space to interact and giving feedback on the lecture contents and performance.

## Significance

Majority of the students gave a positive feedback towards lecturer's performance. About 68.27% strongly agree that lecturer knew the material well. On the Item 2, lecturer was innovative and creative in conducting the course majority of students strongly agree with 63.45%. About 94 students (64.82%) strongly agree with the Lecturer's responsive feedback via Edmodo. Majority of students (n=99, 68.27%) strong agree that their lecturer encourage student to use technology in e-learning (example completing assignment, project, lab work). 92 students (63.44%) strong agree with the lecturer encouragement by using Edmodo as two communication in lesson and finally, about 94 students (64.82%) strong agree with the resource materials which uploaded. This result signifies that **i-E.R.A.T** are able to:

- Inculcates **social cohesiveness** among students towards achieving unity.
- Provides **3in1 teaching and learning techniques** which is university, government and EAC policies compliant.
- Promotes **creative and interactive platform** for both students and instructor feedback and engagement that suits technical and engineering students' learning interest.
- Allows **flexibility of time and space** for both instructor and students outside official lecture hours.
- Enables to **convert subjective and intangible concepts and theories** in social sciences into **objective and tangible output**.
- Allows **team working and problem solving** to be translated by **learning by doing** mode.
- Extends the inculcation of social cohesion into **living academic experience** in both real and virtual world.

## Advantages

Apparently, the advantages of **i-E.R.A.T**. are as the following:

- **Best Practice** in **teaching and learning non-engineering core course** to the technical and engineering students
- **Enhance Teaching and Learning process and performance** for both students and instructor with good grades and awards.
- **Promotes positive teaching and learning ambiance with rewarding win-win situation** for all parties: since everyone can enjoy and witness the importance of effective and efficient teaching and learning processes. (eg: EAC accreditation and observe the university and national educational policy like iCGPA.)
- Extended documents such as **posting, feedback, virtual learning contents** can be served as **evidences and back ups** for the conventional documents.
- Supports effort to promote **cost saving, time and space optimization**.

## Commercialization Potentials

Finally some of the commercial potentials which are focusing on **inculcating social cohesion and unity: team working, leadership, problem solving and conflict resolution** are:

- Training Module
- Book Chapter
- Book
- Article in Magazine & Newspapers
- Journal Publication

## Conclusion

**i-E.R.A.T** is an innovative and integrated initiatives of constructive alignment in teaching Ethnic Relations which is non-engineering core course to the technical and engineering students. The aim to inculcate social cohesion among students via Edmodo as one of the e-learning platform complies with the university, EAC and aspiration of iCGPA accordingly and simultaneously. **i-E.R.A.T** provides more space and time for both students and instructor to engage within the 14 academic weeks to share course contents, keep track with the assessment with both real and virtual feedback effectively and efficiently.

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## ZAKAT KLIK

**Mansor Bin Sulaiman, Hasan Bin Ahmad, Ahmad Irfan Ikmal Hisyam, Saharudin Ramli & Noradilah Md Nordin**

Pusat Bahasa Moden & Sains Kemanusiaan, Universiti Malaysia Pahang.  
mansor@ump.edu.my

**Highlights :** Zakat Klik is an android application developed by a group of researchers from PBMSK for the usage of Pusat Kutipan Zakat Pahang to complement the service of collecting and distributing zakat throughout Pahang state. This application focuses not only on services such as checking and payment for zakat; it also covers aspects on learning and educating for Muslims in Pahang state. Some of the learning and educating aspects which can be found in this application are providing list of options such as information on zakat and also a calculator which enables the society to be alert with recent and educational news on zakat. This application also assists the users on calculating their own zakat on business, wages, agriculture, farming, gold etc. Besides that, this application also provides service directed to PKZ on informing those needed to be helped and given zakat.

**Keywords:** e-learning, zakat klik, calculation of zakat, PKZ, zakat

### Introduction

Zakat institutions are responsible as a medium to redistribute the wealth from the rich to the poor and to ensure the rightful zakat recipients or the asnaf. In Pahang, the institution that responsible with this zakat is Pusat Kutipan Zakat Pahang. This project try to build a user-friendly software that acts as a guide to the public and specific authoritative users' related to Zakat, as well as students pursuing courses related to Zakat. The product support paperless culture among civil society (effective and low maintenance cost).

### Content

Zakat Klik is an Android application built to provide guidance regarding Zakat. This application also assists users on calculating their own zakat on business, wages, agriculture, farming, gold etc. It was built based on new calculation method, known as Had al-Kifaya. Had al-kifayah is defined as minimal basic necessities for one well-being. Each state has different calculation on had al - Kifayah for different households depending on different variables and prices according to location and area and also the number of household members and age group in the households.

This product has been used since 2015 through consultancy project between researchers at Universiti Malaysia Pahang and Pusat Kutipan Zakat Pahang.

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## **Edutainment Competition Learning Strategy**

**Nashasha Nabila Sulaiman,\*Norah Md Noor, Abd Razak Idris, Mohd. Shafie Rosli, & Juhazren Junaidi**

Faculty Education, Universiti Teknologi Malaysia, Johor Bahru, Johor , Malaysia

\* norah@utm.my

**Highlights:** Edutainment can be defined as the act of learning through a medium that both educates and entertains using various digital media, such as video. UTM has conducted an edutainment video competition among the undergraduate student in Semester 1, Session 2015/2016. Lecturers for SPPM4303 (Multimedia Development) course decided to encourage students to join this competition by exploiting 8 elements based on Crosbie (2005) model that were claim to be able to change people behavior. The finding shows a positive insight towards students critical thinking skill when they had to join the competition that insist on the application of edutainment characteristics compared to just developing a video-only assignments.

**Key words:** edutainment, video, video development skill, critical thinking skill

### **Introduction**

The Edutainment competition at Universiti Teknologi Malaysia (UTM) was organized once every year by Center for Teaching and Learning (CTL), UTMLead in collaboration with Student to Student : Edutainment club. Students were invited to submit their video ( individual or groups ) to the competition. Every submission will be judged based on the following criteria :

- Education : Does the Video clearly designed to teach something?
- Entertainment : How well does the Video draw in the viewer and keep their attention?
- Originality and Creativity
- Quality of the visual and sound elements.

First prize Winner for the competition will received RM500, hamper and certificate of participation.

Figure 1 : UTM Edutainment Competition for 2016 banner



According to Roshaini (2010), in order to prepare students for 21st century demand, teacher is in need to provide students with ICT literacy and one of the effort is giving variety of training and ICT courses to in-services and pre-services teacher by Ministry of Education (MOE). This is because, to keep up with student's interest, the role of teacher is not only teaching, but also to coordinate learning resources (Heinich, et.al, 2002).

In Faculty of Education, UTM, Multimedia Development course (SPPM4303) is one course offered to pre-service teacher to develop multimedia material like video. However, in this class, students are not being taught but just being assisted to use the skill that has been learnt in previous course such as Computer System and Multimedia (SPPM1303) and Authoring System (SPPM2332). Previously, students were encouraged but not compulsory to build their own video to be included into their final project. However, most of the students just used or mixed any existing video collected from video collection site like Youtube or Vimeo.

## Description of the product

In semester 1, Session 2015/2016, lecturers for SPPM4303 decided to push their student to develop video as one of their assignment that contain edutainment theme and participate in the Edutainment Competition held by UTM. Two sections consist of year 4 students from TESL and Sport Science Education program registered with this course.

The strategy used to encourage students to develop the Edutainment video for the competition involves 8 elements based on Crosbie (2005) human behavior model which includes (i) expert facilitation, (ii) contextual awareness, (iii) formal support, (iv) informal support, (v) opportunities to use the new skills, (vi) self-study and self-analysis (vii) stress, and (viii) celebration. As we can see, all of these 8 elements can be achieved when the students engage in the competition.

The process started with lecturers provide briefing on the assignment related to the video development, inform the rules and regulation and dateline for the video to be submitted to the UTM competition. Students were given the authority to make their own video with edutainment as a theme. They can choose their members in the team. Every group had equal chances of winning depending on how good their product is. They had to presents their storyboard, and final video in class before they can submit the video to the competition.

Due to this strategy, all lecturers for this course claim that students produced a superior quality video during this semester. Two of the videos submitted by these students won a placed in the Edutainment Competition, UTM Level. Selected students were interviewed and they claims that the competition challenge their critical thinking skill compared to just a normal project assignment.

Some of their comments are :

S1 : We had to discuss in groups and each group member will recommended on what's wrong or what's right to come into collective decision based on the edutainment competition standard.

S2 : ... we had to try to find creative ideas.

According to Flanagan & Runde (2009), whenever a team need to produce new idea or innovation, conflicts will always present and this is the best element for critical thinking skills. This point is supported by one of the respondents from an interview which stated that, "at first, we want others to accept our idea and make it like our way, but with discussion, we are more **open to accept others'** idea...and when we face conflicts, **good communication skills** is needed to get the best result". Despite the challenge that they faced, students shows a positive attitude towards the competition as they were motivated to win the competition.

## Conclusion

It can be conclude that, the student's skill in developing video and critical thinking skill had been improved when they participated in the edutainment competition. Despite all the challenge and hard work that need to be done by the students in order to fulfill the competition requirement, they did not complaint. This might be caused by the implementation of 8 elements based on the Crosbie (2005) human behavioral model by the lecturers of the course. The similar strategy can be used to teach students in different subject that need a group project as the learning activity.

## Acknowledgement

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## **Design and Prototype Development of Problem Solving Game (*Adik Bijak Pecahan*)**

**Rosnaini Mahmud, Yusri Abdullah, Habibah Ab. Jalil, Shafie Mohd Daud**

Universiti Putra Malaysia, Serdang, Selangor

[ros@educ.upm.edu.my](mailto:ros@educ.upm.edu.my), zdeed@yahoo.com

**Highlights:** Over the years, student showed a poor performance in mathematic problem solving. It is proven that student belief and traditional teaching and learning of mathematics which focusing into routine problem solving significantly plays a role in problem solving. Teachers put more efforts into procedural knowledge that leads to the memorization of formula and procedures with little efforts on understanding the mathematical concepts. This case limits the student ability to explore and investigate the essence of the problems and produce various problem solving strategies. Recent studies identified computer game could be used as an interactive and meaningful problem solving experience. However, there is an issue on how to integrate pedagogy and instructional design with a computer design. Therefore, this study proposes a Computer Game Instructional Design Model (CG-ID) to assist the design and development of problem solving game (*Adik Bijak Pecahan*).

**Key words:** *Problem Solving, Teaching and Learning, Routine, Computer Game, Instructional Design*

### **Introduction**

The positive effects of computer games on math achievement and attitude, has prompted many developers of computer games and multimedia software to design and develop a computer games that specializes in math skills, especially in the context of problem solving. Based on the previous findings, one important thing to note is a good mathematic computer games should applied the learning theories and instructional design. Thus, the developers of computer games needs to refer to the instructional model, especially the ADDIE model to understand the development methodology of an instructional system design.

Based on the learning cycle, the impact of designing an effective learning instruction was measured when students can transfer their knowledge or skills acquired through learning environment into their daily life activities. Transfer of knowledge or skill-based learning is a major goal of computer games (Gee, 2005; Prensky, 2002). Therefore, computer games developed for the purpose of education should have an element of instructional design. However, it's found that educational computer game developers struggle to combine the design instruction with computer game design (de Freitas & Oliver, 2006).

In the context of problem solving, computer game gives students more opportunities to create and test strategies, learn from failures, persevere and self-confidence in achieving the games objectives (Admiraal, Huizenga, Akkerman, & Dam, 2011; Kiili, 2007). Sadly, many educational games in the market put more efforts in drill approach and not applying the problem solving theories (Egenfeldt-Nielsen, 2007). Despite the fact that the use of educational games attracts students to play and learn, but the real benefits are low. Therefore, there is a need to design and develop problem solving games that integrates cognitive, meta-cognitive and affective components as well as applied Polya Models (Polya, 1985) in dealing with problems.

Hence this study is based on two objectives;

1. Propose a computer game instructional design model (CG-ID) that integrates the ADDIE model with a computer design focusing into problem solving steps (Polya Model) and meta-cognitive strategies.
2. Develop three prototype of problem solving game (*Adik Bijak Pecahan#1*, *Adik Bijak Pecahan#2*, *Adik Bijak Pecahan#3*).

The findings indicated that CG-ID model proved to ease the communication barrier between content developer, game designers and programmer to understand the games elements and games situations that leads to the problem solving performances. The observation conducted during the pilot test session showed that student enjoy and engaged in the problem solving embed in the *Adik Bijak Pecahan#1*, *Adik Bijak Pecahan#2*, *Adik Bijak Pecahan#3*.

## Content

The main components of CG-ID are pedagogy and computer game (Figure 1). CG-ID was adapted from SG-ISD (Kirkley, Ph, Tomblin, & Kirkley, 2005) and DGBL for history subjects (Nor Azan, Jaafar, & Wong, 2009). The proposed model will be used as a foundation for developing three types of mathematic games; drill games (Adik Bijak Pecahan #1), routine problem solving game (Adik Bijak Pecahan #2) and non-routine problem solving game (Adik Bijak Pecahan #3). CG-ID contained five phases; (a) Analysis, (b) Design, (c) Development, (d) Implementation, and (e) Evaluation. As a result, the problem solving game will have a strong base of pedagogy, especially on problem solving skills and contains a meaningful and engaging computer game element that contributes to the learning objectives.

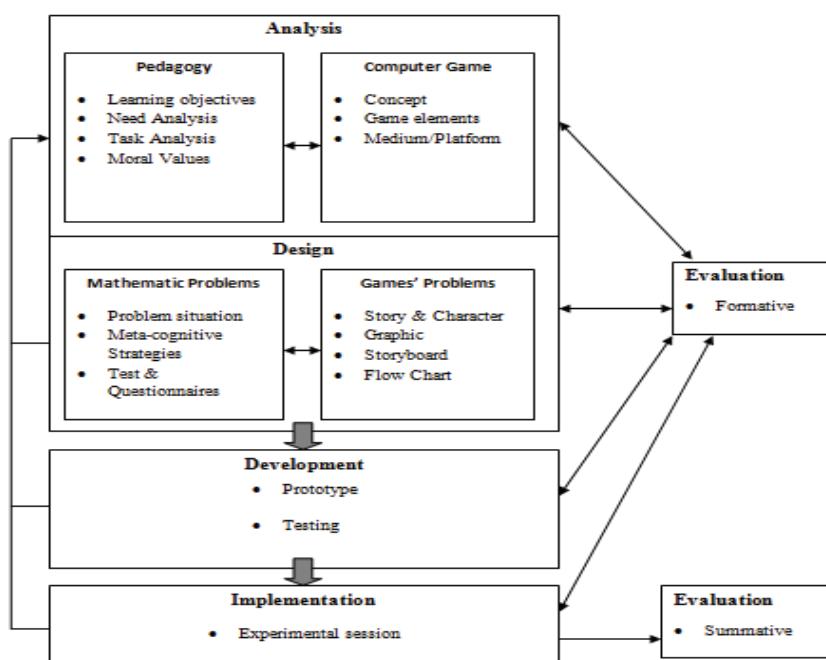
CG-ID model could be used as a reference to design and develop an educational computer game, especially for fraction related topics; ratio, time, money and decimals. Other than that, CG-ID model serves as guidance to educational computer game developer to determine the games scope that strongly based on learning theories to maximize the game objectives.

The three prototype of problem solving game; Adik Bijak Pecahan#1, Adik Bijak Pecahan#2, and Adik Bijak Pecahan#3 is an online problem solving games that focusing into the pizza problems; addition and subtraction of fractions. The three games shared the basic games element, such as (a) the interaction of game characters via dialogues, (b) notebooks for problem summary, (c) immediate feedback, (d) enemies and obstacles, (e) scores and rewards, and (f) ranking. The key differences of Adik Bijak Pecahan#1, Adik Bijak Pecahan#2, and Adik Bijak Pecahan#3 is the types of problems applied in the problem solving situations; Adik Bijak Pecahan#1 is focusing into routine problem solving using drill approach, Adik Bijak Pecahan#2 is also focusing into routine problem solving but making use of the Polya problem solving steps and meta-cognitive strategies, but there's only one correct solution.

Adik Bijak Pecahan#3 is applying the non-routine problem solving concepts based upon Polya Model with the help of meta-cognitive strategies. However, the nature of non-routine problem solving activities in Adik Bijak Pecahan#3, gives more rooms for student to investigate the pizza problems and opportunities to obtained additional scores and rewards. Hence, it's contributes to the students intrinsic motivation and game engagement. The most important parts is, student could devise three different strategies to produce more than one correct solution. Besides that, Adik Bijak Pecahan#3 helps student to reflect their works and think another possible solution for the same pizza problems. In summary, Adik Bijak Pecahan#3 could be used as an example of solving real life problems that needs a creative solution and not rely on predetermined solving strategies.

Higher Order Thinking Skills (HOTS) in mathematics can be enhanced by exposing student with non-routine problem solving. Besides that, student needs to be nurtured with a good attitude towards problem solving and they must be guided how to apply meta-cognitive strategies during problem solving process. Therefore, the three prototype of problem solving provides a fun learning environment and gives students meaningful experiences dealing with pizza problems.

Figure 1: A Computer Game Instructional Design Model



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## EduTechnovation Day as the Final Destiny

**Rosseni Din, Fariza Khalid, Mohd Khalid Mohamad Nasir, Saidatuna Miftahul Jannah Azizul, Nabilah Othman, Siti Norliza, Mohd Khairul Mohamed, Aidah Abdul Karim, Mazalah Ahmad, Parilah Mohd Shah.**

Universiti Kebangsaan Malaysia, Bangi, Malaysia

[rosseni@ukm.edu.my](mailto:rosseni@ukm.edu.my)

[fariza.khalid@ukm.edu.my](mailto:fariza.khalid@ukm.edu.my), [mdkhalid@ukm.edu.my](mailto:mdkhalid@ukm.edu.my), [smjannah2@gmail.com](mailto:smjannah2@gmail.com), [cik.nabilah001@gmail.com](mailto:cik.nabilah001@gmail.com),  
[sitinorliza@ukm.edu.my](mailto:sitinorliza@ukm.edu.my), [krl@ukm.edu.my](mailto:krl@ukm.edu.my), [eda@ukm.edu.my](mailto:eda@ukm.edu.my), [mazalah@ukm.edu.my](mailto:mazalah@ukm.edu.my), [parila@ukm.edu.my](mailto:parila@ukm.edu.my).

**Highlights:** Gamification is applying the science and psychology of gaming in a non-game context to motivate and reward our learners to perform certain desired behaviors. For example, in this Educational Technology MOOC we want our learners to contribute learning objects and their final product (educational video) on our online community sharing space "Peer Content".

**Key words:** Problem-oriented Project-based Hybrid e-Learning, RekaBangun SPP, Gamification

### Introduction:

1. Gamification is applying the science and psychology of gaming in a non-game context to motivate and reward our learners to perform certain desired behaviors. For example, in this Educational Technology MOOC we want our learners to contribute learning objects and their final product (educational video) on our online community sharing space "Peer Content".
2. We offer badges for those who contribute a certain number of posts; or they may work to level up to the next reward that provides recognition among other learners for their accomplished task.
3. Every week student's will complete a task or an uncomplete task from the previous week. The accomplishment of a task is spelled out by uploading the finish product onto the "Peer Content" area and reflecting on the process in their individual blogs.
4. There are many types of gamification techniques. In this course we set up 9 task which students need to complete. The tasks were setup from development processes of a video production process which was based on the RekaBangun SPP IV model for design and development and the PoPeye (Problem-oriented Project-based Hybrid e-Learning method with apprenticeship strategy in running the course. Each completed task will enable learners to start the next task towards the final destiny which is being a prize winner in the **Educational Technology Innovation**, we name as the EduTechnovation Day. Each completed task is important to mark the achievement of one level towards the final destiny.
5. The design process which came out from the Model RekaBangun SPP IV (Reka Bentuk & Pembangunan Sistem Pengajaran dan Pembelajaran Versi ke-IV) can be compile into a module, an edited book and a training kit.

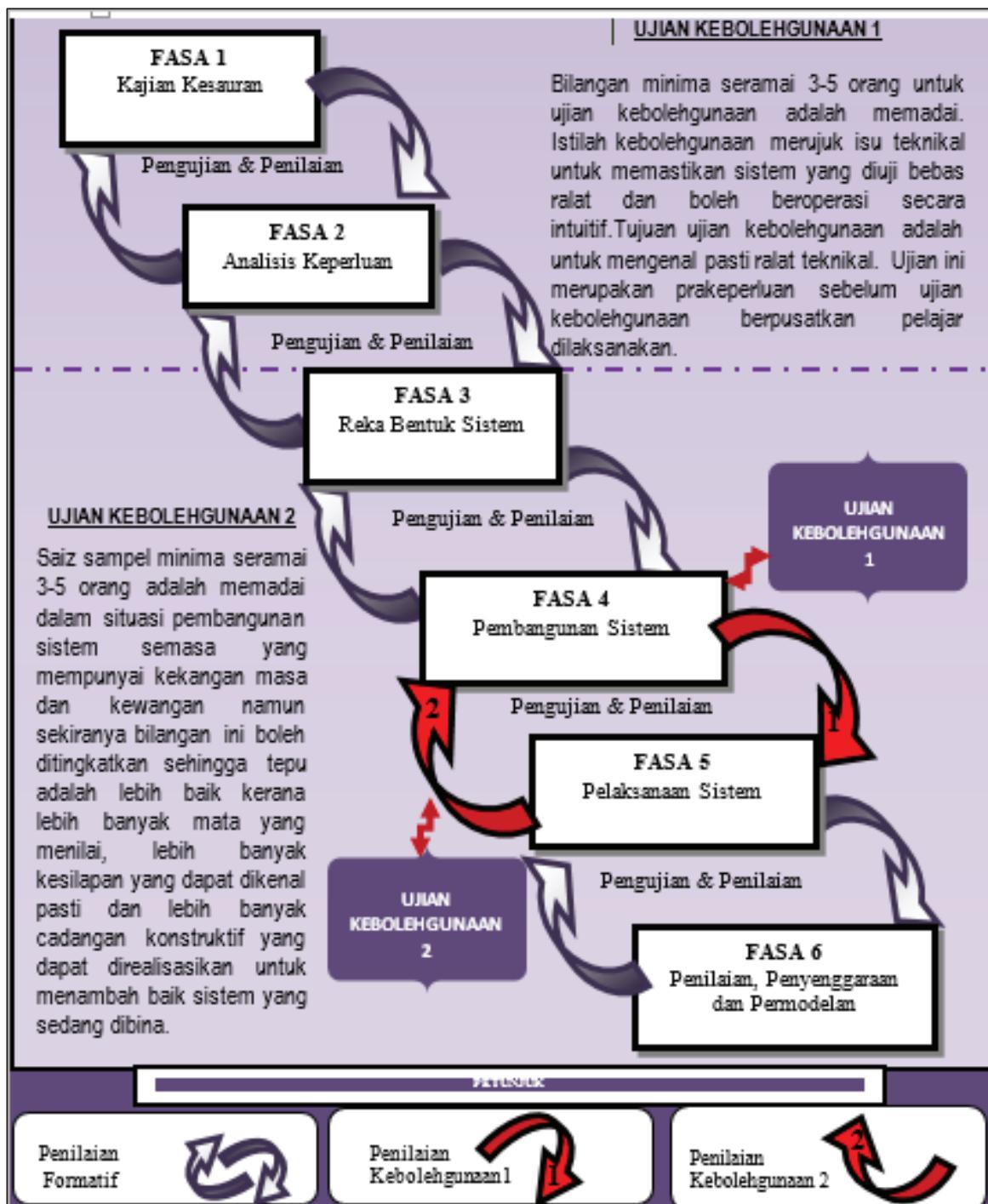


Figure 1: The design and development model used for overall course and learning objects  
Model RekaBangun SPP IV (Rosseni 2014)

The screenshot shows a course interface for 'Educational TECHNOLOGY' offered by 'FAKULTI PENDIDIKAN UKM'. The top banner features colorful icons related to education and technology. On the left, a sidebar menu includes 'Introduction', 'Topics & Activities', 'Announcement', 'Students' Video Project', 'Students' Reflection', 'Groups', 'Class Blog', 'Peer Content', 'Gallery' (which is selected), and 'Course Feed', 'Administer Students', and 'Course Setup'. The main content area is titled 'Class Contributions' and contains a message: 'This is a sharing space! Post anything here that you feel is relevant. It could be cool and interesting things you've found in the media, funny stuff, etc...Please feel free to share materials (texts, links, pictures, videos & files) you feel are relevant to the course that will benefit others. The more we share, the more we will gain and grow as a learning community.' Below this, there is a video thumbnail titled 'Group 4 Travel Tips for Students' from 'The EduTechnovation Day Competition 2016'. The thumbnail shows a building with a distinctive white, curved, sail-like roof against a blue sky.

Figure 2: Peer Content section consisting of learner generated learning objects in Educational Technology MOOC at

<https://www.openlearning.com/courses/ge2153-educationaltechnology/Cohorts/ClassOf2014>

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## Online Microbiology Interactive e-Learning (OMieL)

**Muhammad Anuarruddin Bin Azmilumu, Muhammad Syafiq Aizat Bin Hamid, Muhammad Alif Syuqrie Bin Harun, Mohamad Azzam Bin Mohd Sayuti & Dr. Wan Zuhainis binti Saad**

Universiti Putra Malaysia, Serdang, Malaysia

ibnuazmilumur@gmail.com, [syafashine@gmail.com](mailto:syafashine@gmail.com), alifmohamed04@gmail.com, skylineturbo96@gmail.com, zuhainis@upm.edu.my

**Highlight:** Online Microbiology Interactive e-Learning (OMieL) is an interactive web-based learning of Microbiology designed for undergraduates students studying microbiology related courses. OMieL is aimed to develop self-directed learners, instill interest and passion towards Microbiology. At the same time, students are exposed to self-paced learning environment together with 21<sup>st</sup> Century skills.

### Keywords:

Interactive learning, microscope, microbes, microbiology, web-based learning

### Introduction

E-learning has become widely accepted learning module in this recent year. The development of information technologies has contributed to growth in online training as important education method. E-learning can be defined as the acquisition and use of knowledge distributed and facilitated primarily by electronic means (Shih, Feng, & Tsai, 2008). A study has shown that students in a fully interactive multimedia-based e-learning environment achieved better performance and higher levels of satisfaction than those in a traditional classroom and those in a less interactive e-learning environment (Zhang, 2005).

This innovation is not just another e-learning module that offers typical ways to aid students in their studies. This website aims to develop self-directed learners, instill interest and passion towards microbiobiology.

OMieL is an interactive-based web learning focusing in Microbiology course targeting the undergraduate students. Even though there are various learning management system (LMS) in Microbiology such as Moodle (Dineva & Nedeva, 2009), that can actually ease the educator to manage on their courses, our main aim is to approach the students themselves as they can use this web-based learning system interactively which help them directly in understanding and enhance their learning for the particular topics. It is actually a self-motivated, self-paced learning environment, an excellent platform to develop self-directed learners.

This interactive web-based learning system offers several features that might be the same as others but it has been proved to be effective to the students like, decision-making scenarios, tutorial and quiz concept, and educational games that relate several topics. We want to make sure the student can relate the topic that they studied so that they can apply the knowledge. Study has shown that, visual aids can decrease learning time, improve comprehension, enhance retrieval, and increase retention (Kouyoumdjian, 2012). Visual aids give the freedom to users to edit their own interface. This website will be an easy to handle as it is user-friendly.

One special feature of this website is the interactive microscope, where the user can observe microbes through the microscope and hovering around it. Despite just by looking at it, the user can click on particular microbes and information about that particular microbe will pop up on the screen. They can upgrade the microscope by collecting points in playing games that we offered. By using this method, students can learn about the size, shape, motility, and how it looks like in different type of microscope. I would say this is an interactive micrographia.

Another special feature is that, it has tag or specific column with various links that can be used to refer more details are provided. For example, scientific journal links such as Sciedirect.com, Springer.com, Asm.org and many more. The main purpose is to guide students to seek information from reliable sources so that they can access the correct information.

Mime helps to decrease time in learning and provide interactive environment to engage learners. Despite all of that, it can develop passion in learning Microbiology in many fun ways. Last but not the least, it will train them to apply the knowledge not just memorize it. This is very important in education purpose.

### Impact

This interactive web-based learning system can allow the users to relate the topics that they studied and answer applied questions so that they can enhance their understanding besides just memorizing it.

By using this product, knowledge can be appreciated more by the users. It is able to produce quality learners with self-discipline and passion towards the knowledge. Besides, this product can train the users to become creative and

have high order of thinking skills due to the input that we offered in the website have the uttermost quality ever in serving the knowledge. The product is able to develop self-directed learners. This will make educator's job much easier as the students are all well prepared prior to class. Students are able to differentiate reliable and unreliable sources.

OMeL will be targeted to educational institutions as it can be custom designed based on their syllabus and it has stable medium that can be used in personal computer or mobile phone. Furthermore, the educators can use this interactive website as one their teaching delivery methods to develop their 21<sup>st</sup> Century skills.

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## BacTracker Mobile App

**Afiqah Binti Mustafa Kamil, Nur Hafizah Binti Amdan, Nur Shahirah Binti Ahmad Shukri, Mohamed Alif Mohamed Jamaludin & Dr. Wan Zuhainis binti Saad**

Universiti Putra Malaysia, Serdang, Malaysia

[afiqahmustafakamil@gmail.com](mailto:afiqahmustafakamil@gmail.com), [hafizah9613amdan@gmail.com](mailto:hafizah9613amdan@gmail.com), [nshirah96@gmail.com](mailto:nshirah96@gmail.com),  
[alifmohamed04@gmail.com](mailto:alifmohamed04@gmail.com), zuhainis@upm.edu.my

**Highlight:** Learning about microbes can be fun through mobile app especially those microbes that may be found on you or with you. BacTracker provides platform to explore and enhance learning of microbes that may be present in your lives focusing on cosmetics.

### **Keywords:**

Mobile app, microbes, microbiology, bacteria

### **Introduction**

Bacteria are found everywhere in water, soil and even air. These small prokaryotic cells, typically from 0.2 to 1 um in length are capable of living in boiling water, frozen ground, acid volcanoes and at the bottom of the ocean. They can reproduce by doubling with a generation time of 20 minutes or survive for centuries in a resting stage. Microorganisms are classified as autotrophs or heterotrophs based on whether or not they require pre-formed organic matter. Autotrophs derive energy from either light absorption or oxidation of inorganic molecule. The importance of bacteria are generate oxygen in the Atmosphere, recycle nutrients stored in organic matter to an inorganic form and fix nitrogen from the atmosphere into a useable form. A mobile app was created that contains information about microorganisms, especially on bacteria. It is called BacTracker. The target users are people who may not aware the existing and importance of microbes. The information that will be provided is the basic things about microorganisms that are present in the environment. BacTracker can be used through smartphone and tablet to capture pictures of specific substances that will describe microorganisms that are present on it. This app will emphasize the types of bacteria that may present in either human daily tools or their surroundings such as water also their own body part such as hands. However, BacTracker focus is more to the cosmetics material that is a huge phenomenon nowadays. Cosmetics and women are well-known as inseparable friends. Besides, there are some in the university and the occupational world that really uses the cosmetics or make up as the main component to study or even to earn money. However, many of us do not aware of the bacteria that might happen to exist in the cosmetics especially in the old cosmetics (Cliff, 2015). This app would help people to know about the existing bacteria in cosmetic so that they would know ways to prevent the negative effects of these unseen microbes.

The mobile app functions as an information provider of bacteria that are present in the list found in this app. Each picture of the things comes with a video about the bacteria present as an additional information. In fact, people love video and learn by watching the videos which are more appealing and interesting compared to reading (Spencer, 2016). Not only that, each tool will be provided with quizzes to enhance users' understanding. The questions in the quizzes are based on the video that the users have watched earlier. This activity can help them to evaluate their understandings on that particular information that was obtained.

This mobile app is important in education as it provides information and exposes users to the world of microorganisms. This app delivers information in an attractive way that can engage users. Studies also have shown that mobile apps promote entertainment (Medved, 2013; Leyden, 2015). The learning process will be more active and interactive by using this app and without doubt will enhance education. Furthermore, this app also able to provide basic knowledge about microorganisms instantly on a mobile phone which is handy and easy to use. The users can access this app at anytime, anywhere.

### **Impact**

This product provides a lot of information to the community and as learning tool in education. The users of this app can gain knowledge about microorganisms that live around them and with them. This is very important as these microorganisms may bring both good and bad effects to them. With the knowledge that they gained, people are more cautious and aware of their surroundings and hopefully appreciate life and see things differently. This mobile app was created with the purpose for learning without boundaries. BacTracker app enables people to get real-time feedback during exploration on microbes. This mobile app includes quizzes in the learning process. All quizzes provide the correct answers and can automate the grading and evaluation. This app also gives opportunity to create a fun and engaging learning process through videos. These intriguing activities lead to better results by helping people

retain more of the information learned. This is an easy use mobile app that can enhance not only new knowledge for users, but also help to increase public awareness about the tiny things that they cannot see with their naked eyes. It is the fact that, not every person learns the same way. Even though the course material is consistent for all users, E-learning allows each individual learner to control the pace of the courses to develop self-directed learners. Because of the flexibility E-learning provides, users can also take the course in an environment more conducive to their learning style. This app will help educators create a higher quality, more effective learning experience for learners. When learners are excited about learning, meaningful learning can happen.

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## The Mystery Microbes

**Durratul Fatini binti Yusoff, Sivasni A/P Krishnan, Fareeza Nabiela binti Fuzhi, Nur Fazzera binti Lokman,  
Erfiana Binti Shamsaddin & Dr. Wan Zuhainis binti Saad**

Universiti Putra Malaysia, Serdang, Malaysia.

[durrayusoff@yahoo.com](mailto:durrayusoff@yahoo.com), [sivasnialex11@gmail.com](mailto:sivasnialex11@gmail.com), [reezagwar@gmail.com](mailto:reezagwar@gmail.com), [fazzeralokman@gmail.com](mailto:fazzeralokman@gmail.com),  
[erfiey78@gmail.com](mailto:erfiey78@gmail.com), [zuhainis@upm.edu.my](mailto:zuhainis@upm.edu.my)

### **Highlight:**

Learning is supposed to be fun. Learning happens when learners are engaged and interested. The Mystery Microbes are designed to develop interest and critical thinking of players by solving the mysteries in the game. Clues can be discovered and solved through augmented reality. The Mystery Microbes able to produce self-directed learners through this experiential and innovative learning.

### **Keywords:**

Mystery Microbes, Critical Thinking Game Card, Microbes, Augmented Reality

### **Introduction**

"The Mystery Microbes" is an innovation of e-learning where learning does not necessarily happen through formal situations but through an interactive board game. This is supported by Geurts et al. (2007) which emphasizes "a game is a communication mode capable of linking tacit to formal knowledge by provoking action and stimulating experience." "The Mystery Microbes" is an investigation board game that integrates 3D holographic videos as well as augmented reality application. It contained useful information to the players about microbiology through an interactive and fun ways of learning. The aim of this innovation is to develop critical thinking and improve creativity among the players.

6. "The Mystery Microbes" uses new way of delivering information through 3D holographic videos and augmented reality applications where the players will experience a better engagement during the learning process.
7. Players are required to investigate the mysterious cases caused by different types of microorganisms from all the clues given. The case is solved when one of the players able to deduce the correct answers.
8. During the game the players will directly or indirectly learn about disease-causing microorganisms, their origins and the symptoms of the diseases.
9. This game provides with a board, hologram projector, 3D printed tokens, variety of cards and secret files.
10. "The Mystery Microbes" are important to education because we stimulate the senses of the players through the holographic videos where they can experience it in 3D. The game was designed to develop the critical thinking and the creativity of the players as well as to deliver important information and knowledge about microbiology.

### **Impact**

"The Mystery Microbes" is designed for everyone to have fun as well as exposing them to the unique microbial world. It also can be used in any microbiology related institution as a learning tool for students. It brings action and knowledge together through simulation and gaming methods for better learning experienced. The game integrates interactive videos for better learning performance and increased the level of learner satisfaction. It is suitable for students to use it as one of the student centered learning (SCL) activities or simply play it for fun. Educators may use this as part of their flipped classroom activities to engage learners and develop their critical thinking skills, team spirit and at the same time they have fun. Learning is supposed to be fun. When students are engaged, they are more focus. This game will develop interest to the world of microbes. When leaners are interested, they will commit and dedicate themselves to explore more about microbes.

All components of the game were created by our team members and this innovation is in the process of obtaining the copyright for marketing purposes. Apart from that, "The Mystery Microbes" educates community on diseases caused by microorganisms and delivers awareness on the importance of environmental hygiene and health. The process of developing The Mystery Microbes was an experience that we will never forget. It has brought our team members closer, built our self confidence, critical thinking skills and pique our curiosity more about microbes. Furthermore, we were able to apply the knowledge we have learnt in the class into a product that is informative,

interactive and attractive. We called ourselves self-directed learners and this experiential learning are truly mind-blowing. This is also another way to promote gamification in teaching and learning.

### Acknowledgement

Special thanks to Dr. Wan Zuhainis Saad for her guidance in completing this innovation.

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## **Curriculum Designers Information System for Institution of Higher Learning In Malaysia**

**Yusmadi Yah Jusoh and Rusli Abdullah, Nor Hayati Alwi & Thong Chee Ling**

Faculty of Computer Science and Information Technology, Universiti Putra Malaysia, Serdang, Selangor, Malaysia

yusmadi@upm.edu.my, rusli@upm.edu.my

Faculty of Educational Studies, Universiti Putra Malaysia, Serdang, Selangor, Malaysia

nalwi@upm.edu.my

Faculty of Business and Information Science, UCSI University, Kuala Lumpur, Malaysia

chloethong@ucsiuniversity.edu.my

**Highlights:** Nowadays, the institutions of higher learning (IHL) are competing and moving forward on providing the best quality of curriculum to their stakeholders such as the industries and students. However, designing a curriculum is considered time consuming, tedious and error prone if are not well managed. Whereas with the support of information system (IS), it is able to increase efficiency of curriculum designers in terms of reducing time, error and effort during the curriculum design process. The literature concludes that there are numerous curriculum design information systems in the market and they are used to facilitate the work of curriculum design. However, it is found that they are lack of step-by-step guidance during the curriculum design process. Moreover, the research on IS model for curriculum design that provides guidance in accomplishing the task is scarce. Guidance is important to curriculum designers, in the absence of guidance the curriculum designers do what is best and that is often not good enough. The proposed model and a system developed to guide and assist curriculum designers during the curriculum design process.

**Key words:** curriculum design, institution of higher learning.

### **Introduction**

Designing curriculum is a tedious, time-consuming and error-prone task especially without support of information systems (IS). This research is conducted to address the difficulties faced by both novice and experienced curriculum designers in institution of higher learning (IHL) during curriculum design process. The difficulties include mapping of course learning outcome (CLO) to appropriate learning domains, aligning CLO to teaching and learning activities, aligning CLO to assessment tasks and meeting accreditation requirements such as student learning time (SLT). This is further confirmed by preliminary study conducted among 17 IHL in Malaysia. The findings of preliminary study shows that there is a need to have an IS for curriculum design which provides step-by-step guidance in addressing difficulties faced by curriculum designers during the design process. The curriculum design process consists of various stages (or subcomponents) including CLO Design, CLO Mapping, CLO Alignment and Managing & Monitoring CLO Design. Figure 1 demonstrated the entire curriculum design process which is formed based on Capability Maturity Model (CMM- a process improvement model used in software industry). There is also a continuous improvement (CQI) in the curriculum design process.

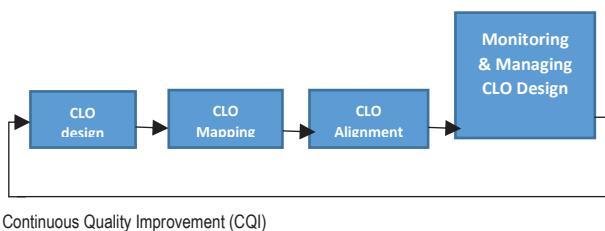


Figure 1 Curriculum Design Process

### **Basic Concept of Curriculum Design**

There are many definition of curriculum given by various scholars. The term curriculum can be defined broadly as dealing with the experiences of the learner (Onstein and Hunskin, 2004). However, for the purpose of this research, Tyler's definition of curriculum adapted. Hence, in this research curriculum is defined as: a plan for action or a written document that include strategies for achieving desired goals. Onstein and Hunskin (2009) pointed that curriculum design is concerned with the nature and arrangement (or relationships) of four parts: objectives, content, learning experiences and evaluation. These curriculum components as noted by Prideaux (2003) are known as: content, teaching and learning strategies, assessment processes and evaluation processes. Based on John Biggs's work (2003), curriculum component are named as intended learning outcomes (ILO), teaching and learning activities

(TLA) and assessment tasks (AT). Various scholars named curriculum components differently. However, based on the literature study it is found that they are rather similar, but different names or terminologies are used in expressing them. This research adapted John Biggs's work in expressing curriculum components and Prideaux's work in defining curriculum design i.e. the process of defining and organizing curriculum components into a logical pattern. The logical pattern in this research refers to Bloom's taxonomy (1956). It is in line with Bloom's which stated in his book, "...taxonomy should be a logical classification system in that every effort should be made to define terms as precisely as possible to use them consistently".

It is believed that there is a paradigm shift in the approach in designing curriculum. According to Ghazali et. al. (2008), the education system in 21st century is inadequately preparing the graduates to face challenges in life and at work place; this situation has prompted people across the world to explore new ways of designing curriculum. For example, there is a paradigm shift of education system from conventional-based education to OBE in Malaysia in 2004. It is becoming very important and the national higher education strategies of Malaysia are designed to achieve this goal (Zita, 2006; Shahrir et. al., 2009). OBE is an education philosophy organized according to several basic beliefs and principles for the learners to practice in order to become successful in life when their studies are completed; it starts with the belief that student could benefit from any educational programme only when the outcomes are measurable as a results of any instructions (Ghazali et. al., 2008). It is consistent with the point noted by Harden (2007) that OBE requires in addition to the specification of learning outcomes, a close match between the outcomes and curriculum contents, the teaching methods and learning strategies (or known as TLAs) and the assessment (or known as ATs).

One of the underlying concepts behind curriculum design is curriculum alignment. The concept of curriculum alignment is widely accepted as a major principle governing curriculum design. This concept is adopted in OBE curriculum design in this project. According to Biggs and Tangs (2008), 'alignment' refers to a learning environment where the key curriculum components such as TLA and AT are aligned to ILO (or here known CLO). Squires (2005) noted that 'alignment' is an agreement or a match between two categories, he also pointed that robust alignment approach could help to develop a good (or quality) curriculum. He further elaborated alignment matrix is the method or strategy to align curriculum ILO has become the centre-point in designing curriculum based on OBE. Figure 2 shows the alignment of Intended learning outcomes, TLAs and ATs.

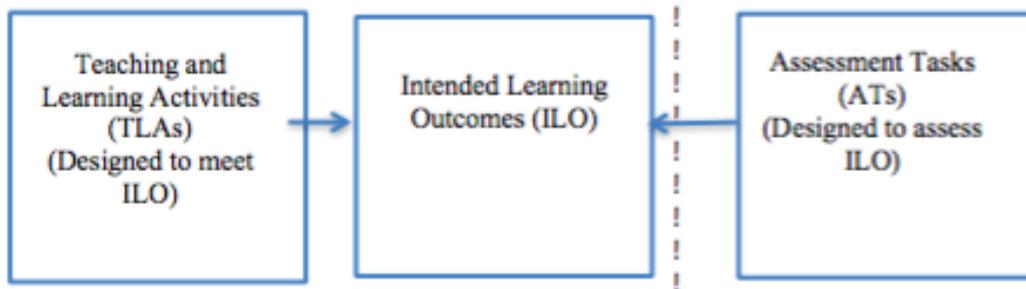


Figure 2 Aligning ILO, TLAs and ATs

Information Systems (IS) is important to IHL especially in the domain of OBE curriculum design. The literature concludes that there are numerous IS for curriculum design, but lack of step-by-step guidance to curriculum designers. Through the review of literature, it is also discovered that agent technology has not been adopted despite its benefits such as it helps to automate repetitive tasks, as a result reducing time, error and effort of curriculum designers during curriculum design process. The component of agent technology is able to capture error and provide services in terms of notifications and suggestions to curriculum designers so that they are guided throughout the design process. As a result, curriculum designers are able to produce OBE curriculum which are aligned in CLO-TLA-AT. A technology acceptance test using technology acceptance model (TAM) is conducted to explore the impact of curriculum designers' perceptions pertaining to usefulness, ease of use, attitude towards and intention to use the system. In the technology acceptance test, it is proven that curriculum designers accepted the use of technology as it helps to bring in and increase efficiency in curriculum design. The average mean value for the construct of perceived usefulness and perceived ease of use is 4.02. The findings show that most of the respondents agreed the system is useful and easy to use. In summary, findings strongly indicate that the system is acceptable by curriculum designers who have evaluated it using TAM. In conclusion, OBE curriculum design guidance system is an easy, effective and useful system to help and guide curriculum designers in designing curriculum.

## Methods

The research methodology consists of four main phases: (i) literature review; (ii) model development and (iii) model verification, and (iv) prototype development and testing. Firstly, literature review phase provides review analysis of current relevant literature. The existing related model are reviewed to identify the important components of the IS model. The relationships between the components are referred to understand the contribution each components to another for the curriculum design process. Secondly, model development phase explains the construction of proposed model based on literature study and thirdly the components and subcomponents of the model are verified through survey. Snowball sampling technique is used for the survey. Research questions in this paper are: 1) what are the important components of IS model; and 2) what the relationships between the components. Lastly, system named Curriculum Designer Guidance System was developed using prototyping approach. User Acceptance testing was conducted to test on the user acceptance of the system.

## Findings and Discussion

The Curriculum Designers Information System contains multiple steps that must be performed by the curriculum designers in a systematic manner. The system is a three-tier architecture of the system. Client presentation layer is the user view layer that is used to accept user input, operation and present the results. In the context of this research, client presentation layer is taking internal input and external input from users and also present report to users. The client presentation layer is tightly coupled with business logic. Business logic performs operation and it contains Curriculum Design Module and Curriculum Design Process.

The Curriculum Designers Guidance System was developed to assist the curriculum designer on designing the curriculum from diploma until PhD programme level. The related information on the institution, programme and course level helps the management and departmental level to monitor the curriculum design progress.

## Conclusions

In conclusion, all subcomponents in the components within the model are perceived important by curriculum designers in IHL and all relationship are positively related to one another. Although the ranking of importance may vary according to their perception, the overall response shown is positive. In future work, the model needs to revise by considering the evolution of the curriculum as the curriculums itself need to be reviewed. Therefore, curriculum reviews process is needed for the purpose to revise and modified the curriculum through time.

## Benefit for Higher Education

The Curriculum Designers Information System is capable to increase efficiency and productivity of curriculum designers in reducing time, error and effort during the curriculum design process.

## Acknowledgement

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## MOOCs : Masalah PC? Mudah jee..

Nurmala Bt. Moktar,

Mohd Naim Ahmad Zubir, Rafiyan Hussain, Zainuddin B. Abd Rahim, Hafizudin Manan, Muhamad Arif Abdul Aziz, Abd Ghani Md Said, Nik Afandi Nik Muhammad, Shariza Shari, Ahmad Bisyri Nawawi, Nur Fazliana Bt. Ramli, Wan Nur Syarafina Wan Bakar, Norhayati Ahmad Shuhaimi, Fathimatuz Zahrah Harun, Foziah Abas, Ahmad Fakhrurrazi Mokhtar, Muhammad Firdaus Ghazali, Mohd Haizi Mazlan, Noor Khilmi Sangit, Rumaizah Mohamed, Shah Emasintan Halim, Muhammad Faisal Mustakim, Nur Adilah Shahli, Hasnah Md Tahir, Siti Halipah Pajian, Jaz Azran Mohamad, Hafizah Suzana Hussien, Aslinda Oon Ridzuan Oon & Rosseni Din

Universiti Kebangsaan Malaysia, Bangi Selangor

nurmala@ukm.edu.my, naimzbr@ukm.edu.my, yan@ukm.edu.my, din71@ukm.edu.my, hafizuddin@ukm.edu.my, muhamadarif@ukm.edu.my, ahanie@ukm.edu.my, nikaf@ukm.edu.my, shariza@ukm.edu.my, bisyri@ukm.edu.my, vans@ukm.edu.my, wanfyna@ukm.edu.my, norhayati@ukm.edu.my, zahrah82@ukm.edu.my, foziah@ukm.edu.my, raz@ukm.edu.my, daus.ghazali@ukm.edu.my, haizi@ukm.edu.my, khilmi@ukm.edu.my, rumaizah@ukm.edu.my, shahemas@ukm.edu.my, faisal@ukm.edu.my, nuradilah@ukm.edu.my, hmt@ukm.edu.my, shp@ukm.edu.my, jasz@ukm.edu.my, suzana@ukm.edu.my, rosseni@ukm.edu.my

### Highlights:

This course provides a step-by-step tutorial consisting of seven (7) topics related to computer maintenance and solution to daily problems faced by computer users. The course provides a two way communication between participants and teachers.

**Key words:** PC Problem, Easy Solution, Computer Maintenance, UKM MOOC, Masalah PC?

### Introduction

We often witness computer problems being solved by advance user without refering to Computer Services technicians. In actuality, everyone can solve their computer problems easily and do their own maintenance. The tutorials provided in this MOOC course will facilitate user to do their own computer maintenance before any problems arise that may cause further damage or result to computer unable to function properly. The course should be able to help users to identify any problem before sending the computer to the center of information technology for repairing purposes. This course provides an easy, step by step tutorial relating to computer problems, ranging from IP Setting Guide and how to identify Physical Address (Mac Address), Computer Low DiskSpace problem, no display In Monitor, Software Installation, Printer Sharing In Local Network, Sharing Files/folders (printer), invasion of viruses & Spyware, and CMOS Battery Problem. At the end of this tutorial, users will be able to identify any computer problems and how to do maintenance on their own.

### Acknowledgement

We are grateful for all the help given to the team in order to develop the MOOC. Thank you to all persons involved in coming out with the idea, in designing, developing and testing, the management and all team members and members from other division, department and units who had help in many ways.

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# Big Data : The Use Of Analytics In Analyzing The Course To Improve Course Richness In E-Learning

**Mohd Hafriz Nural Azhan, Mustafa Man, Noraida Hj Ali, Md Yazid Saman**

Universiti Malaysia Terengganu, Kuala Terengganu, Malaysia

[hafriz@gmail.com](mailto:hafriz@gmail.com), [mustafaman@umt.edu.my](mailto:mustafaman@umt.edu.my), [aida@umt.edu.my](mailto:aida@umt.edu.my), [madyaz@gmail.com](mailto:madyaz@gmail.com)

**Highlight :** E-Learning web applications allow users to interact directly with any web platforms together with other users. Most of the interaction will be logged and keep in database. Big data is data collected in large quantities, whether in the form of structured or un-structured data. Big data can come from multiple sources. Nowadays, each application and equipment will have log data that is being kept that can be translated into meaningful values. In e-Learning, each student activity will be logged and recorded. However, the raw data do not make much sense. As the amount of learning data grows, it become challenging for university to understand and analyze complex data sets. Thus, to understand their value, analytic capabilities are highly needed. Analytics is a technology that is used to translate raw data into something more meaningful to users. Data that are being collected are usually translated into useful and valuable data to users. This paper reports an implementation of real-time analytic on the usage of the use of e-Learning in a tertiary institution. All student access information such as geographic information, devices used, access times, courses and activities that they have accessed are collected. We describe the development of a dashboard system called Nakhoda. It is a course learning analytics platform that displays summarized learning data. One finding is that course activity and student engagement of the course are increase when the course are full fill the requirement of university e-course quality. As a tool, analytics data can help lecturers and encourage them to improve their course by increasing the richness of the activity in LMS.

**Keyword:** e-Learning, Analytics, Big data, dashboards

## Introduction

Technology has now made learning more open. It is no longer using the traditional approach but has entered a new era with the use of various technologies. The use of online learning and the use of web 2.0 applications have increased the learning opportunities (Dalsgaard, 2006; Embi, 2012; Grosseck, 2009). Typically, to apply e-Learning, most universities will use a system application to simplify the management of learning. It is known as Learning Management System (LMS) (Mehrabi & Abtahi, 2012). The use of this application provides various advantages either as instructors or students in facilitate learning and potential to attract students to conduct independent learning (Mehrabi & Abtahi, 2012; Wang, Doll, Deng, Park, & Yang, 2013).

Blended learning (BL) offers an attractive education program by combining the teaching and learning (T&L) activities through the use of information technology. In this mechanism, a student learns at least in part through online delivery of content and instruction with some element of student control over time, place, path or pace (Cashman & Eschenbach, 2003; Garrison & Kanuka, 2004). In blended learning, a form of learning called flipped classroom is perceived to be a suitable technique for T&L (Cashman & Eschenbach, 2003; Garrison & Kanuka, 2004). This method of T&L may also be described as "just in time teaching" (JITT). Students will have to complete certain preparatory tasks before coming to class. The lecturers will discuss those answers and comments in the face-to-face classroom sessions. With the aid of an LMS, students may perform their learning through the online contents. They may take an online quiz, do an assignment and submit it online or watch video lectures before coming to class. In the face-to-face classroom with the presence of the lecturer, the solutions of the assigned problems may then be discussed. This offers a more personalized guidance and interaction with students, instead of lecturing. Thus, the students come to class more prepared and motivated to learn. Thus, the lecturers spend more time on difficult topics or common misconceptions. Ministry of Higher Education Malaysia (MoHE) has put every course offered at public universities must implement course contents in blended learning. In BL, classroom teachings are combined with online activities (Mohd Saman & Nural Azhan, 2014). MoHE has encouraged the application of blended learning as one of the methods in T&L. They expect 30% of T&L are done through BL.

With the use of an LMS, students can access the system for the purpose of learning that is suited to them. Lecturers on the other hand, they can monitor the learning progress when needed (Jung, 2009; Peredo, Canales, Menchaca, & Peredo, 2011; Rodgers, 2008). Monitoring the implementation of T&L may be made on logged data stored in the LMS system. The stored data typically are student grades, activities undertaken by the students, date access, student and course details. The data can be interpreted to show the performance of a student or the entire class that a lecturer is teaching (Agudo-Peregrina, Iglesias-Pradas, Conde-González, & Hernández-García, 2014;

Davies & Graff, 2005; Kong, 2010). With the proper implementation of e-Learning, the lecturers can know exactly which students might be problematic. Nevertheless, the data that is displayed by the LMS is usually quite difficult to be understood by lecturers unless the data is processed and visualized in a form understandable (Kent, Carr, Husted, & Pop, 2011).

Analytics is a way to translate the data into something more meaningful that representations of information (Ali, Hatala, Gašević, & Jovanović, 2012; Kent et al., 2011). Data that are usually translated are data that are valuable. This much depends on the preparation of statistical, computer programming and operation research to measure performance (Ali et al., 2012). The preparation of analytics data requires the use of mathematical and statistical technique (Kent et al., 2011). Data that have been translated may be used to recommend actions or to assist in decision-making. Usually, these analytical tools will be used to assist the decision for the business context (Muntean, Cabău, & Rîncioag, 2014; Wu, Chen, & Olson, 2014). It helps companies identify the best investments that can be made and the amount of stock and sales materials can be added and subtracted based on purchase data trend analysis (Muntean et al., 2014).

## **Content**

### **Big Data in e-Learning Environment**

Big data is data collected in large quantities, whether in the form of structured or unstructured data. They can come from multiple sources. Each activity that is being performed in the T&L environment will be kept and logged for analysis purpose. In e-Learning, data comes from the learners while accessing and doing an activity in the e-Learning courses modules. Each task and activity such as access notes, logging in the system, taking quiz or log out from e-Learning will be collected. For example, once student logs into the e-Learning system and interact with learning modules, their progress, assessment results, views and other data being produced during the e-Learning course in big data. With the implementation of statistical technique combined with mathematical methods, these data can be analyzed and translated into understandable visual that can help teachers or lecturers understand and determine how the learner is acquiring information, at what pace, in what time and show to us any problems that may exist while make easier for us to understand students learning pattern.

### **Analysis and Mapping of e-learning activities to the visualization**

Web administrators have used the analytics data for business and marketing research (Kent et al., 2011; Rizzotto, 2007; Ruipérez-Valiente, Muñoz-Merino, Leony, & Delgado Kloos, 2014). They may focus on the user needs, which product have higher hits and which section have lower hits (Rizzotto, 2007). In e-Learning, there are data that we can use in order to make assumption and to view user patterns for managing e-Learning system facilities. Suggestions may also be offered to lecturers when the best day to do quiz and which modules that will engage student more in T&L.

In developing an analytic system, the information that needs to be focused is in translating the data that are obtained from the source that can be understood by the lecturers (Ali et al., 2012; Ruipérez-Valiente et al., 2014). This is to ensure that each data that appear in analytics system can give value and help lecturer in analyze student activity in using content and participation in an e-Learning system. The main problem encountered in e-Learning system is in how we can analyze the behavior of students and monitoring student's activities to ensure students carry out the activities (Hu, Lo, & Shih, 2014; Mehrabi & Abtahi, 2012; Rodgers, 2008). An LMS has the ability in tracking student activity somehow most of it lack of analytics tools in helping lecturer defining student participation and activeness (Awang & Darus, 2012). Table 1 shows the mapping of the data sources and the analytics outcomes that are used in analyzing student and lecturer activity in e-Learning.

### **Nakhoda Dashboard System**

Based on the mapping of the activities in e-learning to the visualizations of the students activities, a dashboard system called Nakhoda has been developed. It is a system that is used to collect and display the visualizations of the students activities. The development of Nakhoda is expected to help in monitoring the implementation of 30% activities conducted using online. The lecturer can have an idea what going on in their courses. Which activity the most give interest to the student, Lecturer can have each student profile analysis based on their activity and helping the student in evaluate the best activity that can be conducted in e-Learning. Figure1 shows the structure of the Nakhoda system. It is an extended version for Laksamana system that has been developed earlier (Nural Azhan, Mohd Saman, & Abdullah, 2011). Laksamana is a system that has applied the push-pull technology with temporal analysis. It is used to help increase the activeness of student in an e-Learning environment (Nural Azhan et al., 2011).

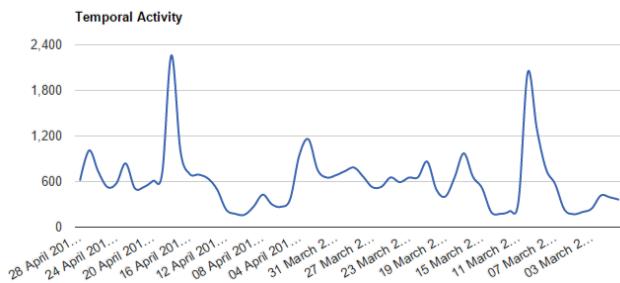
Although Laksamana helps to increase activeness among students, the system lacks strong analysis that should help lecturer in giving decision applying the best activity and monitoring student activeness.

Table 3 : Example of Data source and analysis outcome

e-Learning Factor	Data measured & Sample	Information Outcome / Pattern Analyze
<ul style="list-style-type: none"> <li>• Device Access</li> <li>• Type of device</li> <li>• Number of Access</li> <li>• Type of OS use</li> <li>• What module they access</li> </ul>	<ul style="list-style-type: none"> <li>• Student access log</li> <li>• Server log</li> <li>• Browser type</li> <li>• OS type</li> <li>• Device information</li> <li>• Time access</li> </ul>	<ul style="list-style-type: none"> <li>• System / Learning Management System that need mobile view for particular device</li> <li>• Needed to develop native application for Mobile Device</li> </ul>
eActivity in e-Learning	<ul style="list-style-type: none"> <li>• Page Access</li> <li>• Server log</li> <li>• Users access log</li> <li>• Browser type</li> <li>• eActivity track log</li> </ul>	<ul style="list-style-type: none"> <li>• Temporal information on student access</li> <li>• Statistical report which eActivity is the highest in LMS</li> <li>• Requirement to expand e-Learning bandwidth (if using cloud) on certain time/days</li> </ul>

In Figure 2, it shows how Nakhoda analyzes the patterns of student engagement based on the temporal data. This data are then compared and we can see there is a different patterns of student engagement assuming that each different course are using different approach of pedagogy of blended learning. With this patterns of student, we can analyze the best way to present our content with knowing that each content have highest engagement according content type or in temporal manners.

BBB3103 ENGLISH FOR OCCUPATIONAL PURPOSES



CSF3103 PENGATURCARAAN ASAS

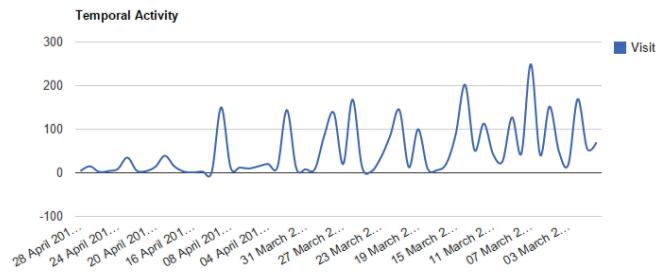


Figure 2: Different patterns of Students Engagements in e-learning

The concept of big data analytics with smart business elements has been adopted and used in an e-learning environment. It is used to help analyzing e-learning data to help in improving the development of e-learning in terms. As the decision made by lecturer using this system can help in enhancing and improve the implementation of e-learning in the university through increased interaction between students and lecturers. Analytics offers a way to translate data into something more meaningful that representations of information. Data that usually translated is data that valuable and much depends on the preparation of statistical, computer programming and operation research to measure performance. Data that have been translated will be used to recommend actions or to assist in decision-making. Usually, these analytical tools will be used to assist the decision for the business context. It helps companies identify the best investments that can be made and the amount of stock and sales materials can be added and subtracted based on purchase data trend analysis.

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## Code Puzzle Apps For Learning Actionscript 2.0 Programming

**Nurul Faizah Rozali, Norasykin Mohd Zaid, Norah Md Noor\***

Universiti Teknologi Malaysia, Johor Bahru, Johor , Malaysia

\* faizah.rozali@gmail.com

**Highlights:** CODE PUZZLE is an edutainment mobile apps that is specifically designed for learning ActionScript 2.0. This apps used Puzzle as the game genre because research shows that there are interrelation between programming and puzzle game in term of logic. This Apps have various solution paths which is motivating and fun, where players unintentionally develop their problem-solving skills which are fundamental elements to improve programming skills.

**Key words:** edutainment, mobile learning, game, programming, ActionScript, Android

### Introduction

Learning to program is generally considered hard (Teague, 2009). It has even been said, that it takes about 10 years for a novice to become an expert programmer (Soloway & Spohrer, 1989). To overcome this problem, it is fundamental to change the way of teaching programming to make it more attractive such as game (Salcedo & Idrobo, 2011). Educational games are potentially motivating students to learn by "making learning fun" (Ames, 1990). Motivation is an importance element in instructional design and act as an underlying factor of learning process (Katzeff, 2000). Thus, implementation of motivation model in game could strengthen the effectiveness of mobile game.

Colarutto (1993) claim that play "promotes engagement and mastery of development tasks". While, Rieber (1996) mention that play is a "powerful influence on learning" for both adults and children. Thus, implementation of game in learning programming should give a positive result.

### Description of Innovation

We use puzzle as the game strategy where students need to develop situated understandings and learn through failure. So, problem solving thinking skill is required to finish this game.

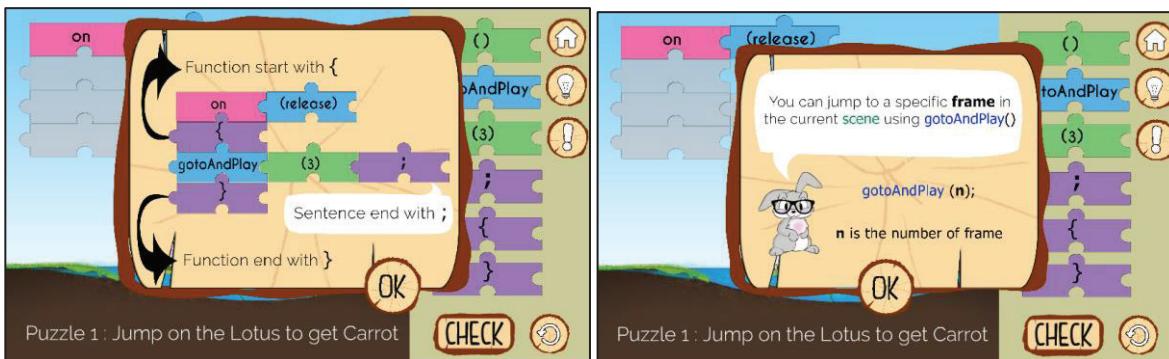


Figure 8: Screenshot of CODE PUZZLE Apps

The game start with a situation and the student needs to arrange the puzzle to complete the missions in which each of them differ in every level to achieve one goal. Notes on how to use the puzzle and error warning menu are provided to help students in completing the task. In this game, learner needs to think critically to arrange the code into the puzzle form in correct order with the goal to program the Rabbit. At the same time, learner will learn syntax error in programming ActionScript 2.0.

Table 1: Result of the Performance Test

Achievement	Description	Number of students
Excellent Pass	More than 80%	7
Good Pass	70 - 79	2
Pass	50 - 69	1
Fail	Less than 50%	0

A performance test was distributed to 10 students after they used this mobile apps application to measure their programming ActionScript 2.0 concept acquisition. Result showed that 90% of the learners pass with more than 70% marks on the performance test. The result consistent with YanHong et. Al (2010) finding that mobile game affects learner motivation and performance.

### **Important to education (novelty and uniqueness)**

We have apply the concept of playing in order to learn Action Script 2.0 programing lessons for this Mobile Apps. This is a new invention as currently there is no approach provided for teaching and learning ActionScript programming using mobile phones, even though ActionScript is common for novice programmer (Crawford & Boese, 2006).

### **Potential to be Commercialization**

CODE PUZZLE android application package (APK) will be used for distribution and commercialization purposes. APK file can be installed on any Android devices by downloading the CODE PUZZLE application from the online apps store (Google Play). This mobile apps is a market-ready product with a copyright and looking forward to be commercialized. In term of marketability value, this product has the potential to be used not only for student learning Action Script in tertiary education but also for school children and public self-learners.

### **Acknowledgement**

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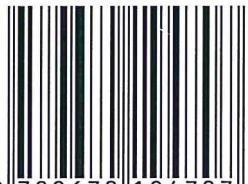
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