2023 Trend Report

Higher Education & e-learning in ASEAN

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“Harnessing the Power of ChatGPT for Education” Online Training Event by TET Myanmar

#Artificial Intelligence #Education #ChatGPT #Plagiarism

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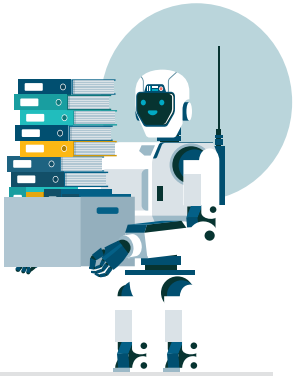

The growing presence of artificial intelligence (AI) in education has captured the attention of educators worldwide. With rapid advancements in AI technologies, educational institutions now offer training programs and discussions on effectively using AI in education. This has made AI an essential resource for improving teaching methods and learning experiences, leading to more personalized and efficient educational systems.

TET Myanmar, a non-profit social educational enterprise, seeks to transform education in Myanmar by helping teachers reach their full potential, thus paving the way for a better future for the next generation. To achieve this, TET Myanmar hosted an online training event centered on using ChatGPT in education. The event aimed to showcase the potential of Artificial Intelligence (AI)-powered language models for enhancing learning experiences across various educational institutions in Myanmar. There were over 300 participants in the training. The event received overwhelmingly positive feedback from participants, including those from higher education institutions, PreK-12 schools, language training centers, non-governmental organizations and freelance teachers. They found the discussions on the role of AI in the future of education, rethinking plagiarism and cheating in light of AI advancements, and other AI tools in education particularly valuable. Even though the event was highly praised, some attendees were worried about the need for better internet and technology access to fully benefit from AI-powered tools like ChatGPT. Educators, in particular, were concerned about students relying too much on AI tools for their schoolwork.

The training session primarily centered on exploring the following topics related to AI in education:

- Introduction to ChatGPT
- AI Detectors and their Reliability
- Plagiarism and Cheating (Rethinking)
- ChatGPT for higher education
- Other AI tools
- The future of AI in education

Figure 1. A screenshot of the online training event on ChatGPT by TET Myanmar

01 Introduction to ChatGPT

According to ChatGPT is an AI-powered language model developed by OpenAI Company that can understand and generate human-like language [1]. It has the ability to perform various language-related tasks and is particularly useful for generating responses to open-ended questions or prompts in the field of education. The latest model of ChatGPT, GPT-4, is more precise and can ace the Uniform Bar Exam, calculate tax liability, and describe images in detail [2].

02 AI Detectors and their Reliability

With the increased use of AI tools in education, the need for AI detectors to ensure academic integrity has also grown. However, there are concerns about the reliability of these detectors in accurately detecting plagiarism and cheating. Several well-known AI detectors currently exist in the market, including AI Text Classifier by OpenAI (created by the developers of ChatGPT), GPTZero (an AI tool designed by a college student for educators), Fictitious.ai (an AI detector that integrates with Canvas LMS), and AI Writing Check (a free service provided by Quill and CommonLit). In the paper “Can AI-Generated Text be Reliably Detected?” [3], researchers argue that the unregulated use of large language models (LLMs) in widely used applications from major technology companies may lead to negative consequences such as sophisticated spam, fake news, inaccurate summaries, and plagiarism. Paraphrasing attacks can easily avoid detection by AI detectors, degrading their accuracy to as low as 57%. It is impossible for AI-generated text detection problems to be reliably solved in practical scenarios. Watermarking schemes designed to safeguard LLMs can be prone to spoofing attacks, which can result in false accusations of spamming or plagiarism. As a result, it may not be possible to reliably determine if a text is written by a human or an AI, and verification of the source of text through other information may be necessary.

03 Plagiarism and Cheating (Rethinking)

The rise of AI tools has led to a rethinking of traditional notions of plagiarism and cheating. As AI tools become more prevalent, educators must consider how to redefine academic integrity in light of these advancements.

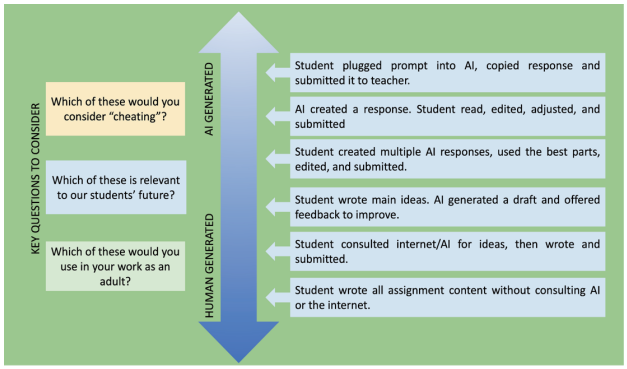

Figure 2. Exploring the changing definition of cheating and plagiarism in education in light of AI advancements

In Fig.2 based on [4], which among these actions would be deemed as "cheating" or "plagiarism"? The answer to this question must consider the future of education and the evolving role of AI in the workforce.

As AI technology advances, it is vital to evaluate current educational practices and contemplate how to adjust to this ever-changing field. Despite the challenge of determining the proper use of AI tools in education, engaging in these conversations is critical to adequately preparing students for what lies ahead.

04 ChatGPT for Higher Education

The paper [5] addresses “ChatGPT” as a co-author of the paper, and discusses AI chatbots and their potential uses and risks in nursing education, including personalized learning and plagiarism prevention. ChatGPT has potential applications in higher education, including providing personalized learning experiences, assisting with research and writing, and answering student inquiries. However, ChatGPT's ability to generate accurate citations and information on a research topic is limited, as it is a machine learning system that is constantly learning and improving its language generation capabilities.

When prompted to produce a literature review on a specific research topic, ChatGPT is not able to consistently provide accurate citations and information. The citations and information produced by ChatGPT are often subject to errors, highlighting the need for human oversight to ensure accuracy and reliability. Although ChatGPT has released its updated version, GPT-4, which is said to provide more accurate citations and information, it is still not flawless and requires human supervision. Additionally, access to GPT-4 may be limited for users.

Despite its limitations in generating accurate citations and information, ChatGPT can assist with various tasks such as paraphrasing ideas, creating outlines for presentations, summarizing research papers, and providing feedback on essays. It is worth noting that ChatGPT can also generate computer programming codes, and with the release of GPT-4, it has the ability to analyze pictures, although this feature is not yet available to the general public.

05 Other AI Tools in Education

There is an abundance of AI tools and platforms that are powered by artificial intelligence not only in K-12 education but also in higher education. Here are some examples:

- Coursera (coursera.org): A massive open online course (MOOC) platform that offers courses from top universities worldwide. Coursera uses AI to personalize learning experiences and recommend courses to students based on their goals and interests.
- EdX (edx.org): Similar to Coursera, EdX is a MOOC platform that provides access to courses from top institutions. EdX leverages AI to create personalized learning paths and recommend relevant courses to users.
- Turnitin (turnitin.com): An AI-driven plagiarism detection tool that helps maintain academic integrity in higher education institutions. Turnitin uses machine learning algorithms to identify instances of plagiarism in student work and provide feedback on citations and referencing.
- Writefull (writefull.com): An AI-powered writing assistant that helps students and researchers improve their academic writing. Writefull provides feedback on grammar, style, and usage, enabling users to create clear and concise documents.
- Grammarly (grammarly.com): A widely-used AI-driven writing assistant that checks for grammar, punctuation, and style errors. Grammarly offers a premium version tailored for academic writing, which includes advanced suggestions and plagiarism detection.

- Gradescope (gradescope.com): An AI-driven platform that streamlines the grading process for educators, allowing them to provide consistent, timely, and accurate feedback to students. The platform supports various assessment formats, including exams, homework, and programming assignments.
- Cognii (cognii.com): An AI-powered platform that uses natural language processing to provide personalized tutoring and assessment. Cognii can evaluate open-response answers, provide instant feedback, and generate analytics to help educators improve their teaching methods.

06 AI Detectors and their Reliability

With the increased use of AI tools in education, the need for AI detectors to ensure academic integrity has also grown. However, there are concerns about the reliability of these detectors in accurately detecting plagiarism and cheating. Several well-known AI detectors currently exist in the market, including AI Text Classifier by OpenAI (created by the developers of ChatGPT), GPTZero (an AI tool designed by a college student for educators), Fictitious.ai (an AI detector that integrates with Canvas LMS), and AI Writing Check (a free service provided by Quill and CommonLit). In the paper "Can AI-Generated Text be Reliably Detected?" [3], researchers argue that the unregulated use of large language models (LLMs) in widely used applications from major technology companies may lead to negative consequences such as sophisticated spam, fake news, inaccurate summaries, and plagiarism. Paraphrasing attacks can easily avoid detection by AI detectors, degrading their accuracy to as low as 57%. It is impossible for AI-generated text detection problems to be reliably solved in practical scenarios. Watermarking schemes designed to safeguard LLMs can be prone to spoofing attacks, which can result in false accusations of spamming or plagiarism. As a result, it may not be possible to reliably determine if a text is written by a human or an AI, and verification of the source of text through other information may be necessary.

Implications

In conclusion, the "Harnessing the Power of ChatGPT for Education" online training event organized by TET Myanmar successfully illustrated the potential of AI-driven language models, such as ChatGPT, to transform educational practices across various institutions in Myanmar. Participants from diverse educational backgrounds expressed appreciation for the insightful discussions surrounding AI's role in the future of education, plagiarism, and cheating in the context of AI, and other AI tools in education. While the event received widespread praise, concerns were raised about the need for improved internet and technology access and the possibility of students relying excessively on AI tools for their academic work. As AI continues to reshape the educational landscape, it is crucial for educators, technologists, and policymakers to collaborate and address these concerns, ensuring the responsible and equitable integration of AI-driven tools in the learning process.

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2023 Trend Report

Enhancement of Engineering Higher Education Systems and Teaching Staff Training Development in Yangon Technological University (YTU) in Myanmar

#Higher Education in Engineering #Teacher Training #Implementation Procedures

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Myanmar's engineering higher education system encourages the learning model of life-long circumstance and essentially applicable. Accordingly, the role of technological universities is responsible for more dominant roles in practical features.

01 Myanmar's Approach to Improve Engineering Higher Education

Myanmar Engineering Higher Education System (especially YTU) emphasizes both the importance of traditional institutions of engineering higher education and their collaboration with local and/or global industries and local and/or international governments. This innovative approach no longer supposes students to pursue the highest possible academic achievement as young as potential, but relatively to learn and acquire fresh skills all the way through their lives.

▶ Research-Based Learning (RBL)

Engineering higher education shall act out and formulate students for real life as much as imaginable. It motivates on upskilling the students through real-life research-based learning by conveying problems of industries into campuses and vice-versa.

▶ Stimulate Digital Transformation (SDT)

Yangon Technological University in Myanmar is already occupying on building students experienced in languages for engineering degree programmes with digital technology. Besides in IT-promoted digital transformation and digital technology-related courses that are apprehended in YTU are also roughly of the utmost popular choices. Consequently, concentrating more on digital transformation is imperative.

Differentiate Engineering Higher Education Corridors

The reform gives emphasis to on the significance of facilitating students and teaching staffs recognize and track their concentration, as it would preserve them inspired to learn over and done with life and complete prowess in the learning process.

Boost Lifelong Learning (BLL)

Through IT-promoted Digital Transformation encourages life-long learning in engineering education. At this juncture, it is acquainted with assorted interests and recognized talents, boosting a lifelong tracking down of prowess from end to end numerous corridors, implementation of an unfluctuating extensive characterization of excellence based on skills prowess, more willingly than preceding academic consequences.

Implications

YTU's line of attack on the way to engineering higher education is to benefit engineering students to realize the solutions for real-life problems and by extending the role of technological universities in Myanmar (in line with Washington Accord Institutions), an impression of technological universities is no longer restrained to engineering higher education and changing the lives of engineering students.

02

Teaching Staff Training Development in Yangon Technological University

Yangon Technological University (YTU) is the Centre of Excellence (CoE) in Engineering Institute of Myanmar.

It has begun as the Burma Institute of Technology (BIT) established in 1961 to offer degree courses in engineering for some people. In 1964, BIT became Rangoon Institute of Technology (RIT), which is only one of Myanmar's engineering universities.

The university was renamed Yangon Institute of Technology (YIT) in 1990 and was placed under the Ministry of Science and Technology in 1997. In 1998, the name of the university was changed to Yangon Technological University (YTU).

It also provides extensive engineering degree programs and the best Centre for engineering professional development and continuing engineering higher education contributions for teaching staffs traditionally.

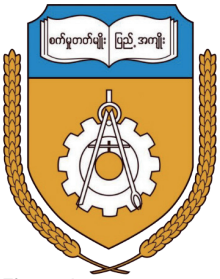

Figure 1.
Rangoon Institute of Technology (RIT) Logo

Figure 2.
Yangon Technological University (YTU) Logo

To work for the needs of the Ministry of Science and Technology (MOST) functioned closely with it for the engineering professional development of the definite number of technological teaching staffs in Myanmar. YTU conduct initial engineering teaching staff preparation program based on Prediction, Observation, Discussion, and Synthesis (PODS) methodology to formulate students with the intention of they would be greatly effective teaching staffs on the day they enter technical classrooms and grow into responsible for student learning at Technological Universities in Myanmar. It delivers specific content and experiences that would get someone ready them with the knowledge, skills and personalities to the engineering students. YTU also affords opportunities to learn and work overseas to the engineering teaching staffs and engineering students. With this worldwide exposure, the perspectives of engineering teaching staffs and engineering students nurture to suit their personal.

YTU has been playing an essential role as an engineering educational institute to support Myanmar's engineering higher education by formulating engineering teaching staffs to give a grounding in the national engineering curriculum, formulating future engineering education leaders, providing continuing engineering professional learning, and conducting technological research that would lead to enhancements in reality.

Hosting the Teaching Staffs' Training at YTU

YTU always hosts the engineering teaching staffs' training in May and in November every year. YTU emphasizes that trainings for enhancing the research skills in specific areas of young researchers and promoting the education professionals of young teaching staffs from technological universities in Myanmar.

Figure 3. Teaching Staffs' Training at YTU
by Japanese Professor (Prof. Dr. Yoshihiro Ishitani)

Utilizing the PODS Methodology (Teaching Purposes)

In order to get the accomplishment of Research-Based Education (RBE) system, the effective teaching method like PODS is very important for teaching and learning activities at YTU. The PODS activities have been started at the beginning of 2017 at YTU. Most of the faculty members of YTU could easily follow the fundamental concept on the effective teaching and learning activities in their class and laboratory.

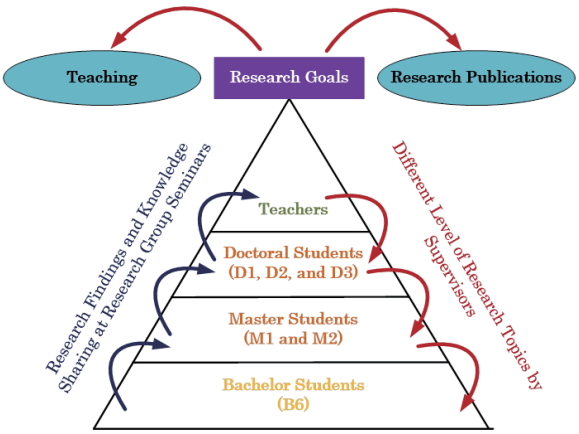

Figure 4. Formulation of Research Groups Activities at YTU

Leading the Research Groups Activities (Research Purposes)

The research publications are one of the credits for the establishment of Research University. In this model, the first level is the final year or sixth year students, and the second level is the first year and second-year master students, the third level is the first year to third-year doctoral students, and the top-level is the teachers. At first, teachers announced their research themes and topics for creating their research groups. The different levels of research topics are provided by the respective supervisors or teaching staff at YTU.

The leader is those teachers, and he/she introduced his/her research works in front of all students. That teacher always creates research group seminars every week. All research group members have to present their understanding of research findings and knowledge sharing at the research group seminars. That teacher always gives valuable advice to his/her research group members. The research group members follow the suggestions of that teacher. Finally, they have got their research achievements after completing the research activities based on different levels. The teachers shall have to transform their research outcomes into research publications and teaching material. In this regard, the teachers have the dominant teaching qualifications based on the research achievements by researching with research groups at university. The consequence of research-based education is directly affected by the Outcome-Based Education system with research university establishment.

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Outcome-Based Education Systems and Learning Management Systems (LMS) Implementation in Yangon Technological University (YTU) in Myanmar

#Learning Management Systems #e-learning System #Blended Learning Methodology

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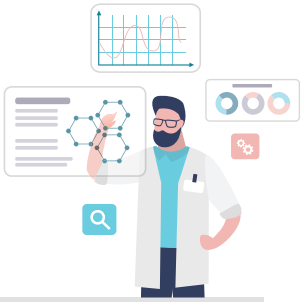

Learning Management Systems (LMS) encourages the advanced learning model of lifelong learning and continuous quality improvement. For that reason, the role of LMS in Yangon Technological University is in control for more leading roles in professional developments of teaching staffs and engineering students.

01

Establishment of Outcome-Based Education Systems at YTU.

Yangon Technological University (YTU) (Formerly names of Burma Institute of Technology (BIT) or Rangoon Institute of Technology (RIT) or Yangon Institute of Technology (YIT)) was found in 1965. The activities of education and research purposes of YTU gradually increases until 2012. The participations of a lot of alumni of YTU, industrial people and the government are great opportunities to enhance the contribution of excellence teaching before 2012. The transformational shift from traditional university to Research-based University was transpired by internationalization and collaboration experience after 2012. Japanese Government mainly contributed to the Project on Enhancement of Engineering Higher Education through Research Activities in YTU intended to the development of all Technological Universities in Myanmar. The new intake of HR development programme for outstanding student recruitments under that project was launched in 2013 and the promotion of teaching and research quality for teaching staffs was implemented by achieving the master and doctoral degrees through research works at Japanese Supporting Universities (JSUs). The important contribution of JSUs are Kyoto University, Okayama University, Kanazawa University, Nagasaki University, Chiba University, Niigata University and Kumamoto University in Japan. YTU sent over fifty staff to those universities to promote their outstanding research activities through doctoral degree programme in 2014. During 2014 to 2019, the PhD graduates could contribute their experience on research-based activities and outstanding teaching to the highly qualified engineering students.

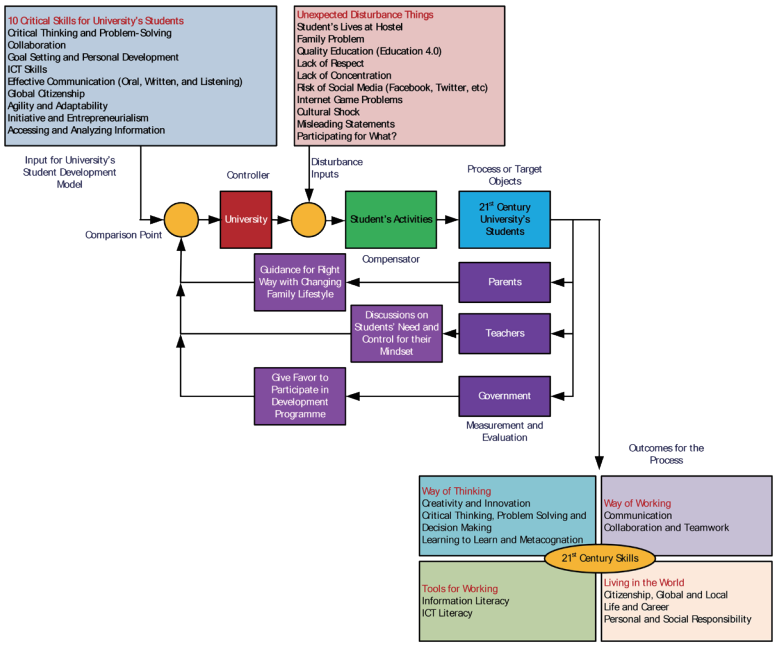

Figure 1. Analysis Model for Outcome-Based Engineering Education System

Due to the efforts of all staff of YTU, a full accreditation certificate was awarded to YTU by FEIAP through MEngC in 2019. There are seven criteria under the FEIAP level such as (1) Programme Educational Objectives (PEOs), (2) Graduate Attributes (GAs), (3) Curriculum and Syllabus, (4) Academic and Supporting Staff, (5) Students, (6) Facilities, and (7) Quality Management System (QMS).

The top management of YTU guided the right way to implement the OBEE system in line with the Quality Objectives and Quality Policy based on effective PEOs and GAs standard.The development of Curriculum and Syllabus for all engineering departments was led by seven JSUs.There are two formal trainings and discussion meetings called “Staff Training at YTU and MTU (called Mandalay Technological University)” in a year especially occurred in May and November. All staff from YTU and MTU actively participated in those trainings to promote and develop the effective design of curriculum and syllabus through model teaching of sample subjects. Consequently, there are 11 Engineering departments which were fully accredited by Myanmar Engineering Council (MEngC), a full member of Federation of Engineering Institutions in Asia and Pacific (FEIAP), and MEngC is now trying to promote the national level to international level which is called the full signatory of Washington Accord over and done with the Enhancement of Engineering Higher Education (EEHE) and High Quality Research in YTU.

The input of that model is ten critical skills for university students, and the disturbance input is unexpected disturbance things. The feedbacks are depending on the parents, teachers, and government. The outcomes for the process of this model is intended to obtain 21st-century skills.

02 Moving Froward to Early LMS of YTU.

Due to the COVID-19 pandemic, the face-to-face teaching and learning systems were temporarily stopped in Myanmar. The government of Myanmar tried to promote the e-learning system in all universities. The Ministry of Science and Technology (MOST) motivated to introduce the effective teaching and learning systems in Yangon Technological University (YTU). From March 2020 to May 2020, the teaching and learning in person were broken. After May 2020, the online teaching approaches via Zoom Application, Microsoft Teams, Google Meets were introduced in YTU. Consequently, now just we investigate some good examples of how they leveraged technology in engineering education before COVID-19.

Video Conferencing Research at Yangon Technological University

From 2007 to 2010, the Minister of Ministry of Science and Technology (MOST) motivated to the Electronic Engineering Researchers and Computer Engineering and IT Researchers for doing research works concerning the video conferencing technology for online teaching and learning platform improvements.

In late 2010, the unique software environment was developed and those researches were introduced to create the early Learning Management System (LMS) in Myanmar but the lack of technological advancements were blocking at that time.

Preparation of Online Teaching Materials with Microsoft PowerPoints

In YTU, all teaching staffs shall have to prepare their teaching materials with PowerPoints presentation files. They added their videos and voices in that files for online teaching and learning platforms after May 2020. In response to the COVID-19 pandemic, the YTU in Myanmar was shifted to conducting many classes over Zoom. And they are quiet keeping most activities online with the exemption of practical and laboratory sessions that must be completed on campus.

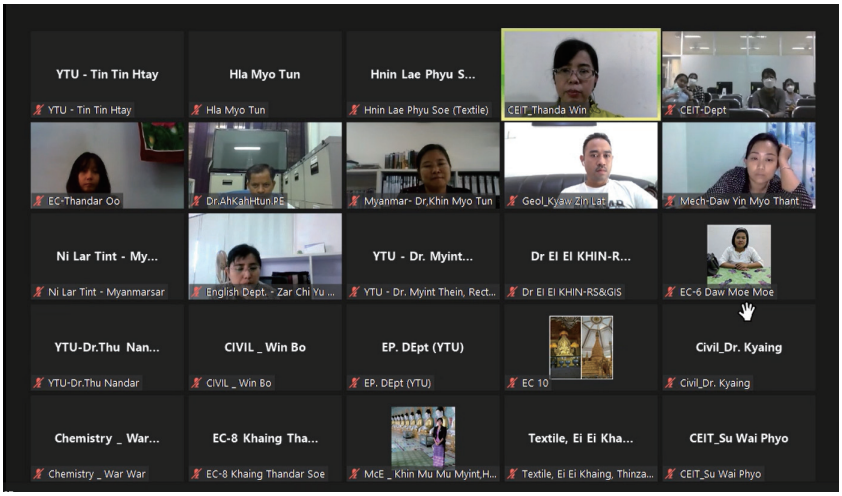

Figure 1.
LMS Training at YTU

03

Establishment of Learning Management Systems at YTU.

YTU started to establish the own Learning Management Systems (LMS) of YTU in January 2021. All engineering departments and Department of Architecture completed all teaching materials in digital format and assessment processes such as quiz, assignments, tutorials and so on. The Department of Computer Engineering and Information Technology hosted to establish the YTU LMS in central server of YTU effectively.

Covid-19 has speeded up the timeline for educational transformation. At the same time, challenges such as a privation of one and the same resources and how teaching staffs engage engineering students in online modules are emerging. At the national level, Ministry of Science and Technology (MOST) is frustrating to solve the challenges. We describe the obstacle to sustaining digital transformation and the efforts of Singapore's MOE.

Disregarding Community Discrimination

e-learning system foundations a cavernous gap between students than they are in physical school.

Students from low income families may have smaller number of resources at their home.

Online Teaching Methodology

Some teaching staffs who do not belong to adequate learning familiarity in online sceneries could be users of information technology not energetic learning coaches.

MOST newly arrange for opportunities for engineering teaching staffs to advance their design competencies in engineering teaching and learning processes.

Allocating Sustainability Challenges

Supporting digital learning necessitates teamwork determinations at all levels, together with teachers and parents.

As revealed above, Myanmar uninterruptedly effort to revolutionize the existing engineering education system with the intention of they can become accustomed rapidly to the transition of the engineering educational system from in person to e-learning. This would outcome in Myanmar hang around into the future of others in the e-learning characteristic.

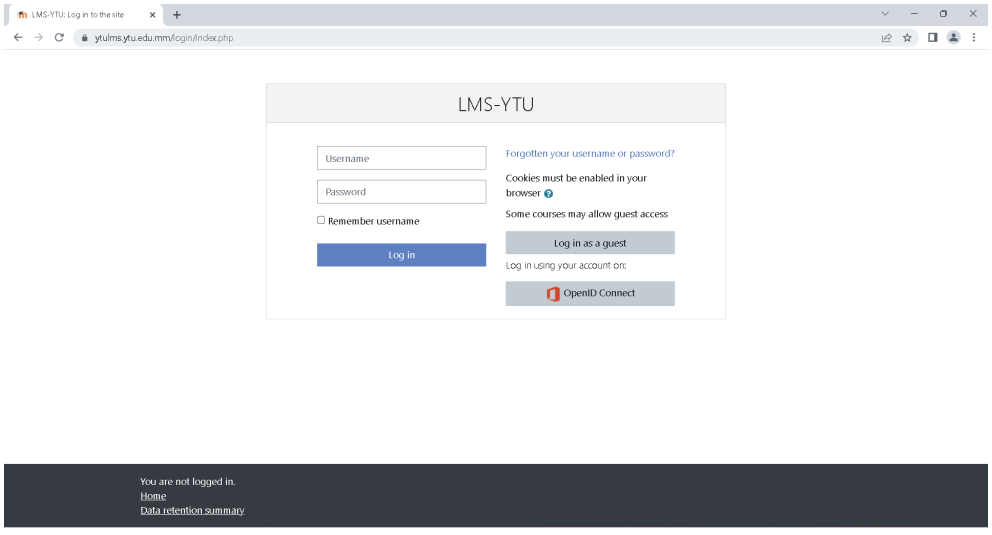

Figure 2.
YTU LMS Platform

Implications

Myanmar's initial acceptance of digital transformations finished a fast and relaxed shift to online education for the duration of the pandemic. This makes us keep thinking about again the trend of education for the forthcoming and several extraordinary circumstances.

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Approach to Effective Technique of Prediction, Observation, Discussion, and Synthesis (PODS) to Improve Research and Education at Yangon Technological University (YTU)

#Effective Technique #PODS #Research and Education
#Educational Philosophy #Teaching and Learning Activities

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The study presents the advanced teaching and learning technique of Prediction, Observation, Discussion, and Synthesis (PODS) at Yangon Technological University (YTU). A technique of PODS is the effective teaching and learning activities used in research and education cultures at the universities. The analysis on PODS technique on semiconductor related subjects under the Department of Electronic Engineering of YTU has been accomplished in this works.

01 Education System at YTU

Yangon Technological University is only Research University and the Best Centre of excellence (COE) in Myanmar. The teaching techniques and research system at YTU are excellence to enhance the engineering higher education in Myanmar. There are various techniques for engineering education all over the world [1]. Among them, Prediction, Observation, Discussion, and Synthesis (PODS) is the best teaching and learning activities for enhancement of engineering higher education in science and technology education system [2].

Department of Electronic Engineering plays a crucial role in the best engineering department under Yangon Technological University. There are six main research groups under the umbrella of the Department of Electronic Engineering of YTU. They are (1) Semiconductor Electronic Research Group, (2) Telecommunication Research Group, (3) Automatic Control Research Group, (4) Signal Processing Research Groups, (5) Unmanned Aerial System Research Group, and (6) Microelectronics and Embedded Technology Research Group. Each research group worked together with each other to improve the quality of research work for the development of Department of Electronic Engineering of YTU. One of the most popular research groups is Semiconductor Electronic Research Group. The department development plan was established based on that research group by Japan International Cooperation Agency (JICA) Enhancement of Engineering Higher Education (EEHE) project. Most of the Japanese Professors from Chiba University, Kumamoto University, Kanazawa University and Okayama University in Japan have come to the Department of Electronic Engineering of YTU since 2014.

They advised the faculty members to promote the research capacity based on semiconductor engineering. There are four major areas under the semiconductor engineering. They are (1) semiconductor material, (2) semiconductor devices, (3) semiconductor measurement, and (4) semiconductor fabrication. According to the department development plan, the semiconductor engineering trend is one of the most important areas for bachelor degree program under the Department of Electronic Engineering at YTU. In order to get the accomplishment of Research-Based Education (RBE) system, the effective teaching method like PODS is very important for teaching and learning activities at the Department of Electronic Engineering at YTU. The PODS activities have been started at the beginning of 2017 at YTU. Most of the faculty members from the Department of Electronic Engineering at YTU could easily follow the fundamental concept on the effective teaching and learning activities in their class and laboratory.

Implications

The significant observation could be noted based on the analysis of Prediction, Observation, Discussion, and Synthesis (PODS) teaching and learning activities in the class and laboratory at YTU. The RBE system of YTU had met with the Outcome-Based Engineering Education (OBEE) for Quality Assurance (QA) Processes.

02 Prediction, Observation, Discussion, and Synthesis (PODS)

PODS is one of the learning cycle used for design active learning teaching module. In PODS learning cycle, students are encouraged to make a prediction about the result of a particular engineering experiment before any treatment. The experiment is then performed and the students are encouraged to make a quantitative or qualitative observation of the experimental results. And then, students can discuss and share their predictions and observations with group or class; whether the same or not from any conflict between their predictions and observations can be solved during the discussion phase. After discussion, students come to be a better understanding about the physics of semiconductor materials and devices underlying the observations amongst themselves and or with the facilitators. Finally, students are encouraged to synthesize their newly learned ideas and conclusions into the more general framework of their knowledge on semiconductor engineering.

Figure.1 shows the block diagram of PODS learning cycle that always start with the Prediction. In the case of improving the students' understanding on semiconductor electronics, the researcher has implemented and utilized the PODS learning cycle based on hand-on activities. This is because it is more suitable for the topic and students who learn in the physics of semiconductor electronics. All students have a chance to discuss, share their ideas and experience between their predictions and observations in this study. Moreover, it is important that all students are encouraged to synthesize what they have learnt. This can reflect how their understanding of a particular topic has been evolved to try to identify the critical issues that need to be addressed for meaningful

learning to occur. As they progress in their investigation of semiconductor electronics, the researcher can be given many opportunities to express their ideas.

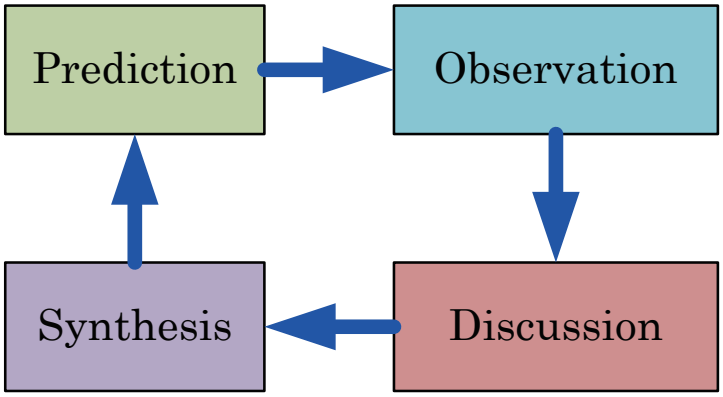

Figure 1. Block Diagram of PODS Learning Cycle

Activities of PODS Teaching and Learning

The researcher would like to create PODS learning cycle-based activities to help student motivate their research idea and knowledge on semiconductor related subjects. Researcher thus designed and implemented PODS based on Material in Electronics, PODS based on Physics of Semiconductor Devices, PODS based on Semiconductor Devices, and PODS based on Semiconductor Process and Material Characterization to explore students' motivation on doing research works in the semiconductor electronics areas. Moreover, the concepts covered in the PODS-based works. All students' response to this evaluation as a pre-analyzed and post-analyzed was used to evaluate the efficacy of those activities in terms of how much the activities could help all students to improve their motivation on doing research works for semiconductor electronics. Figure.2 demonstrates the design flow for the study.

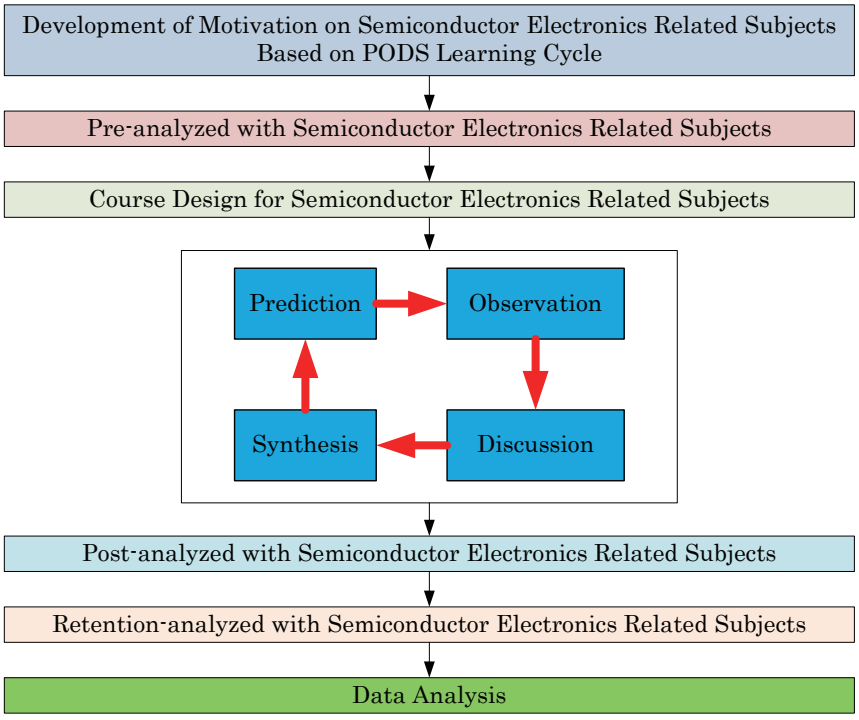

Figure 2. Design Flow

Effectiveness of PODS System on Research Activities

The supervisors for research activities could utilize the PODS technique in experimental studies. The theoretical research could be come first and the expected outcomes would be observed in research group activities at YTU. The first principle calculations could be accomplished based on the PODS processes from the advisor. Table-I gives the Statistic Table of Research Works at the Department of Electronic Engineering of Yangon Technological University. The first row represents the academic year (AY), and the second row is for the number of research (NR) works at YTU. The number of doing research works is increasing year by year because the outcome-based education system reflects the improvement of teaching staff qualification and the development of YTU as a research university in Myanmar. The financial supports for doing research works are government funds, U Nyi Hla Nge Foundation research funds, and JICA EEHE research funds. Table-II gives the research publications of the teaching staff at the Department of Electronic Engineering of Yangon Technological University. The starting year is 2007, and the main areas for doing research works are based on the specializations of the Department of Electronic Engineering of YTU.

According to the analysis model for developing the students' activities for teaching and research works, some outstanding students had published their research outcomes. The significant point could be found in the 2013-2014 academic year for research publications at YTU. Table-III gives the research publications of undergraduate students. There are ten publications in prestigious academic societies such as IEEE or ELSEVIER in the world.

Table 1. Statistic Table of Research Works at the Department of Electronic Engineering of Yangon Technological University

AY	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
NR	1	1	2	2	2	2	3	3	4	4	4	10

Table 2. Research Publications of Teaching Staff at the Department of Electronic Engineering of Yangon Technological University

Year and Fields of Interest	Telecomm	GoPro	EmbSys	Semicon	UAS	Auto
2007						1
2008						4
2009		3			7	2
2010	2					
2011	1		1		1	1
2012	2					1
2013	1	1			1	
2014	8	2				20
2015	9	10	2	2	1	9
2016	6	8			6	18

2017	13	12	6	4	10	13
2018	2	8		11	7	11
2019	10	6	2	12	8	14
2020	16	10	3	23	8	18
Total	**70**	**60**	**14**	**52**	**49**	**112**

Table 3.
Research Publications of
Undergraduate Students

No	International Publications	Batch	Number	Country
1	International Conference (IoT, IEEE)	First	2	Indonesia
2	International Journal (Semiconductor)	First	2	USA
3	International Journal (Blockchain, Elsevier)	First	1	USA
4	International Conference (Control, IEEE)	Second	2	Thailand
5	International Conference on Science and Engineering (ICSE)	Second	3	Myanmar

Implications

Prediction, Observation, Discussion, and Synthesis (PODS) techniques could be utilized in teaching activities as well as research activities. The traditional technique on teaching activities could not be accomplished for 21st Century Skills for both teaching staffs and students in engineering. The achievements on research outputs could be the reflection of utilizing the PODS techniques at YTU.

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Boosting Education with OER and AI

#OER #Education #AI #Learning

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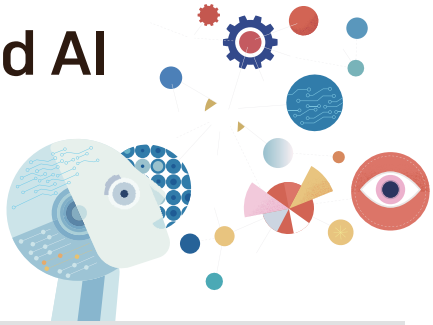

Open Educational Resources (OER) and Artificial Intelligence (AI) present transformative potentials in global education. OER, comprising free, online educational materials, enhances education affordability and access, while encouraging pedagogical innovation. Research demonstrates positive outcomes from OER use, including improved grades, retention rates, and collaboration skills. OER's impact extends globally, as seen in Myanmar, where organizations like "Mote Oo Education" and the "Monastic Education Development Group" democratize learning material access, despite facing challenges like the digital divide and variable resource quality. Also, the incorporation of local language access, as demonstrated by Khan Academy's Burmese version, furthers inclusivity.

Meanwhile, AI integration into educational platforms, as seen in Khan Academy and Formative's partnership with ChatGPT, revolutionizes digital learning by providing personalized learning, intelligent tutoring, and efficient assessment. This significantly enhances the learning experience when paired with OER and verified learning certifications, for instance, courses from Coursera Community Project Network.

Despite its promise, the implementation of this combined approach should not overshadow traditional pedagogical strategies, and issues such as data privacy and fairness must be addressed. Collectively, OER and AI could serve as key drivers in building a more inclusive, effective, and innovative global education system.

01 Introduction

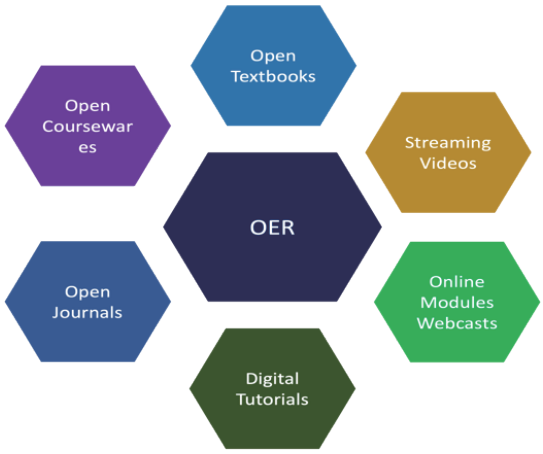

Figure 1. Types of OER

OER refer to any type of educational materials that are available online and can be used freely by anyone. These resources include textbooks, modules, lecture notes, videos, tests, software, and other learning materials as shown in Figure 1 based on [1]. OER has gained a lot of attention in recent years due to their potential to improve access to education and reduce costs for students. Many other institutions and organizations have created and distributed OER, and the movement has gained significant momentum. Today, there are thousands of OER resources available online, covering a wide range of topics and subjects.

02

Impacts of OER on Learning

OER substantially enhances higher education, improving affordability, completion rates, and academic performance. Studies [2] involving thousands of students demonstrate that OER not only eases financial burden but also improves grades and lowers course withdrawal rates, particularly benefitting part-time students and underserved groups. Thus, OER addresses key challenges in today's higher education landscape.

Highlighted findings on the impact of OER on teaching and learning include:

- OER significantly boosts education affordability by offering free, high-quality resources.
- It broadens global access to education, particularly benefiting remote and underserved areas.
- OER facilitates the customization of learning materials, leading to enhanced learning outcomes.
- Collaboration is fostered through OER, bolstering essential skills like teamwork, communication, and problem-solving.
- OER promotes pedagogical innovation and ensures the provision of updated, relevant content.
- The utilization of OER enables tracking and analyzing learning patterns, providing invaluable insights for educational research.
- Empirical studies report positive learning outcomes from OER use, including improved grades and higher retention rates.
- Free verified certificates from initiatives like Coursera Community Project Network enhance value for learners, providing independently verifiable credentials [3][4].
- A holistic approach that combines AI technology, OER, and verified learning certifications can significantly enhance the overall learning experience.

03

OER in Myanmar

OER are profoundly influencing education in Myanmar, particularly through the work of organizations like Mote Oo Education [5] and the Monastic Education Development Group (MEDG) [6]. Also, the incorporation of local language access, as demonstrated by Khan Academy's Burmese version, furthers inclusivity [7]. By democratizing access to learning materials, these organizations are enhancing the educational landscape and fostering a collaborative learning culture.

Mote Oo Education creates high-quality, open-source educational materials and advocates for teacher training, making customized learning resources readily accessible. Similarly, MEDG, through its online learning platform MEConnect, ensures that students in monastic schools can access curriculum-aligned resources and that educators receive professional development support.

However, despite these positive strides, the implementation of OER faces challenges. The digital divide, lack of sufficient teacher training, variable quality of resources, and language barriers are substantial hurdles. For instance, not all students and teachers have equal access to internet-enabled technology, and many educators may require additional training to effectively utilize these resources.

To optimize the benefits of OER, it is imperative for policy-makers, educators, and stakeholders to work collectively. Efforts should focus on bridging the digital divide, enhancing teacher training, instituting rigorous quality control measures, and creating resources in local languages. This multi-pronged approach can ensure the continued growth and success of initiatives like those of Mote Oo Education and MEDG, helping to build a more inclusive and effective education system in Myanmar.

04

AI and OER

Leveraging OER and AI can significantly improve learning outcomes. Khan Academy has announced a pioneering partnership with ChatGPT to revolutionize digital learning by integrating AI-powered interactive conversational tools into their educational platform [8]. Educational platforms such as Khan Academy and Formative [9] utilize these technologies to enhance the learning process:

- Personalized Learning: Khan Academy uses AI to customize content, fostering improved learning paths.
- Intelligent Tutoring: Platforms incorporating ChatGPT offer one-on-one AI tutoring, supporting students on demand.
- Predictive Analysis: Formative uses AI to identify potential learning difficulties early on.
- Efficient Assessment: Formative, leveraging ChatGPT, automates question creation for assessments, saving significant time for teachers and providing timely feedback and insights.

However, it's critical to address issues such as privacy, data security, and fairness when integrating AI with education. AI and OER should supplement, not replace, effective teaching and learning strategies.

Implications

In regions like Myanmar, where OER significantly impacts education, it's essential to address digital disparities, boost teacher training, enforce quality controls, and develop local language resources. The successes of initiatives like Mote Oo Education provide promising models for OER implementation.

AI's integration with OER, as seen in the Khan Academy-ChatGPT partnership, promises enhanced learning. However, privacy, data security, and fairness concerns must be addressed. AI and OER should enhance, not supplant, effective pedagogical strategies. These technologies must be utilized responsibly for a more inclusive, effective global education system.

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Approach to the Implementation of Open Educational Resources (OER) University System in Engineering Education at YTU with Specific Logic Model

#Open Education Resource (OER), #Engineering Education, #Specific Logic Model

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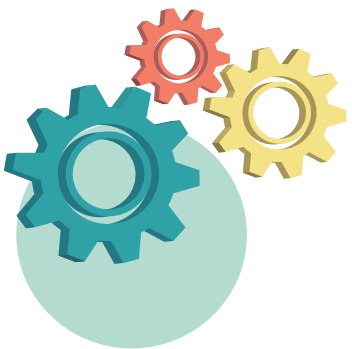
Yangon Technological University initiated the Open Education Resources (OER) university system in Engineering Education for the development of a "parallel learning universe" to boost and enhance significance to existing engineering education establishment by creating pathways with flexible conditions for all learners using open learning materials accommodated on the Internet to earn reliable credentials from accredited HEIs. Individuals are unrestricted to learn from the OER platform and other digital learning materials accommodated on the Internet. The central problem is that learners who access those digital learning materials on the specific web and acquire knowledge and skills either officially or casually, on their own or in groups, cannot eagerly have their learning assessed and consequently take delivery of proper academic recognition for their efforts.

01 Accredited University (YTU) in Myanmar

Yangon Technological University is the best flagship research university in Myanmar. There are twelve engineering and architectural departments in YTU. Among them, eleven engineering departments, including Department of Civil Engineering, Department of Mechanical Engineering, Department of Electronic Engineering, Department of Electrical Power Engineering, Department of Mechatronic Engineering, Department of Computer Engineering and Information Technology, Department of Chemical Engineering, Department of Textile Engineering, Department of Petroleum Engineering, Department of Mining Engineering, and Department of Metallurgical Engineering and Material Sciences are fully accredited by the Federation of Engineering Institutions of Asia and the Pacific (FEIAP) and Myanmar Engineering Council (MEngC) based on the guidelines and manuals of FEIAP Level Accreditation in 2019. That accreditation recognition is program-wise system for engineering education based on Outcome-based Education (OBE) Implementation.



YTU officially offered the formal education in Myanmar when the date after establishment of engineering education in 1924. YTU tried to enhance the traditional education system before 2015. In 2015, the OBE System was initiated to YTU to walk on the pathway for Quality Assurance Implementation Mode. That is the right time to implement the OBE System in Engineering Education in Myanmar.

The research group activities for all departments led the outstanding research in YTU to become the best flagship research university in the nation in 2014. The formal and non-formal education systems are critical to developing human resources nationwide. Therefore, YTU is intended to initiate the Open Education Resource (OER) University in Engineering Education with a specific model. The online learning management system implementation and blended learning modes are the flagship projects of YTU.

Implications

YTU always holds the idea of "Without OBE, No Accreditation". The engineering education through ICT platform can enhance the best practice for formal and non-formal education. The OER university initiated by YTU recommends the establishment of an innovative organization among like-minded institutions in the formal education zone to outspread their community service and outreach missions and visions in ancillary enhanced access to higher education in engineering specifically for those all learners who lack the means or right to use to follow the traditional learning routes.

02

Specific Logic Model of YTU

The intended specific logic model for OER university system of YTU is shown in Figure 1. There are three main components such as open collaboration and networking between OER universities, services for engineering educational institutions, and support infrastructure for OER

The OER university system of YTU would:

- facilitate accredited educational institutions to deliver assessment and credit pathways for formal academic credit
- recognize courses and programs based entirely on digital resources through a network of participating universities.

The specific logic model of YTU differentiates among three core components required to accomplish the OER university implementation.

- **Collaboration and Networking between OER universities:** concealments those activities where cross-institutional collaboration is more actual than institution-based service endowment.
- **Services for Engineering Educational institutions:** designate the fee-for-service ingenuities that will be delivered by participating institutions in engineering education on an experiencing no loss method.
- **Support infrastructure for OER:** integrates the cross-cutting infrastructure obligatory to upkeep an accessible network for the OER university scheme.

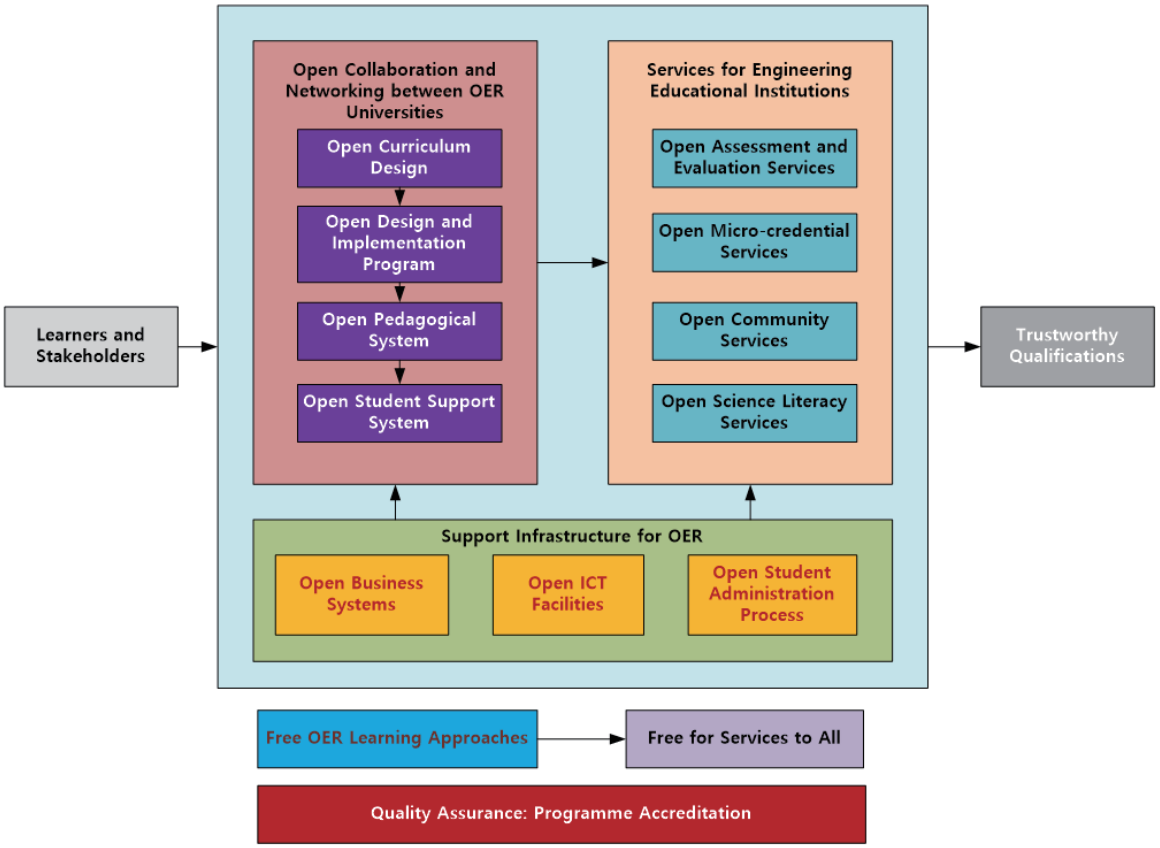


Figure 1. Specific Logic Model for OER System

Implications

The crucial outcome of the OER university system implementation of YTU might be to deliver flexible corridors to ensure that OER learners can accomplish trustworthy qualifications. Quality assurance and program accreditation are the groundwork stone on which the implementation is centered. The OER university system implementation of YTU could arrange for a flight of stairs to trustworthy credentials based uniquely on OER, and the specific logic model affords an outstanding framework for designing the distinctive system.

03

Implementation of OER at YTU

Based on the idea and background knowledge of specific logic models to implement OER at YTU, the open curriculum design was developed by collaborating with many partner universities in ASEAN, Korea, Japan, and the EU. The effective course materials were formulated based on the experimental studies and theoretical analyses. The OER could also be accessed in the LMS platform of YTU in current situation. All materials would be fully accessed after completing the web security processes and uploading the repository for e-sources, such as research publications and learning materials, to all learners. The completing percentage of OER in engineering courses at YTU is only sixty percent at present.

Implications

Collaboration, networking, and internationalization are essential to establish OER at YTU generally. The main concepts of learning materials in free mode are based on the outstanding efforts of the autonomous bodies in a university. Therefore, the implementation process plays a crucial role in enhancing formal and non-formal education in engineering and technology.

04

Questions and Challenges for OER University System at YTU

- How to develop the engineering course materials for all learners internationally?
- Finding a free online platform or specifying that learning materials for the OER university system could be established and converted into open file formats that are equally accessible by an assortment of Learning Management Systems (LMSs).
- Be efficiently creative. Start without thinking about current systems and engineering courses. Rethink components of learning.

Implications

The effective implementation of the OER university system at YTU could be way forwards to promote the university ranking worldwide. Each creativities would necessitate several activities to accomplish the envisaged outputs within the specific logic model.

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Education Professional Development Scheme for Course Facilitator in Online Mode at YTU

#Engineering Teachers' Education #Capacity Building #Human Resource Development #21st Century Skill

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The fundamental concept for establishing a prestigious university directly depends on the fulfillment of the high-quality teaching staff of that university. The art of nurturing 21st-century-skillful engineering teachers is very soft and gentle. The essential ideas behind the training for highly qualified teaching staff are based on soft skills and hard skills with honesty and dignity. If someone does not meet those qualifications, the outstanding teaching staff with a righteous spirit cannot be nurtured. The educational professional development scheme for course facilitators via online mode is very important for the HRD scheme.

01 Ideas Behind the Nurturing the High Qualified Teaching Staffs

A University is an important place or service location that always provides high-quality teaching and learning environment. Yangon Technological University (YTU) offers outstanding services for teaching and learning processes in engineering education in Myanmar. There are three main processes to enhance the teaching staff's qualification based on (a) Nurturing the qualified teachers (Instructors and Lecturers) based on research activities, (b) Establishing precision research laboratories for experimental studies, and (c) Transforming the lectures based on the experimental research outputs effectively.

▶ Nurturing the Qualified Teachers (Instructors and Lecturers) based on Research Activities (Blended Mode)

The competency-based teaching staff's qualification is very important to nurture highly qualified teachers with the activities of basic and applied research works. Assessment methods on lesson planning, checking the teaching ability, and utilization of effective teaching methods tend to model teaching processes. Pre-service training is a good idea to nurture outstanding teaching staff. One of the activities is to offer refresher training on specific courses. Short-term and long-term certification programs are the solution for nurturing qualified teachers. The research group seminars play a significant role in formulating the fulfillment of the experience of research activities.

The research outputs shall have to transform the real lectures, and the standard teacher shall have to prepare effective lesson planning. After that, the teachers shall have to use the effective teaching method, especially the PODS method for

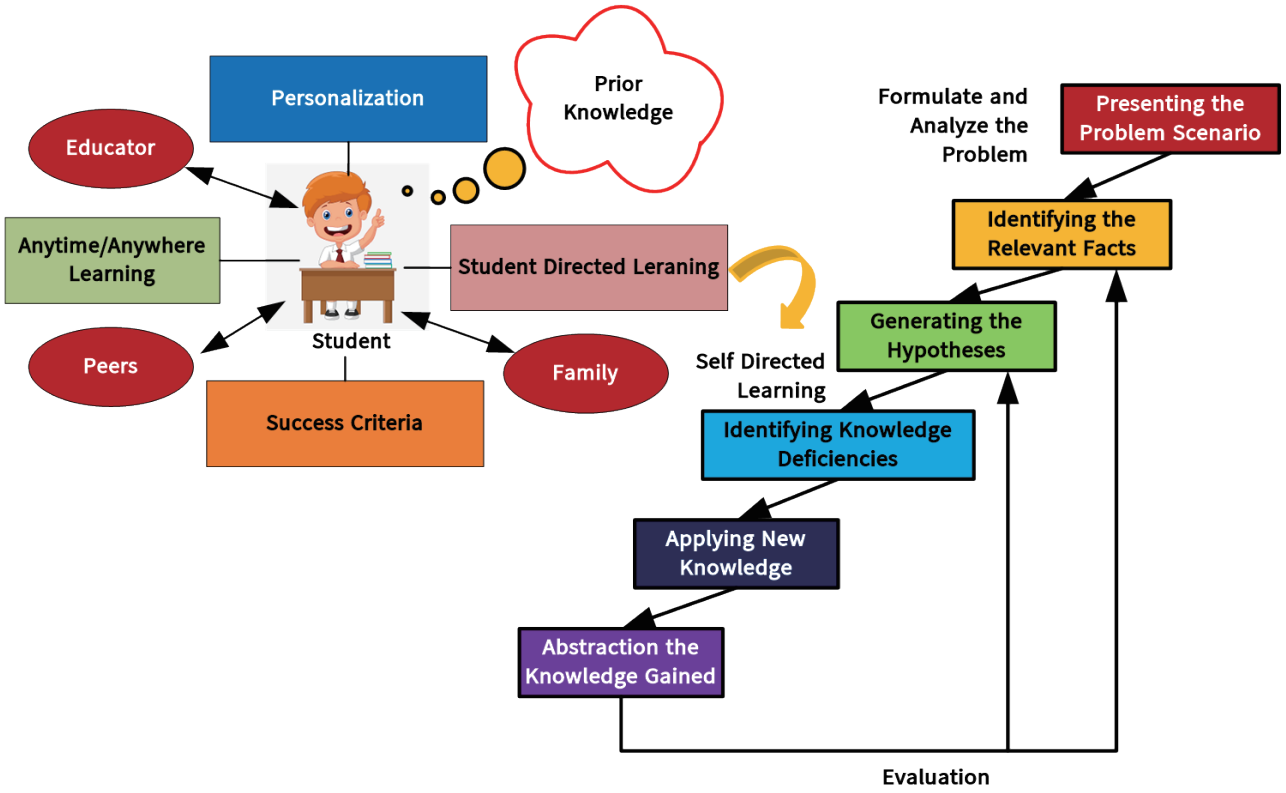

Figure 1. Student-Centered Approach and Problem-Based Learning

In the PODS learning cycle, students are encouraged to predict the result of a particular engineering experiment before any treatment. The experiment is then performed, and the students are encouraged to make a quantitative or qualitative observation of the experimental results. Students can then discuss and share their predictions and observations with the group or class; whether the same or not from any conflict between their predictions and observations can be solved during the discussion phase. After discussion, students understand the specific subjects underlying the observations amongst themselves and the facilitators. Figure.1 illustrates the Student-Centered Approach and Problem-Based Learning for outstanding services from YTU via online mode. Equipped with the four major competencies of the 21st century—collaboration, communication, creativity, and critical thinking—is to improve the quality of faculty at research-oriented universities. According to the discussions on some models for improving qualified teaching staff in a research university, YTU staff follow the development idea and experience based on several research activities. The next section is the supporting phase for teaching staff and students' research activities towards the research-based education (RBE) system. Figure.2 shows the analysis model for developing qualified teaching staff in the 21st century. There are five inputs and one output for the analysis model.

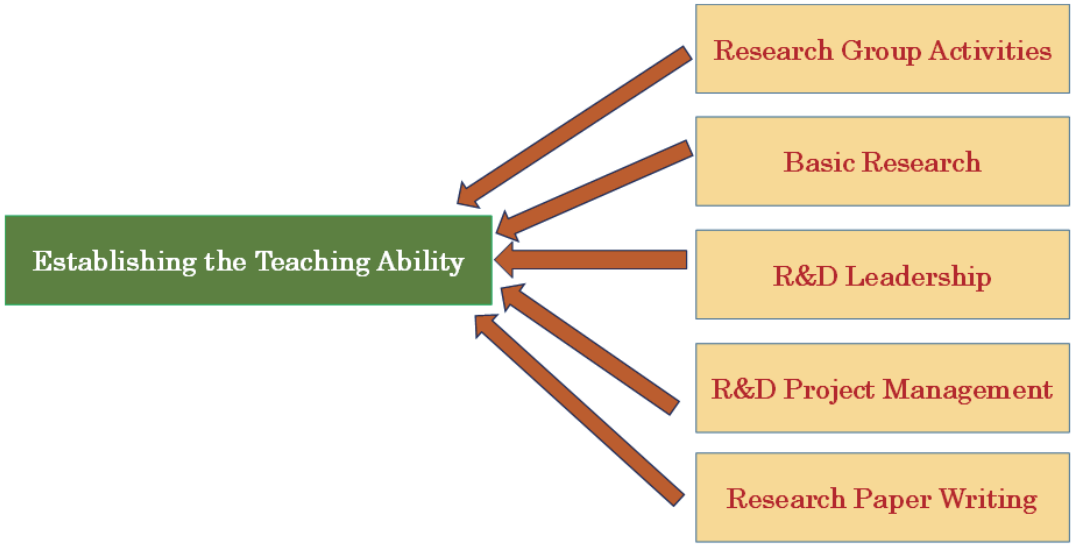

Figure 2. Models for Improvement of Teaching Staff Qualification (Blended Mode)

Establishing the Precision Research Laboratories for Experimental Studies

Figure 3 illustrates the model for the formulation of a research laboratory. To formulate the research laboratory under YTU, all teachers or researchers shall have to find the research problems from their own idea or from the industries and the research funds from the funding agencies like government research funds, U Nyi Hla Nge foundation, JICA project for EEHE (Enhancement of Engineering Higher Education). They shall have to prepare the research setup for doing research work, and they shall have to do their proposed research work. They also shall have to analyze the outcomes of their research findings. After that, they shall have to prepare the teaching materials, such as experimental procedures and lectures, for their teaching purposes. These steps are for establishing the research-based education system. After the accomplishment of the confirmed research outcomes, they shall have to prepare the laboratory manual for their students. And then, they shall have to collect the appropriate equipment according to the permission from the budget section to comply with the auditing rules and regulations. And then, they shall have to make the experimental setup for their laboratory. Finally, they shall have to establish a research laboratory for their students (target for research engineering and research scientists) by approaching outcome-based education.

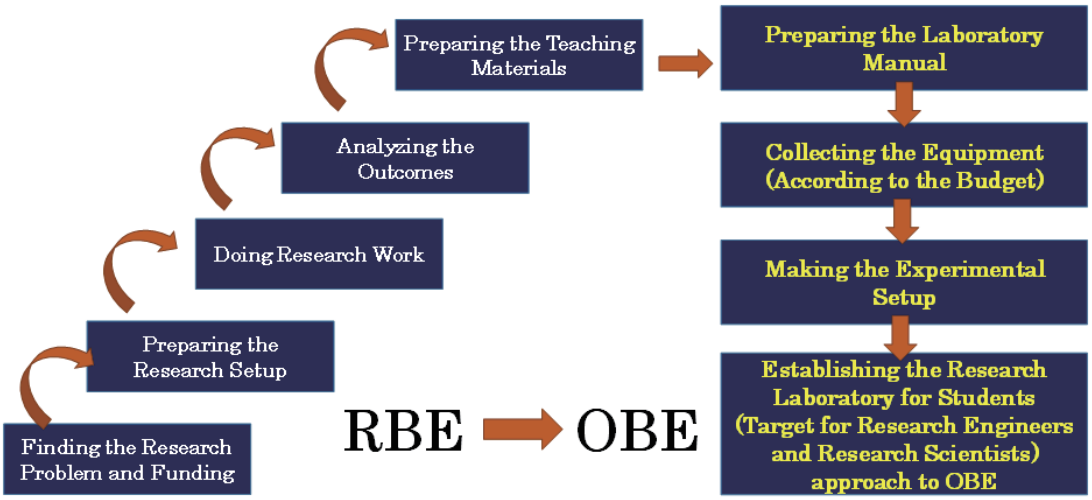

Figure 3. Model for establishment of research laboratory

▶ Transforming the Lectures based on the Experimental Research Outputs Effectively

The last step is to prepare a good lecture from the research outputs. The course facilitators always prepared their course materials for online mode based on their experience in research activities.

The Learning Management System (LMS) is an effective modern tool for professional development via online mode.

Implications

YTU's approaches for nurturing the outstanding qualified teaching staff for engineering education are based on Research-Based Education (RBE) and offer Outcome-Based Engineering Education (OBEE) for all engineering graduates. The qualified teaching staff for engineering education shall have to follow the three steps model, including (a) Nurturing the qualified teachers based on research activities, (b) Establishing the precision research laboratories for experimental studies, and (c) Transforming the lectures based on the experimental research outputs effectively.

02 Analysis Model for Development of Qualified Teaching Staff via Online

Equipped with the four major competencies of the 21st century—collaboration, communication, creativity, and critical thinking—is to improve the quality of faculty at research-oriented universities.

▶ Academic Professional Competency for Teaching Staff at YTU

Yangon Technological University (YTU) recognizes the academic professional competency for teaching staff qualification based on the following criteria to establish the research-based university in Myanmar.

- Discipline Knowledge (Understanding DK theoretical underpinnings and ways of thinking)
- Self-Motivation Skills (A self-motivated teacher is focused on his/her growth and the growth of the students)
- Thinking Skills (Thinking creatively to generate innovative solutions)
- Research Skills (Solving unknown complex problems from society)
- Information Skills (Deciding what information is needed and where it might be found using appropriate technologies)
- Communication Skills (Communicating in ways appropriate to the discipline, audience, and purpose)
- Technology Skills (Using appropriate technologies recognizing their advantage and limitations)

- Learning how to learn (Take responsibility for one's own learning and development)
- Teaching Skills (Offer high-quality teaching for the students)
- An international perspective (Thinking globally and considering issues from a variety of perspectives)
- Cultural understanding (Respecting individual human rights)
- Professional Skills (Work independently and in teams, Demonstrate leadership, Professional behavior, and ethical practices)
- Interpersonal Skills (Empathy, Positive motivation, non-verbal communication, Humor)

All teaching staff shall have to be qualified with the abovementioned criteria for the recruitment process at YTU.

Model Implementation

According to the discussions on some models for improving qualified teaching staff in a research university for the OBEE system, YTU staff follow the development idea and experience based on several research activities. The next section is the supporting phase for teaching staff and students' research activities towards the OBE system. Figure.4. shows the analysis model for the development of qualified teaching staff. There are five inputs and one output for the analysis model.

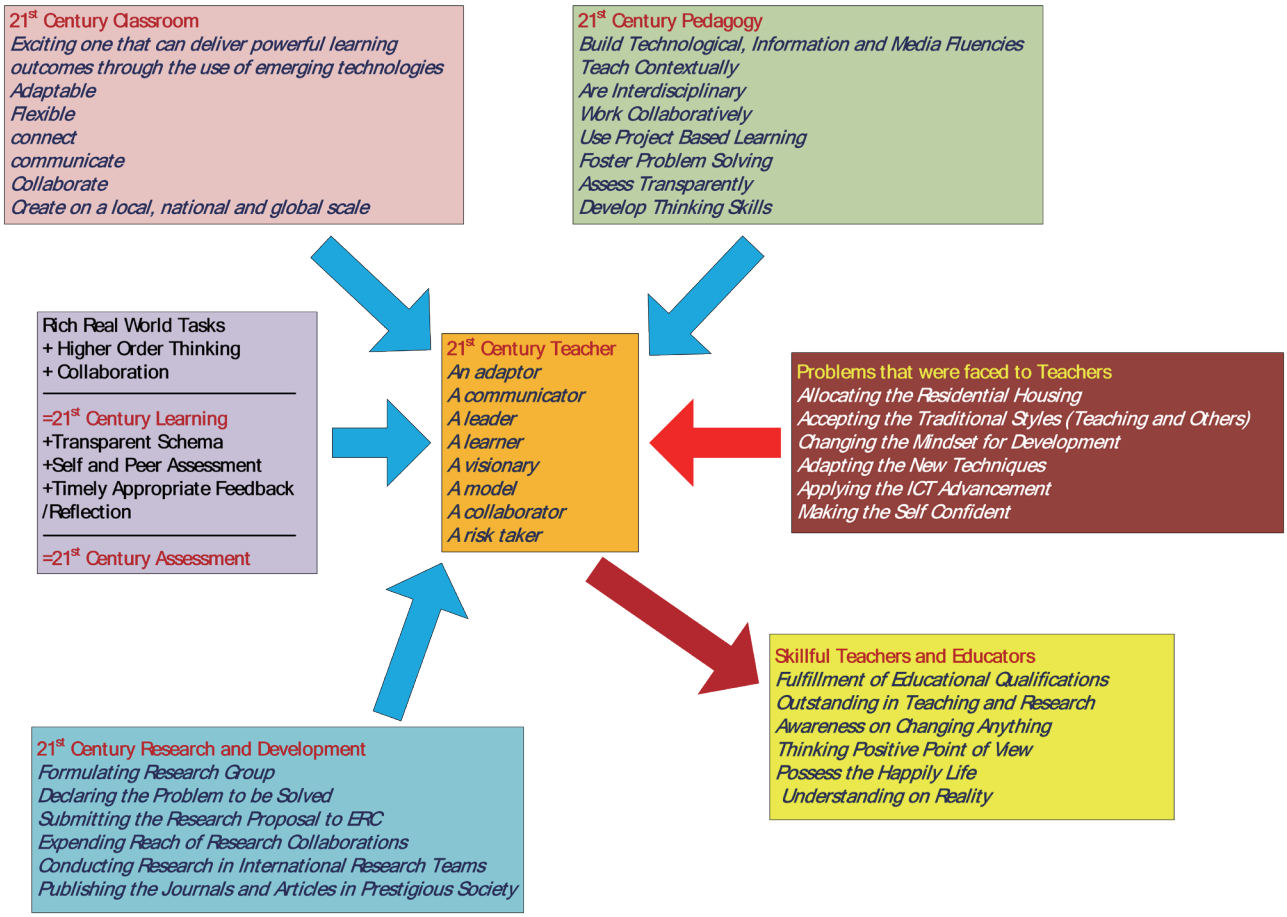

Figure 4. Analysis Model for the Development of Qualified Teaching Staff

▶ Creation of Online Mode for Educational Professional Development (EPD) Program

Based on the analysis model, the educational professional development program could be conducted interuniversity system or through stakeholders' participation, especially Myanmar Engineering Council (MEngC). The outcome-based teaching and assessment processes are vital to nurturing excellent course facilitators for the continuous EPD scheme. After completing the EPD via online mode, the course facilitators could be operated to implement the Open Education Resources (OER) university system in YTU.

Implications

The high-quality teaching staff qualification model includes improving the supply and quality of teachers' continuous professional development (CPD) approaches via online mode; providing educational institutions high-quality teacher education models that respond to the evolving needs of schools, teachers, and educational society; and facilitating the acquisition of the competencies that teachers need, such as teaching transversal competencies, teaching heterogeneous classes, and collaborating with colleagues.

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Development of Open Educational Resources (OER) University System at YTU Using Specific Logic Model

#Open Education Resource (OER), #Engineering Education, #Specific Logic Model, Impacts on OER Implementation

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Yangon Technological University (YTU) developed the Open Education Resources (OER) university system in Engineering Education with a Specific Logic Model, which was reported in the last volume. During the implementation of the Specific Logic Model at YTU, there are several challenging issues to accomplish in the OER university system based on the Networking between Local and International Institutions, Relationship and Engagement between Scientists from the University and Non-Scientists from the Public Community, and Open Access to ICT facilities from University. YTU could solve the important, challenging issue for sustainable development of the OER university system. The participating institutions and the specifically developed programme are key players in the OER university system that benefited students in Myanmar. The enhancement of the OER university system at YTU was presented in this report.

01

Answers for Questions and Challenges for OER University System at YTU:

Yangon Technological University could solve some issues regarding the development of all engineering course materials for all learners internally by doing the benchmarking processes with collaborative universities. The main collaborative universities are Chulalongkorn University (CU) and Sirindhorn International Institute of Technology (SIIT) in Thailand, Singapore University of Technology and Design (SUTD) in Singapore, Chiba University, Kumamoto University, Kanazawa University, Okayama University, Niigata University, Nagasaki University and Kyoto University in Japan, and University of Oulu in Finland. Currently, the Learning Management System (LMS) implementation at YTU is for all learners with open file formats in some courses that are equally accessible. The last question is to be efficiently creative. Start without thinking about current systems and engineering courses. It is necessary to rethink the components of learning. In order to implement the intended specific logic model for the OER university system of YTU, the engagement of the public community and university people is a very crucial role for future services.

02

Ideologies for Specific Logic Model of YTU:

The intended specific logic model for the OER university system of YTU was reported in Volume 3 of the 2023 Trend Report of Higher Education and e-learning in ASEAN. The first component is open collaboration and networking between OER universities, the second component is services for engineering educational institutions, and the third component is support infrastructure for OER.

Firstly, the open curriculum design was carried out at Yangon Technological University and at Mandalay Technological University in May and November of every year from 2014 to 2019. The Six Universities in Japan were supported to enhance the engineering higher education project under the JICA scheme. The curriculum benchmarking processes were accomplished to accredited by the Myanmar Engineering Council (MEngC) in 2019. The continual quality improvement (CQI) processes for open curriculum design are sustained. In 2018, the international postgraduate diploma programme in Telecommunication Engineering was initiated at YTU in official collaboration with the University of Oulu in Finland. During that collaboration, the eleven modules were offered by international experts, and the digital course materials were provided for all Telecommunication Engineering Students at YTU.

Secondly, the open design and implementation program for all undergraduate and postgraduate students for their education. The integrated design projects and graduate research for undergraduate courses and research project implementations for postgraduate courses are compulsory at YTU. The internship and students' exchange programme between YTU and collaborative universities in the world were completed based on the open design and implementation for outstanding achievement for education and research purposes.

Thirdly, the open pedagogical systems were also implemented at YTU based on the research works. The Research-Based Education (RBE) system is the main idea for implementing the open pedagogical systems. The researchers did their research work, and they observed their research outcomes from their collaborative research works with Japanese Universities. After that, they got new ideas and knowledge from the research experience, and they could publish their research outcomes and transfer their knowledge to industries by tech-transfer process. And then, the researchers shall have to transform their course materials from their research outcomes for their classes by modifying their old pedagogy.

Fourthly, the open student support systems were developed by a unique RBE system with a triangle shape model, reported in Volume 1 of the 2023 Trend Report of Higher Education and e-learning in ASEAN. The idea and way of thinking of undergraduate and postgraduate students always work together with the course facilitators to achieve the best education system at YTU by research group' activities.

The second component is services for engineering educational institutions by open assessment and evaluation services, open micro-credential, open community services, and open science literacy services. The open assessment and evaluation services are essential services for international degree programme. Based on the experience of the international postgraduate diploma programme in Telecommunication Engineering at YTU, the assessment and evaluation services are done by the course facilitators from Finish University. Also, the assessment and evaluations are conducted by external evaluators from MEngC for the programme accreditation purposes. In connection with the assessment services, open micro-credential services are also important. At present, YTU is now emphasizing to accomplish those services.

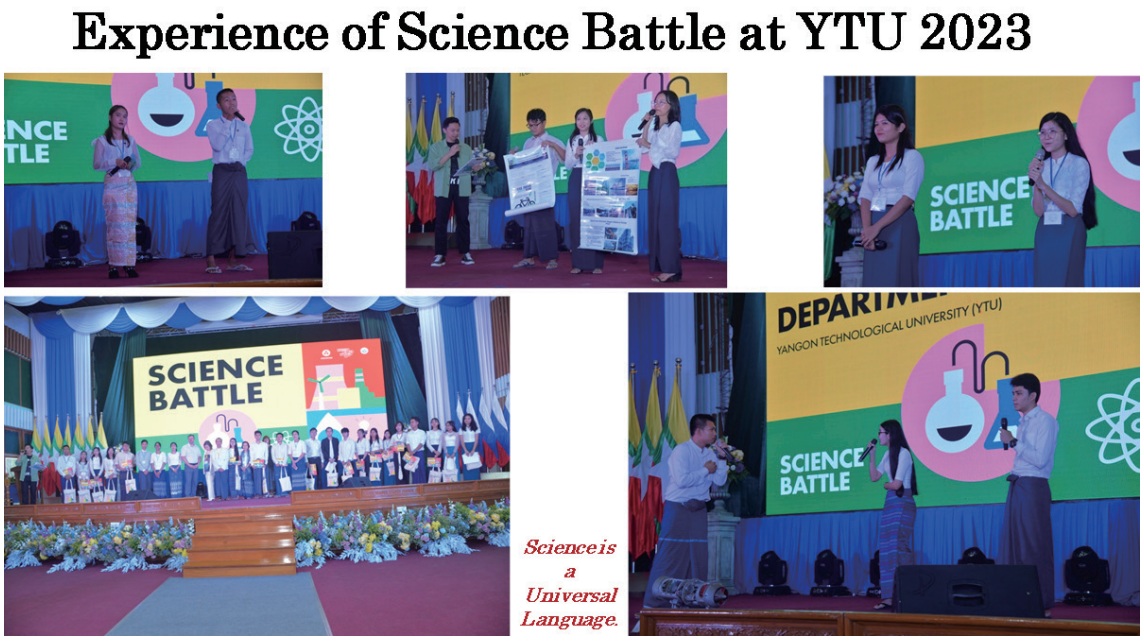

Figure 1. Science Battle Experience at YTU in 2023

Figure 2. Small Museum Establishment at YTU in 2023

The more important one is open community services. YTU has formulated to engage community services by organizing an open campus system for everyone. Generally, YTU invites all fresh students and the public community to engage in scientific thinking and experience non-scientists from the public for implementing citizen science. At that time, all laboratories of YTU were open to the public for participating in research activities and experimental works based on their fundamental understanding of science and scientific popularizations.

The most important thing is open science literacy services. In this phase, there are three concepts of

1. Science Museums, Science Park, Centre and Science Battle configuring the new entrepreneurial ecosystem in the physical area,

2. Science Museums, Science Park, Centre and Science Battle enabling the entrepreneurial ecosystem's platform, and

3. Science Museums, Science Park, Centre and Science Battle integrating additional connections beyond the entrepreneurial ecosystem in the physical area

are very important to enhance the Improvement of Public Scientific Literacy through the establishment of Science Museums, Science Park and Science Battle in Universities.

The third component is support infrastructure for OER through an open business system, open ICT facilities, and an open student administration process. The important one is the open business system for all, and YTU always hosts the business areas on the campus for exchanging knowledge and experience with people in industries based on a co-creation program. The ICT facilities could be utilized by anyone for fulfilling the programme educational objectives after graduation of all students. The open student administration process is obligatory at YTU to enhance the education purposes for all.

That is the ideology for free OER learning approaches to free services to all.

Implications

The critical outcome of the OER university system implementation depends upon the Ideologies for the Specific Logic Model of YTU. The success story of the OER university system is based on the three components of open collaboration and networking between OER universities, services for engineering educational institutions, and support infrastructure for OER. The collaboration and networking between YTU and collaborative institutes are essential for implementing the OER university system successfully.

03

Implementation, Outcomes and Impacts:

YTU always actively participates in implementing the specific logic model for the OER university system by collaborating with international institutions. YTU created the unique LMS model for engineering education and sustainable university establishment. The successful percentage of the OER university system implementation is about 75% for the whole university. There are twelve engineering degree offering departments, and the course materials of about 600 files have already been uploaded in the YTU LMS platform. The outcomes of the implementation of the OER university system could be analyzed after establishing and monitoring the system completely.

The direct positive impacts of the OER university system are not only to the undergraduate and graduate students of YTU but also to the other students from local institutions and collaborative institutions. In addition, the other indirect positive impact body is the public community with non-scientists knowledge for their life-long learning processes.

Implications

The effective implementation of the OER university system at YTU depends upon the collaboration, cooperation, and networking processes according to the sustainable development of education and research purposes between YTU and international institutions. The direct and indirect impacts to all people could be measured based on the full implementation of the OER university system at YTU.

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Integrating Project-Oriented Learning Activities into Online Learning

#Online Learning #POL Activities

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It is necessary to create learning environments that can incorporate modern learning methodologies that use IT in the best possible ways for online learning. Project-Oriented Learning (POL) is an increasingly popular pedagogical practice centered on learners working collaboratively on projects while the instructor facilitates learning activities and progression. POL embodies several factors considered central to motivation in online learning. Instructors design authentic activities focused on real-world issues using real-world tools and products. The lesson is designed in such a way to promote inquiry versus instruction: learners learn information through research and investigation and by carrying out the project. The activity promotes learner choice, autonomy, and decision-making. In their project, learners use many tools that professionals use (technology, surveys, etc.). In particular, technology is a critical tool in project-oriented learning that can help learners develop entrepreneurial skills. In project-oriented learning, assessment is not a test or exam. It is authentic—it directly assesses learner performance based on completing real tasks: designing an app, solving a problem, building a model, etc.

01 What is Project-Oriented Learning?

Project-oriented learning is an instructional method in which learners gain knowledge and skills by working for an extended period to investigate and respond to an engaging and complex question, problem, or challenge. Project-oriented learning calls for real-life application of both technical and work readiness skills to solve a problem.

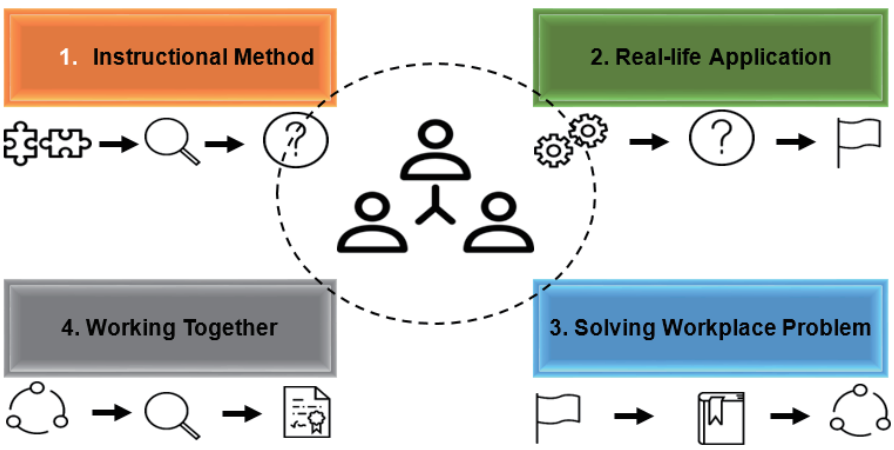

Figure 1. Project-Oriented Learning Activities

02 Why Project-Oriented Learning?

When implemented well, POL can increase learners' retention of content, improve learners' attitudes towards learning, and help learners develop important work-readiness skills: adaptability, collaboration/teamwork, communication, critical thinking, diligence, and time management. POL helps learners develop skills to work in a knowledge-based, highly technological world. Bringing real-life context and technology to the curriculum through a POL approach encourages learners to become independent workers, critical thinkers, and lifelong learners. POL lends itself to authentic assessment:

- It allows learners to demonstrate their capabilities while working independently.
- It helps learners apply important skills such as doing research and problem solving skills.
- It develops the learner's ability to work with his/her peers and build teamwork skills.

03 Designing a Project-Oriented Learning

The process of Project-Oriented Learning is organized into three phases: issue or challenge (prompting action), organizing statement (telling learners how to address issues), and solution process (finding a solution).

Figure 2. Steps of Project-Oriented Learning

What elements must be parts of the POL activity? As an instructional designer, the instructor designs an open-ended project that allows learners to learn in multiple ways, cultivate work-readiness skills, and develop learners' solutions. The POL activity must contain the elements in the list below.

Element to Include	Description
Essential question	Design a project ▶ Look at the curriculum and see where it intersects with real-world issues. ▶ Analyze and address essential questions focusing on the big organizing issues that are the heart of POL.
Learning outcomes	Use specific outcomes for this POL activity
Learner-centered assessment	Use specific assessment methods for this POL activity
Sequence of activities	Use activity planning template for instruction and assessment of POL activity
Work experience task	Integrate work-based learning
Collaboration technique	Collaborate checklist and rationale for grouping (how to group learners, define numbers of participants and their roles; how this technique promotes real collaboration—not just cooperation)

Element to Include	Description
Technology	Some uses of technology: assessment, content, or support instruction
Higher-level thinking	Include as part of activity design
Analytic rubric	Assess the learners' final product

Implications

POL aims to help learners seek solutions and display behaviors that set them on the road to lifelong learning. Instructors use project-oriented learning techniques in the physical classroom/online learning to help learners develop deeper content knowledge and promote the development of work readiness skills. By using POL, instructors can design authentic activities focused on a real-world issue, using real-world tools and a real-world product. Project-oriented learning is like learner-centered instruction, focusing on learner activities. The design of the project-oriented activity and the way learners work together to address the issue can deepen content knowledge and develop learners' work readiness skills. In project-oriented learning, the learner can engage in various activities—investigating an issue, planning, researching, gathering data, analyzing data, working in a team, looking for additional information, making decisions, and presenting findings.

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Transforming Teaching: Exploring the Impact of AI-Driven Lectures in Education

#AI-driven Lecture #Concerns #Adaptive Learning #Education

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Mr. Si Thu Wai / TET Myanmar

This study examines how artificial intelligence(AI), especially AI-driven lectures, can enhance the teaching and learning process in higher education and the potential opportunities, challenges, and ethical considerations that need to be considered for the success of AI-enhanced education. AI-driven lectures present a promising option to improve future education as technological breakthroughs continue to change how we teach and learn. By examining the impact of AI-driven lectures on teaching and learning outcomes, this study aims to uncover the benefits and challenges associated with the evolving landscape of AI-enhanced education and provide valuable insights for educators on utilizing AI effectively for future education.

01 AI-Driven Lecture Creation

Creating AI-driven lectures involves several key components and considerations. Before creating and delivering the courses, educators need to carefully plan, including identifying appropriate AI tools and resources such as natural language processing (NLP) tools, machine learning algorithms, educational software, and content generation platforms. Moreover, educators should consider, "Will the AI tools they choose effectively cover the intended learning objective?". Changing the way of teaching and learning content using AI can assist educators in improving the quality of their lecture content, including text, slides, multimedia elements, and supplementary materials.

02 Challenges and Concerns for Adaptive Learning

AI-driven lectures offer numerous benefits, fostering education and catering to diverse learning styles and abilities, but they also come with their own set of challenges, including content delivery ranging from technical issues to pedagogical concerns, the role of human educators, technological infrastructure, and ethical considerations. AI-generated lectures will be factually up-to-date, but they may lack the depth, nuance, and accuracy that human educators can provide. AI lacks a deep understanding of pedagogical principles, making designing lectures that effectively engage and educate learners challenging. Effective teaching requires more than just information delivery; it involves active learning, motivation, and interaction. Educators and institutions should ensure that AI complements their teaching methodologies and enhances the learning experience rather than replacing human interaction entirely.

While AI-driven lectures and educational technology can enhance the learning process, human educators remain irreplaceable in providing the expertise, guidance, mentorship, and personalized support that contribute to effective education. To impart ethical values, critical thinking skills, and moral guidance to learners, to facilitate discussions and interactions, bring forth encouragement to keep learners motivated and on track, to provide emotional support and create a positive learning environment, the role of human educators in an AI-driven educational landscape is indispensable. Strong and adaptable technological infrastructure is essential to support AI-driven lectures and provide students and educators with a seamless and effective learning experience.

The next inevitable concern for AI-driven lectures is ethical consideration. Researchers, educators, and learners need to consider the rights of data owners and intellectual property as AI scrapes huge amounts of data from the internet and should be aware of it without the proper owner's permission. Thus, educators should be aware of how the data should be used without contravention.

03 Readiness for AI in Education

Readiness for AI in education is essential for educators and learners to effectively harness the benefits of AI in the teaching and learning process. AI competencies for both educators and learners are essential in today's educational landscape, where artificial intelligence is increasingly integrated into the teaching and learning process. Familiarizing with the technology, its capabilities, and how it integrates into the curriculum and readiness for the use of AI is critical for the success of AI-enhanced education. Educators, as well as learners, should have basic digital literacy skills, including a basic understanding of what AI is, how it works, and proficiency in using AI tools and platforms relevant to education, such as learning management systems, adaptive learning software, and virtual labs and ethical awareness. It is necessary to provide training and support for educators as well as learners who will be using AI-driven lectures in their teaching-learning process.

The training should be conducted:

- the ability to use AI-driven tools to personalize learning experiences, adapt content and resources to meet individual learners' needs, and
- the skills in solving common issues that may arise when using AI tools in teaching.

04 Integration with Current Existing Systems

Adaptive learning pathways driven by AI are individualized and catered to the unique requirements and development of each learner. By tailoring instruction to the individual needs and abilities of each learner , these pathways can help improve retention, engagement, and overall learning outcomes of learners with automated grading, and help learners understand their strengths and weaknesses. Well-known personalized learning platforms and websites for using AI-driven features in their educational setting: Coursera, edX, Udacity, etc. that were integrating AI-driven features into their lectures and educational content. ChatGPT is the most popular AI-powered language model that is capable of generating human-like text based on context and conversations.

Some language learning websites and applications that incorporate AI-driven features to enhance language instruction are:

- Grammarly: writing assistant that employs AI to check grammar, spelling, punctuation, and style,
- WriteSaver: AI-driven proofreading and editing service specifically designed for academic and business writing,
- Duolingo: a gamified approach to language learning that provides instant feedback, and
- Rosetta Stone: a website that can provide pronunciation feedback using speech recognition technology.

Some websites and applications in the field of science and mathematics that use AI-driven features to enhance learning experiences are:

- Khan Academy: AI-driven content based on a student's skill level that can offer appropriate exercises with instant feedback;
- DreamBox: an AI-driven platform that adapts lessons based on a student's progress and provides personalized instruction;and
- Photomath: a mobile app that can solve handwritten or printed math problems using AI and provide step-by-step solutions and explanations.

The key is to choose AI applications that align with the course objectives and the needs of educators as well as learners. Some real-world examples are Adaptive Learning Platforms that analyze learners' performance and adapt the content to their individual needs. AI can be effectively incorporated into lectures to improve the educational goals and requirements of a specific course or program. Educators can incorporate platforms, like Kahoot and Symbaloo Lesson Plans, into lectures to create customized lesson plans, games, assignments, and resources for each learner. The capacity to adapt teaching methods based on AI-generated data and insights leads to better support for the learning process.

05 Impact on Teaching and Learning Process

AI-driven lectures have a profound impact on teaching and learning, transforming traditional educational approaches in numerous ways. For educators, AI can save time on repetitive tasks such as grading and preparing materials, allowing educators to focus more on instructional design and one-on-one interactions with learners. AI can help educators curate the most relevant and up-to-date content. AI can analyze learners' performance data and tailor learning materials to their individual needs and pace, leading to personalized learning. This personalization can generate the contents and tools that are particularly aligned with learners' strengths and weaknesses, leading to a more effective learning environment. For learners, AI-powered educational platforms can be accessed anytime and anywhere, allowing learners to learn at their own convenience. Adult learners with busy schedules would particularly benefit from this adaptation.

AI-driven education can have significant psychological, emotional, and critical thinking implications for educators and learners. While it can enhance motivation, engagement, and self-efficacy, it may also bring stress and ethical concerns. Educators need to consider how to handle the negative effects of AI by maintaining a healthy balance between AI and human interaction, addressing educators' and learners' concerns, and promoting critical thinking skills in the digital age.

It's essential to recognize that while AI can bring about significant educational advancements, it should be used thoughtfully and ethically. Educators must balance technology and human interaction to ensure the educational experience remains personalized and supportive.

Implications

This study reveals that it is essential to balance automation and human interaction while AI can enhance teaching and learning systems. Educators, as well as learners, should keep abreast of AI developments, address the potential challenges, and consider how to integrate AI-driven tools into their teaching and learning system, and utilize AI effectively for future education.

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2023 Trend Report of Higher Education & e-Learning in ASEAN

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Published in 11. 2023 **Publisher** ACU Secretariat (ASEAN Cyber University Secretariat)
Address 64, Dongnae-ro, Dong-gu, Daegu, Republic of Korea
TEL. +82-53-714-0114 **Homepage** https://www.aseanoer.org