A Study on the Techno-Pedagogical Knowledge of Academics in a Malaysian Private University

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ABSTRACT

Techno-pedagogical Knowledge (TPK) is a framework encompasses two different types of knowledge, namely technological knowledge and pedagogical knowledge. As a fragment of the knowledge areas making up Techno-Pedagogical Content Knowledge (Mishra & Koehler, 2006), TPK is a staple skill for the 21st century educators. This is especially true when the educational landscape nowadays is overwhelmed with vast array of digital devices. There is also a need for educators to be creative in using their techno-pedagogy skills, referring to the ability of the teachers to make lesson interesting though technological and imaginative approaches. The study attempts (1) to study the current level of techno-pedagogical knowledge among lecturers of Taylor's University (2) to study how techno-pedagogical knowledge help lecturers in integrating blended learning into their teaching and learning processes. This quantitative study was carried out by distributing 21-item questionnaire to full-time academic staffs (n= 126) of Taylor's University. The main findings revealed that while the TPK competency of lecturers are rather high (mean=4.21), the "Motivation" and "Internet discussion" aspects remained low compared to the rest of the TPK components. It was also found that while the focus is to look at the integration of blended learning into the lecturer's teaching, it is interesting to note that the academics of this university still place much emphasis on face-to-face teaching, and prefer flipped model of learning rather than blended learning. This study provided further insights on the need to emphasize on

the techno-pedagogical skills and consequently, improve the current TPK courses available for lecturers.

Keywords: *Techno-Pedagogoical,educators, Pedagogical Content Knowledge*

INTRODUCTION

Malaysian Higher Education institutions are witnessing exponential growth of learners who are thriving for higher degree of knowledge hence promoting bigger number for enrollment each year. Despite the goal of getting more learners and training them to become skillful and knowledgeable workers in realizing Vision 2050, the outsourced facilities of universities can be a barrier to large enrollment. Consequently, the integration of technology into education has brought a different paradigm in viewing education in higher institutions, emphasizing blended learning as a panacea. Besides enabling learning through virtual communication and setting, educational technology provides numerous benefits.

Technology has been recognized as a powerful enabler, endowed with vast potential to innovate the education practices (Atkinson & Castro, 2008). Recent decades has recognized the need for learners to learn in the environment supporting their need to understand contents in animated, dynamic and unusual manner. One of the impetus resulting from this thinking is the development of various policies worldwide, including Malaysia, emphasizing on the provision of such assess to technologies. For example, the smart school initiative in Malaysia in 1997 was started with the aim to integrate ICT into education (MOE & MSC, 2010). Following that, all schools in Malaysia are equipped with computer labs and internet connection to foster technological literacy, eliminating the digital divide and build a community of technology users (MOE, 2009). However, the investment in placing computers did not yield expected outcomes for pedagogical change as it was later found out that teachers' ICT literacy competence is not equivalent to their technological pedagogy competency (Ala-Mutka, 2008). One factor of such shortcoming is because teachers simply cram and fit new technologies in the existing pedagogical structure instead of engineering a new model for more effective pedagogical framework (Bottino, 2003; Coldwell, 2003; Kwang, 2010).

The need for individuals to equip themselves with ample skills of technology also has been extensively emphasized, as mastering such skills allow them to use, manipulate and disseminate information in the sophisticated world. However, the real importance underlying the need for students to have technological skills is the lifelong learning it promotes; providing freedom for learners in shaping their own learning paths through collaborations and new technologies (Attwell, 2007). Hence, educators have to emphasize the use of technology to motivate learners to use and understand the potential for meaningful learning through digital platforms. Other than that, the developments of information, communication, knowledge and technology in the recent era have resulted in a different type of learners, compared to the traditional era. Pedro (2006) claimed that these learners are the cohorts growing up surrounded with digital media. He referred them as the "new millennium learners" associated with short attention spans, multi-tasking and non-linear ways in retrieving information. Hence, educators teaching the new millennium students need to attract and retain the attention of the students in different ways during the teaching and learning process (Ala-Mutka et al., 2008). This can be more challenging as students learn best differently and educators need to have a wide pedagogical coverage to cater for meaningful learning for each kind of learners.

Not limited only to the subject matter needed to be taught, the educators are also expected to have the pedagogical content knowledge in order for them to teach effectively, and creative enough to incorporate multiple approaches in teaching to suit various types of learners. While the common facet of assessment in educators' education courses emphasizes on the content knowledge and the pedagogical content knowledge, integrating ICT into educators' pedagogy has been under explored in the local setting. Studies conducted locally has insofar investigated on Smart School Project (Azizah Yaa'cob et al., 2005; Sharifah Maimunah Syed Zin, 2003; Ong & Ruthven, 2009), ease of use of technological gadgets (Moses et al., 2013; Samuel & Bakar, 2006) and on the readiness of teaching with ICT (Koo, 2008; Goh & Md. Wahid, 2006). These studies suggested that the competency of local educators to integrate ICT into education has been sidelined. Hence, educators' techno-pedagogical competency is placed under the focus in this study.

Another facet that was brought to the fore is the educators' creative teaching ability, referring to teachers' ability to manipulate and incorporate different approaches in teaching. It has also been reported that "one-size-fits-all" techno-pedagogy does not result in effective instructions as students learn differently (Oster-Levinz & Klieger, 2011). Hence, it is required them to be able to manipulate the technology in different ways to convey the lesson for various types of learners. While it is acknowledged that students are more dominant in a type of learning, multiple approaches in teaching methods benefits more students. For example, the creative way of teaching can blend all audio, kinesthetic and visual learning at once to benefit a wider range of learners with different learning preferences.

Problem Statement

Taylor's University takes pride in the use of technology in enabling effective and meaningful learning. With this, Taylor's University has established a department which oversees the technology-driven teaching and learning campus-wide, known as the e-Learning Academy (eLA). Among the many goals for eLA is to assist academics in integrating the use of technology which are consistent with their subject learning outcomes, to extend staff capabilities in the use of blended learning, as well as the provision of optimal learning spaces. Part of the provision is the technology-rich collaborative classroom, specifically designed for flexible formal learning spaces.

The unique seating design and the availability of fast Internet connection in the classrooms ensure better collaborative learning. Ideas can be easily shared and decisions can be made together more effectively throughout the learning session. It also enabled digitally animated presentation for learning, thus making learning session more interesting. Apart from that, the University has rolled out a policy in 2014 which calls for all academics to make all modules at least 30% blended learning, which is seen as consistent with the goal of the University in promoting 21st century learning. With all the strategies and provision of optimal infrastructure, there is a need to measure the current level of techno-pedagogical knowledge of the lecturers in Taylor's University, as well as take a closer look on how lecturers use techno-pedagogical knowledge to integrate blended learning into their teaching endeavor.

Research Objectives

Deriving from the problem mentioned, the objectives of this study are two-fold:

1. To study the current level of techno-pedagogical knowledge among lecturers of Taylor's University.

2. To study how lecturers use techno-pedagogical knowledge to integrate blended learning into their teaching and learning process.

Research Questions

The research questions for this study are:

1. What is the current level of techno-pedagogical knowledge among lecturers of Taylor's University?

2. How do lecturers use techno-pedagogical knowledge to integrate blended learning into their teaching and learning process?

Significance of the Study

Taylor's University educators' techno-pedagogical knowledge remained as an area under-explored. The needs to investigate these area are vital to ensure that the goals of inculcating ICT in education remain on track. A thorough research based on the data grounded in the Taylor's University can be helpful in developing a framework for the more effective training programs to develop the skills of integrating techno-pedagogical approach in education among the lecturers. In a way, understanding teacher's techno pedagogical knowledge contributes to a new knowledge, specifically in the field of teacher-education.

LITERATURE REVIEW

The exponential growth of technologies has propelled various transformations in life and foster dynamism in various walks of life. The need for individuals to equip themselves with ample skills of technology has been extensively

emphasized, as mastering such skills allow them to use, manipulate and disseminate information in the sophisticated world. However, the real importance underlying the need for students to have technological skills is the lifelong learning it promotes; providing freedom for learners in shaping their own learning paths through collaborations and new technologies (Attwell, 2007). Information, communication, knowledge and technology in the recent era have resulted in a different type of learners, compared to the traditional era. Pedro (2006) claimed that these learners are the cohorts growing up surrounded with digital media. He referred them as the "new millennium learners" associated with short attention spans, multi-tasking and non-linear ways in retrieving information. Hence, educators teaching the new millennium students need to attract and retain the attention of the students in different ways during the teaching and learning process (Ala-Mutka et al., 2008). This can be more challenging as students learn best differently and educators need to have a wide pedagogical coverage to cater for meaningful learning for each kind of learners.

Reasons for Technology-enabled Teaching and Learning

Technology has been recognized as a powerful enabler, endowed with vast potential to innovate the education practices (Atkinson & Castro, 2008). Recent decades has recognized the need for learners to learn in the environment supporting their need to understand contents in animated, dynamic and unusual manner. One of the impetus resulting from this thinking is the development of various policies worldwide, including Malaysia, emphasizing on the provision of such assess to technologies. For example, the smart school initiative in Malaysia in 1997 was started with the aim to integrate ICT into education (MOE & MSC, 2010). Following that, all schools in Malaysia are equipped with computer labs and internet connection to foster technological literacy, eliminating the digital divide and build a community of technology users (MOE, 2009). However, the investment in placing computers did not yield expected outcomes for pedagogical change as it was later found out that teachers ICT literacy competence is not equivalent to their technological pedagogy competency (Ala-Mutka, 2008). One factor of such shortcoming is because teachers simply cram and fit new technologies in the existing pedagogical structure instead of engineering a new model for more effective pedagogical framework (Bottino, 2003; Coldwell, 2003; Kwang, 2010).

Techno-Pedagogical Content Knowledge

It is vital that every lesson intended to be delivered in class is well-planned for. Scrivener (2005) mentioned that lesson planning is important as it help the teachers to cater for more different learning styles of their learners, and provides the educator with more coherent framework for efficient teaching. Hence, developing a good plan for a particular lesson needs both sound knowledge of content and pedagogy. However, Shulman (1986) pointed out that these two knowledge are usually treated as separate concerns in teacher education trainings, and introduced the term "Pedagogical-content Knowledge" (PCK) that reflects the interrelated components for effective teaching. Extending from this notion, Hughes (2000) added technology as another component of educator's knowledge, articulating the need for technology to be blended into the teaching in the 21st century. As mentioned previously, effective usage of technology enables effective teaching and learning and hence, the rationale for the knowledge of effective integration of technology into a lesson.

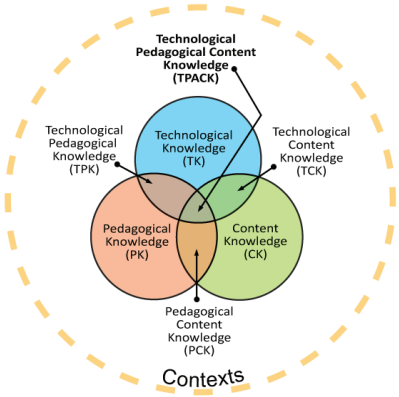

Figure 1: Framework for TPACK (Koehler & Mishra, 2009)

In the TPACK framework, there are three primary knowledge for an educator which is focused upon, namely Technological Knowledge, Content Knowledge and Pedagogical Knowledge. These three are not to be viewed in isolation, but it reflects the complex interplay of all knowledge essential for teaching with technology, positioned at the heart of this framework.

The concept of TPACK goes beyond the blend of Content, Technology and Pedagogical knowledge where another four knowledge base arise from the intersection of any two. These four knowledge bases are Pedagogical Content Knowledge (PCK), Technological Content Knowledge (TCK) and Technological Pedagogical Knowledge (TPK). The intersection of all three circles is the Technological Pedagogical Content Knowledge (TPACK). Quoting Koehler and Mishra (2009, para. 8), "An understanding of how teaching and learning can change when particular technologies are used in particular ways. This includes knowing the pedagogical affordances and constraints of a range of technological tools as they relate to disciplinarily and developmentally appropriate pedagogical designs and strategies".

While the common facet of assessment in teacher's education courses emphasizes on the content knowledge and the pedagogical content knowledge, integrating ICT into educator's pedagogy has been underexplored in the local setting. Studies conducted locally has insofar investigated on Smart School Project (AzizahYaa'cob et al., 2005; Sharifah Maimunah Syed Zin, 2003; Ong & Ruthven, 2009), ease of use of technological gadgets (Moses et al., 2013; Samuel & Bakar, 2006) and on the readiness of teaching with ICT (Koo, 2008; Goh & Md. Wahid, 2006). These studies suggested that the local educators' competency and knowledge on techno pedagogy has been sidelined. Hence, educator's techno-pedagogical competency is placed under the focus in this study.

The Technology Integration Planning Model

The choice of whether or not to integrate technology into the classroom is up to the educator, but usually with little understanding on the impact and the strategies for technology integration during decision-making. To address the issue of integrating technology effectively into teaching, a model called Technology Integration Planning (TIP) was developed which guide educators to make good decision about integrating technology into their teaching (Roblyer&Doering, 2013), and subsequently result in successful teaching and learning outcomes.

The model outlaid three different phases for technology integration into teaching, namely Phase One: Analysis of needs, Phase Two: Planning for integration and Phase Three: Post instruction analysis and revisions.

Phase One involves the educator to reflect on the strategies that they have used or planned to use and how technology can help address the issues raised. There is also a need to review on whether the technology is necessary to be integrated or not. This is because technologies, which are used blindly or ineffectively, will only cause more burdens to the students, in understanding how both content and technology work. Besides that, the element TPACK was made an important part of the model as teaching is a complex combination of what the educator is teaching, how to teach the content in the best way, and the knowledge on the tools for them to carry out their lesson plans. Phase Two of the TIP model on the other hand, consists of more specific learning planning and products where the educators should know the skills that he or she wants the students to learn through the lesson, the strategies that will work best in achieving that aims, and if the essential conditions for technology integration are present for the technology to support the lesson successfully. The third and last phase of the TIP model involves post-instruction analysis where the educators reflect critically on the execution of the lesson planned. Educators should constantly reflect on the outcome data and be informed of the technology-integrated methods that can be successfully implemented in the future lessons.

Scenario in Malaysian Higher Educational Institutions

With the expansion of global education and globalization, many higher educational institutions took up the initiatives of offering more diverse programs and courses, thereby increasing the need for institutional partnership, both local and international. Students' profile in HEI also witness significant changes, with more foreign students enrolled for the courses offered. The difference in geographical and demography rationalized the need for HEI to implement the use of technology in it teaching and learning process, resulting in vast investment for ICT infrastructure to support blended learning, distance education and in a larger scale, Massive Open Online Courses (MOOC).

However, a study conducted by Raja Maznah (2004) revealed that it's a norm for most HEI to provide ICT infrastructure but lack of plan to implement technology effectively. In another view, the ICT infrastructure is to only support online learning and not to enhance teaching and learning process. Enhancing more on the online learning and technology-

enabled teaching and learning was also seen as a panacea to the proliferating number of students that caused limitation in classroom availability in many HEIs (Farahiza, 2010).

METHODOLOGY

Research Design and Sampling

This study is descriptive in nature and was intended to collect quantitative data on the current TPK level of the lecturers, as well as to inform the strategies used by the lecturers in integrating blended learning into their teaching endeavor. Lecturers in Taylor's University is the target population of this study, with 468 active staffs as per September 2017 when the data collection commenced. Lecturers were chosen via cluster and systematic sampling according to their faculties. There are five main faculties in Taylor's University, listed as follow:

1. Faculty of Business and Law
2. Faculty of Built Environment, Engineering, Technology and Design
3. Faculty of Health and Medical Sciences
4. Faculty of Hospitality, Food and Leisure Management
5. Faculty of Arts and Social Sciences

Cluster sampling means the list of faculties in each stream will be chosen randomly. The lecturers in the faculties selected will then be selected using systematic sampling. The sample involved in the actual study was 126 from all the faculties.

Instrumentation

This study utilized the "Techno pedagogical content knowledge" (TPACK) Survey as developed and refined by Schmidt et al. (2009). The data was piloted to 25 lecturers prior to the actual data collection of this study. From the analysis to determine the reliability of the items in the piloted instrument, it was found that 2 sub-items were not reliable and were omitted from the instrument for the actual data collection. The Cronbach's Alpha generated from the pilot was 0.921, inferring that the items with the two mitted sub-items has excellent internal consistency (Nunnally, 1978).

Analysis of Data

Data gained was analyzed using the descriptive and inferential statistics, where the descriptive analysis describe the frequency, percentages, means and the standard deviation of the demographic details. The inferential statistics such as ANOVA, Pearson Correlation and Post Hoc tests are also used to determine the relationships between competencies and other variables.

FINDINGS AND DISCUSSION

Demographic Findings

The respondents of this study were representative lecturers from 5 faculties in Taylor's University. A total of 126 lecturers participated in this study which consist of 49 (38.9%) males and 77 (61.1%) females. A summary of respondents in this study is as illustrated in Table 1 below.

Table 1: Respondents according to Gender

Gender	Respondents
Male	49
Female	77
Total	126

In terms of age, a majority of the lecturers were of age 30-39 consisting of 46 (36.5%) lecturers, 40 (31.7%) lecturers of age 40-49 years old, 29 (23%) lecturers were of age 50-59 years old, 10 (7.93%) lecturers of age 60 and above. There was only 1 (0.8%) lecturer whose age is between 25 to 29 years old. Table 2details the percentage of the age groups.

Table 2: Percentage of Respondents' Age Groups

Age Group	Percentage of Respondents (%)
25 - 29 years old	0.8
30 - 39 years old	36.5
40 - 49 years old	31.7
50 - 59 years old	23
60 years old and above	7.93
Total	126

In terms of the highest qualification, majority of lecturers have Masters (61.9%) consisting of 78 people and PhD (33.3%) consisting of 42 lecturers. There rest were Bachelor Degree holders (2.28%) consisting of 3 people and another 3 (2.38%) of professional qualification. There are none for diploma holders. Table 3 shows the percentage of highest qualifications by lecturers.

Table 3: Percentage of Lecturers and Their Highest Qualification

Highest qualification	Percentage of Respondents (%)
PhD	33.3
Masters	61.9
Bachelor Degree	2.38
Diploma	0
Professional Qualification	2.38
Total	126

In terms of designation, there were 58 (46%) senior lecturers, 57 (45.2%) lecturers, 7 (5.56%) professors, 3 (2.38%) associate professor and 1 (0.8%) tutor. Table 4 shows the percentage of designation of lecturers in this study.

Table 4: Percentage of Designation of Lecturers

Designation	Percentage of Respondents (%)
Lecturer	45.2
Senior Lecturer	46
Associate Professor	2.38
Professor	5.56
Tutor	0.8
Total	126

In terms of faculties, the largest participation in this study were lecturers from the Faculty of Arts and Social Science with 32.5%. Another 21.4% of respondents in this study were from Faculty of Built Environment, Engineering, Technology and Design, followed by Faculty of Business and Law and Faculty of Health and Medical Sciences, both at 15.9%. Finally, there was 14.3% of lecturers from Faculty of Hospitality, Food and Leisure Management who participated in this study. Table 5 depicts the percentage of respondents who took part in this study according to their faculty.

Table 5: Percentage of Respondents according to Faculties

Faculty	Percentage of Respondents (%)
Faculty of Business and Law	15.9
Faculty of Built Environment, Engineering, Technology and Design	21.4
Faculty of Health and Medical Sciences	15.9
Faculty of Hospitality, Food and Leisure Management	14.3
Faculty of Arts and Social Sciences	32.5
Total	126

In terms of years of teaching experience, majority of respondents were lecturers with 6-10 years of experience (39.3%) consisting of 35 people and lecturers with less than 5 years of experience (23.6%) consisting of 21 people. Meanwhile, the rest consist of 13 (14.6%) lecturers with more than 20 years of experience, 11 (12.4%) lecturers with 16-20 years of experience while only 9 (10.1%) lecturers with 11-15 years of experience. Table 6 shows the percentage of lecturers' years of teaching experience.

Table 6: Percentage of Teaching Years

Years of teaching	Percentage of Respondents (%)
5 years or less	27
6-10 years	22
11-15 years	31
16- 20 years	19
More than 20 years	27
Total	126

a. Current Level of Techno-Pedagogical Knowledge

The current level of Techno-pedagogical knowledge (TPK) of lecturers was gauged through their responses given in seven different aspects, namely i) Technology access, ii) Online skills relationship, iii) Motivation, iv) Online audio and video, v) Internet discussion, vi) Supporting element and lastly vii) ICT abilities. The overall level of the lecturer's TPK will be discussed after the presentation of findings for each aspect which are constituting to their TPK.

Techno-Pedagogical Knowledge: Technology Access

The items below are to find out the current level of Techno-Pedagogical Knowledge. Table 7 presents the respondents' techno-pedagogical knowledge on technology access. Item 1 has the highest mean which is 4.86 with standard deviation of 0.468 while item 3 is the second highest with mean 4.39 with standard deviation of 0.769. The lowest mean is item 2 at 4.10 with standard deviation of 0.954.

Table 7: Technology Access

No	Item	Mean	Standard Deviation
1	I have access to a computer with an Internet connection.	4.86	0.468
2	I have access to a fairly new computer (e.g., Faster RAM, speakers, CD-ROM).	4.10	0.954
3	I have access to a computer with adequate software for teaching and learning (e.g., Microsoft Office).	4.39	0.769
	Average	**4.45**	**0.730**

Techno-Pedagogical Knowledge: Online Skills

Table 8 shows the techno-pedagogical knowledge on online skills and relationships. Item 3 has the highest mean which is 4.81 with standard deviation of 0.39. Item 5 has the middle mean which is 4.88 with standard deviation of 0.325. Item 7 has the lowest mean, 4.09 with standard deviation of 0.849.

Table 8: Online Skills

No	Item	Mean	Standard Deviation
1	I have the basic skills to operate a computer (e.g., saving files, creating folders).	4.77	0.423
2	I have the basic skills for finding my way around the Internet (e.g., using search engines).	4.68	0.484
3	I can send an email with a file attached.	4.88	0.325
4	I think that I am comfortable using a computer in an IT-related courses.	4.37	0.787
5	I think that I would be able to communicate effectively with others using online technologies (e.g., chat).	4.44	0.614
6	I think that I would be able to express myself clearly through my writing (e.g., emotions, humor available in online tools).	4.27	0.742
7	I think that I would be able to use online tools to work on assignments with students in different places.	4.09	0.849

8	I think that I would be able to schedule time to provide timely responses to other students and/or the instructor.	4.19	0.777
9	I think that I would be able to ask questions and make comments in clear writing.	4.21	0.730
	Average	**4.43**	**0.630**

Techno-Pedagogical Knowledge: Motivation

Table 9 is the respondents' responses regarding techno-pedagogical knowledge on motivation. Item 1 has the highest mean which is 3.91 with standard deviation of 0.82 while item 2 and 3 obtained mean of 3.87 with standard deviation of 0.933 and 1.109 respectively.

Table 9: Motivation

No	Item	Mean	Standard Deviation
1	I think that I would be able to remain motivated even though my students are not online at all times.	3.91	0.820
2	I think that I would be able to complete my work even when there are online distractions (e.g., friends/ colleague sending emails or Websites to surf).	3.87	0.933
3	I think that I would be able to complete my work even when there are distractions in my home (e.g., television, children, and such).	3.87	1.109
	Average	**3.88**	**0.950**

Techno-Pedagogical Knowledge: Online Audio/Video

Table 10 shows items that answer the question on the respondents' response regarding techno-pedagogical knowledge on online audio/video. Item 2 has the highest mean, 4.24 with standard deviation of 0.698. In the middle is item 1 with mean 4.14 and standard deviation of 0.766. Item 3 has the lowest mean which is 4.08 and standard deviation of 0.744.

Table 10: Online Video/Audio

No	Item	Mean	Standard Deviation
1	I think that I would be able to relate the content of short video clips (1-3 minutes typically) to the information I have read online or in books.	4.14	0.766
2	I think that I would be able to integrate video in my teaching	4.24	0.698
3	I think that I would be able to explain course related information when it's presented in video formats.	4.08	0.744
	Average	**4.15**	**0.730**

Techno-Pedagogical Knowledge: Internet Discussion

Table 11 shows the respondents' response on the techno-pedagogical knowledge on Internet discussion. The highest mean, 4.13 with standard deviation of 0.780 is item 1. The second highest mean is item 3 with 3.77 with standard deviation, 0.997. Item 2 has the lowest mean of 3.61 with standard deviation of 1.020.

Table 11: Internet Discussion

No	Item	Mean	Standard Deviation
1	I think that I would be able to carry on a conversation with others using the Internet (e.g., Internet chat, instant messenger).	4.13	0.780
2	I think that I would be comfortable having several discussions taking place in the same online chat even though I may not be participating in all of them.	3.61	1.020
3	I think that I would be able to follow along with an online conversation (e.g., Internet chat, instant messenger) while typing.	3.77	0.997
	Average	**3.83**	**0.930**

Techno-Pedagogical Knowledge: Supporting Elements

Table 12 describes the respondents' techno-pedagogical knowledge on supporting elements. Item 1 has the highest mean which is 4.59 with standard deviation of 0.597. This is followed by Item 3 has the middle mean which is 4.43 with standard deviation of 0.599. Item 4 on the other hand has the lowest mean which is 4.21 with standard deviation of 0.823.

Table 12: Supporting Elements

No	Item	Mean	Standard Deviation
1	Quick technical and administrative support is important to the success in online course.	4.59	0.597
2	Frequent participation throughout the learning process is important to the success in online course.	4.37	0.735
3	I feel that prior experiences with online technologies (e.g., email, Internet chat, online readings) are important to the success with online course.	4.43	0.599
4	The ability to immediately apply course materials is important to the success with online course.	4.21	0.823
	Average	**4.40**	**0.680**

Techno-Pedagogical Knowledge: ICT Abilities

Table 13 shows the respondents' techno-pedagogical knowledge on ICT abilities. Item 1 has the highest mean which is 4.74 with standard deviation of 0.509. Item 7 has the middle value of mean which is 4.40 with standard deviation of 0.682. Item 5 has the lowest mean which is 3.60 with standard deviation of 1.187.

Table 13: ICT Abilities

No	Item	Mean	Standard Deviation
1	I have regular access to a computer or laptop each week for my course(s) (4 to 5 times a week).	4.74	0.509
2	I have regular access to the internet each week for my course(s) (4 to 5 times a week).	4.71	0.507
3	I have access to a printer.	4.49	0.701
4	I have access to headphones or speakers for courses that may have video conferences or require student-recorded presentations.	3.83	1.132
5	I have access to a microphone for courses that may have video conferences or require student-recorded presentations.	3.60	1.187
6	I am able to use a web browser/search engine to navigate the internet (e.g., Mozila Firefox, Safari, Internet Explorer, Google Chrome etc.).	4.60	0.621
7	I am proficient typing on a keyboard.	4.40	0.682
8	I have experience using software such as Microsoft Office (e.g., Word, PowerPoint, and Excel)	4.62	0.519
9	I have experience downloading/installing programs or plugins (Such as Java, Adobe Reader, Quick Time, etc.).	3.97	1.138
10	I am proficient at sending/receiving emails.	4.67	0.470
11	I am proficient at sending/receiving emails with attachments.	4.67	0.470
	Average	**4.39**	**0.720**

In essence, it can be inferred that the lecturer's current TPK level in Taylor's University is rather high, with every area of TPK achieving above 3.80 mean. Most of the lecturers agree that they have ample access to technology, however, the motivation on staying and working online appeared to be a challenge for most of them. The following Table 14 illustrates this.

Table 14: Average Mean for Lecturer's Current TPK Level

Aspects of TPK level	Mean
Technology access	4.45
Online skills relationship	4.43
Motivation	3.88
Online audio and video	4.15
Internet discussion	3.83
Supporting element	4.40
ICT abilities	4.39
Average	4.21

b. The Use of TPK to Integrate Blended Learning into Lecturer's Teaching and Learning Process

In the second part of the finding, this report aims to provide insights on how lecturers use TPK to integrate blended learning into their teaching and learning process. Blended learning view teaching and learning process as being done in two different realities- both physical and virtual. Hence, the questions asked in the survey were looking for lecturer's preference on f2f and online environment, their use of technological tools as well an example on how they have integrated technology in their teaching.

Lecturer's Preference on Face-to-face (f2f) vs Online in a Blended Learning Environment

Table 15 presents how much of face-to-face (f2f) vs online respondents' prefer in a blended learning environment. Majority of the respondents (35.7%) preferred to have 70% of f2f and 30% online. This is also in-line with the University policy on making each module online by 30%.

There is also a high number of lecturers (19%) who felt that they are ready to increase the portion of online learning for their students, on indicating their preference for f2f 50% and online 50%. Another 15.9% of the lecturers preferred f2f 60%: online 40%, 12.7% of lecturers on f2f 80%: online 20% and 11.9% lecturers preferred f2f 90%: online 10%. A minority of the respondents chose a highest spectrum of online environment, with 1.6% each for f2f 40% and f2f 30%, and 0.8% each for f2f20% and f2f 10%.

The percentage of face-to-face model in a blended learning environment being higher than the online environment seemed to be the preference of the lecturers in Taylor's University. Although there are a small portion of the respondents who feel that they are ready to teach with gradual decease of personal meetings with their students, the majority of the respondent are comfortable to only meet the required policy which is 30% online. There is a steady response on keeping the teaching process face-to-face too, with online portion going as low as 10%.

Table 15: Blended Learning Models

No	Mode	Percentage
1	f2f 90 %: Online 10 %	11.9
2	f2f 80 %: Online 20 %	12.7
3	f2f 70 %: Online 30 %	35.7
4	f2f 60 %: Online 40 %	15.9
5	f2f 50 %: Online 50 %	19
6	f2f 40 %: Online 60 %	1.6
7	f2f 30 %: Online 70 %	1.6
8	f2f 20 %: Online 80 %	0.8
9	f2f 10 %: Online 90 %	0.8
	Total	100

Integration of Techno-Pedagogical Knowledge into Teaching

The item in this part were asking about the lecturer's beliefs on using Web 2.0 tools as compared to the traditional whiteboard and marker. The excerpts given were the responses given by the respondents, indicated by the alphabet R, followed by the random number assigned to the respondents. For example, R1 means Respondent 1.

Majority of respondents said that the traditional way of teaching is incomparable with teaching with technology. The main reason is due to technology's flexibility and higher effectiveness in elevating the overall teaching and learning tool and experience, making learning more meaningful. Furthermore, using technology would also cater to millennial students who has their own 21st century skills and preference. As one respondent shared,

"Technology aids to augment teaching and learning through a more interactive means of communication." (R46)

"Millenials and Gen Z needs constant engagement and digital immersion to sustain the learning experience. Digital immersion is also second nature to this generation of learners and therefore it would only be natural to teach them it the way they choose to learn. No whiteboard/marker and teacher centered learning pedagogy will achieve the same intended outcomes." (R124)

Another respondent too resonated with what has been mentioned by Respondent 46 and 124, by providing more detailed example. He mentioned:

"Personally I am relying on the technology including different mobile apps and instructional websites, and the devices a lot even in face to face classroom setting. It is hard to imagine that I will be able to conduct my lecture very effectively and lively without the assistance of technology nowadays, since those elements in class provide me and students with more accurate information and diverse materials in easy and faster way." (R89)

The respondents also agree that technology allows the educators to cater to the different learning styles of the students, as the traditional method would only cater well to auditory and visually inclined students, while neglecting other types of learners' learning style.

"...using technology we are able to cater the needs for diverse students' learning styles. There are limitations to what whiteboard and marker can be used to demonstrate and deliver the content knowledge to students." (R3)

However, some respondents emphasized on the advantages of conventional teaching methods over technology. One respondent argued that

"Nothing can beat F2F (Face-to-face) teaching. F2F teaching is preferred by students because they feel they get a personal coaching with more understanding." (R104)

"Physical presence is always better as it is interactive and it's easier to explain things face to face." (R15)

"In the physical space, the interactions can be instantaneous- we can see the students faces/expressions/behaviors directly and change/alter/remove /add stuff to our in-class work which we cannot do online." (R58)

A portion of the respondents also are adamant that the blended method is the way forward as the two different habitats allow for different accomplishment onto students' learning. For example, the following two responses focused on the instrumental nature of both online and traditional methods.

"Well I use both. And it's not entirely same. In class I use a whiteboard to draw and write instructions or emphasis a point, while online I provide information ask questions and give instructions from anywhere and anytime. While I suppose there may be similarities, I don't use them in the same way." (R49)

"I would prefer combining both. It is clearer when (slides are) projected and it grabs students' attention. Whiteboard is used to explain further. Plus, students these days have a short attention span." (R16)

Yet, several respondents noted that the tool used for teaching here is not the one which lecturers need to focus on. Rather, the lecturers need to first scrutinize how to meet the learning outcomes intended for their students and then only strategize on the tool to be used. Lecturers pointed out that it is important to focus on which tool would deliver the contents effectively to students' learning as they stated below:

"Whatever method to be used must be relevant to/ effective for the objective to be achieved."(R76)

"I would say as the person conducting the class/ facilitating the class is the most important element to ensure an engaging and meaningful session to take place." (R43)

Hence, majority of respondents who provided a variety of perspectives in response to teaching using just whiteboard and marker versus using technology felt that both method is dissimilar. From the analysis, their differed opinions may due to their teaching preferences orindividual teaching pedagogy. Further study need to be conducted in order to reveal other underlying reasons that may affect their stance in this topic.

Lecturers' Implementation of Technology

Over half of those surveyed reported that they agree on the importance of knowing how to utilize the technology to their advantages. They viewed technology as a tool to not only improve their teaching approach but also to suit their students' 21st century learning styles and skills. They shared a consensus that by having the adequate skills to use the technology would cater to their students' interest, lengthen their attention span and ensure an effective communication throughout learning process. Being comfortable in using and blending technology into teaching are inferred to be a facet of a competent lecturer. Few excerpts which supported this notion when asked about whether lecturers need to be integrate technology into teaching are as follow.

> *"Absolutely. The role of the lecturer today is facilitating students in acquiring knowledge. As there is an overload of information in the Internet, lecturers need to guide the students on which information is important and need to pay attention to." (R14)*

> *"Definitely. Regardless the student's expectation and learning preferences, I think the educators are expected to aware of the needs of fast-changing society. It would not be a real hassle for the educator because the implementation of the use of technology in teaching will be selective depending on the area of studies." (R45)*

> *"Yes. The current generation is more tech savvy and would prefer technological integration rather than conventional f2f teaching." (R66)*

There are also a portion of academics who believe they need to be kept abreast with technology, but require additional support to understand the use of tools and how to integrate them into their teaching.

> *"Yes, it is important for lecturers to be abreast with technology. However, lecturers who are from the old school generation (like me) would need support and sufficient training to be able to incorporate technology in the current teaching and learning." (R101)*

> *"Yes indeed. If blended, flipped and virtual learning environment were to be applied to achieve project-based and OBE (outcome-based education) learning outcomes, the facilitator/lecturer would need to be savvy." (R89)*

> *"Yes. Move with the times or risk being an outdated dinosaur and having students ridiculing you about your incompetence with technology. Adequate and consistent support and infrastructure is required to ensure the right conditions for lecturers to implement technology in the classroom. Older lecturers who are not well-versed in technology require patience as they build up confidence and competence in implementing technology in their teaching."(R125)*

> *"Yes. This is important for lecturers who are not digital natives (i.e. non Gen-Y lecturers) as more training should be provided to the senior members of the academic."(R3)*

It can be derived that majority of the respondents realized on the importance of implementing technology in their teaching and learning as it improves communication between lecturers and their students in class through effective use of technologies. However, there are lecturers who feel that it is not necessary for lecturers to use technology in their teaching. Most of them feel that the emphasis should be given to the context of learning, and not on the technology which acts as a tool.

> *"No, technology is just a tool, and lecturers should be given the choice to decide their mode of delivery." (R45)*

"No. It depends on the subject. Some modules are very practical/ skill-based and these subjects should be forced to adopt the same approach just for the sake of making all modules blended." (R66)

"Not necessary, it all depends on the contexts. Self- Regulated learning is important, but it can be achieved in multiple forms."(R14)

Few of the lecturers also mentioned that it is not necessary for all lecturers to use technology to increase the variation in the way teaching is done in the university.

"No. To put myself in the students' shoes, I appreciated that every lecturer uses different methods for teaching. If all lecturers employ similar techniques, it will be a commodization of teaching. Let's celebrate our differences."(R98)

"No. Some lecturers do better when they connect with the students in a face to face manner."(R106)

In summary, the majority of the lecturers agree that they need to include technology in their teaching for various reason, while there is a significantly lower number of lecturers who feel that technology-integrated teaching is not necessary.

Demonstrated or Modeled Teaching

In the final part of the survey, respondents were asked to describe one episode where they effectively demonstrated or modeled combining technologies and teaching approaches in a classroom or lecture. Most respondents described their teaching method in class as an active user of technology. Whilst a minority mentioned that they have yet to fully utilize technology in their teaching, the rest have effectively used basic applications such as Powerpoint slides and videos or excerpts from movies and YouTube in their teaching.

Besides that, more than half respondents reported that they also used web 2.0 to collaborate and share information online with their students

through the use of social medias or other platforms such as Padlet, Socratic, Online forum platforms, Edmodo, Kahoot, Nearpod, Facebook, Instagram, Whatsapp. As one respondent commented,

> *"TIMeS (Taylor's Learning Management System) and Facebook was utilized to disseminate the lecture a few days before. In-class PowerPoint and the projector was used to run through the lecture (for those who may have not done the necessary reading before class). A forum question is posted on TiMES for students to answer. A discussion is conducted centered around the responses to the forum question. This is followed up with hands on exercises to be concluded in class. Students then utilized their academic blogs to document the entire process in a methodical manner and reflect on their experiences, make observations and articulate their findings. I am then able to view the respective student blogs and I derive common threads of confusion/dissatisfaction or successes." (R23)*

Another respondent mentioned on the use of Socrative and how it was helping him to assess student's understanding towards a particular topic, without having to explain much to them.

> *"I have used Socrative for one of my online quiz where I was able to control the pace of students answering the quiz and it helped in enhancing the understanding of the topic without much explanation."(R43)*

Other lecturers also shared about the creative ways on how they integrated technology in their teaching to achieve their lesson learning outcomes more effectively. For example,

> *"I am using Google drives most of the time, get students to respond through Google slides/doc, in some of the tutorial session. Instantly, we can include comments to improve the answer. The slides were shared. Other students were also able to edit to add their views/answers. After session ends, I am able to secure the answers to "can view only"."(R53)*

> *"I adopted augmented reality learning approach whereby the students are given an amazing race envelope and they are required to solve the clue in the first envelope in order to get a second envelope. The students will need to scan a poster put up around campus using their mobile phone and two-dimensional images will appear on the phones. The clues are given in the mobile phones and they will resolve the issue once they have acquired all amazing race envelope. The students did not know that they have actually conducted self-learning while trying to find the law in solving the issues given. They only realized after they have completed the activity. They also mentioned that they have learned how appreciate team members and appreciate the use of technology in law." (R73)*

Interestingly, a few of them noted on how comfortable they are in using technology, that their classes are now flipped and is one of the Massive Open Online Courses (MOOCs).

> *"The recording of my class a few years ago was properly edited and is now available in OpenLearning. Students watch that and come to class for Q&A and tutorial/workshop style activities/ exercises. I find students generally don't like this at the early part of the semester as they are not familiar with it but end up telling me at the end of the semester that the can learn more using such approach. Students who come prepared for the flipped classes generally would have already gain the basic knowledge as well as from question asked in the recorded video and they learned from each other's questions beyond what was recorded." (R78)*

For the second part of these findings, which focused on looking at how lecturers use TPK to integrate blended learning into their teaching, it was found that most lecturers are still comfortable in meeting their students at least once or twice a week and for a few, daily meet-up with their students. This shows that they are still not ready to have their teaching done in a blended mode, despite having good command of TPK. This finding is also supported by the percentage of lecturers preferring 70% face-to-face teachings and 30% online. The reasons were well justified by the lecturers where they mentioned that there are benefits of meeting student in-person,

such as creating more authentic communication and catering to the different learning styles of the students. The 30% online are shared through their responses on the last item which looked at an example of how the lecturers have utilized technology. It was found that technology were used in creative ways, for example, utilizing 'augmented reality' and turning a class lesson into the format of the "Amazing Race" (R73). Majority of the responses also stated that they normally get the students to view and understand the teaching materials first before coming to class, so that class time can be used for deeper intellectual discourse. This model of flipped classroom seemed to be the preference for the lecturers while blended learning remains unpopular.

Overall, these results suggest that all respondents associated their experience in combining technologies and teaching approaches in class as a positive. It is shown through their comments on their students' positive feedback and enhanced teaching and learning process. On the other hand, although respondents were reported to be an active user, they are varied from basic to proficient user of technologies which suggest that further exposure on how to integrate technologies in teaching approaches might be in line with their needs.

CONCLUSION AND RECOMMENDATIONS

Technology has been recognized as a strong tool that can be used to innovate the education practices. However, to utilize it, individuals need to be equipped with ample skills of technology to allow them to use, manipulate and disseminate information in the sophisticated world. Besides that, the educators are expected to have pedagogical content knowledge so that they can teach creatively and effectively to integrate various approaches in their teaching to suit the needs of the learners. Educators also have the responsibility to emphasize to the learners, the use of technology to motivate them to use and understand the potential for meaningful learning through digital platforms.

In the first part of the findings, it was found that the lecturers have well access to the technology (mean: 4.45) which is well-understood due to the provision of collaborative classes like X-Spaces, a comprehensive Learning Management System, the high speed internet and personal computer to each

and every academics. The lecturer's online skill relationship also score a high mean with 4.43 suggesting that the lecturers are competent in using internet and retrieve materials which are related for their teaching. However, the lowest mean scored for Motivation suggests that there is more to be done to increase lecturer's motivation in using technology for teaching purposes. This is vital as motivation keeps the lecturer abreast with the advancement of technology in years to come and make their teaching relevant to the learners who are wired differently from them (Prensky, 2006). This also inject some ideas about the type of professional development courses that the university can design for the lecturers. The courses, while focusing a lot on the new technology and how to integrate them, do not seem to help much in increasing the motivation of using technology in lecturer's teaching and learning.

Besides that, the "internet discussion" aspect also received an average lower mean compared to other aspects in TPK competencies (mean: 3.83). This finding is rather congruence with the finding from the second part of the analysis where lecturers are more comfortable in using flipped model for their teaching, rather than embracing blended learning. As the nature of materials parked online are more of one-directional, meaning the learner do not have to communicate much with the lecturer online but rather in the class, this aspect remains low compared to the rest in the TPK competencies of lecturers.

On the second part of the analysis which sought to understand the implementation of blended learning in relation to lecturer's TPK, it can be seen that majority of the respondents have access to the technology as well as basic knowledge to integrate it into their teaching. However, it appears that trainings and encouragement should be given to the lecturers so that they can explore and experiment with variety of approaches and methods to get their students to participate in the lessons. Besides that, findings show that majority of the lecturers prefer to have more time in face-to-face lesson rather than online lesson which can be implied that lecturers are not ready to integrate blended learning mode fully into their teaching. Hence, it is important for university to provide continuous support to the lecturers. It is hoped that these findings are able to provide further insights on the need to emphasize and integrate different parts of the techno-pedagogical skills and improve the current TPK courses available for lecturers.

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