E-Learning Activities through ACU Learning Management System: A Case Study of UTYCC

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Abstract

Sustainable development is the biggest challenge to Universities in the 21st century. Higher education is a potential catalyst for sustainable development for the next generation. Its importance is beginning to emerge in a more commercialized landscape, and many believe that Universities are key to a sustainable future. Universities in developing country have come to understand that relying on only traditional classrooms is not sufficient to advance students' knowledge and skills. Online learning has to be the greatest revolution in contemporary education. It made a huge change in the system and opened great opportunities for everyone who wants to learn something. For the deployment of Online learning in higher education, the Learning Management System (LMS) has been established since 2013 at the University of Technology, Yatanarpon Cyber City (UTYCC) to assist associate students and lecturers without the confines of the traditional classroom. This paper contributes an overview of Learning Management System (LMS) features to UTYCC based on the deployment of Blended learning and Online learning under ASEAN Cyber University (ACU) project. In the present work, the number of students who registered the course from 2012 to 2019 was used to analyze the e-learning activities. This appraisal means to aid higher education institution to get an idea of developing Online learning system to meet their challenges of student centered learning in this time of Myanmar education transformational move.

Keywords- Learning Management System (LMS), e-learning, Blended Learning

1. Introduction

E-learning is an ICT enhanced learning process, where ICT tools are used to improve the Online learning process and activities. E-learning is complicated and needs efficient management so that educational outcomes can be achieved [1]. It is critical to create strategies and mechanisms by which one can ensure that this system will effectively work as intended, once the following components are defined: educational goals, instructional design, steps and activities, mechanisms to support the learning system, technologies to be used, evaluation system, formal academic procedures and functioning of the system as a whole.

It is possible to advance the planning, organization, management and control of managers and improve e-learning process by combining a Learning Management System (LMS) and the management of e-learning. In the community of higher institutions, the Learning Management System (LMS) is an Online portal that joins lecturers and students. It offers an opportunity for classroom materials or activities to be shared easily. It is also a portal that enables lecturers and students to interact out of the classroom, having discussions through forums that could otherwise take up too much of the time supposed to be spent learning in the classroom.

A Learning Management System (LMS) is a software application or Web-based technology used to plan, implement, and assess a specific learning process. Typically, a Learning Management System (LMS) provides an instructor with a way to create and deliver content, monitor student participation, and assess student performance.

A Learning Management System (LMS) may also deliver students with the ability to apply interactive features such as threaded discussions, video conferencing, and discussion forums. At the University level, the learning process is a two-way process, lecturers share their knowledge and students give their opinions or thoughts in return a topic in a class discussion. Therefore, University students require to constantly broadening their knowledge by searching for information. Most University students nowadays also have access to the Internet as their University provides Internet access. Some also have Internet access within their own home as they subscribe to an Internet Service Provider (ISP).

2. Learning Management System (LMS)

A Learning Management System (LMS) is a software application for the administration, documentation, tracking, and reporting of training programs, classroom and Online events, e-learning programs, and training content. There are basically four types of e-learning systems: the Learning Management System (LMS), Learning Content Management System (LCMS), Learning Design System (LDS) and Learning Support System (LSS) [2].

For the purpose of this paper, an e-learning system is used by various Universities all over the globe. Meanwhile, the LMS is also identified in various Universities as Virtual Learning Environment or Course Management System.

There are different LMS according to their categories [8].

A. Open Source Learning Management System

The open source LMSs are learning management platforms which are available under a public free license, providing users the rights to use, to change, to study, to create and to distribute the results, free of charge, to anyone and for any purpose.

B. SAAS/Cloud Based Learning Management System

Cloud based learning management comes with cloud computing features and deliver the education online to any student, at anytime and anywhere around the world, the only must requirements to be fulfilled being the existence of an Internet connection and of a tool such as computer, tablet and Smartphone .

C. Proprietary Learning Management System

These systems have been licensed by their developers under the legal rights belonging to the copyright owners.

2.1. Functions of Learning Management System (LMS)

A Learning Management System (LMS) is described by coordinating various media, various dialects and assets, empowering elective advances, and exhibiting data in a sorted out way to satisfy its primary reason, which is the development of learning through connection. It is also important to note that a well planned course, based on innovative teaching methodologies is also necessary when both e-learning quality and a greater adherence to this modality are longed [3].

Administrators and instructors are allowed by a Learning Management System (LMS) to follow course completions, current status or performance of students. Actually, all students activities in the Learning Management System (LMS) can be followed that could be helpful for performance evaluation, competency management and other related capacities [4].

A Learning Management System (LMS) today is a one-stop shop of encouraging, assigning, and directing, reporting and surveying e-learning courses. It can be used for a variety of educational, deployment and administrative purposes. So, the roles of administrator who can do with a Learning Management System (LMS) are listed as follows:

- **Managing users, contents, roles, instructors, and generating reports**: This includes uploading contents, managing roles, recommending contents and generating various reports.
- **Making a content schedule**: This is a feature that enables Learning Management System (LMS) users to view the available training programs or courses at one glance. As a result, they can send requests for registrations to those that they are interested in easily.
- **Messaging and notifications by learners**: The reminders and notifications can be sent by the instructors to the students on upcoming training events or deadlines. Forum can also be used to promote existing e-learning courses to encourage more registrations to their courses.
- **Assessments that can handle the student's pre/post testing**: The instructors have assessments uploaded which can serve as a follow up to classroom training programs. They can also have analytical assessments to assess the level of knowledge of students and assign suitable level to them.
- **Certification and display student scores and transcripts**: In one location, the instructors will be able to access student's scores and transcripts and maintain an ongoing record of the performance of the individual. The students who have successfully completed courses can be certified by the instructors.

2.2. Benefits of Learning Management System (LMS)

The six major advantages of Learning Management System (LMS) are interoperability, accessibility, reusability, durability, maintenance ability and adaptability [5]. The advantages include:

- A Learning Management System (LMS) supports content in various formats: text, video, audio, etc.
- One can access materials anytime, from everywhere, the content can be modified by the teachers and the updated material can be seen by the students.
- The evaluation of students is easier and fair, based on student attendance, assignments and online quizzes.
- Students and teachers can re-use the material every time they need. [6]
- Students can learn collaboratively by setting up a University website with the Learning Management System (LMS) software and keeps organizations up-to-date with compliance regulations.

Although there are many advantages of Learning Management System (LMS), some disadvantages of using these systems are:

- Well-built technology infrastructures are required for implementing a Learning Management System (LMS). Teachers have to be willing to adapt their curriculum from face to face lectures to Online lectures. [7]
- Expenditure
- Complexity of learning to use authoring software

3. Learning Management System (LMS) Process of UTYCC

Learning Management System (LMS) has been deployed in our University to deliver and manage all types of content, including video, courses, and documents since 2013. Learning Management System (LMS) contain a variety of functionality that is similar to corporate but have features such as rubrics, teacher and instructor facilitated learning, a discussion board, and often the use of a syllabus in the education and higher education markets.

The objective of Learning Management System (LMS) support in our University is to improve the blended learning and Online learning. A blended learning approach is a combination of the traditional face to face education and e-learning. All the users of the system mainly accessed the Learning Management System (LMS) via a web site. When locally hosted, each institution has its own web site, whereas when SaaS-based there is a single web site for the whole system. Current Learning Management System (LMS) also offer access through mobile applications in order to increase accessibility.

Our Learning Management System (LMS) portal service (www.aseancu.org) is supported by ACU project. This project operates and offers e-learning courses and educational resources through Learning Management System (LMS) in ACU Website. It aims to expand higher education opportunities in ASEAN and to strengthen relations between Republic of Korea (ROK) and ASEAN Universities.

Figure 1. E-Learning Process in UTYCC

In UTYCC, the overall procedure for ACU e - learning is shown in Figure 1. As shown in Figure 1, the contents are uploaded in UTYCC's content server after developing the contents. And then, the contents are registered in LCMS. After that, the administrator starts to open the courses in Learning Management System (LMS). Then the learners can take the courses and the quiz, submit the assignments and evaluate the courses during the specified period of time.

3.1. Roles for Learning Management System (LMS)

Three roles for Learning Management System (LMS) were assigned as follows:

Learner: The main users of Learning Management System (LMS) and they are the first consumer of the services. They take courses and take assessments in Learning Management System (LMS).

Instructor: The instructor prepares syllabus, exam quiz and assignment. They apply Learning Management System (LMS) to guide, supervise, assist and evaluate learners**.**

Administrator: The administrator keeps the proper flow of operation of services and its users. They manage open lectures, manage shared lecture authorization, manage class registration and certificate management.

The system is accessed by each user e.g. an instructor or a student via a user account associated an email address. Learning Management System (LMS) offers an internal messaging system for communication between instructors and students. This messaging system is a useful feature especially for e-learning and blended learning courses where coordination among instructors and students.

3.2. Learning Management System (LMS) Operations

Progression tracking was utilized so that the students can keep track of their progress in each module and the instructors can track each student's progress. At the end of the course, based on the student's grades on each module, the Learning Management System (LMS) can provide a report on each students attained level in each outcome separately. This report provides a much rougher outcome compared to a single letter grade from a course. The automatic forwarding was used since the students and instructors were coming from different institutions having Learning Management System (LMS) and e-mail systems. Our students and instructors are allowed an automatic forwarding system to utilize the dedicated Learning Management System (LMS) of the course without the need for checking Learning Management System (LMS) they are enrolled to individually.

The video lectures are one of the main content types we have utilized in the course. In longer video lectures, it became difficult to keep the interest of the students. In the video lectures, small questions such as multiple choices or a true/false question are inserted for interactive videos by using HTML5. By automatically pausing the video, showing the question and only reverting back to the video, the student can answer the question. We observed that such additional interactivity considerably increases the attention of the students to the lecture. After the learners have submit the assignments and evaluations for their content course, finally the certificated was issued via email.

4. Results

This section of the paper presents the number of available courses in Learning Management System (LMS) and provides the analysis of the improvement of

Learning Management System (LMS) in our University. The following courses are the registered courses in the Learning Management System (LMS) of ACU as shown in Table 1.

Table 1. Registered Courses

No.	Subjects
1	Operating System
2	Java Programming
3	Introduction to Fluid Power
4	Artificial Intelligence
5	Complex Analysis and Its Application
6	e Business
7	Software System Analysis and Design
8	Data Communication and Networking
9	Application Physics and Its Application
10	Object Oriented Programming in C++
11	Database Analysis and Design
12	Oracle Database Management System
13	Human Computer Interaction
14	Introduction to Digital Image Processing
15	Distributed Programming
16	Engineering Chemistry
17	Management Information System
18	Electric Circuit(Micro Electronics)
19	Introduction to Circuit Theory and Laboratory
20	Introduction to Digital Signal Processing
21	Introduction to Computer System

In our University, Learning Management System (LMS) has been utilized in both Online learning and Blended learning. Online learning started up the Learning Management System (LMS) program in 2012-2013 academic years. In 2016-2017 academic years, our University began the blended learning operation. In this operation, the students must learn the courses via Online to fulfill the credit requirement according to the University's policy.

The choice based system was used in the Online-learning system and the students can choose the courses depending on their needs. Not only UTYCC but also other Universities in ASEAN region can access ACU Learning Management System (LMS) system.

The total number of courses registered on Learning Management System (LMS) is shown in Figure 2.

According to the statistical data, the number of courses was the highest point in 2015-2016 academic years for Online learning. This may be the fact that more courses were developed by teachers and registered on Learning Management System (LMS) due to the flexibility of system. Online courses registered on Learning Management System (LMS) were slightly decreased after 2016-2017. This may be due to the introduction of Blended learning as both courses for Blending and Online needed to be registered at the same time.

In 2018-2019 academic years, Blended learning reached a peak for course registering and the registration exceeded 20 for the first time in seven years

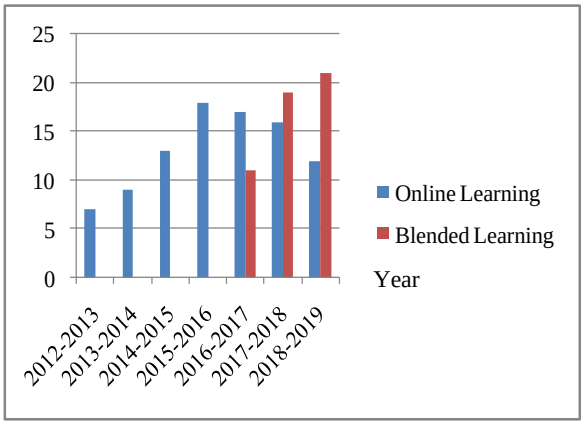

Figure 2. Statistics of Registered Courses in LMS

period of time. The results showed that the number of developed courses was increased on Learning Management System (LMS) for Blended learning.

The yearly circumstance of learning students in Learning Management System (LMS) was described in Figure 3. The number of registered students was the highest point in 2012-2013 academic years for the first Online learning. This may be due to the total number of registered students are improved in the earlier academic years. This is the first introduction of Learning Management System (LMS) in UTYCC and this attracted students as a new experience. In addition, the new courses were developed and delivered by UTYCC and this probably took students attention to Learning Management System (LMS). The number of registered student for Online learning was slightly decreased year by year because of the inadequate internet facilities in and around UTYCC.

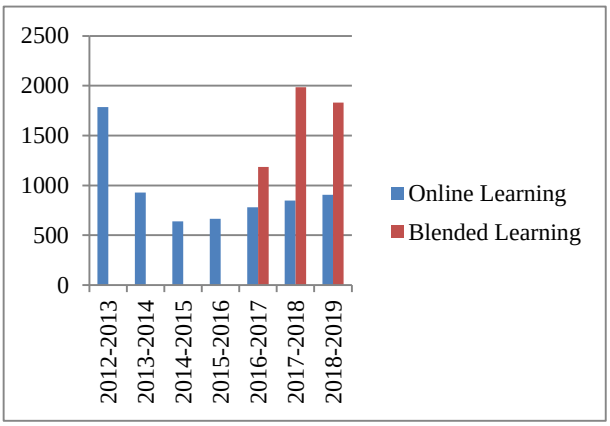

Figure 3. Statistics of Learning Students in LMS

From 2016-2017 to 2018-2019 academic years, the number of registered students learning in Learning Management System (LMS) was increased both in Online and Blended learning due to the credit requirements of the University. The results show that the adequate internet facility and University regulations can enhance the application of Learning Management

System (LMS) system in addition to the system flexibility.

The current Learning Management System (LMS) has some limitations such as lack of flexibility, need fast internet bandwidth and mobile version cannot be supported the courses developed in earlier 2015 because these courses were not responsive courses for portable devices.

5. Conclusions

The Learning Management System (LMS) is essential components of Online learning and Blended learning courses. The universities should consider the application of Learning Management System (LMS) as a supplement to the formal educational system to increase the quality of education. The Universities can meet its e-learning management requirements with a Learning Management System (LMS) which will also provide robust/strong classroom and learner management functionality.

In order to become effective Learning Management System (LMS) system, the capabilities of the Learning Management System (LMS) must be understood. There are many capabilities in the Learning Management System (LMS) system. Responsive Learning Management System (LMS) is crucial for using the Learning Management System (LMS) across multiple platforms and devices. So, Learning Management System (LMS) will be available with the same ease-of-use across all major browsers and mobile devices, including iPhones and iPads. Online examination and assessment are vital when reporting against learning objectives. There are interesting, engaging and fun. Fun is the ways of evaluation that an Online education course has been engrossed and understood. An utilizable Learning Management System (LMS) will allow the students to report on online tests and to learn the courses that have been done as mini-quizzes, games and interactive comic-style click-through. These create the online learner keep the information in a unique way and are the keystone of a user-friendly Learning Management System (LMS).

This paper presented the role of Learning Management System (LMS) in educating and learning teaching method, access and adaptability in higher education institution. The results also provide that the University credit policy and internet accessibility can also enhance the application of Learning Management System (LMS) in the University. Therefore, it is recommended for higher education institutions to coordinate Learning Management System (LMS) into their instructing and learning process so as to accomplish successful learning result. We believe that this study is useful to develop Online learning system in higher education as well as for the Learning Management System (LMS) developers in order to create a result which new features to expand.

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Current Status Analysis in Blended Learning Operation at University of Technology (Yatanarpon Cyber City)

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Abstract

Education is a complex system that requires multiple perspectives and levels of analysis to understand its contexts, dynamics, and particularly concerning technological innovations. The need of Higher Education is traditional learning as well as modern learning. Blended learning (BL) is an approach to education that combines online educational materials and opportunities for interaction online with traditional place-based classroom methods. Because of the flexible nature of BL, it has got more demand among the universities of our country and the demand is increasing gradually. For that reason, BL model based on elearning has been implemented in University of Technology (Yatanarpon Cybercity). The objective of this paper is to describe research on the teaching and learning of content operation in UTYCC. This research is based on the operation of teaching and learning contents of ACU(Asean Cyber University) project at University of Technology (Yatanarpon Cyber City). This paper also points out the two phases: UTYCC's current learning content operation in BL and analysis based on course operations. This research gives some ways of the development of BL contents and improvement of the teaching and learning contents operation in UTYCC.

Keywords- Blended Learning, Higher Education and teaching and learning content.

1. Introduction

The educational system of Myanmar at present is in a transition stage. To make their knowledge correlate with the present technological advancement and globalization, to improve the quality of education system, and to increase students exposure ICT supported teaching learning process is a good option. The demand of today is an approach that blends the advantages of both the modes for the student's learning i.e. blended learning. Although many standards are already there and has accepted by many universities, institutes and organisations, still there are some gaps and works are going on to make them more practicable and systematic. To overcome the challenges of new ICT technologies and exploring new paths to reach the goal of higher education of 21st Century, the best solution is BL model based on elearning. BL is an approach of blending traditional mode of learning and Information and Communication Technology(ICT) supported learning. UTYCC has already implemented elearning system since 2012-2013 academic year. Consequently, University of Technology (Yatanarpon Cyber City) is put on BL at 2016-2017 academic year. Successively, UTYCC become the first applied online University of Myanmar. This research mainly focuses on the content operation of BL in 2018-2019 academic year at UTYCC. Currently we have over 1920 registered students and 21 courses. There are totally 21 co-instructors who are supervising the classes.

The objectives of this research are based on the followings:

- To designate how BL of UT operation is running.
- To highlight the strength and weakness of operation.
- To get the feedback of the students.
- To show the analysis of current operation and how to solve the current challenges.
- To support for the improvement of BL

2. Blended Learning

The term ' blended learning ' as shown in Figure 1 actually describes the manner in which e-Learning is integrated or combined with a more traditional classroom setup, offering independent study.[1][2]

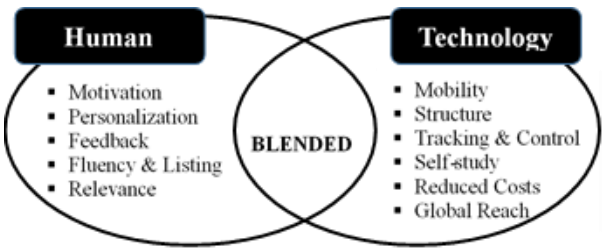

Figure 1. Blended Learning

BL refers to a strategic and systematic approach to combining times and modes of learning, integrating the best aspects of face-to-face and online interactions for each discipline, using appropriate ICTs. BL is the combination of multiple approaches to learning. Blended learning can be accomplished through the use of blended 'virtual and physical' resources. BL is the integration of face-to-face and online learning to help enhance the classroom experience and extend learning

through the innovative use of information and communications technology. There are six model in BL as follow:

A. Face-to-Face Driver Model. This BL model targets students who demonstrate skills either below or above grade level, allowing them to receive additional instruction through a computer program.

B. Rotational Model. The rotation model focuses on using learning stations, exposing students to a range of instruction types and kinds of content. This blended learning environment can benefit students who have distinct learning styles and needs.

C. Flex Model. Schools who are supporting a large number of non-traditional or at-risk students often choose the flex model of blended learning. With this approach, material is primarily delivered online. Although teachers are in the room to provide on-site support as needed, learning is primarily self-guided, as students independently learn and practice new concepts in a digital environment.

D. Online Lab Model. As schools face increasingly tighter resource constraints, the online lab model of blended learning is a viable option for helping students complete courses, including those not offered at the specific school site. In this scenario, students learn entirely online but travel to a dedicated computer lab to complete their coursework.

E. Self-Blend Model. Popular in high schools, the self blend model of blended learning gives students the opportunity to take classes beyond what is already offered at their school. While these individuals will attend a traditional school environment, they also choose to supplement their learning through online courses offered remotely.

F. Online Driver Model. At the opposite end of the spectrum from face-to-face driver we have online driver, which is a form of blended learning in which students work remotely and material is primarily delivered via an online platform. Although face-to-face check-ins are optional, students can usually chat with teachers online if they have questions. [3][4]

3. UTYCC's Current Blended Learning System

UTYCC is one of the Member Universities of ASEAN-Korea Cyber University Project. E-learning center at UT was established on July 11, 2012. Blended Learning model was established on elearning center in 2016-17 academic year. Asean Cyber University (ACU) Project supports Learning Management System (LMS) for on-line learning process. The BL model of UT is illustrated the following Figure 2.

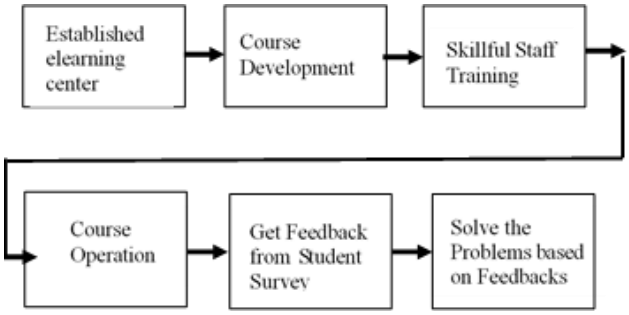

Figure 2. Blended Learning Model at UTYCC

3.1. Identify Criteria for Course Operation in BL Model

The necessary criteria for course operation in Blended Learning system is as follows:

- Online and offline courses are parallel session
- One online course contains 15 weeks (13 weeks Lecture and 2 weeks Exam)
- One hour Offline class lecture is equivalent to 30 minutes in online class lecture
- One week online lecture is approximately between 75 minutes and 90 minutes

3.2. Identify Prerequisite for Blended Learning

Implementing blended teaching involves certain fundamental preparations in all the elements of teaching learning process- teacher, student, content designing, and infrastructure.

Well trained Co-Instructor & Teaching Assistant- Teachers should be well acquainted with the concept of blended learning and fully trained and skilled to blend both types of approaches- traditional and technological. They should be trained to develop content in digital form so that it can be available to students online. They should have experience in internet browsing, should know internet terminology and should have a winder knowledge of the useful website to guide students for online learning.

Teachers with positive approach towards change- Blended learning process also need teachers that have a wider outlook. They should be flexible and be ready to accept the changes. They should be innovative and dynamic.

Lab Facilities- Blended learning largely depend on infrastructure, a well-furnished computer laboratories with sufficient number of computes to cater to all the students of one class and the internet facility, a Wi-Fi campus if possible.

Flexibility LMS- The system should be flexible to use easily for students and examinations system all this is very crucial for implementing blended learning.[1]

4. Roles of Blended Learning System

UTYCC's current blended learning system is organized three parties (LMS admin, Co-Instructor and Teaching Assistant, Students).

LMS admin - The LMS should be flexible for students to take course and examinations.

Co-Instructor - The Co-instructor must not only understand the content that is to be taught within the classroom but they must now have a depth of understanding that allows the content to be adapted into the delivery system allowing the student to take ownership in their learning process. And Co-Instructor have to submit the syllabus and the number of students to register to the LMS admin before the semester starts. During Semester, he have to upload assignments, exam questions and discussion. After semester, he also need to submit the final report of his teaching and learning status, grades report and send to the completion certificate to the students.

Teaching Assistance (TA) - TA has to check their attendance, assignments and upload questions for examinations. And he/she also often teaches and discusses lecture in place of Co-Instructor. The teacher's role is to encourage each student group to come up with three their own answers to the essential question or problem, teacher's responsibility is also to help students set up the end of the lesson where they will do a quality presentation to real-world experts, defend their ideas, and then reanalyze what they have learned about the subject. Thus teacher motivates students to increase their confidence so that they can develop critical thinking. Most important role played by the teacher is in keeping the students learning status digitally safe.

Students - Students must make use of good time management skills as blended courses require them to balance both online and face-to-face course activities. The basic requirement of students is to understand the unit of the subject so their participation is necessary. They have to submit their assignments and discussion in time and sit exam according to the due date.

5. Course Operation Process

In UTYCC, the online courses are developed by content development team yearly. The selection of course is made in accordance with the UT's curriculum and syllabus. The development of course content over time is described in Table 1. The sample contents of University are shown in Figure 3.

Table 1. University's Developed Contents

Name of the Subject	Year	Developed Type
▪ Data Structure ▪ Simulation and Modeling	2012	Adobe Captivate
▪ OOP in C++ ▪ Data Communication and Networking	2013	Adobe Captivate
▪ Complex Analysis & Its Application ▪ Engineering Physics & Its Application	2014	Adobe Captivate
▪ Introduction to Fluid Power ▪ System Analysis & Design	2015	Adobe Captivate
▪ Introduction to AI ▪ Geometric Dimensioning and Tolerancing (GD&T)	2016	Chroma Key
▪ Java Programming ▪ Digital Image Processing ▪ Engineering Chemistry	2017	HTML5
▪ Digital Signal Processing ▪ Introduction to Computer System ▪ Android Programming ▪ Big Data Processing	2018	HTML5
▪ Material Selection & Design ▪ Control System Design ▪ Project Management	2019	HTML5

Figure 3. Sample Contents

BL has been used for courses delivering since 2017. UTYCC uses ACU LMS system for blended learning. ACULMS website is shown in Figure 4.

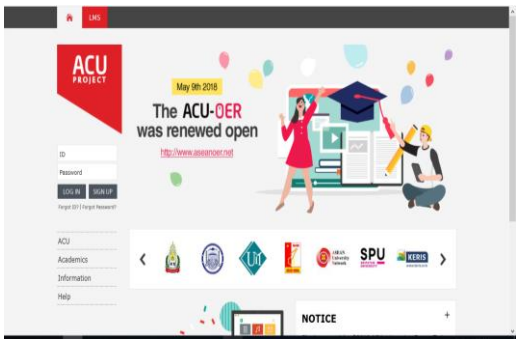

Figure 4. ACU LMS Website

UTYCC's blended learning incorporates class room teaching/learning and online learning. Class room

teaching/Learning includes face-to-face learning and group discussion most of the time. Face-to-face learning give opportunities to teachers to assess students' personality, behavior and value. Group discussion gives students' opportunities to hear different aspects on lessons and exchange ideas and thoughts University credit policy give students enough time to interact with learning materials. Student can interact learning materials through printed media and/ or ICT mediated learning.

The initial blended learning system of UTYCC is started 11 courses in 2016-2017 academic year. The growth of BL system in 2017-2018 academic year is 19 courses and then 21 courses are increased in 2018-2019.

6.1. Difficulty during the Course Operation

During the course operation, some difficulties occurs in software and hardware If the multiple access on LMS server at the same time, internet's bandwidth can't be fully supported to the students' studying and earning. Some problems are teaching assistance's upload assignments and questions because of the slow internet bandwidth. Occasionally, the student can't sign in the ACULMS website because of the system error.

6.2. Evaluation Method

The evaluation method for the courses of UTYCC's BL system as shown in Figure 5. There are learning progress (Student attendance), Assignments (at least two times per semester), and Online exam (two times per semester). During the learning period, the students have to sit two examinations.

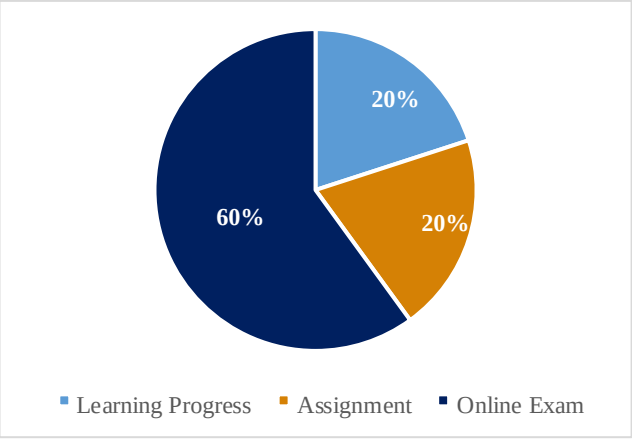

Figure 5. The Mark Distribution of BL System

7. Research Target Course and Method

The study area based on Database Analysis Design course using BL model. In Database Analysis and Design course, I participated as course's Co-instructor. Qualitative research was conducted to obtain the feedback on the implementation of BL in UTYCC. For the analysis how BL approach is effective for student, I collected survey for online learning according to ACU project' Continuous Quality Improvement (CQI) criteria such as assessment on the integrity of the lecturer in organizing the lecture and assessment on Lecturer's Teaching Ability.

8. Analysis of the Survey Result

At the end of the academic year, we take the survey for course evaluation. There are 75 students (40 male and 45 female) responded to the offline survey for Database Analysis and Design course. The following Table shows how the students responded on their satisfaction of course operation in BL. Based on the analysis of the survey result, the percent responded in their course satisfaction is shown in the following table.

Table 2. Student's Course Evaluation Survey Result

Area	Evaluation Items	Satisfied %	Neutral %	Non %
Class Issues	01. Course information (e.g. syllabus, reference) is helpful in learning.	29.41	58.8	11.75
	02. Each lesson has a clear learning goal.	17.7	82.3	0
	03. The professor replied to the student's questions fast and accurately.	58.8	35.3	5.8
	04. The professor properly utilized cases & examples to help the learners to understand the class.	64.8	29.4	5.8
	05. The professor's explanation was clear & specific enough to be easily understood.	76.5	11.75	11.75
	06. The professor made efforts to inform the students of evaluation criteria in advance & to make a just evaluation.	70.58	17.7	11.75
Delivery	07. The professor delivered the learning content with clear pronunciation.	76.5	11.75	11.75
	08. The voice of professor was appropriate.	76.5	11.75	11.76
	09. The speaking speed of professor was appropriate.	70.58	17.7	11.75
System	10. The system was stable during the class.	41.18	58.82	0
	11. Inconvenience of & requirements for LMS were reflected & improved.	23.5	64.8	11.75

Contents	12. The quality of content (sound quality, video quality) was fine.	29.4	58.85	11.75
	13. Methods used for presenting content were appropriate for each course.	17.7	76.5	5.8
Satisfaction of Course	14. I am satisfied with this course.	29.4	64.8	5.8
	15. I would like to recommend this course and the professor to other students.	11.75	70.15	17.7
Self-evaluation of Student	16. I made good use of the Notice, Q&A, and Bulletin Board.	17.7	64.7	17.7
	17. I paid full attention while taking the lectures.	23.53	58.82	17.7

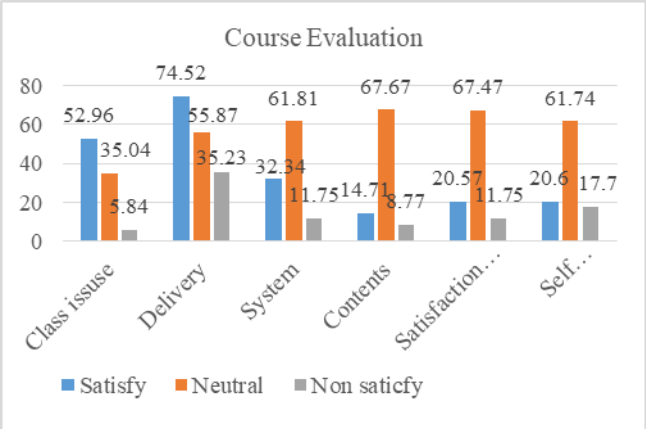

Figure 6. Student Evaluation Survey Result in Database Analysis and Design

According to the result, over 60% of the students satisfied on contents, satisfaction course and self evaluation of student. However over 30% of the students' unsatisfied on class issue, delivery and system. Moreover, we also met lower 50% of student satisfaction in system, contents, satisfaction of course and self-evaluation of student.

8.1. Assessment on the Integrity of the Lecturer in Organizing the Lecture Survey Result

There are 75 students responded to the offline survey based on Database Analysis and Design course. This subject is explained in English. The detail result shows for assessment on the integrity of lecturer in organization the lecture survey is shown in Table 3.

Table 3. Student Survey Result for Database

Area	Satisfied %	Neutral %	Dis-satisfied%
Course Description	55	45	0
Course Goal	60	40	0
Reply for the answer	35.6	63	1.3
Use of Case	33.3	53.3	13.3
Clarity of explanation	40	47	13
Evaluation standard, Fairness of evaluation	40	60	0

According to the result, 44% of the students is satisfied, 51% is neutral and 4.6% is dissatisfaction in this survey. Overview the dissatisfied result, we encounter the student difficulties for assignment, notice and counseling.

Another survey result collected 75 students based on Data Communication and Networking course. This course is explained in mother language. The detail result shows for assessment on the integrity of lecturer in organization the lecture survey is shown in Table 4.

Table 4. Student Survey Result for Data Communication

Area	Satisfied %	Neutral %	Dis-satisfied%	
Course Description	97.22	2.78	0	
Course Goal	91.67	8.33	0	
Reply for the answer	81.25	18.75	1.3	
Use of Case	88.89	11.11	13.3	
Clarity of explanation	80.56	19.44	13	
Evaluation standard, Fairness of evaluation	40	60	0	

According to the result, 79% of the students is satisfied, 20% is neutral and 4.6% is dissatisfaction in this survey. Overview the dissatisfied result, we met the student problem on assignment submission on time.

8.2. Assessment on Lecturer's Teaching Ability Survey Result

The offline survey collects 75 students for Database Analysis and Design course. The following Table 5 shows for assessment on lecturer teaching ability survey.

Table 5. Student Survey Result for Database

Area	Satisfied %	Neutral %	Dis-satisfied%
Clarity of Pronunciation	47	40	13
Volume of Voice	50	40	10
Speed of Speaking	30	67	3

The table is shown only the evidence result responded from the students. According to the result, 40.3% of the students is satisfied, 49 % is neutral and 8.6% is dissatisfaction in this survey. According to the analysis, students have difficulties for teaching language, English.

Additional offline survey collects 75 students for Data Communication and Networking course. The following Table 6 shows for assessment on lecturer teaching ability survey.

Table 6. Student Survey Result for Data Communication

Area	Satisfied %	Neutral %	Dis-satisfied%
Clarity of Pronunciation	80.56	48.89	0
Volume of Voice	83.33	16.67	0
Speed of Speaking	82.86	17.14	0

In this survey, 82.25% of the students is satisfied, 27.56 % is neutral and no feedback in dissatisfaction. In relation to the analysis, students have no difficulty for teaching language because of explanation with mother language.

The satisfaction results are highly difference between two courses. Because of weakness the listening ability in foreign language. Students are more absorbed in mother language.

8.3. Student's Attitude in Blending Learning

How do learners in the observe the achievements of the blended learning course? To answer this question, the researcher asked the 74 students (male 30 and female 44) respond to a questionnaires consisting of 5 items.

1. The BL course make it easier for students to learn at their own level.
2. The students' learning experience is enhanced by this BL.
3. The BL helps students find their learning materials anytime and anywhere.
4. The BL motivates students to develop independent learning skills.
5. The BL provides effective and frequent feedback.

The collected results are presented in the following Figure 7.

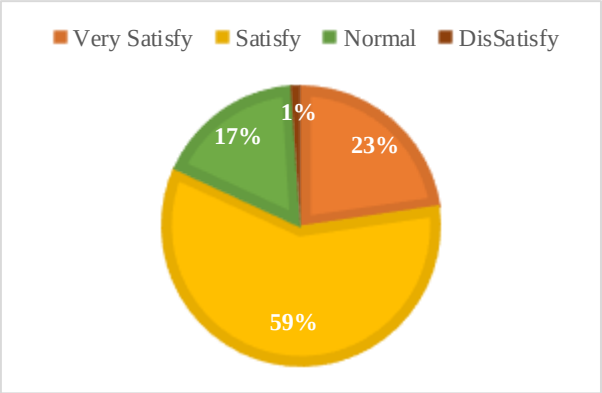

Figure 7. Student's Attitude Survey Result in BL

The overall result in all questions display 22.4% of student is very satisfy, 58.33 is satisfy, 17.62% is normal and is 1% is dissatisfy. This result indicated that learner's attitude with the blended learning, since it enhanced the teaching and learning experience.

8.4. Benefits and Challenges of Implementation BL in UTYCC

The result of qualitative research on the implementation of BL show the following benefits were brought to UTYCC.

- Engage and motivate learners through interactivity and collaboration
- Successful evaluations
- Better communication between teachers and students
- Flexible access to instruction, resources and learning opportunities
- Tracking and reporting
- Students to learn and access material in a variety of modes
- The instructor tailor learning content to the unique needs of different audience segments

The result on the implementation of BL show the following challenges were brought to UTYCC.

- Bandwidth makes a huge difference
  One of the most important factor is the students can't access e-learning anytime anywhere because of the limitation of bandwidth and internet speed.
- Most online courses are in English
  Since the lecturer of Database Analysis and Design in BL course operation is teaching in English, so students are boring in the lecture and may need to explain content and help with language.

9. Discussion

The collected various survey results present the strength and weakness of BL. To overcome the weakness and sustain the BL successfully in the future, we need to resolve the following issues according to the feedback of various surveys. Some contents need to change mobile version and recreate the up to date courses to improve the quality of BL courses and increase student learning satisfaction. In addition, we need to supplement new media technologies to our LMS such as group online chatting to share their knowledge, discussion and game based learning by using tools such as khoot and quizlet.

10. Conclusion

BL is one of the most important success factors for higher education in Myanmar. It will help to improve the quality of education system. UTYCC is the only one e-Learning center under ministry of science and technology (MOST). Therefore, UTYCC will be created more online suitable engineering courses for BL. Moreover, UTYCC will widely share the lecture to other universities. Online lecture is used with images and video. So, we need to upgrade internet facilities. This research will provide the needs and success of BL content operation in which what we should have to prepare, what we need more and how the problems to be fixed in the future. If we overcome issues, UTYCC achieved very successful BL model based on e-learning.

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Design Thinking Attitude in YCC Invent

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Abstract

Ideation and innovation processes have become a cornerstone for the competitiveness of Higher Education. Shifts in science and technology innovation policy have come to necessitate better education for instructing society's future innovators.[8],[9] We need to educate students who can solve problems that overlap multiple fields and who can also discover and identify what the new issues will be. One approach to educating such students, design thinking education, is attracting attention at Universities. Design Thinking is one capable way to extend the creative potential of both students and professionals. Design thinking is a user centered process which concerns with real problems that can be solved through empathy with users and rapid prototyping. The purpose of this paper is to determine whether design thinking approach will improve the students' motivation, skill and abilities in Human Computer Interaction. This paper presents how the designing thinking approaches in intensive design experience (IDE) of YCC's invent that held in 2018 and 2019.This paper also describes the analysis how design thinking is the highest correlation with team success.

Keywords- Innovation, Design Thinking, Intensive Design Experience, YCC's Invent

1. Introduction

Design Thinking has been growing as a central point in the contemporary design world with a variety of applications not only focusing on just a single product but more becoming a methodology to practice for innovations. From a large scale of the design industry, this human-centred approach results in innovative impacts, to a smaller scale of academic environments, applying design thinking also helps design students build up with creative confidence and transform them into design thinkers.[1] In the journal "Notes on the Evolution of Design Thinking: A Work in Progress", Craig M. Vogel give emphasis to on the progression of design thinking within multidisciplinary programs that could bring out a new model for innovation not just in universities but companies to approach all of the unmet global human need.[2] Design Thinking has been taught in successful design education at school, the Institute of Design at Stanford University as a methodology for innovating routinely with feasibility, viability, and desirability to approach the real needs and desires of the human.[3] Roger Martin also believed that design thinking could bring potential effects on education when design thinking was about the mental processes through a project-based workflow for problem-solving solutions. Moreover, Design Thinking might help students become empowered agents on their own way of self-developing because of possessing both the tools and the confidence to change the world). [4]

In the increasingly complex life and work environments in 21st century, Learning and Innovation skills are skills will be essential for students. To fulfill this requirements, teachers need to integrate design thinking, growth mindset, and inquiry learning into their lecture.

Main objective of design thinking approach in YCC is to facilitate students through the motivating teaching and learning strategies to acquire complex problem solving skill and the other core skills that are valuable for employers. And also 21st century teaching, learning and workplace, problem solving and creative thinking are highly treasured. As we adopt the students for the workplace, learning and teaching should center on design thinking approach to offer students a greater ability life. The purpose is to make real world problems for lectures, workshops and assignments based on design thinking methodology and teach students to adopt and use them in solving real problems in university field and real life as well [4].

2. Design Thinking

Design Thinking is a design methodology that delivers a solution-based approach to solving problems. It's extremely useful in tackling complex problems that are ill-defined or unknown, by understanding the human needs involved, by re-framing the problem in human-centric ways, by creating many ideas in brainstorming sessions, and by adopting a hands-on approach in prototyping and testing.

The five stages of Design Thinking is as shown in Figure1.

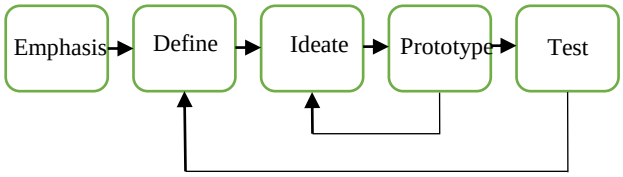

Figure 1.Five Stages in Design Thinking Process [6]

2.1. Empathize

The first stage of the Design Thinking process is to gain an empathic understanding of the problem that is tried to solve. This involves consulting experts to find out more about the area of concern through observing, engaging and empathizing with people to understand their experiences and motivations, as well as immersing yourself in the physical environment so you can gain a deeper personal understanding of the issues involved [5][6].

2.2. Define (the problem)

During the Define stage, the created and gathered information of the Empathise stage are put together. The students should seek to define the problem as a problem statement in a human-centred manner. The Define stage will support the designers in the team gather great ideas to establish features, functions, and any other elements that will allow them to solve the problems [5] [6].

2.3. Ideate

This stage is one of the core elements of design thinking and consists mainly of brainstorming and its rule. Prepare initially for brainstorming and facilitate promising ideas. Brainstorming may often be thought of as wild and unstructured, but it in fact is a focused activity that involves a lot of discipline [5] [6].

2.4. Prototype

The design team will now produce a number of inexpensive, scaled down versions of the product or specific features found within the product, so they can investigate the problem solutions generated in the previous stage. Prototypes may be shared and tested within the team itself, in other departments, or on a small group of people outside the design team. This is an experimental phase, and the aim is to identify the best possible solution for each of the problems identified during the first three stages.

The solutions are implemented within the prototypes, and, one by one, they are investigated and either accepted, improved and re-examined, or rejected on the basis of the users' experiences. By the end of this stage, the design team will have a better idea of the constraints inherent to the product and the problems that are present, and have a clearer view of how real users would behave, think, and feel when interacting with the end product [5][6].

2.5. Test

Designers or evaluators rigorously test the complete product using the best solutions identified during the prototyping phase. This is the final stage of the 5 stage-model, but in an iterative process, the results generated during the testing phase are often used to redefine one or more problems and inform the understanding of the users, the conditions of use, how people think, behave, and feel, and to empathize. Even during this phase, alterations and refinements are made in order to rule out problem solutions and derive as deep an understanding of the product and its users as possible [5][6].

3. The Role for Design Thinking in 21st Century Education

21st Century society demands the students to have the skills to solve the real world problems and situations which are increasingly complex. For this demand, students are taken by design thinking approach to find the solutions of the problems. Design thinking help students become allowed agents in their own learning who possess both the tools and the confidence to change the world. In addition, by integration design thinking in project, classroom learning and teaching has the capacity to give students an edge in the future.

4. Target Group of Study

Engineering students who participated in YCC Invent in 2018 and 2019 were selected as target group of study. The participants' information are described in Table1.

Table 1. Participants Information in YCC Invent (2018 & 2019)

Characteristics	Statics (2018)	Statics (2019)
Number of Teams	10	7
Total Number of Participants Specialization	52	50
Gender	40 % Male, 60% Female	40 % Male, 60% Female
Major	Information and Communication Technology(Information Science, Computer Engineering),Electronics Engineering, Precision Engineering, Advanced Materials Engineering	
Undergraduate or Graduate	98% Undergraduate 2% Graduate	100% Undergraduate

5. Design of YCC Invent

The IDE was organized around the theme of healthcare, Internet of Things (IOT), first responder's needs, social entrepreneurship, or education to develop solutions to industry and agency posed problems to practice entrepreneurship.

Students were allowed to form a team of 4 to 6 participants with common interest in a particular

problem. Students were given a total of 48 hours to complete the IDE, during which students must develop solutions to the problem, build prototype of design product and give 10-minutes presentation. The presentation must include the 90 second long video support to show the function of their design product.

The IDE was designed as competition to motivate the participants to perform their best. In addition, IDE was designed for the students to complete the project within short time, to work in multidisciplinary group, to produce multiple deliverables. In the real work place, the projects need to be delivered within the limited time and budget. Group work and coordinating in multidisciplinary team also play crucial in real work place. The criteria for evaluation by judges were technical performance, project feasibility, innovation and effectiveness of presentation. Cash prizes were awarded to top three winning teams.

5.1. Design Thinking Education Activities in YCC Invent

The Design Thinking education of YCC targets empowering students to be set up to take an interest in Design Thinking ventures later on.

Students are educated to become design thinkers who can provide reasonable solution and innovative techniques to the individuals' needs of business and market opportunity. In order to achieve this objective, YCC organizes IDE as a learning strategy to build the human centered design mindset in students. In addition, basic of design thinking lecture are taught in class as an activity. University also invites industrial partner to give the talk about design thinking.

To nurture the design thinkers, YCC use a variety of learning strategies in design thinking process. The students have to integrate designing thinking activities during the YCC Invent to reach their goals.

Empathize: In this stage, learning strategy is designed for students to understand more about people so that they can develop the solutions that fit their need. Therefore, it is important for students to be aware of the needs of different people from different places in different situation. Learning methods such as interviewing and observation are used to give this learning outcome.

Define: The goal of this stage is to come up with the narrow problem statement. In this stage, the students collect the necessary facts and define which facts are more suitable and important for their solution. The output is only facts or sketch diagram that drive the team forward.

Ideation: In the ideation mode, the students focuses on idea generation. Learning methods such as brainstorming and/or bodystroming are the best tools for student to come up with new ideas. In this stage the team iterates and validates their ideas along the way by hearing from the people they are actually designing for.

Prototyping: Students study how to generate quick and low resolution artifacts. To do so, students are taught a variety of methods ranging from simple outlining techniques to compute simulations as well as physical prototypes. After learning, they are taking risk out of the process by making something special first. And they also learn the lessons from it.

Testing: Within this phase user tests are performed in order to evaluate prototypes and to inspire further development. After this stage, they redesign their prototype or their ideas from the designing experiments through which the team going to learn.

6. Study Method

During a YCC Invent, facilitators have had the unique opportunity to observe effective and low designing thinking teams, note some observed characteristics, and have intervened when teams appear to be headed into a situation where success could be compromised.

In YCC invent, I participated as facilitator. For the analysis of how design thinking approach is effective for student, I set the criteria and prepared marking scheme. My criteria for evaluation is inspiration, ideation and implementation of the project. My criteria are substantial equivalent to the judges' criteria.

In addition, to observe the characteristics of students and their team, I identified some important characteristics based on inspiration, ideation and implementation level as shown in Table 2. Then students and their team performance were observed and checked three times(10:00am, 5:00 pm on Saturday and 10:00am on Sunday) to evaluate their performance.

Table 2. Predefined Characteristics for Facilitator's Observation

Characteristics	5	4	3	2	1
Inspiration Level (Learning how to better understand people and their needs)					
Ideation Level (Define the design challenge, generate many ideas, identify the best approach)					
Implementation Level (Developing Prototype and Testing)					

And effective team success was also defined by the results of the scores by the judging panel of 5 judges.

The score sheet, was provided to the teams about 24 hours before the judging session so each team knew the criteria for success.

Judges were asked to score teams on Technical Performance of the project, Project Feasibility, Project Innovation, and Presentation – all key skills needed in any successful entrepreneurial activity. Scores were averaged across each judge, multiplied by a weighting, and then summed for a final score. Judges included professors and industry leaders involved in the field representative of the theme of the IDE.

And we also interviewed the students about their improved motivation and skills after learning the design thinking approach in YCC Invent.

6.1. The Result of Analysis

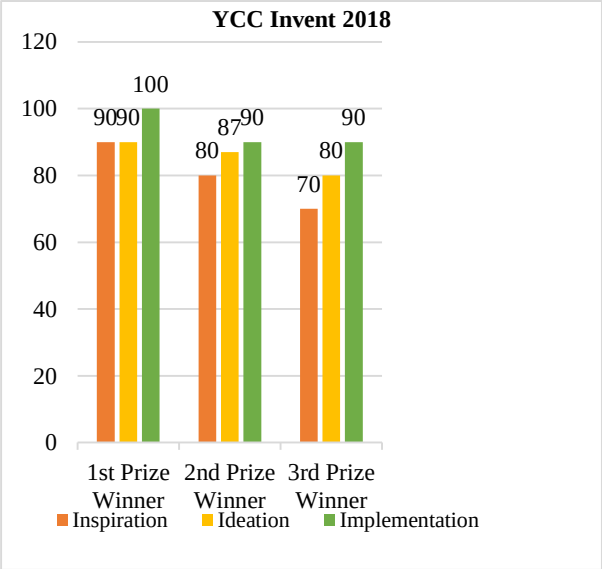

Figure 2. Design Thinking Scores of Top Three Teams

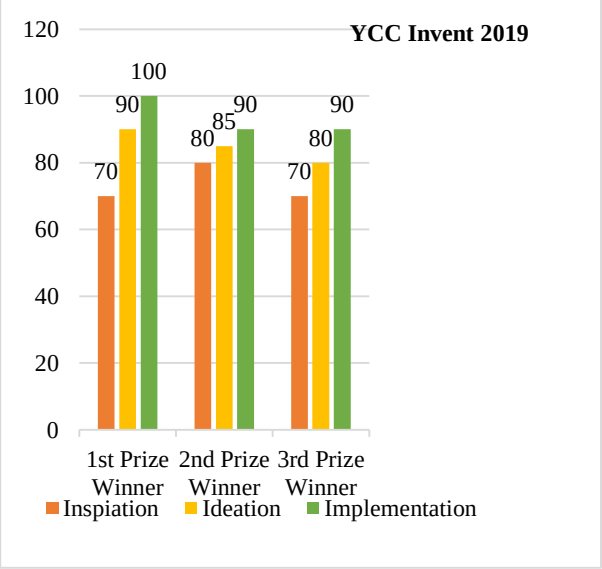

Figure 3. Design Thinking Scores of Top Three Teams

This study area includes 8 teams comprising 52 students who participated in 2018 YCC Invent and 7 teams comprising 50 students who participated in 2019 YCC Invent. The smallest team includes 4 students and the largest team includes 7 students. Facilitator's choice of top three winning group are the same as judges' choice of winning group. Five facilitators' scoring for top three teams 'design thinking progress of 2018 and 2019 YCC Invent is shown in Figure 2 and 3.

Judges scoring data are shown in Figure 4 and Figure 5 for the top three teams of 2018 and 2019 YCC Invent.

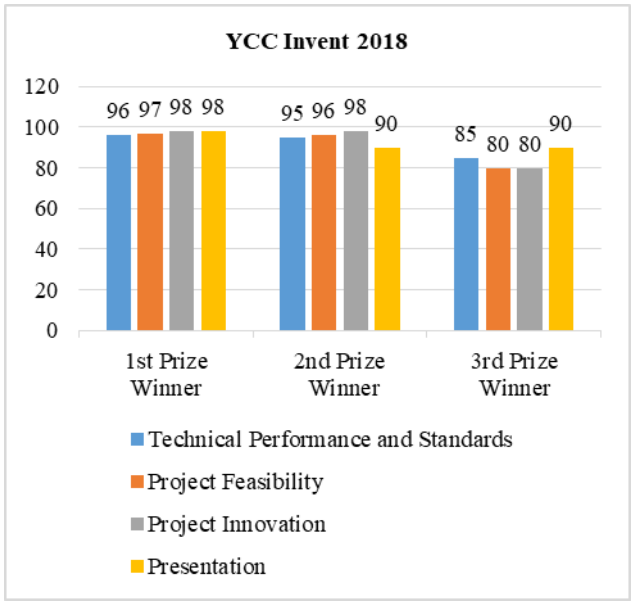

Figure 4. Judging Scores of YCC Invent 2018

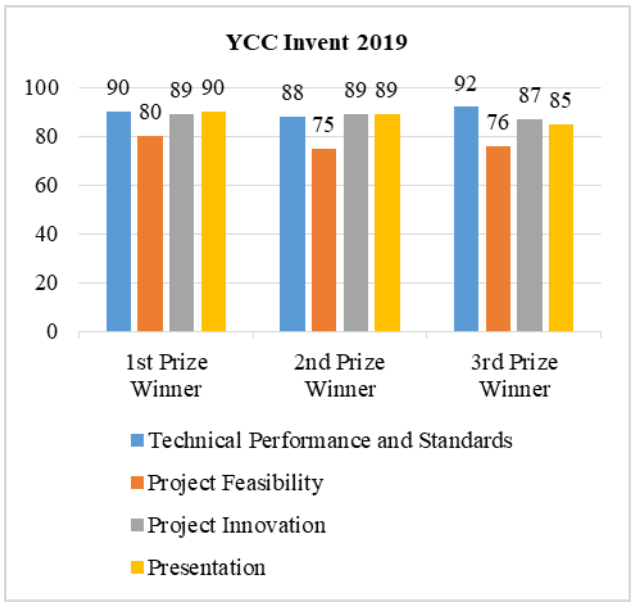

Figure 5. Judging Scores of YCC Invent 2019

Above two observation and judging scores, we found that the most significant change occur between

inspiration and implementation stage over two days. The most successful team during YCC Invent exhibited the ability through inspiration and ideation to excellent implementation.

The result shows that although the winning teams have fair inspiration and good ideation at the start of IDE, they can perform implementation very well. The result of characteristics shows that share individual inspiration and ideas to each member are their strength. Due to this characteristics, they can contribute to team cohesion and bring success.

In addition, the leaders and some of the participants of each group were interviewed to capture their views and experiences about design thinking learning and activities. The interview question is 'which abilities they improved and which benefits they got during and after the invent". We asked 30 students in 2018, 25 students in 2019 and the average result is calculated depend on their improved abilities. According to the interview results, the participants' motivation and abilities are improved as follows:

- 80% of the students improved their ability to identify critical needs/requirements, develop and evaluate conceptual designs, integrate hardware and software, and understand the process of design
- 75% of the students improved their ability for oral presentations and showcasing skills to others
- 77% improved their ability in all areas of teamwork

6. Conclusion

During a YCC Invent, design thinking approach in making project were examined through facilitator's observations and judging scores. This paper described the teaching/learning and assessment strategy of design thinking skill of YCC and to give suggestion for the improvement of nurturing students with design thinking skill.

In addition, this paper presented the YCC framework for the development of innovation, design thinking and creativity in learning. This study with different creative activities and tools such as hands-on practices in separate phases could help design students build up their creativity, confidence and design thinking skill.

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