UTM
UNIVERSITI TEKNOLOGI MALAYSIA

Technology and Information System (SECP1513)
2023/2024 Semester 1
Assignment 1: Report on Visit to NALI 2023

Student ID(s)

Name	**Matric No.:**
Raden Salma Humaira Binti Muhammad Mun'im	A23CS0264
Ong Jie Min	A23CS0259
Loh Hui Yi	A23CS0106
Soo Zhen Yang	A23CS0270
Lee Jian Ai	A23CS0234

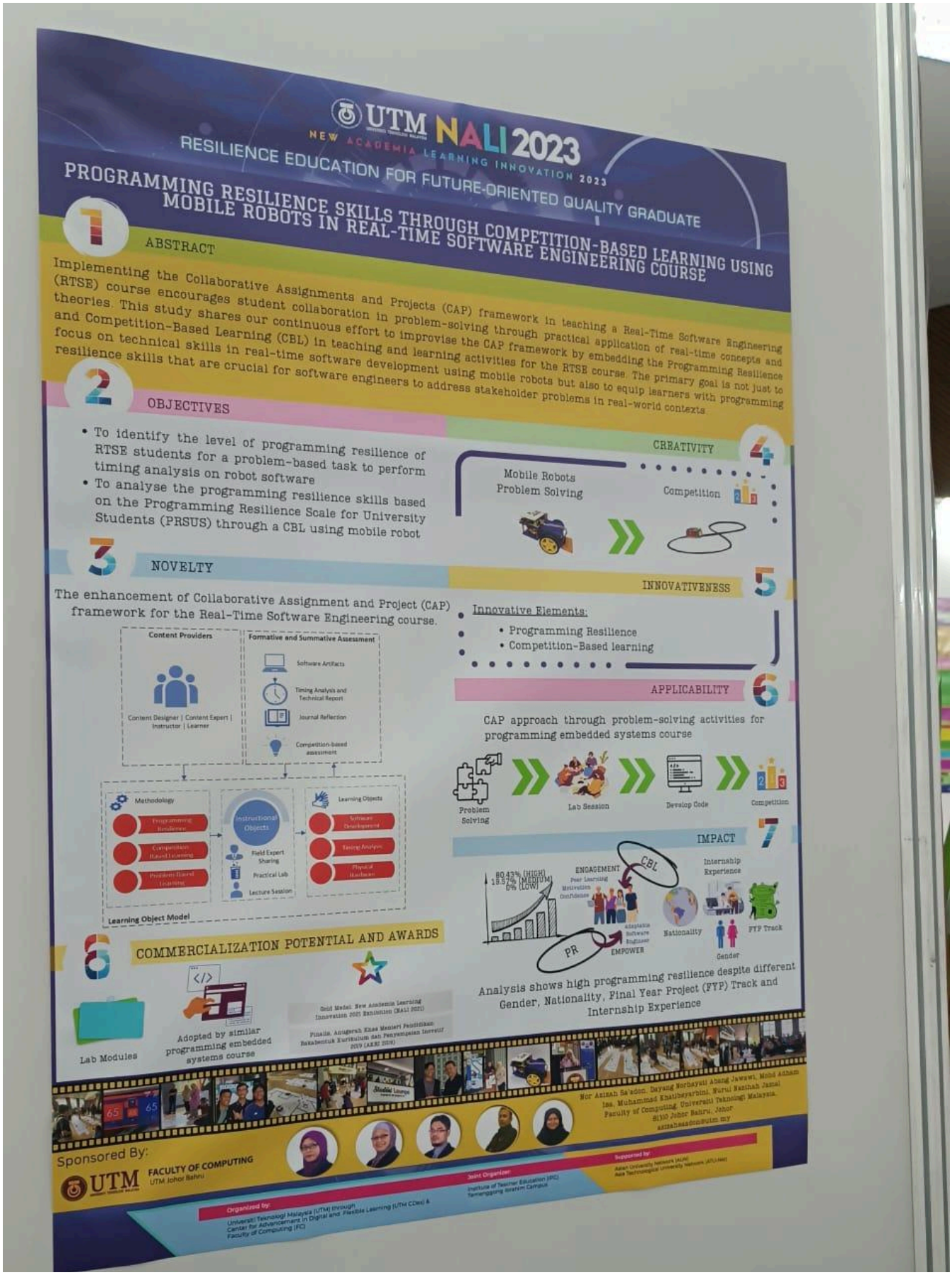
Introduction of Group and Overview of the Program Visit

"Nothing in life is to be feared, it is only to be understood. Now is the time to understand more, so that we may less fear, " quoted by Marie Curie. Upon ruminating on the quote, science and technology will continue to develop exponentially and we must stay updated lest getting fooled and ensuring we can improve our lifestyle by adapting to developing gadgets and tools.

New Academia Learning Innovation 2023 (NALI 2023) is an annual knowledge-sharing event organized by Universiti Teknologi Malaysia (UTM), through the Center for Advancement in Digital and Flexible Learning (UTM CDex). NALI is a framework to promote innovative teaching and learning practices in education. It comprises a student-centered and blended learning philosophy, multiple learning modes and materials for achieving entrepreneurial academia. The first edition of NALI was organized in 2018. The objectives of this program are to improve STEM awareness among educators in practicing NALI and to be the platform for sharing research and innovation products in teaching and learning. Furthermore, to recognize NALI research and innovation products in teaching and learning through exhibition and competition.

During our visit to the NALI exhibition at Dewan Sultan Ismail, UTM, there were many participants and presenters that were explaining their projects with great enthusiasm. We learned quite a big deal of knowledge and innovations retold by the presenters who were competing for the awards. We visited the Development of E-Bike Tracking System for Bike Sharing in Promoting Transport Resilience, Virtual Lab and Programming Resilience Skills Through Competition-Based Learning Using Mobile Robots in Real-Time Software Engineering Course booths.

Primarily we will be speaking about what topic the poster elucidates for, what we learned from the event, what we felt throughout the event and what can be improved for the future. Although, some of our humble opinions shall be backed up by reliable sources to enhance its credibility.


UTM NALI 2023
NEW ACADEMIA LEARNING INNOVATION 2023
RESILIENCE EDUCATION FOR FUTURE-ORIENTED QUALITY GRADUATE
PROGRAMMING RESILIENCE SKILLS THROUGH COMPETITION-BASED LEARNING USING MOBILE ROBOTS IN REAL-TIME SOFTWARE ENGINEERING COURSE
1 ABSTRACT
Implementing the Collaborative Assignments and Projects (CAP) framework in teaching a Real-Time Software Engineering (RTSE) course encourages student collaboration in problem-solving through practical application of real-time concepts and theories. This study shares our continuous effort to improvise the CAP framework by embedding the Programming Resilience and Competition-Based Learning (CBL) in teaching and learning activities for the RTSE course. The primary goal is not just to focus on technical skills in real-time software development using mobile robots but also to equip learners with programming resilience skills that are crucial for software engineers to address stakeholder problems in real-world contexts.
2 OBJECTIVES
• To identify the level of programming resilience of RTSE students for a problem-based task to perform timing analysis on robot software
• To analyse the programming resilience skills based on the Programming Resilience Scale for University Students (PRSUS) through a CBL using mobile robot
3 NOVELTY
The enhancement of Collaborative Assignment and Project (CAP) framework for the Real-Time Software Engineering course.
Content Providers
Content Designer | Content Expert | Instructor | Learner
Formative and Summative Assessment
Software Artifacts
Timing Analysis and Technical Report
Journal Reflection
Competition-based assessment
Methodology
Programming Resilience
Competition Based Learning
Problem-Based Learning
Instructional Objects
Field Expert Sharing
Practical Lab
Lecture Session
Learning Objects
Software Development
Timing Analysis
Physical Hardware
Learning Object Model
4 CREATIVITY
Mobile Robots Problem Solving
Competition
5 INNOVATIVENESS
Innovative Elements:
• Programming Resilience
• Competition-Based learning
6 APPLICABILITY
CAP approach through problem-solving activities for programming embedded systems course
Problem Solving
Lab Session
Develop Code
Competition
7 IMPACT
80.43% (HIGH)
19.57% (MEDIUM)
0% (LOW)
ENGAGEMENT
Peer Learning
Motivation
Confidence
CBL
Internship Experience
Nationality
FYP Track
Gender
PR
EMPOWER
Adaptable Software Engineer
Analysis shows high programming resilience despite different Gender, Nationality, Final Year Project (FYP) Track and Internship Experience
6 COMMERCIALIZATION POTENTIAL AND AWARDS
Lab Modules
Adopted by similar programming embedded systems course
Gold Medal: New Academia Learning Innovation 2021 Exhibition (NALI 2021)
Finalis, Anugerah Khas Menteri Pendidikan: Kebolehcitak Kurikulum dan Penyampaian Inovatif 2019 (AKKI 2019)
Nor Azimah Sa'adon, Dayang Norhayati Abang Jawawi, Mohd Azham Isa, Muhammad Khaluleyarbini, Nurul Nazihah Jamal
Faculty of Computing, Universiti Teknologi Malaysia, 81310 Johor Bahru, Johor
azimahsa@utm.my
Sponsored By:
FACULTY OF COMPUTING
UTM Johor Bahru
Organized by:
Universiti Teknologi Malaysia (UTM) through Center for Advancement in Digital and Flexible Learning (UTM CDex) & Faculty of Computing (FC)
Joint Organizer:
Institute of Teacher Education (IPG) Temenggong Ibrahim Campus
Supported by:
Asian University Network (AUN)
Asia Technological University Network (ATU-Net)

Reflections and Conclusion

First of all, let's look at the poster for the booth. Referring to the poster, the project is to instill the resilience in programming skills towards the university, primary and secondary school students by implementing real-time concepts and theories for the real-time software engineering course (RTSE). What makes the project profound is that it attempts to recognize the level of proficiency in programming of students in problem-based tasks to perform timing analysis on robot software and also analyzing the programming resilience skills in , students through case-based learning (CBL) using mobile robot which according to the presenter, their proposal has been accepted for the past 2 years and for this year too, they received a gold award for this proposal. The project ensures students to equip their skills crucially in order to solve real-world problems for stakeholders and project teammates.

One of the modules in this project is learning through Robokar. Its novelty is the enhancement in Collaborative Assignment and Project (CAP) framework for the RTSE course by having practical lab, lecture sessions and also field expert sharing (inviting employed engineers) from whom these students can learn from. Thus, they can apply techniques shared for RTSE courses in their journal reflection, software artifacts, timing analysis and technical reports and competition-based assessments. As for the capabilities in real-world contexts, they will gain programming resilience skills which is to keep programming critically to solve the problems in even more efficient ways as time progresses and also participating in competition with the skills in limited time. In addition, we can see that this project's approach is to allow students to solve the problem theoretically, then go for a lab session to develop code and finally are liable to participate in diverse levels of competitions.

In my opinion, this project absolutely deserves the gold award because of its evidential impacts on students for the past years. This project implementation in the RTSE course has further empowered students in programming resilience skills despite the disparity in genders and nationality in their Final Year Project (FYP) and internship phase. As stated by the presenter, Nurul Nazihah binti Jamal, one of the very basic sensors which is the line-following sensors (detecting white and black lines whether it can move forward or halt) in Robokar can be used in real-world concepts especially for self-driving cars.. Moreover, students' level of confidence are more likely to increase through collaborative learning and supporting tools in activities in which I will highlight four skills: CT concept, robotic programming, programming concept and collaborative learning. By interacting with other students in their module learning such as in Discord and Google Meet which the students are already familiar with. Hence, the positive increment in their computational thinking and teamwork have given enough reason why this project is significant to take note of.

Next, I will talk about the massive knowledge I gained from this event. I stood corrected when I thought sumo robots can only battle in sumo actually and can also lift heavy items, draw and push within approximate radius. Another booth that I visited, which is the Development of E-Bike Tracking System for Bike Sharing in Promoting Transport Resilience, was also fairly innovative. The project proposed to improve the transportation system in UTM by establishing an E-Bike app that allows students to book their bicycles anytime, anywhere via their app. It uses green technology by generating electricity just by pedaling the e-bike (kinetic energy). The method to use the e-bike is simple: just book and use any nearby bike and afterwards pay according to the distance rates after leaving it inside the campus area. It is very convenient for students, especially first-year students like me that were not allowed to bring cars and motorcycles inside UTM per the laws and are only limited to use either public buses, e-hailing and asking for shelter from the seniors to go somewhere far. Not only it saves time, but it is also lucrative for the app developers and stakeholders since practically, students always book their transportation via devices and they can generate money 24/7. To elaborate, the system uses a tracking system to detect any e-bike that has exceeded away from UTM. Some of my friends suggested that the e-bikes can be immobilized or the students must pay fines in the UTM portal which the presenter took interest in. Overall, I hope the project will be realized sooner before I graduate with a bachelor degree so that my life in UTM will be less hassle-free and time-efficient in the transportation aspect.

Other than that, I visited the Virtual Lab booth which is necessary for Graphics and Multimedia Software students. My friend, Nur Amiera Zulaikha binti Hardi tried out the virtual lab using an advanced VR box (Perhaps Oculus) and console to control movement inside the virtual reality. There was a lab especially to demonstrate nuclear reaction inside the lab and its half-life duration, which is displayed also inside the virtual lab, so the user does not have to take off their headset to read the experiment results. Furthermore, there are labs especially developed for Built Environment and Surveying students for them to experience how the site should look like, how much budget should they allocate for a project and imagine how to construct their building in the virtual lab before going to the real site. However, there are downsides of a virtual lab that cannot replace the taste of first-hand experience in the real world. One of them is that it cannot replace the reaction caused by external factors that has yet to be discovered eg: Substances when they undergo nuclear reaction. It involves two reacting particles—a heavy target nucleus and a light bombarding particle—and produces two new particles—a heavier product nucleus and a lighter ejected particle (**Nuclear Reaction.** https://www.britannica.com/science/nuclear-reaction). Nuclear chain reactions in fissionable materials produce induced nuclear fission. So, some factors like air pressure, the moisture and humidity of the lab can be expected but what if there are other factors which scientists have yet to discover such as another kind of wave radiation that can interrupt with the existing half-life reaction of a certain substance? Hence, the virtual lab is limited to the existing data and

knowledge gained in real world experimental sessions and proven theories. Alas, it is still a thrilling experience to be able to immerse yourself in virtual reality that imitates the real world by interacting with the objects inside it. I wish that VR and AR technology can rapidly grow in education as it can elevate students' experience practically and opens more opportunities for them in understanding what they learnt in class.

Throughout the event, this event has proven to be very beneficial to students. All I could feel was to be frantically inquisitive to learn more new knowledge from the booths. As the presenters are Master and PhD students, senior lecturers and also employees in renowned companies, I grabbed the chance to ask them lots of questions. Indeed, I learnt lots of things, understood in general how the mechanism and the education methodology should impact students but out of alI, I wish that these projects can continually assist students if they were permitted, and also towards common people to integrate advanced technology in their life and improve their technology literacy.

To summarize, I feel elated that the presenters were very kind and wise to explain their projects in in-depth terminology while also making it comprehensible during the interview. It helps us to understand our course better by getting exposed to the creative innovations and projects related to TIS. The most impactful aspect of this event was how organized the booths and the sharing given by the innovators were conducted at the venue for three days. It was adorned with minimalistic-themed colors and decorations around the hall. Another one is that it was also easy to navigate around as the paths were not overlaid with other hidden exhibition. All projects got their own fair space and attention from those who passed by. For the students who came, out of interest or just to complete their assignments, I can say that there were at least some sparks of excitement to learn about other people’s ideas coming to life. Not only IT related projects but also the education methodology ones since they might get the interesting modules in their studies if the projects are considerably life-changing and within the realm to be realized with the current technology.

I feel that visiting NALI 2023 and the interview sessions helped me to learn the course material better, especially from the posters. They clarified me in understanding the innovations’ objectives and applications and also the impact on students. To add, TIS presentation slides can only cover terminologies, examples and effects in words, but by visiting NALI, I can witness how these projects implemented the softwares such as Microsoft Azure, Arduino and MySQLin a familiar way to the users. That being said, the only disappointing aspect of this event was that some students did not even know what NALI event was, judging from its acronym so they did not bother to visit the event. All in all, it was such an enjoyable and eye-opening event so I wish to come again for next year's NALI to see more innovation ideas from an abundance of amazing potential talents.

UTM NALI 2023

NEW ACADEMIA LEARNING INNOVATION 2023

RESILIENCE EDUCATION FOR FUTURE-ORIENTED QUALITY GRADUATE

OS Zoo: Online Jigsaw For Enjoyable Cooperative Learning Experience

Abstract

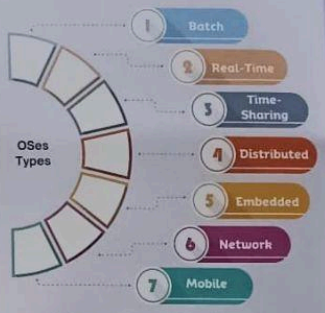
Windows, Android and MacOS are among the popular OS however, it is not precise to describe the actual massive OSes environment.

Moreover, traditional lecture is not appropriate T&L method; it takes a long time to explain the definitions, concepts for each type of OS, types of machines and the information gathered is limited and boring especially for online learning.

Objectives

- To implement jigsaw pedagogy for OS Zoo online cooperative learning for enjoyable learning experience
- To build student knowledge and experience on various OSes types in enjoyable environment with positive result

OS Zoo



Different types OSes based on machine size, single or multi processors and application

Impact

- Improve knowledge and generic skills
- Lessen courses workloads and learning time

Learners

Instructors

- Improve methods of teaching and learning environment

Engagement & Empowerment

Course

- Cultivates systematic implementation of multi-disciplinary domain

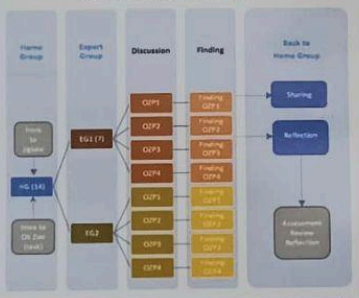
Program & Institution

- Align programs outcomes based on Outcome-based Evaluation (OBE)
- Produce highly competent graduates

Task Description

Session : 2021/2022 Semester 2
Subject : Operating System SECR2033
Topic : Introduction to OS
Subtopic : Types and Categories of Operating Systems
CLO : CLO1 (Knowledge) - Comprehend the relationship of various operating system mechanisms in handling concurrent processing.
Time for lecture : 30 minutes
Cooperative learning : 4 hours (2 lectures period)

Online Jigsaw Learning Design

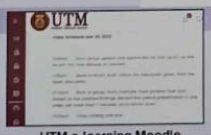


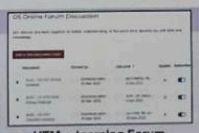
Improvements & Design of Ideas

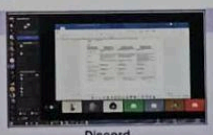
Realization of Cooperative Learning using Various Technology

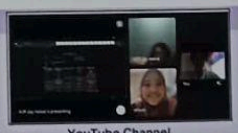
Platform	Description	Steps Involved
UTM Webex	Class lecture	1
UTM e-learning Moodle	Information and schedule	1
UTM e-learning online forum	Activity submission	2,4,7,8
Discord (breakout room – video sharing & communication and text chat)	Home group and expert discussion	3,5,8
YouTube	Home group presentation	6
Internet – website, books, articles	Information gathering	4

Technologies


UTM e-learning Moodle


UTM e-learning Forum


Discord


YouTube Channel

Reflection

"During this activity, we able to share and discuss our findings with others. As we discuss with our classmates, we able to get a better understanding of different types of operating systems. We also get familiar with many types of applications that use different operating systems. We really enjoy this activity not only because we can get more information about each type of operating system but also because we are able to improve friendship or interaction among our classmates."

"In the classroom, we also need more fun, more interaction, and more technologies to realise learning and to cater to students" ***Xu, Song & Yu (2017)***

RASHIDAH KADIR, NORAINI IBRAHIM, HAZINAH KUTTY MAMMI
Universiti Teknology Malaysia
rashidah@utm.my, noraini_ib@utm.my, hazinah@utm.my

Explanation to Poster

The poster above presents the theme "OS ZOO" which carries out Online Jigsaw for an enjoyable cooperative learning experience. According to this project, Jigsaw is a cooperative group activity in which students are interdependent to achieve a common goal. The target audience for this project are lecturers to help in their teaching skills and help students in their learning skills. The main goal of this project is to explore more about OS features among lecturers and students and share with each other.

Conclude and Reflection

In the poster presented, it showed the project using Information and Communication Technology (ICT) in teaching and learning. The project set a goal to explore more about operation system (OS) features while teaching and learning. One of the objectives of this project is to actualize jigsaw pedagogy for OS Zoo online cooperative learning for an enjoyable learning experience. Other than that, this ongoing project is to construct students' information and encounter different OS types in a pleasant environment with positive results.

There are 7 types of OS Zoo such as batch, real-time, time-sharing, distributed, embedded, network and mobile. Through this project, it engaged and empowered instructors and learners to improve skills of teaching and learning. They can explore the interest in OS features and increase the interaction among instructors and learners. It also cultivates systematic implementation of multi-disciplinary domains for the courses. Besides that, it produced highly competent graduates for the programs and institution. This project makes learners get a better understanding of various types of operating systems and get familiar with the types of applications for different operating systems and lastly improve their friendship.

I had visited NALI2023 and carried out an interview session with one of the booth's presenters. Most of the projects that exhibited during the event are related to ICT in teaching and learning. Through the interview session with the presenter, I understood that there are many types of OS, and we can explore more about the OS features in the future. I also knew different types of OS based on the machine size, single or multi processors and applications. The features of operating systems should be explored more in the future so that we can fully explore, learn and use the applications of operating systems by innovating ICT for teaching and learning.

The presenter was very cooperative with me during the interview session. He answered the questions that I asked him with his knowledge and expertise. He is a friendly person and he also allowed me to continue the interview session with him although he was just ready for having

lunch. I was moved by his professionalism, serious attitude and enthusiasm. It made me more interested in learning more about the operating system and wanted to get involved to work together to explore more features of the OS. I really want to work hard for the future of the world and make the world more technologically advanced. I could feel the enthusiasm from the presenter when he was explaining this project. He thoroughly enjoyed serving in his position.

From the decoration of the booth to the attitude of the presenter, I knew that they worked very hard to achieve their goals. They interacted, cooperated and supported each other to bring out a new and better future. The probability of occurrence for applications of operating systems is very high. It has long been integrated in our daily life. However, there is still a lot of improvement and design of ideas to complete the project and make it to be perfect. Lastly, I hope that we can explore more features of OS, use its usage more effectively and get the more suitable or customized technologies to improve our quality of life.

UTM NALI 2023

NEW ACADEMIC LEARNING INNOVATION 2023

RESILIENCE EDUCATION FOR FUTURE-ORIENTED QUALITY GRADUATE

PHYSICAL EDUCATION AUGMENTED REALITY

ABSTRACT

This research introduces the "P.E.A.R" Augmented Reality (AR) app, designed to aid students with disabilities and offer additional resources to mainstream students. The study's main goal is to assess the app's effectiveness in enhancing the grasp of movement concepts. Developed with Unity software, the app employs image tracking (Vuforia) and 3D models from Mixamo Adobe.

The research process involved creating the P.E.A.R app, which visualizes 3D movement models. By integrating image tracking, students can engage with virtual models in real-world scenarios. Teachers from specific schools tested the app, leading to positive feedback about improved engagement and comprehension, especially among students with disabilities.

Results show successful app implementation, with teachers endorsing enhanced learning experiences. While acknowledged areas for improvement exist, the app's interactive and inclusive nature aligns with Howard Gardner's Theory of Multiple Intelligences, bridging gaps between students. In conclusion, the P.E.A.R app's promising potential for inclusive education is underscored by positive feedback and alignment with educational theories. Future development holds the prospect of refining features and broadening its impact.

OBJECTIVES

- Improve the learning experience by making it more engaging and interactive. AR can bring textbook concepts to life, helping students understand anatomy, physiology, and biomechanics more effectively.
- Encourage physical activity and active participation among students. AR can guide users through exercises, routines, and sports drills while providing real-time feedback.
- Facilitate skill development in various sports and physical activities. The app can offer step-by-step guidance, correct form, and tips for improvement in a personalized manner.
- Educate users about proper techniques and safety measures in physical activities. Visualizing potential dangers or mistakes in a controlled AR environment can help prevent injuries

IMPACT

The positive feedback received from teachers who used the app underscores its impact. Teachers reported enhanced learning experiences and improved engagement, particularly among students with disabilities. This app has the potential to make a meaningful impact on how movement concepts are taught and understood.

COMMERLIZATION

- Turning P.E.A.R app into a book with QR code
- Sell through shopper
- Embed QR codes strategically throughout the book
- Allow readers to scan and access specific AR
- Sponsored listings and promotions in shopee

NOVELTY

The "P.E.A.R" app's applicability is evident as it directly addresses the educational needs of students with disabilities, providing them with a visual and interactive way to understand movement concepts. Moreover, its potential applicability to mainstream students highlights its versatility as a learning tool.

CREATIVITY

The creativity in this project lies in the integration of AR technology to bridge the gap between students with disabilities and mainstream students. The idea to use image tracking (Vuforia) and 3D models from Mixamo Adobe demonstrates a creative solution to make learning more interactive and engaging.

INNOVATIVENESS

The app's development using Unity software showcases the innovativeness of turning the creative concept into a practical tool. The integration of image tracking technology enhances the interaction between students and virtual models, making the learning experience more dynamic and hands-on.

APPLICABILITY

The "P.E.A.R" app's applicability is evident as it directly addresses the educational needs of students with disabilities, providing them with a visual and interactive way to understand movement concepts. Moreover, its potential applicability to mainstream students highlights its versatility as a learning tool.

AWARD

1 Pertandingan Inovasi Peringkat Jabatan Pendidikan Jasmani & Kesihatan IPGKTI 2022

Explanation

This research introduces the Physical Education Augmented Reality (PEAR) app, which is designed to assist students with disabilities and provides students with additional resources. The primary goal of the study is to evaluate the app's effectiveness in improving understanding of movement concepts. The app, created with Unity software, makes use of image tracking (Vuforia) and 30 Mixamo Adobe models. The PEAR app, which visualizes 3D movement models, was developed as part of the research process. Students can interact with virtual models in real-world scenarios by incorporating image tracking.

The main objective of this project is to improve the learning experience by making it more engaging and interactive. AR can bring textbook concepts to life, assisting students in better understanding anatomy, physiology, and biomechanics. Furthermore, it promotes skill development in a variety of sports and physical activities. The app can provide personalized step-by-step guidance, correct forms, and improvement tips.

Conclusion and Self-reflection

Students can gain a great deal from this activity. This is because, in contrast to the traditional study method, which consists solely of consulting textbooks, students can learn new material from their teachers in a more engaging and novel way. This project develops an Augmented Reality (AR) app called PEAR, which can give students a different study experience that is a virtual model in real-world scenarios, students can engage themselves in studying the new knowledge and can have deep learning in the study topic. Learning is made more comprehensive by the app's exploration of anatomy, biomechanics, and physiology, which not only broadens knowledge but also gives theoretical ideas a real-world application.

Students will be able to focus better on their studies and make fewer unintentional mistakes due to this activity, which offers step-by-step instructions and instant feedback. It is also evident that the use of such a tool could greatly lower the number of injuries sustained while participating in sports. The app's guidance makes sure that students understand the theoretical underpinnings of physical education and can safely apply them in real-world situations. It benefits both teachers and students by fostering an atmosphere that promotes safety and comprehension.

I gained a great deal of knowledge from this activity. The PEAR app not only helped me better understand how technology can transform traditional education but also made me realize how AR can make difficult subjects more interesting and approachable. It demonstrated how theoretical knowledge could be applied in real-world situations, broadening the scope of learning.

I believe that the student is excited by this activity. The integration of technology and traditional classroom instruction results in a vibrant, interactive learning environment. When education turns from a passive to an engaging experience, students are probably more inclined to

participate. The idea of learning through novel and entertaining interactive augmented reality experiences adds appeal to the subject matter.

The interview and my visit to NALI 2023 definitely helped me understand the course material better. I came away from the tour and interviews feeling optimistic about the way technology is changing education. It gave me a firsthand look at what the future of education could be. It also provided me with numerous examples of products developed using information and technology to fully address social needs. Not only in the field of education but also in other adjacent fields such as business, in order to increase production, machines are designed to produce more goods in a day. The visit established links between theory and practice, giving the ideas greater substance and applicability.

UTM NALI 2023

NEW ACADEMIA LEARNING INNOVATION 2023

RESILIENCE EDUCATION FOR FUTURE-ORIENTED QUALITY GRADUATE

ABSTRACT

Runlinc is a new artificial intelligence (AI) or internet of Things (IoT) invention from South Australia based on a web page inside a Wi-Fi chip. It is a rapid development platform for IoT, AI, and Science, technology, engineering, and mathematics (STEM). In November 2022, a short course was conducted for two days at Universiti Teknologi Malaysia (UTM), Johor Bahru participated by STEM school teachers around Johor. A beginner projects module was taught by lecturers and facilitators from UTM and Universiti Putra Malaysia (UPM), and a hands-on demonstration was guided by an instructor from STEMSEL Foundation in South Australia through a webinar.

RAPID DEVELOPMENT PLATFORM FOR IOT, AI AND STEM THROUGH PROJECT-BASED LEARNING

BACKGROUND

In an era of rapid digital advancement, innovation has become the driving force behind transformation across various domains. One notable area of focus is the Internet of Things (IoT), Artificial Intelligence (AI), and education within Science, Technology, Engineering, and Mathematics (STEM). In pursuit of advancing these fields, a promising breakthrough has emerged, known as Runlinc Easy Coding. This innovative platform significantly accelerates the development of IoT, AI, and STEM in extraordinary ways. Particularly, Runlinc redefines the software development paradigm, enabling effective and efficient programming not only on conventional computers but also within web browsers. Impressively, this platform's sophistication has enabled coding education for children as young as eight years old. A tangible manifestation of Runlinc's dedication to advancing STEM education is evident in the short course held at the Universiti Teknologi Malaysia (UTM), Johor Bahru, in November 2022.

INNOVATIVENESS

- Fridge alarm project that constructs an alarm when the fridge door has been left open using STEMSEL controller board, a Wi-Fi Runlinc chip, a Light Dependent Resistor (LDR), a yellow LED, and a web buzzer tone generator.
- AI project modules. AI object recognition is one of the amazing applications of image recognition applied to a camera or video.

APPLICABILITY

- Explore open-ended questions and extend their skills.
- Provide opportunities for students to learn deep content.
- Participants are able to share their skills and innovation with other team members.

IMPACT

- Understanding in fundamental and technical knowledge
- Understanding in obtaining new knowledge
- Developing new skill. Using this approach, participants earned 66% understanding in fundamental and technical knowledge, 76% understanding in obtaining new knowledge, and 80% developing a new skill.

NOVELTY

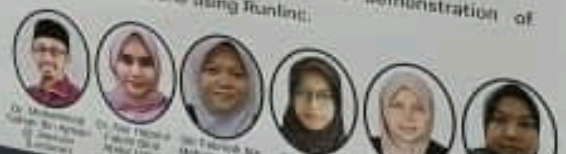
- Encourages a deeper level of engagement and critical thinking, as participants actively participate in a hands-on learning process.
- Extends to its ability to instill resilience and adaptability, qualities often overlooked in traditional assessments.

CREATIVITY

DAY 1 : "Beginner Projects"

DAY 2 : "AI Projects"

- These kits were given to each participant during the registration.
- Participants demonstrated their outcome.
- The sharing sessions involved the demonstration of controlling a drone using Runlinc.



UTM

Explanation

The poster introduces a rapid development platform for IoT, AI and STEM through project-based learning. The platform promises to provide an easy coding environment to accelerate the development of IoT , AI and STEM in extraordinary ways. The platform has enabled coding education for children as young as eight years old. The objective of the project is for students to use their capability and also their creativity to produce a system that can be used at home. It also uses AI and their knowledge in STEM too. This project mainly targets primary and secondary school students, and also students in RBT subjects.

Conclusion and Self-reflection

Throughout the interview about the poster, I understand that the project is about a rapid development platform for IOT, AI and STEM through project-based learning. Their objective on the project is for students to use their capability and creativity to produce a system that can be used at home. I also understand that the project is for any primary and secondary school student, thus the project is a benefit for students mainly because it encourages students to be creative, they can learn coding so that they apply the knowledge.

According to the interview, I find that the project brings benefits to students. The project-based learning not only encourages creativity but also equips students with practical skills applicable to real-world scenarios. Students can apply directly what they learn, and from early years they can learn coding to actually use it because it is quite easy to be learned and to use this system. It can be an enhancement for the students to think what else they can do with the knowledge or with the technical knowledge that they have. This project also gives a huge impact on the subject, students can use their knowledge to produce encoding in the system and also apply whatever that they have learned in school.

I like the fact this project targets to let students understand ICT in their early years and they provide guidance and support for the student. The interview not only widened my understanding on teaching and learning in ICT, it also changed my perspective on teaching and learning in this rapidly evolving field.

I believe that this activity sparked excitement and interest in the student. I can tell by seeing how excited the students were during the interview, it shows that these activities make them interested in technology subjects.

In conclusion, the visit to NALI 2023 and the interview sessions have expanded my understanding on teaching and learning in ICT. It lets me know what the future with technology will be like. It also provides me a look at future technology tools and apps. Thankfully, I have the opportunity to be involved in this wonderful event and learn so much just from an interview.

UTM NALI 2023

NEW ACADEMIA LEARNING INNOVATION 2023

RESILIENCE EDUCATION FOR FUTURE-ORIENTED QUALITY GRADUATE

NXT-PRIME IN EDUCATIONAL ROBOTICS

Dr Nur' Ain Binti Baharin, Chin Yuan Bin, Chua ZhiJing, Loi Hui Xian, Tan Chien Li, Farah Izura Binti Roslan
Institut Pendidikan Guru Kampus Pendidikan Teknik

Collaboration: Prof. Madya Ts. Dr. Dayana Farzeeha Ali (Universiti Teknologi Malaysia)

Product Description

The MINI INDUSTRY NXT-PRIME: BURGER FACTORY project utilizes LEGO MINDSTORMS NXT EDUCATION and LEGO SPIKE PRIME EDUCATION to engage students in STEM learning. The platform features LEGO bricks, motors, sensors, and programmable hubs, attracting students' attention. An interactive module, MINI INDUSTRY NXT-PRIME: BURGER FACTORY INTERACTIVE MODULE, is created using BRICKLINK STUDIO 2.0 to explain the robots' construction and functions.

Applicability

Targeted Group

Advantages

Provide teachers with a relevant and high-quality teaching tool in the PdP process.

Provide a real simulation of food processing to students.

Able to attract the interest of students as well as deepen their knowledge on the basic components of robotics.

Objectives

- As a **simulation of the Teaching and Learning Process (PdP)** for RBT subjects in food technology
- **Enhance the knowledge** of PISMP RBT students on the **basic components of robotics** in RBTS 3263 course that will learn about components such as manipulators, gear and so on.
- Primary school pupils can learn about the basics of robotics, in line with the **Standard-Based Curriculum and Assessment Document (DSKP)** of the RBT subject.
- **Knowledge of the Industrial Revolution 4.0 (IR 4.0)** can be exposed to students as well as preserving the use of **machine learning IR4.0** through this teaching tool.
- Related to **IPG Transformation 2018-2025 cluster 3.**

Market Potential

Commercial

Used as a tool in **vocational training programmes.**

Used as an example in **marketing and advertising programmes.**

Used as a **curriculum cross-activity.**

Impacts

Provide relevant teaching materials.

Suitable to use as reference material for all levels of education.

Robotics Clubs

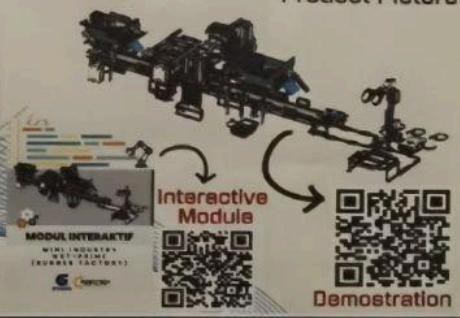
Save Time

Create a real simulation

Novelty

Based on BPK 2017, RMK of PISMP students intake June 2019 and past intakes in Major RBT especially in IPGKPT do not have any exposure on basic knowledge of robotics and programming skills. Therefore, they face problems during teaching at school. However, in 2023, the MK of RBT major students intake June 2022 have learnt courses about robotics such as RBTS 3263, RBTS 3452 and RBTS 3373. Although, these course are in line with the DSKP RBT Standard 4, 5 and 6, there is no any teaching aids for those subjects. Therefore, Mini Industry NXT-Prime (Burger Factory) is designed to demonstrate a real simulation of food processing. It emphasizes the process of producing a product by combining a range of design, technology skills and programming in the subject of Design and Technology (RBT).

Product Picture



Interactive Module

Demostration

UTM METU

NXT PRIME in Education Robotics:
Mini Industry NXT-PRIME: Burger Factory

Introduction to the Poster

The poster shown has the title of "NXT-Prime in Educational Robotics", and this project utilizes Lego Mindstorms NXT Education and Lego Spike Prime Education for student engagement in STEM learning. The teachers that graduated from PISMP, majored in RBT are provided with a relevant high quality tool during the PdP process for the targeted student group, which are students in Year 4,5 and 6 in Design and Technology Subjects (RBT). The main objectives of this project is to be used as a simulation for Teaching and Learning Process(PdP) for RBT subjects in food technology, also enhancing the knowledge of PISMP RBT students about the basic components of robotics in RBTS 3263 course, and components such as manipulators, gear and others will be learned in this course.

Conclude and Reflection

The students are able to acquire lots of knowledge through this project. By applying the Lego bricks, motors, sensors and programmable hubs, students will concentrate more on the class due to the difference it has compared to regular text-based Teaching and Learning Process. They get to try out the high quality real simulation of food processing, letting them to understand their syllabus efficiently. Throughout the learning process, students will be capable of delving deeper into the fundamental components of robotics.

Since the project provides relevant teaching materials for the RBT class, students can learn by doing more than just studying through standard textbooks; instead, they can approach the content by getting their hands on the material. As a result, the PdP will be more effective. Not only that, the material is suitable to be used as reference for all levels of education, hence even the students from Year 4, 5 and 6 are able to understand the concept of their curriculum through this project easily.

The activity impacts me well and I have gained quite a handful of knowledge. The application of robotics in class has always fascinated me and this project makes me know that learning can be more fun and out of the traditional teaching methods. We should apply more technology in our teaching and learning process as we have access to a wide variety of them nowadays. A real time simulation is very necessary for learning as we can not only imagine it inside our head, also look at the live simulation in front of us.

Students must be very excited to know about this activity. The implementation of Information and communications technology in the classroom are very new and suitable for these days. Students will be thrilled for the engagement of hands-on projects, as they get to try out the things that have been taught by their teacher immediately. The positive attitude of students towards the robotic material will become a motivation for them to keep on and get great results for their course.

Lastly, in my opinion I think that visiting NALI 2023 and doing interview sessions with the participants really helped me to learn more about the course material. The exposure of the innovations has widened my knowledge of ICT implication in teaching and learning, also allowing me to interact with their developing team to gain more knowledge about the projects. This event makes me more confident about the future of our world's education system with the help of the latest technologies. Most of the projects that were shown in the booth have the great opportunity to be applied into our life further on. I have been inspired by them and hopefully I will be able to develop some useful projects in the future that can help to make our society even better.

Conclusion

For this task, we visited NALI 2023 to learn and interact with the booth's presenters to increase our knowledge about how they are innovating ICT in teaching and learning for education. They also organized some workshops for the participants to get experience in those workshops so that they could improve their skills in exploring something that is new to them. It also increased the interaction among each other and had more opportunity to share their knowledge to each other and gain new knowledge from each other. We learnt more information and knew the reason that they contribute to these projects in our life. Other than the booths that we had interviewed, there were also a lot of booths that were attractive and interesting. We enjoyed gaining the information and knowledge from the booths' presenters. We were grateful to them because they were willing to cooperate with us to complete our assignment. They also use professional terminology to explain our confusion and patiently answer our questions. I hope they will continue to work hard in their positions and achieve better results.

Interview Session

Assignment 1