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E-Proceedings

International Conference on
Innovation in Education:
Opportunities and Challenges in Southeast Asia

Co-presented by the United Board for Christian Higher Education in Asia and Soegijapranata Catholic University

Editors:
Cecilia Titiek Murniati M.A., Ph.D
Dr. Heny Hartono, SS., M.Pd

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Soegijapranata Catholic University
October 29 - 30, 2019

Venue: Thomas Aquinas Building 3rd Floor

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FOREWORD

The advancement of technology has tremendously transformed today's teaching and learning. Teachers have a plethora of ways to keep students engaged and empowered. Technology allows both students and teachers to interact better and more effectively. Changing student demography, changing teaching paradigms, and changing needs of today's students necessitate the integration of technology in the universities. Universities undoubtedly have to seek innovative methods in delivering courses to increase students' engagement and to attain their teaching goals.

This proceeding is a collection of papers presented in the International Conference on Innovation in Education: Challenges and Opportunities in Southeast Asia. Co-presented by the United board and Soegijapranata Catholic University, the conference discussed the unique challenges and opportunities facing the Asian region, with sessions designed to highlight the innovative ways in which colleges and universities leverage technological advances for the promotion of whole person education.

The themes in this conference centers around massive open online course, online, distance, virtual, and augmented reality learning, faculty development and digital pedagogy, social media and social networking in education.

In the first part of the proceeding, the papers focus on various online, distance, virtual, augmented reality-based methods used to engage students in the classrooms. In the second part of the proceeding, the papers center on the innovative ways to deliver course materials. The papers in the last part of the proceeding highlight how social media and social networking are adopted in the classroom.

We hope that the insights and ideas put forward in this proceeding will greatly contribute to the scholarly discussions of how digital technology is adopted to meet the needs of today's young generations and teachers in the universities.

Editors

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C. Social Media & Social Networking in Education

Are we ready yet to flip our classes? Analysis on students' and lecturers' use of technology

[1]Mega Wulandari [2]Monica Ella Harendita, and [3]Vittalis Ayu

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Abstract: As flipped learning seems to offer potential benefits in improving students' engagement, developing problem-solving skills and enhancing learning outcomes, more research on this area is required to gain more insights on its implementation in different contexts. In the context of Universitas Sanata Dharma, flipped learning seems to help realize the goal of the institution, which is to nurture competence, conscience, and compassion. Thus, this study was conducted to evaluate the readiness of lecturers and students to undertake flipped learning. SAMR framework (Puentedura, 2013) is used to evaluate the level of technology integration. From the results, it can be seen that the most dominant level of technology use by the lecturer was Substitution, which comprised 39.7%. It was then followed by Modification (27.6%), Augmentation (24.1%) and Redefinition (8.6%). The results may serve as part of needs analysis which becomes the basis upon which of the University proposes their strategic plans.

Keywords: flipped learning, SAMR, ICT integration

INTRODUCTION

As technology has permeated numerous aspects in education, there is a growing concern on its affordances. The integration of technology in teaching and learning is expected to give a positive impact on students' learning. As a result, educational institutions are trying to keep up with the development of educational technologies by not only providing teachers and students with infrastructure but also offering training and professional development for the teachers. Various technological tools have then been employed activities in and outside the classroom. The activities may include planning, teaching

and learning instructions, as well as assessment and evaluation.

However, to realise quality education, technological tools should not merely regarded as a stand-alone element infused in the curriculum. Instead, the integration should be accompanied with appropriate teaching methods which will help the 21st-century learners learn best. In this vein, studies have been conducted to investigate how technologies can be adopted in various teaching and learning methods, such as blended learning (Sandanayake, 2019), mobile learning (Mobinizad, 2018; Koohestani, Arabshahi, Ahmadi, & Baghcheghi, 2019), and flipped learning (Schaffzin, 2016; Tsai, Shen, Chiang, & Lin, 2017; Ünal & Öztürk, 2017; Merlin-Knoblich, Harris, & Mason, 2019; Phillips & O'Flaherty, 2019).

Among all the previously mentioned methods, flipped learning seems to offer potential benefits in improving students' engagement (Merlin-Knoblich, Harris, & Mason, 2019; Phillips & O'Flaherty, 2019), developing problem-solving skills (Tsai, Shen, Chiang, & Lin, 2017; Ünal & Öztürk, 2017) and enhancing learning outcomes (Schaffzin, 2016). Thus, more research on this area is required to gain more insights on its implementation in different contexts. In the context of Universitas Sanata Dharma, flipped learning seems to help realise the goal of the institution, which is to nurture competence, conscience, and compassion. Flipped learning is hoped to help lecturers accommodate whole-person education in their teaching and learning.

Having discussed the trends in educational technologies as well as the context in Universitas Sanata Dharma, the researchers are interested in conducting a preliminary study to see the readiness of lecturers and students to undertake flipped learning. SAMR framework (Puentedura, 2013) is used to evaluate the level of technology integration that has been initiated by lecturers.

LITERATURE REVIEW

A. SAMR Framework

Technology instruments can extend learning in effective ways when incorporated efficiently into the curriculum. When technology is used to support the curriculum objectives and help learners to achieve their goals efficiently, successful technological integration is accomplished. In order to help teachers integrate technology in the classrooms, the SAMR Model was

constructed by Ruben Puentedura (2013) as a framework to evaluate the use and technological inclusion levels in schools.

The four-level SAMR model comprises "Substitution, Augmentation, Modification, and Redefinition" (Puentedura, 2013). This model represents a way of shifting teaching and learning to the more meaningful and innovative through different grades of technology integration. The different levels in the SAMR model show certain classifications of ICT integration that have been defined as enhancing or transforming learning. "Substitution" and "augmentation" are viewed as ways of enhancing learning tasks, while "modification" and "redefinition" are seen as transforming the learning process. The SAMR model is illustrated in the following figure.
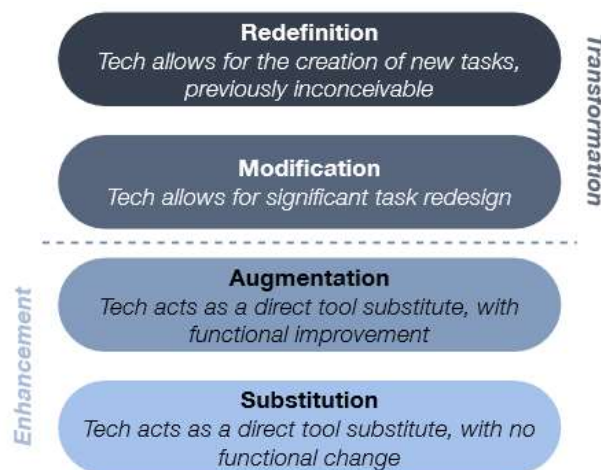
Figure 1. SAMR model. Source: Puentedura 2013.

1) Substitution Level

At the stage of substitution, technology serves as a direct replacement for traditional tools but does not improve the function fundamentally. Puentedura has indicated that technology could be used to replace traditional ways of instructions directly. The substitution level, therefore, is considered as the simplest level in the ICT integration where technology is used only to replace another tool without any modification. Examples of this level is the

use of Microsoft Word, PowerPoints, PDF reader as the media to present lesson materials in the classroom instead of using paper and pen.

2) Augmentation Level

Examples of SAMR augmentation learning tasks go beyond substitution level, providing some types of functional improvement over traditional instruments. The use of mobile DVD players by Pfeiffer et al. (2009) increases the teaching context for a marine biology course. The added video and audio linked the students with the reference that is closer to the fish in a real context, which offer a more situated experience of learning. The learners who used the realistic guideline via their handheld DVD players indicated to experience more learning benefits than the learners who used a static guideline.

3) Modification Level

In this level, technology modifies learning activities or meaningfully re-designs them. This is demonstrated by the use of technological devices and online communication. Online communication promotes cooperation and analytical thinking, while technological devices promote participation of students in the learning process enabling them to interact and engage with each other more easily. A study conducted by Wang, Yu and Wu (2013) is considered as the ICT integration in modification level. They developed a module for speech and debate class using social media apps. Lessons have been given on Facebook, LINE, WeChat, Google Hangouts and YouTube, which are the most frequent mobile social apps in support of group communication. It shows how mobile apps can connect individuals through the addition of technology and encourage learners to think about how to maximize the function of mobile social application in their classes.

4) Redefinition Level

Technology allows the learners, at the redefinition stage, to engage and work together as professionals but with the additional skill of communication for a wide array of audiences enabling students to experience the sense of audience in completing the tasks given. The implementation of technology at this stage has a transformative impact on learning because it encourages the development of new learning tasks. Liu and Tsai's (2013) case study provides an illustration of a redefinition stage, since students engage in instructional activities that would not have been possible without the existence of mobile

devices. They created an augmented reality cellphones application to assist Chinese learners to learn English. The result of the study revealed that mobile learning with increased reality can enhance the efficiency of language learning. The SAMR level and sample activities can be seen in the following table.

Level	Definition	Example	Example
Substitution	Technology acts as a direct tool substitute, with no functional change	A word processor is used as a paper and pencil replacement.	Instead of a paper-pencil test, Google Form exam is used
Augmentation	Technology is a direct replacement for an instrument that improves its functionality	Using spellcheck to correct spelling errors enhances the function of the task	Automatic grading for Google Form exam
Modification	Technology enables important redesign of tasks	The use of Google docs to collaborate or leave comments for each other	A project which requires creativity such as making a movie
Redefinition	Technology makes it possible to create new and previously inconceivable tasks	Writer of a blog post to share the world and add multimedia to it creates an unprecedented task	Creative project with audio feedback

Table 1. Instructional design/SAMR Model. (2018) from *https://en.wikiversity.org/w/index.php?title=Instructional_design/SAMR_Model&oldid=1877819*.

The SAMR model should be considered as a continuum to comprehend how to set an instance for each stage. The substitution level occurred if a lesson can proceed with or without a technology tool. However, if a technology instrument facilitates a lesson or improves a lesson, then this is considered augmentation. While to transform a lesson, it can not happen without the technological instruments. Technology must be present for alteration to allow the tasks to work. The prevalent classroom is substituted in the stage of redefinition with a cooperative setting that concentrates on students and technological instruments.

The model provides a structure for educators to evaluate the use of technologies and to determine the level of inclusion in their schools. Furthermore, the model reiterates that effective technology integration is more

than just selecting and using some classroom apps. Successful technological integration should be geared towards supporting and enhancing student learning by utilizing computers, mobile phones and the Internet connection. In other words, technology should be integrated into lesson purposefully and efficiently using appropriate apps which can augment and alter the learning experience. The following table presents some applications used in each level of the SAMR model.

SAMR LEVEL	APPLICATIONS
Substitution	Wikipedia, Pages, iBooks, Adobe PDF reader, Simplemind, Collage Creator, Calculator, Dictionary, Notes, Microsoft Word, Microsoft PowerPoint, Microsoft Paint
Augmentation	Google Doc, Evernote, Word Cloud, Google Form, Adobe Acrobat Reader, Blogger, Twitter, Prezi
Modification	Skype, Keynote, Mindmeister, Canva, Edpuzzle, QR Code Reader, Edmodo, Survey Monkey, PDF Expert Flipboard, Dragon Dictation, Comic Strip, Quizizz, Kahoot
Redefinition	Storybird, Nearpod, Padlet, Windows Moviemaker, Flipgrid, iMovie, ClassDojo, Google Hangouts, Quizlet, YouTube

Table 2. SAMR Model Application (adapted from Imamah, 2019)

The SAMR model does not appear hierarchical (Kirkland, 2014), although the often-presented approach frequently gives the impression that the aspirational objective is "redefinition". Most importantly, technology use should be strongly related to the purpose of learning and the anticipated results in order to enhance the learning experience.

Several previous studies have been conducted either to measure ICT integration using SAMR framework or implement SAMR model in the learning activities. The first study was conducted by Jude, Kajura and Birevu in 2014. The study entitled "Adoption of the SAMR Model for the Assessment of Pedagogical Adoption by the ICT University" reveals the failure to use a

number of ICTs in educational processes at institutions primarily due to lack of a powerful unit which is capable of driving educational technologies into implementation, limited knowledge on how to use ICT, the non-accessibility of the appropriate technology infrastructure and lack of policies implementation in the field of education technology.

A study conducted by Floris and Renandya (2018) provides practical thoughts on how the SAMR model can be used to teach listening and reading in language classes. Through the article, they try to inspire educators to integrate technology to improve their teaching experience and to attain pedagogical objectives in their learning courses, realizing the huge potential that technology can offer.

B. Flipped Classroom

The flipped classroom has been increasingly prevalent in tertiary education in recent years. This includes teaching learners the fundamental material of a course autonomously, often by viewing or reading a video-based lecture instead of listening to a classic lecture in classrooms, and providing more time in the class for group analytical tasks, simulations, experiments, questions and responses, and further interesting learning experiences (Saitta & Morrison, 2016).

The flipped classroom is adjustable to the teaching style, techniques and conditions; teachers have the option of personalizing their own personalized version of flipped classroom for their learners and (Bergmann & Sams, 2014). Educators began to progressively re-organize some of their contents outside of the lesson in higher education. Time was therefore freed up for further exploration inside the classroom (Wulandari, 2017).

In the flipped classroom model, the role of the teacher in the classroom has changed. The teacher is no longer the presenter of the information, but they will have the tutorial role (Sams & Washington, 2012). Based on Demirel (2016), the most crucial step that is done by the teacher to start flipping the class is deciding the content and the material and planning the learning process. The material can be given in the form of video recording of the teacher himself or he can also embed a related video, or in the form of online exercises that can be done by the students before the class started. Hence, in the flipped classroom, the students will use the class time to discuss the material more in-depth by having a questions and answers session with the teacher, doing peer or group activity, or having a presentation about the

material instead of spending the entire class time watching and listening to the teacher (Roach, 2014).

In order to implement successful flipped classrooms, some components need to be involved. Bergmann & Sams (2014) elicit five components to apply in flipped classrooms, namely collaboration between teachers and students, students' initiatives to learn, optimized learning facilities, support from policymakers and support from the IT department in the university.

C. Technology Integration in Indonesian Context

There have been many factors influencing the inclusion of ICT in education. Traditional approaches to learning are less likely to be suitable to prepare students to participate in contemporary workplaces. The other reasons focus on the pedagogical impact that ICT may have, such as developing higher-order thinking skills (OECD, 2001), increasing levels of participation and collaboration (Davies & Merchant, 2009; Reeves, Herrington & Oliver, 2002), and amplifying creative teaching strategies (Lih- Juan, Jon-Chao, Horng, Shih-Hui, & Chu, 2006).

Indonesia is recognized as a densely populated nation (more than 250 million people), with a wide range of populations on 17,500 islands. Based upon this, the capacity of education research to depict Indonesia as a whole is usually restricted. For instance, between Java and the Eastern Indonesian provinces, there is a significant gap between education and Internet access. Research involves looking at the connectivity between Indonesian schools, Indonesian educators and Indonesian students.

Besides the accessibility of the internet, Karmila Machmud (2011) revealed the other barriers encountered by educators in Indonesia. Findings of her research show that technology accessibility and availability were not the only obstacle in integrating technology in Indonesia. Another constraint faced by educators was the insufficient knowledge on how to integrate technology effectively into their teaching process.

In this vein, Harendita (2013) argues that the absence of digital literacy in Indonesia may be related to some cultures that are typically marked by compliance. She also claims that alternative pedagogies concerning ICT use in classes conflicting with previous approaches to the classroom. Resistance can spring from teachers' unreadiness to accept new ideas. Those are in line with Ertmer (1999) who projected a framework that elicit "first-

order" obstacles and "second-order" obstacles for integration of technology in education. The first obstacle to technology integration involves some external variables, such as the absence of sufficient access and facilities, time, training and institutional support. The "second barrier" is more intrinsical to teachers, which encompasses pedagogical beliefs of the teacher, technological conviction and a willingness to change by teachers. Those elements could hinder the integration of technology in classes.

Despite a limited inquiry on ICT integration in Indonesia, some studies in this area indicate that teachers, with appropriate support and adequate time, are capable of implementing an innovative stance as a basis to provide students with whole-person education. Therefore, it is exceptionally advisable to nurture innovative thinking of the teaching staff by providing training and professional development program necessary to apply innovative technology integration in the instruction.

METHODOLOGY

This research employed a quantitative research methodology. The study was undertaken at 33 departments of Sanata Dharma University involving 593 students and 63 lecturers. The lecturers were aged between 26 – 75 years. The data was collected using an online questionnaire generated using Google Form that follows the Substitution, Augmentation, Modification, Redefinition (SAMR) theorized by Puentedura (2013). Data gathering was conducted from March-May 2018.

RESULTS AND DISCUSSION

For the purpose of this paper, data in the findings will be divided into two sections: from the viewpoint of the lecturers and from the viewpoint of the students. In both parts, it consists of the reasons for IT integration, the SAMR level and activities, and their suggestions regarding IT integration in Sanata Dharma University in order to achieve whole-person education.

A. Lecturers' data

a. Lecturers' age range

The majority (31 percent) of respondents were over 45. Those aged 31 and 35 years old accounted for 23%, and those between 26 and 30 years old represented 20%. Sanata Dharma University could tape from this age characteristic to adopt an ICT-led pedagogy.
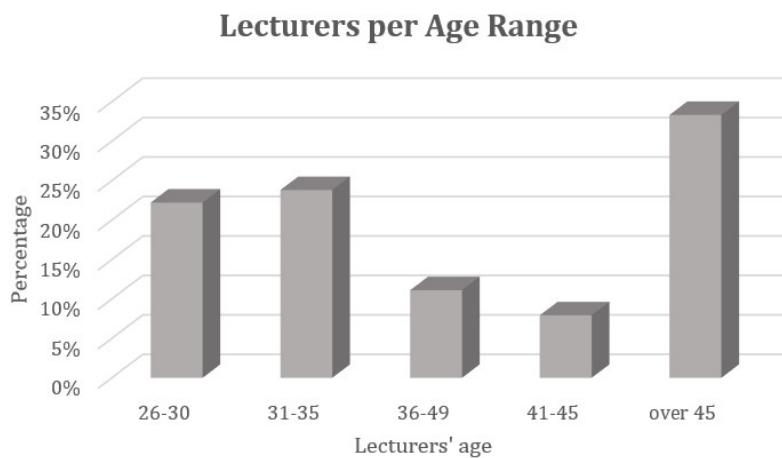

Figure 2. Age distribution of the lecturers

The analysis found that most of the respondents were older than 45 years. The senior level is what Prensky (2008) identified as "digital immigrants" or persons with technological skills and knowledge who do not previously own the skills. Nevertheless, the data also shows that the number of lecturers from 26-35 years of age dominates the overall number of teaching staff involved. They are viewed as more technically competent regarding technology integration in educational context. Prensky (2001) notes that younger generations are more ICT-related and have a higher affinity than their relatively old counterparts. Therefore, Sanata Dharma University has a fertile ground where pedagogical ICT use can flourish.
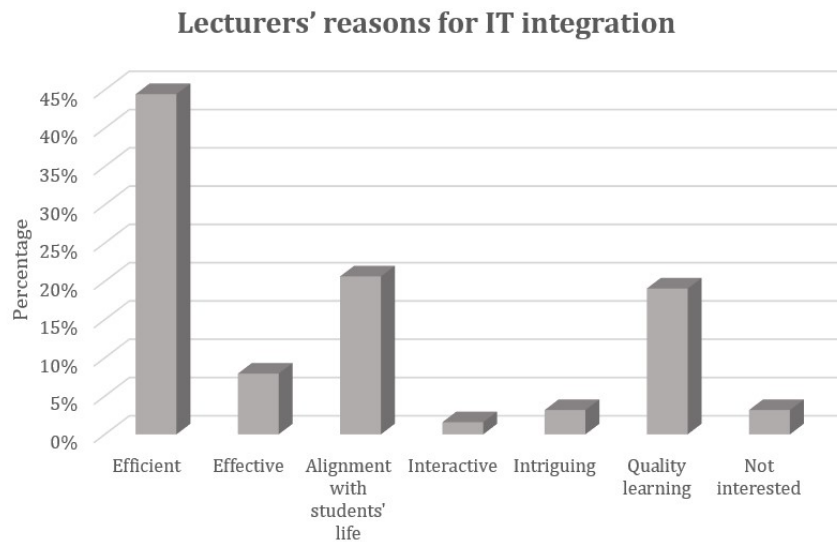
b. **Lecturers' reasons for IT integration**

Figure 3. Lecturers' Reasons for IT integration

The result shows that, due to its efficiencies, teachers favored the use of technology. Student evaluation is one of the most tedious and time-consuming activities in many universities. One approach to addressing workload challenges can be the use of pedagogical technology.

c. **Lecturers' SAMR level and sample activities**

To assess if the teachers used ICTs in various teaching and learning tasks, they were asked to mention the use of specific ICTs for different pedagogical processes. The researchers used Puetendura's (2013) SAMR model to determine the level of ICT integration. According to Puetendura (2013), ICT use in educational institutions can be found in four different levels, namely, Substitution, Augmentation, Modification and Redefinition. It defines the stages of ICT pedagogical integration and was built based on the teaching and learning cycle which is the focus of this research. The following sections address the level of ICT integration based on the SAMR Model lens at Sanata Dharma University.
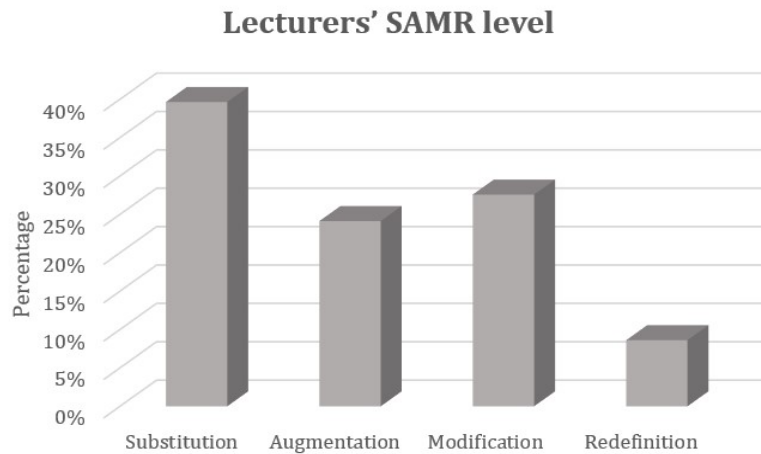
Figure 4. Lecturer's SAMR level

As evaluated by SAMR, Substitution, which comprises 39.7% was the most dominant level of technology employed by the lecturer. This was then followed by Modifications (27.6%), Augmentation (24.1%) and Redefinitions (8.6%). The table below shows the types of work undertaken by the lecturers.

Level SAMR	Sample Activities
Substitution	1. Using PPT to display material 2. Upload and download learning material from LMS 3. Prepare lecture note using MS Word 4. Upload assignment to LMS
Augmentation	1. Automatic grading for quizzes in LMS 2. Automatic grading with Kahoot 3. Online forum discussion 4. Using spelling and grammar checker
Modification	1. Peer reviewing process 2. Making infographic poster 3. Video conferencing with guest lecturers
Redefinition	1. Upload video as learning materials in YouTube 2. Collaboratively creating mind map 3. Collaboratively write blog posts 4. Making story book

In Substitution level, lecturers attempt to replace conventional lessons with ICT-based methods without any practical enhancement, for instance with the use of a word processor to substitute a typewriter or with PPT to display teaching materials instead of merely using whiteboards. Lecturers also use the institutional learning management system, *EXELSA*, to upload their teaching material and assignments.

The Augmentation level presupposes that the pedagogical information and communication technology are used to replace traditional methods of education and learning but with some changes in operation. For example, a lecturer with the aid of a word processor can use a spell checker to erase typos from his lecture notes.

From the data, the most common modification ICT is enabling interaction among students via the internet, for instance conducting peer-review process as one of the steps in writing classes. In this stage, lecturer assigns students to upload their work to LMS, and then encourage them to review and comment on each other's posts. Peer review is in line with Vygotsky's constructivist learning.

At the redefinition stage, technology allows for the creation of new tasks previously inconceivable. This level ranked lowest in the chart showing lack of readiness of the lecturers to innovatively create learning experience with the assistance of technology. We may infer from the data that Sanata Dharma University has to make a great effort to increase ICT use as instruments to redefine the teaching and learning process.

d. **Lecturers' suggestions to improve IT integration**

Four key areas were suggested from the findings, which could enable institutions to incorporate the SAMR Model into their educational process. These are: 1) training related the improvement of skills and knowledge in educational technologies, 2) equipment and infrastructure 3) updated LMS, and 4) educational technology policy.

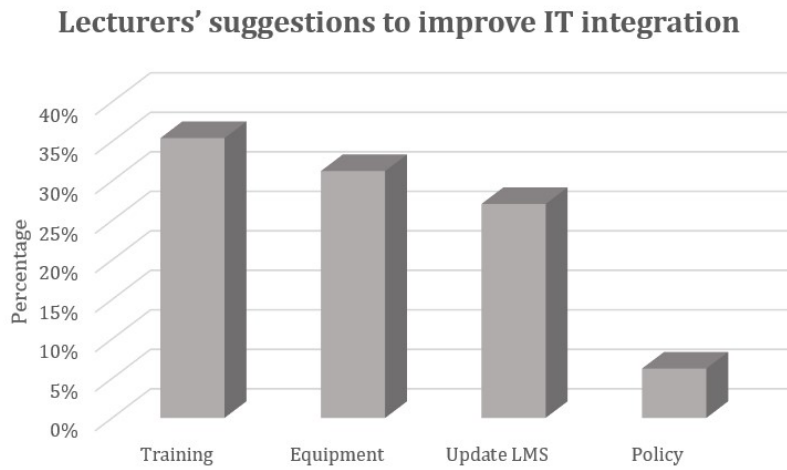## Lecturers' suggestions to improve IT integration

Figure 5. Lecturers' suggestion to improve IT integration

A lack of knowledge on using educational technology or ICT is the most frequent cause for the non-users of technology. The University should mobilize lecturers who have additional know-how in educational technologies to train other lecturers. There should also be concerted efforts to improve facilities, to sustain and upgrade institutional LMS systems and to enforce educational technology policies to recognize educators who use learning technology in an innovative way.

B. **Students' data**

a. **Students' reasons for IT integration**
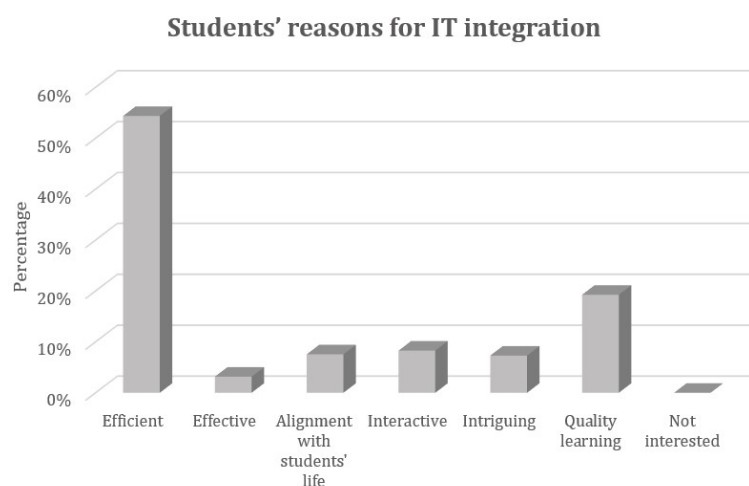
Students' reasons for IT integration

Figure 6. Students' reasons for IT integration

The findings among the students also show the same results as those reported for IT integration by the lecturers. The main reason why students are interested in using technology is because technology allows their learning to become more efficient.

b. **Students' SAMR level and sample activities/tools**

In comparison to the SAMR rate of the lecturers, students' most prevalent level of technology was Augmentation that accounted for 43%. It was then followed by Substitution (31%), Modification (18%) and Redefinition (7%). The following graph shows the SAMR level distribution of the students.
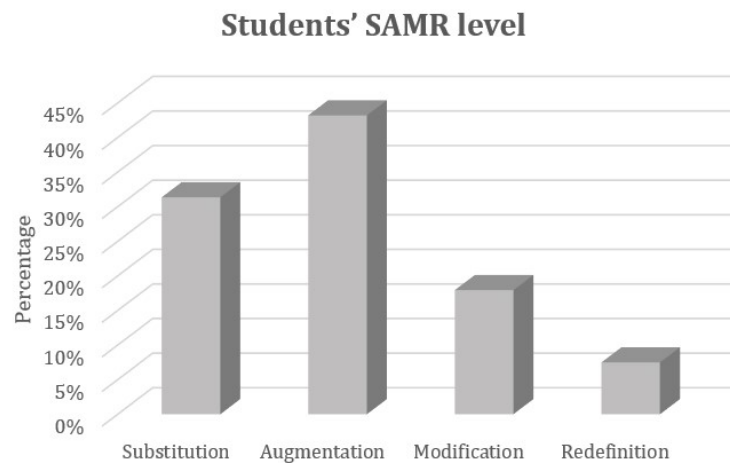


Figure 7. Students' SAMR level

The following table shows the types of activities done by the students.

Level SAMR	Sample Activities
Substitution	1. Upload and download learning material from LMS 2. Reading online resources (e-journal or e-book) 3. Submit assignment to LMS

Augmentation	1. Doing online quiz 2. Online forum discussion 3. Exploring virtual lab
Modification	1. Participate in auto-graded quiz like Quizizz or Kahoot 2. Peer reviewing process 3. Spreadsheet processing
Redefinition	1. Collaboratively creating mindmap 2. Digital video processing 3. Using Google Classroom 4. Online publication in Youtube or Wordpress.

c. **Students' suggestions to improve IT integration**

Students' suggestions to improve IT integration
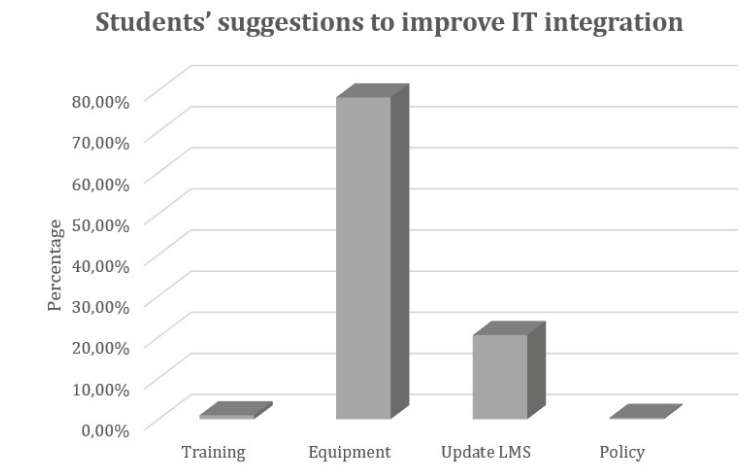
Students, as digital natives, are typically attached to technology. They do not wish to have trainings in order to upgrade their skills related to ICT use. They expect more on high bandwidth and better internet access. Technology's significance in autonomous learning should be sensitized by the institution. Priority should be given to the improvement of ICT infrastructure for both students and lecturers. If ICT integrations are to be enforced, the budget line for ICT resource mobilizations should be prioritized. The use of personal computer systems, such as laptops, mobile phones, tablets etc, should be encouraged and Wi-Fi hotspots should also be effectively expanded and improved.

CONCLUSION

From the results, it can be seen that the use of technology was preferred by the students and the lecturers mostly due to its efficiency. As analysed using SAMR framework, the most dominant level of technology use by the lecturer was Substitution, which comprised 39.7%. It was then followed by Modification (27.6%), Augmentation (24.1%) and Redefinition (8.6%).

The findings also suggest that since most of the lecturers still used technology on Substitution level without any task modification, there need to be workshops to upgrade the lecturers' competence in order to embed the use of technology more powerfully to create a meaningful learning experience. The results may serve as part of needs analysis which becomes the basis upon which of the University proposes their strategic plans. Some programs that may help the institution to augment their ICT adoption include running workshops and other professional development schemes. In addition, compared to short training and workshops, long-term and continuous assistance and programs are more likely to be fruitful.

ACKNOWLEDGEMENT

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