# Exploring TESL Pre-Service Teachers' Technology Acceptance Perspectives towards Online Multimedia Materials Development: A Case Study in Sabah, East Malaysia

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Abstract—E-learning is often conceived to have a positive impact on both teachers and students in terms of the tenacity to learning and training, and the perceived attitudes towards elearning environment. The purpose of this paper is to examine the perceptions of TESL pre-service teachers towards multimedia materials development via the Technology Acceptance Model (TAM). The dimensions explored were perceived usefulness (PU), perceived ease of use (EU), satisfaction (SN) and intention to use (IN). Multimedia materials development was done via a Web 2.0 tool named Blendspace (tes.com). Data was elicited via survey approach and analysed quantitatively to support the investigation. The study involved 69 TESL pre-service teachers pursuing Bachelor of Education (TESL) programme in a public university in Sabah, East Malaysia. The results revealed that there were moderate level of acceptance in the observed PU (mean=3.82), EU (mean=3.52), SN (mean=3.35) and IN (mean=3.82). A further examination of the relationships showed that PU influenced the intention to use the Web 2.0 tool strongly (r = .63) and on the other hand EU also had strong influence on SN (r = .68). As predicted, the mean score for PU (3.82) was higher than EU (3.52). The study implicated that the design, pedagogical and navigational aspects of the Web 2.0 tool are important to obtain good SN and IN scores from the users.<sup>1</sup>

*Index Terms*—Perceived usefulness, perceived ease of use, satisfaction, intention to use, e-learning, acceptance of technology.

### I. INTRODUCTION

Preparing second/foreign language teachers (TESL) to teach using a right blend of content, pedagogical and technological knowledge and skills is often seen as a challenge in most teacher education institutions. More often than not, e-learning is usually considered as the panacea for learning and instructional purposes to meet the everchanging students' demands [1]. The emphasis on elearning as a ubiquitous cure-all is not surprising considering evidences that it can help to improve quality of learning, provide learners with personalised and selfdirected learning, and help learners' to retain learning, attention and motivation in online learning [2]. Online learning such as 'just-in-time' learning is gaining popularity nowadays due to its flexibility in accessing learning materials anywhere and anytime [3].

The increase growth of e-learning needs especially in developing countries like Malaysia, calls for the need to further investigate factors that affects the adoption of elearning. One model that lends itself well to investigate elearning adoption is the Technology Acceptance Model (TAM), which is used quite extensively as the foundation for studying the factors of adopting e-learning systems.

This study investigated the level of technological acceptance via components in the model of TAM by [4], [5]. It attempts to fill a research gap by addressing the influence of perceived usefulness (PU) and perceived ease of use (EU) on the quality features of a Web 2.0 tool named Blendspace for TESL multimedia materials development. The survey also measured the satisfaction (SN) and the intention to use (IN) the Web 2.0 tool. The research questions are:

- 1. What were the TESL pre-service teachers' level of PU, EU, SN and IN towards online multimedia materials development for ESL learners?
- 2. Were there influences of PU and EU on TESL preservice teachers' SN and IN in online multimedia materials development for ESL learners?

This study hopes to add to the existing literature through identifying factors which affect Sabah TESL students' behavioral intention to learn online. It is further hoped that by understanding the relationships between these variables will provide those responsible for the management and development of online learning programs with important information about how students perceive and react to online learning. In doing so, they can enhance the effectiveness of online learning and create mechanisms for attracting students to adopt it.

### II. LITERATURE REVIEW

# A. Factors that Affect Students' Acceptance of Online Learning

A quick review of the literature revealed that there have been several studies that investigated the influence of some students' attributes on their acceptance and usage of online technology (e.g. [6]-[8]). Findings revealed that students' preference for an online delivery system could be attributed to a number of factors, among which are their perceived ease of use (e.g., their competence in using internet and electronic communication), and their ability to engage in autonomous learning. According to [9], an individual' perception of the usefulness of online learning is an

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important attribute that could increase their academic success in an online environment (p.18). In studies by [6], it was found that factors such as the social influence of students' referent groups, and student's attitude towards online learning are additional factors related to individuals' attributes and may also influence their intention to learn online. Interesting, findings also revealed that there was a strong correlation between the users' actual usage of the technology with their behavioral intention. This in turn is influenced by their prior experience with this technology [8].

Thus, attributes or factors such as (1) students' perceptions of usefulness and (2) ease of use, attitudes and social influence factors may affect the factors of students' acceptance and intention to use online learning. The aforementioned attributes are all relevant to the technology acceptance model (TAM) which will be discussed next.

### B. Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) was first proposed by [4], [5]. The theory of TAM explains how the ways learners accept and use a new e-learning system. When encountering a new technology, the TAM Model looks at the learners' decisions on using it and the ways it is used. TAM studies two factors, namely PU and EU. TAM explores the behaviours of the learners by analysing the positive or negative behavior when adopting the new technology.

In the TAM model, two main factors that are discussed are:

a) PU and the usual question asked is "In what ways can my productivity or performance be enhanced by the elearning system?"

b) the level of difficulties while using the e-learning system is often referred as the EU.

Therefore, the use of the TAM's Model for exploring learners' behaviour will enable the researchers to predict and understand the level of e-learning acceptance especially for a new Web 2.0 technology. To actualize this study, the researchers explore a group of TESL students who were required to plan and develop online multimedia learning materials for ESL classrooms via Blendspace (tes.com), a freely available Web 2.0 tool. Blendspace enables the TESL students to seamlessly integrate multimedia content. For instance, the uses of blogs, wiki, podcasts and Facebook in language teaching are becoming common features in language classrooms [10].

### C. Perceived Usefulness (PU)

According to [5], PU is defined as the learners' perceptions regarding the outcome of the experience after using the e-learning system. If a new technology is useful and effective, it will enhance or improve the learners' job performance.

According to [11], a system with a sound quality online Web 2.0 materials development website determined the positive PU of an e-learning system. For example, build in more multimedia features to attract learner's attention and create responsiveness of teachers to learners' queries will increase the level of perceived usefulness of the system.

## D. Perceived ease of use (EU)

According to [12], EU is the degree to which a new technology is easily understood or used. It is also regarded

as how much lack of effort that is needed by the learner to adopt the new technology. In other words, the degree to which users perceive a new product as better than its substitutes is known as EU [4].

# *E.* Influence of Perceived Usefulness and Perceived Ease of Use on Attitudes towards adopting Web 2.0 Technology

Researches have shown that PU and EU influenced the ways how learners accept a new innovation or system [1]. Findings seem to indicate that high level of EU would typically result in greater intention to use and implement the system.

PU will affect whether a user intends to use a new technology. It can be said that technology that is more innovative, user-friendly and give them greater freedom will see user's PU, EU and satisfaction higher. The quality of an online Web 2.0 tool for multimedia materials development must be well-designed to achieve the highest quality. According to study by [13], the good quality of e-learning services, together with high level of PU and EU would positively affect learners' intentions to use the innovation. This was supported by [11] whose findings proved that the good quality of a web-based product significantly influenced learners' satisfaction in the product. He further said that this would give a significant effect on PU of the innovation. Hence, the conclusion is the level of user satisfaction is a factor that can determine user's intention towards the use of any e-learning product.

There is a need for long-term measurement of PU for any new innovation under study because it would affect longterm users' intention to use the innovation. This point was supported by a study by [1] who stated that there was a positive influence of PU and EU towards user satisfaction in adopting video for online learning.

### III. METHOD, INSTRUMENTATION AND SAMPLING

This was a quantitative study using the survey method to elicit data from respondents. A survey is defined as a brief interview, discussion with individuals or asking questions of respondents about a specific topic to collect information. Survey research was often used to assess thoughts, opinions, and feelings [14]. This study used questionnaires via a series of close-ended questions. This was done via the group administered questionnaire approach to ensure high response rate. If the respondents were unclear about the meaning of a question they could ask for clarification.

TABLE I: RELIABILITY COEFFICIENTS OF THE TAM'S CONSTRUCTS					
No.	Constructs	Alpha Cronbach			
1	Perceived Usefulness (PU)	0.81			
2	Ease-of-Use (EU)	0.68			
3	Satisfaction (SN)	0.56			
4	Intention to Use (IN)	0.84			

The Questionnaire was adopted from the Technology Acceptance Model (TAM) by [4] to investigate respondents' perception related to perceived usefulness (9 items), perceived ease-of-use (6 items), satisfaction (3 items) and intention to use (3 items). All the items were scored using a 5-point Likert Scale. The alpha cronbach reliability for the constructs in this study is shown in Table I. Other researchers reported alpha cronbach reliability for perceived usefulness (PU) at 0.95 [11] and 0.89 [15] respectively while perceived ease-of-use (EU) was reported at 0.95 [11] and 0.93 [16] respectively.

This study involved 69 undergraduates taking Bachelor of Education majoring in TESL in Universiti Malaysia Sabah, a public university in East Malaysia. At the time of the study, they were known as pre-service teachers and would be absorbed into the education industry after graduation.

They took a 14-week multimedia course which provided them with skills on designing and developing multimediabased online learning materials with of the support of Web 2.0 technology. The online material development platform used was Blendspace (available at tes.com). Blendspace is a free, open access e-learning system designed with a theme: "create e-learning content in 5 minutes". After attending 7 weeks of lessons and hands-on sessions, each group of between 3 to 4 students began materials development. Each group leader would nominate students from any other three groups to use and assess their developed materials beginning Week 11. On Week 14, the survey would be given to all students for their feedbacks. Quantitative data was analysed using statistical test via SPSS Version 21. The types of statistical tests for this study are shown in Table II.

No.	Research Question	Type of Test				
1	What were the TESL pre-service teachers' level of PU, EU, SN and IN towards online multimedia materials development for ESL	Descriptive statistics (percentage, mean &				
	learners?	standard				
		deviation)				
2	Were there influences of PU and EU on TESL pre-service teachers'	Correlation test (Pearson)				
	SN and IN in online multimedia	,				
	materials development for ESL					
	learners?					

This study also adopted the guidelines for establishing relationship according to [17] as shown in Table 3 below.

TABLE III: RELATIONSHIP ACCORDING TO CORRELATION VALUES

Correlation	Relationship Interpretation	
Index		
0.00-0.19	Very Weak, Very Low	
0.20-0.39	Weak, Low	
0.40-0.69	Moderate	
0.70-0.89	Strong, High	
0.90-1.00	Very Strong, Very High	
Source: [17]		

TABLE V: VALUES FOR THE THREE LEVELS FOR PU, EU, SN AND IN

Con	Maxi	Min	Ran	Ran		Levels	
stru	mum	imu	ge	ge/3	Low	Mode	High
cts		m				rate	-
PU	4.89	2.89	2.00	0.67	2.89 -	3.57 –	4.24 –
					3.56	4.23	4.89
EU	4.67	2.17	2.50	0.83	2.17 -	3.01 -	3.84 -
					3.00	3.83	4.67
SN	5.00	2.00	3.00	1.00	2.00 -	3.01 -	4.01 -
					3.00	4.00	5.00
IN	5.00	2.00	3.00	1.00	2.00 -	3.01 -	4.01 -
					3.00	4.00	5.00

To analyse the level of perceived usefulness, ease of use, satisfaction and intention to use towards online multimedia materials development, the study would report using three levels namely high, moderate and low. The range is the difference between the highest and the lowest values in a normal distribution [18]. The formula for range is:

Range = (maximum value - minimum value)

This study divided perceived usefulness, ease of use, satisfaction and intention to use towards online multimedia materials development to three levels; hence each level would be equally separated by (the range / 3) and are shown in Table IV.

### IV. FINDINGS AND DISCUSSION

### A. Pre-service Teachers' Level of Perceived Usefulness, Perceived Ease of Use, Satisfaction and Intention to Use towards Web 2.0 Materials Development Tool

The survey on pre-service teachers using the TAMs questionnaires produced positive results for the 69 preservice teachers on the acceptance of Web 2.0 technology for online multimedia materials development. Based on Table 4 for the interpretation of the mean scores, the levels of the perceptions for perceived usefulness, ease of use, satisfaction and intention to use towards online learning are shown in Table V.

TABLE V: PERCEIVED USEFULNESS, EASE OF USE, SATISFACTION AND
ATTITUDES TOWARDS ONLINE LEARNING OF THE RESPONDENTS

TAMs Constructs	Ν	Mean Scores	SD	Level
Perceived usefulness (PU)	69	3.82	0.42	Moderate
Ease of use (EU)	69	3.52	0.54	Moderate
Satisfaction (SN)	69	3.35	0.58	Moderate
Intention to use (IN)	69	3.82	0.42	Moderate

Table V shows that the PU mean scores of the 69 respondents was 3.82 (SD = 0.42) and were at moderate level. The mean scores for ease of use (EU) was 3.52 (SD = 0.54) and was also at moderate level. The mean scores on SN and IN were 3.35 (SD = 0.58) and 3.82 (SD = 0.42) respectively and were also at moderate level.

The moderate perceptions on PU, EU, SN and IN found in this study were similar with findings from other researchers. For instance, [1] also found moderate PU, EU, SN and IN for the adoption of videos by school teachers.

The findings clearly indicated that learners' satisfaction and intention to use Web 2.0 tool for online multimedia materials development could be improved if the quality of the online functions and services were improved. In other words, users' acceptance of technology towards online multimedia materials development would be maintained positively if their confidence in the e-learning services could be assured.

B. The Influences of Pre-service Teachers' Perceived Usefulness and Ease-of-Use on Satisfaction and Intention to Use towards Web 2.0 Materials Development Tool

The results of the correlation analysis between PU and SN and EU and SN are shown in Table VI below.

According to Table VI, the relationship between PU and

SN was considered to be moderate, r = .43 and was significant at 99% confidence level. The relationship between EU and SN was also reported to be moderate, r = .68 and was significant at 99% confidence level. The relationship between PU, EU and SN is shown in Fig. 1.

TABLE VI: RELATIONSHIPS BETWEEN PU, EU AND SN					
Relationships	Pearson	Significance	Relationships		
between the	Correlation	( <i>p</i> < .01)	Interpretation		
TAMs	( <b>r</b> )				
Constructs					
Perceived	.43	Significant	Moderate		
usefulness (PU)					
vs Satisfaction					
(SN)					
Ease of use	.68	Significant	Moderate		
(EU) vs					
Satisfaction					
(SN)					



The findings showed that the quality of the delivery platform and its services were important because they affected PU and EU. These must be maintained consistently because it showed considerable positive influence on SN (the moderate and strong correlation as shown in Fig. 1). [13] also proved similar findings on the influence of learner satisfaction towards the usage of Web 2.0 tools.

Users' satisfaction was found to be high if the information quality of the e-learning system was high. This fact was supported by [11] and [12] who discovered that quality functionalities of the tool and satisfaction were positively related. Therefore, to maintain good quality Web 2.0 tools and platforms with the best services, feedback mechanism must be established to make the learning process more helpful and engaging.

TABLE VII: RELATIONSHIPS BETWEEN PU, EU AND IN

Relationship s between the TAMs	Pearson Correlat ion (r)	Significance ( <i>p</i> < .01)	Relationships Interpretation
Constructs			
Perceived	.63	Significant	Moderate
usefulness			
(PU) vs			
Intention to			
Use (IN)			
Ease of use	.53	Significant	Moderate
(EU) vs		-	
Intention to			
Use (IN)			

According to Table VII, there was a moderate relationship between PU and IN, r = .63 and was significant

at 99% confidence level. The relationship between EU and IN was moderate, r = .53 and was significant at 99% confidence level. The relationship between PU, EU and SN can be illustrated in Fig. 2.



Fig. 2 shows that PU and EU did affect the learner's acceptance of technology for Web 2.0 tool as implemented in this study. The Web 2.0 platform provider must provide e-learning services according to the preferences of learners so that learners would be motivated to use it. Learners needed to access interfaces that were easy to use to complete e-learning activities in order to ensure they could maintain the intention to use the system.

The findings that the service quality of the e-learning influenced the intention to use it were similar to findings by [11]-[13]. Furthermore, [1] had also confirmed that PU affected strongly on the intention to any new technological innovation. Due to these relationships between PU and EU on SN and IN that were proven in this study and also by other researchers, all Web 2.0 tool providers should adhere to the quality of their respective e-learning system and its functions during the planning and designing stages in the future.

#### V. RECOMMENDATION AND CONCLUSION

The study proved that learners' acceptance of any Web 2.0 tools that come with e-learning system for learning depends on many factors especially on the satisfaction factor and also the learners' PU and EU of the system. Preservice teachers who participated in this study demonstrated and learned ICT-related skills and knowledge previously unknown to them. In teacher education programmes, preservice teachers were taught to devise multimedia-based learning materials. However, they had limited opportunities to experience teaching using ICT-based materials in real classrooms. Participation in community projects enabled pre-service teachers to develop pedagogical, technological and content knowledge using the resources available in the community.

According to [19], the teachers' way of designing and orienting the online learning experience influenced students' learning behaviours who are also the ESL learners. In other words, a successful website that hosts multimedia-based learning materials must be well-designed and engage students with technology. [20] suggested that an e-learning program must also cater students who are pioneer users so that they do not experience culture shock that can affect their PU, EU and satisfaction. Therefore, they must design lessons to be effective for online learning in order to raise the status of users' satisfaction, PU and EU and then only can raise the intention to use the developed multimedia materials for learning.

This study proved that the level of technology acceptance was important for e-learning developers, teachers and lecturers. Therefore, Web 2.0 tools for developing multimedia content in the future must focus along the concepts of users' collaboration and networking. Pre-service teachers who are also technology providers or creators for ESL content must offer hybrid courses which are a blend of face-to face classroom instruction with web-based learning with automated feedbacks mechanism to maximise learning performance.

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