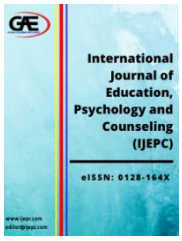
International Journal of Education, Psychology and Counseling
IJEPC
EISSN : 0128-164X
Volume 7 Issue 48 (December 2022) PP. 206-220
DOI 10.35631/IJEPC.748015



INTERNATIONAL JOURNAL OF EDUCATION, PSYCHOLOGY AND COUNSELLING (IJEPC)
www.ijepc.com

DEVELOPMENT AND VALIDATION OF A SURVEY QUESTIONNAIRE ASSESSING TECHNOLOGICAL PEDAGOGICAL CONTENT KNOWLEDGE AND E-LEARNING ACCEPTANCE FOR MALAYSIAN ENGLISH TEACHERS

Lim Pei Sing[1], Wardatul Akmam Din[2*], Nik Zaitun Nik Mohamed[3], Suyansah Swanto[4]

[1] Faculty of Psychology and Education, Universiti Malaysia Sabah, Malaysia
Email: mp1911203t@student.ums.edu.my
[2] Faculty of Psychology and Education, Universiti Malaysia Sabah, Malaysia
Email: wardadin@ums.edu.my
[3] Faculty of Psychology and Education, Universiti Malaysia Sabah, Malaysia
Email: nzaitun@ums.edu.my
[4] Faculty of Psychology and Education, Universiti Malaysia Sabah, Malaysia
Email: suyansah@ums.edu.my
[*] Corresponding Author

Article Info:

Article history:
Received date: 15.09.2022
Revised date: 10.10.2022
Accepted date: 30.11.2022
Published date: 15.12.2022

To cite this document:

Lim, P. S., Din. W. A., Nik Mohamed, N. Z., & Swanto, S. (2022). Development And Validation Of A Survey Questionnaire Assessing Technological Pedagogical Content Knowledge And E-Learning Acceptance For Malaysian English Teachers. *International Journal of Education, Psychology and Counseling*, *7* (48), 206-220.

DOI: 10.35631/IJEPC.748015

Abstract:

The traditional method of teaching and learning is found to fail in developing English language as a skill among the learners. E-learning is stated as a powerful tool for educational change and reform to improve English language teaching and learning. The implementation of e-learning in education has shown significant growth over the last decade with the rapid development of technology. The emergence of the Covid-19 pandemic around the world in 2019 has risen the implementation of e-learning as an alternative way of teaching and learning. The major challenges faced by teachers in implementing e-learning involve issues such as low Technological Pedagogical Content Knowledge (TPACK) level and technology acceptance. In line with this, this study aims to develop and validate an instrument to measure TPACK and e-learning acceptance, particularly for English teachers in Malaysia. This survey produced an adapted survey questionnaire that combines TPACK for English teachers' questionnaire items and perceived ease of use and perceived usefulness questionnaire items. The content validity and face validity of the developed survey questionnaire were identified using CVI and FVI calculations. The experts and raters pointed out that all items are relevant and comprehensible. Some minor improvements can be done based on the suggestions given. The results of CVI (0.89) and FVI (0.94) show that the developed survey questionnaire is found to achieve a satisfactory level of both content validity and face validity and can be used for further study.

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Keywords:
Instrument Validation, E-learning Acceptance, English Teachers

Introduction

In this era of globalisation, the evolution of technology has changed the mode of teaching and learning. Chhabra (2012) stated that the traditional method of teaching and learning focusing on lecturing and rote learning "reduce English language learning to mechanical memorization and miserable fail in developing English language as a skill among the learners" (p. 1). Education updating is essential with the advanced development of technology (Mahyoob, 2020). Shyamlee and Phil (2012) believed that technology can make the interaction of teaching and learning become more successful and interesting. The current generation of students who are common with technology are believed to learn better via a technology-based environment (Ghavifekr & Wan Rosdy, 2015).

There is a technology-based teaching method called e-learning, "a learning method and a technique for the presentation of academic curricula via the Internet or any other electronic media inclusive of multimedia, compact discs, satellites, or other new education technologies" (Gul, 2015, p. 1). E-learning has shown significant growth in usage over the last decade with the rapid development of technology (Koksal, 2020). E-learning tools "have been touted as potentially powerful enabling tools for educational change and reform as they are making marked inroads into the combinations of digital technologies and English language learning" (Chhabra, 2012, p. 2). In addition to that, the emergence of the Covid-19 pandemic in 2019 around the world has highlighted the significant surge in the usage of e-learning as an alternative to face-to-face learning (Li & Lalani, 2020). Hardan (2013) pointed out that English language teachers should equip themselves with appropriate knowledge and readiness to improve the subject matter according to learners' ability and capacity based on e-learning.

Despite that, many researchers found out that teachers are facing difficulties in implementing e-learning in teaching and learning. Teachers with insufficient knowledge and skills in using technology tools are anticipated to be left behind in e-learning (Adedoyin & Soykan, 2020). According to the analyses of The Teaching and Learning International Survey (TALIS) 2018 (as cited in Loi, 2020), teachers who had not used technologies in teaching as part of their formal education or training are found to face difficulties in implementing e-learning. Furthermore, the outbreak of the Covid-19 pandemic has caused the sudden transformation of teaching methods which will cause the difficulties to become more prominent, given this happened suddenly without prior preparation (Rosalina, Nasrullah & Elyani, 2020). This situation affects "the greatest on those that were least prepared and were still residing entirely in the old mode of face-to-face delivery (Wieland & Kollias, 2020, p. 87).

Teacher professional development on how to implement e-learning is crucial in helping teachers to overcome difficulties in implementing e-learning. Maatuk, Elberkawi, Aljawarneh, Rashaideh and Alharbi (2021) stated that professional development is one of the important elements in the implementation of e-learning. There are several models that can help in enhancing teachers' professional development in implementing e-learning in education. One of them is Technological Pedagogical Content Knowledge (TPACK) model, a conceptual model developed to facilitate teachers' professional development. This model provides

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"meaningful insights into teachers' necessary knowledge for technology integration" (Philipsen, Tondeur & Zhu 2015, p. 802). Another one is the Technology Acceptance Model (TAM), one of the most popular acceptance models in implementing e-learning that is based on user requirements (Suryawanshi & Suryawanshi, 2021). It is a helpful model to predict and explain a user's intention to use a particular technological tool.

Several past studies were conducted to identify teachers' TPACK levels. Mahdum (2015) and Harits Sujadi and Slamet (2019) found out teachers' TPACK levels were good, Mtebe and Raphael (2018) and Agustini, Santyasa and Ratminingsih (2019) found out teachers' TPACK levels were moderate, while Riandi, Apriliana and Purwianingsih (2018) found out teachers' TPACK level was low. There was inconsistency in the results of past studies regarding teachers' TPACK levels. The review of past studies also shows that research related to teachers' e-learning acceptance is also limited, particularly for English teachers in the local context. Instead, most of the studies were conducted to identify University students' e-learning acceptance (Anwar, Omar, Isa, & Shamsudin, 2020; Lim, Hong & Tan, 2008). In particular, to the best of the researcher's knowledge, no research has been done on how TPACK affects English language teachers' acceptance of e-learning in the local context.

In line with this, this study aims to develop and validate an instrument to measure TPACK and e-learning acceptance, particularly for English teachers in Malaysia. This survey produced an adapted survey questionnaire that combines Elas, Abd Majid and Narasuman (2019)'s TPACK for English teachers' questionnaire items and Davis (1989)'s perceived ease of use and perceived usefulness questionnaire items. It is hoped that this research would be able to establish the face validity and content validity of the adapted survey questionnaire to further assist more studies on TPACK and e-learning acceptance among English teachers in Malaysia.

Literature Review

The two theoretical frameworks that are used in developing the survey questionnaire are Koehler, Mishra, Kereluik, Shin and Graham (2014)'s TPACK and Davis (1989)'s TAM.

Koehler et al. (2014)'s TPACK

The first theoretical framework that is used in developing this questionnaire is Koehler et al. (2014)'s TPACK. The figure below shows the TPACK framework.

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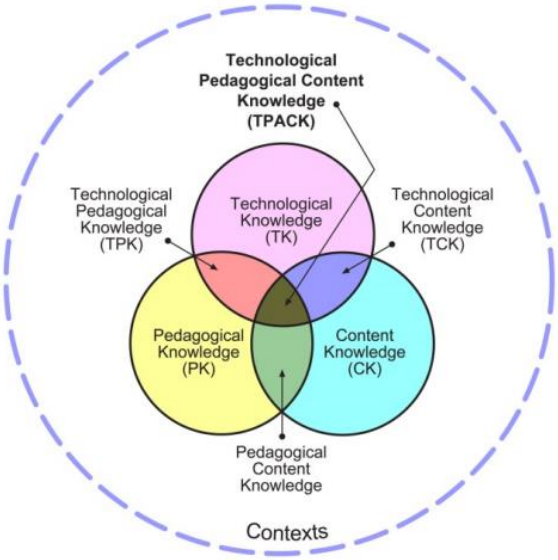

Figure 1: Koehler et al. (2014)'s TPACK

According to Misieng, Ramanair and Rethinsamy (2018), TPACK is used to "measure the types of knowledge teachers have and need, to enable them to integrate technology with a complex, intricate and situated nature of teacher knowledge" (p. 8). There are seven constructs of TPACK which are Technological Knowledge (TK), Pedagogical Knowledge (PK), Content Knowledge (CK), Technological Pedagogical Knowledge (TPK), Technological Content Knowledge (TCK), Pedagogical Content Knowledge (PCK) and Technological Pedagogical Content Knowledge (TPACK). The description of each construct in the TPACK framework is shown in the table below (Agustini et al., 2019; Mtebe et al., 2018; Riandi et al., 2018; Valtonen et al, 2017; Mishra & Koehler, 2006).

Table 1: Description of Each TPACK Construct

Construct	Description
TK	A teacher's knowledge of possibilities and constraints of the application of technology in teaching and learning. It also includes the skill that the teacher has to utilize technology efficiently in a classroom to support learning.
PK	A teacher's knowledge of the process and the methods of teaching and learning. It includes the ability to manage and facilitate teaching and learning activities.
CK	A teacher's knowledge of the subject matter or content to be taught or learned. It includes the central theories and concepts of topics taught.
TPK	A teacher's knowledge of knowing the nature of teaching and learning with technology. It includes understanding the advantages and disadvantages of applying various technologies for particular pedagogical practices.
TCK	A teacher's knowledge of understanding the link between technology and content. It includes understanding how technology and content influence and constrain one another.
PCK	A teacher's knowledge in the application of pedagogy in the teaching of particular content including teaching, learning, curriculum assessment and reporting. It includes the selection of learning methods, approaches and models in teaching subject matter to students.

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TPACK	A teacher's knowledge of the understanding that emerges from the interactions among TK, PK and CK. It includes the knowledge of how to integrate technology into the teaching of certain material into a complete package.

Davis (1989)'s TAM

The second theory underpinning this research is Davis (1989)'s TAM. The figure below shows Davis (1989)'s TAM.

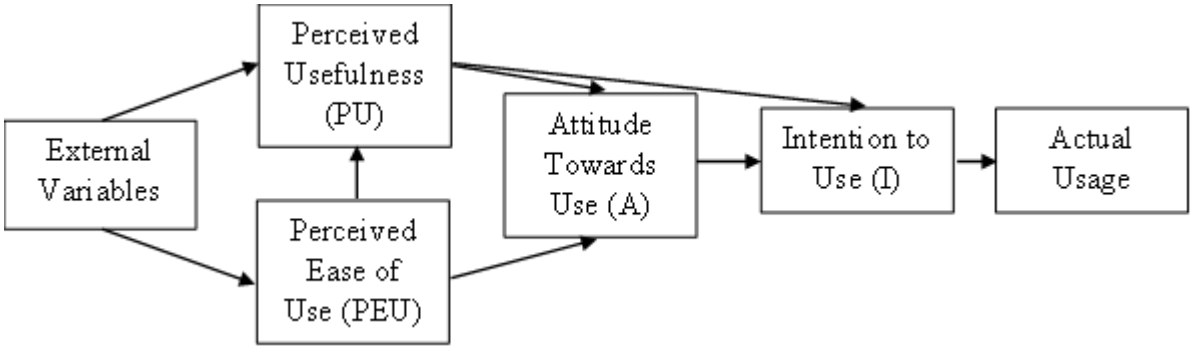

Figure 2: Davis (1989)'s TAM

The aim of Davis (1989)'s TAM is "to explain the general determinants of computer acceptance that lead to explaining users' behaviour across a broad range of end-user computing technologies and user populations" (Lai, 2017, p. 26). There are several constructs of TAM which include PU, PEU, A and I. The description of each construct is shown in the table below (Deslonde & Becerra, 2018; Davis, 1989).

Table 2: Description of Each TAM Construct

Construct	Description
PU	A user's belief in the usefulness of technology to enhance his/her job performance.
PEU	A user is more likely to use new technology if he/she believes the technology is easy to use.
A	A user's desire to employ technology by which when a user has a positive attitude towards technology, he/she will have higher usage of technology.
I	A user's likelihood to use technology.

Methodology

The purpose of this paper is to develop and validate an instrument to measure TPACK and e-learning acceptance, particularly for English teachers in Malaysia. A survey questionnaire was developed, and the instrument validation was conducted to test the content validity and face validity of the developed survey questionnaire.

Development of Instrument

For the purpose of this research, a survey questionnaire that combines Elas et al. (2019)'s TPACK for English teachers' questionnaire items and Davis (1989)'s perceived ease of use

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and perceived usefulness questionnaire items with a total of 47 items was developed. The items of this questionnaire are shown in the table below.

Table 3: Items of the Developed Survey Questions

Items	Statement	Sources
TK1	I know how to solve my own technical problems.	Elas et al. (2019)
TK2	I can learn about technology easily.	Elas et al. (2019)
TK3	I keep up with important new technologies.	Elas et al. (2019)
TK4	I frequently play around with technology.	Elas et al. (2019)
TK5	I know about a lot of different technologies.	Elas et al. (2019)
TK6	I have the technical skills I need to use technology.	Elas et al. (2019)
TK7	I have had sufficient opportunities to work with different technologies.	Elas et al. (2019)
CK1	I have sufficient knowledge about English.	Elas et al. (2019)
CK2	I have various ways and strategies for developing my understanding of English.	Elas et al. (2019)
CK3	I can create materials that map to a specific level of proficiency among my students in teaching English.	Elas et al. (2019)
CK4	I can decide on the scope of concepts taught within my class.	Elas et al. (2019)
PK1	I know how to asses student performance in a classroom.	Elas et al. (2019)
PK2	I can adapt my teaching based upon what students currently understand or do not understand.	Elas et al. (2019)
PK3	I can adapt my teaching style to different learners.	Elas et al. (2019)
PK4	I can assess student learning in multiple ways in my class.	Elas et al. (2019)
PK5	I can use a wide range of teaching approaches in a classroom setting.	Elas et al. (2019)
PK6	I am familiar with common student understandings and misconceptions.	Elas et al. (2019)
PK7	I know how to organize and maintain classroom management.	Elas et al. (2019)
PCK1	I can select effective teaching approaches to guide students' thinking and learning in English.	Elas et al. (2019)
PCK2	I can produce lesson plans based on the topic in English.	Elas et al. (2019)
TCK1	I know about technologies that I can use for teaching specific concepts in English.	Elas et al. (2019)
TCK2	I know about the technologies that I can use for teaching English.	Elas et al. (2019)
TPK1	I can choose technologies that enhance the teaching approaches for a lesson.	Elas et al. (2019)
TPK2	I can choose technologies that enhance students' learning for a lesson.	Elas et al. (2019)
TPK3	I am thinking critically about how to use technology in my classroom.	Elas et al. (2019)

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TPK4	I can adapt to the use of the technologies that I am learning about different teaching activities.	Elas et al. (2019)
TPK5	I can encourage online interactivity among students in my class.	Elas et al. (2019)
TPACK1	I can teach lessons that appropriately combine English, technologies and teaching approaches.	Elas et al. (2019)
TPACK2	I can select technologies to use in my classroom that enhance what I teach, how I teach and what students learn.	Elas et al. (2019)
TPACK3	I can use strategies that combine content, technologies and teaching approaches that I know.	Elas et al. (2019)
TPACK4	I can provide leadership in helping others to coordinate the use of content, technologies and teaching approaches at my school.	Elas et al. (2019)
TPACK5	I can provide leadership in helping others to coordinate the use of content, technologies and teaching approaches at my district.	Elas et al. (2019)
TPACK6	I can choose technologies that enhance the content for a lesson.	Elas et al. (2019)
TPACK7	I can use technology to predict students' skill in a particular topic in English subject.	Elas et al. (2019)
TPACK8	I can use technology to predict students' understanding of a particular topic in English.	Elas et al. (2019)
PEU1	Learning to implement e-learning would be easy for me.	Davis (1989)
PEU2	I would find it easy to get e-learning to do what I want to do.	Davis (1989)
PEU3	My interaction with e-learning would be clear and understandable.	Davis (1989)
PEU4	I would find e-learning to be flexible to interact with.	Davis (1989)
PEU5	It would be easy for me to become skillful at using e-learning.	Davis (1989)
PEU6	I would find e-learning ease to use.	Davis (1989)
PU1	Using e-learning in my teaching would enable me to accomplish tasks more quickly.	Davis (1989)
PU2	Using e-learning would improve my teaching performance.	Davis (1989)
PU3	Using e-learning in my class would increase my productivity.	Davis (1989)
PU4	Using e-learning would enhance my effectiveness on the job.	Davis (1989)
PU5	Using e-learning would make it easier to do my teaching.	Davis (1989)
PU6	I would find e-learning useful in my teaching.	Davis (1989)

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Instrument Validation

Elas et al. (2019) believed that a developed instrument should be validated first before it is used to conduct the pilot study. Validity is the extent to which an assessment measures what it claims to be measured (Phelan and Wren, 2007). Taherdoost (2016) listed several types of validity namely face validity, content validity, construct validity and criterion validity. For this research, both content validity and face validity were identified. The content validity of the developed survey questionnaire was identified using content validation while the face validity was identified using response process validation.

Content Validation

The content validation was conducted based on Yusoff[a] (2019)'s ABC of content validation and content validity index calculation. It is believed that content validation is "a subjective judgement of experts about the degree of relevant construct in an assessment instrument" (Yaghmaie, 2003). The content validation of the developed survey questionnaire was quantified in the form of the content validity index (CVI). Content validity is the measure to identify "whether or not the items sampled for inclusion on the tool adequately represent the domain of content addressed by the instrument" (Waltz, Strickland & Lenz, 2005, p. 155). A content validation form was prepared to make sure that the panel of experts understand the task. The definition of each domain was also provided to help the experts in reviewing the item. Yusoff[a] (2019) stated that "the selection of individual to review and critique an assessment tool is usually based on the individual expertise with the topic to be studies" (p. 51). He also pointed out that two experts are the minimum acceptable expert number. Thus, the selected panel of experts were two senior Teaching English as a Second Language (TESL) lecturers with the qualification of Doctor of Philosophy in Education. The content validation form together with clear instructions was then distributed to each expert. They are required to provide a score ranging from 1 (not relevant to the measured domain) to 4 (highly relevant to the measured domain) for each item depending on its relevance to the measured domain. All the experts were also allowed to give any written comments and all the comments were taken into consideration to improve the relevance of the items. After all the experts completed their forms, the data was analysed and the content validity index (CVI) was then calculated using Microsoft Excel.

Response Process Validation

The response process validation was carried out based on Yusoff[b] (2019)'s ABC of response process validation and face validity index calculation. It is believed that response process validation is crucial to "support the overall validity of an assessment tool such as questionnaires, especially for research purposes" (p.56). The response process validation of the developed survey questionnaire was quantified in the form of the face validity index (FVI). Face validity is "the degree to which a measure appears to be related to a specific construct, in the judgement of non-experts" (Taherdoost, 2016, p. 29). A response process validation form was prepared to make sure that the respondents understand the task. Yusoff[b] (2019) stated that the number of rates should not be less than 10 raters. The target respondents of the developed survey questionnaire are Malaysian English teachers and therefore, 10 Malaysian English teachers were appointed as the panel of raters. The response process validation form together with clear instructions was then distributed to each rater using Google Form. They are required to provide a score ranging from 1 (not clear and not understandable) to 4 (very clear and very understandable) for each item depending on its clarity and comprehension. All the raters were also allowed to give any written comment and all the comments were taken into consideration to improve the clarity and comprehension of the items. After all the raters submitted their

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forms, the data was analysed and the FVI of the survey questionnaire was then calculated using Microsoft Excel.

Results and Discussion

The data collected through both the content validation form and response process validation form were analysed to identify the CVI and FVI of the developed survey questionnaire. The results of both content validation and response process validation are reported in the next sections.

Content Validity

For content validity, all the 47 items were reviewed by 2 experts who are senior lecturers that expertise in TESL. The CVI for each item (I-CVI) and the CVI average are presented in the table below.

Table 4: I-CVI and Average CVI

Item	Expert 1	Expert 2	I-CVI
TK1	4	4	1.00
TK2	4	4	1.00
TK3	4	4	1.00
TK4	4	4	1.00
TK5	4	4	1.00
TK6	4	4	1.00
TK7	4	4	1.00
CK1	4	1	0.50
CK2	4	4	1.00
CK3	4	2	0.50
CK4	4	2	0.50
PK1	4	2	0.50
PK2	4	2	0.50
PK3	4	4	1.00
PK4	4	4	1.00
PK5	4	4	1.00
PK6	4	2	0.50
PK7	4	4	1.00
PCK1	4	4	1.00
PCK2	4	4	1.00
TCK1	4	2	0.50
TCK2	4	4	1.00
TPK1	4	4	1.00
TPK2	4	4	1.00
TPK3	4	2	0.50
TPK4	4	2	0.50
TPK5	4	4	1.00
TPACK1	4	4	1.00
TPACK2	4	4	1.00
TPACK3	4	2	0.50
TPACK4	4	4	1.00
TPACK5	4	4	1.00

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TPACK6	4	4	1.00
TPACK7	4	4	1.00
TPACK8	4	4	1.00
PEU1	4	4	1.00
PEU2	4	4	1.00
PEU3	4	4	1.00
PEU4	4	4	1.00
PEU5	4	4	1.00
PEU6	4	4	1.00
PU1	4	4	1.00
PU2	4	4	1.00
PU3	4	4	1.00
PU4	4	4	1.00
PU5	4	4	1.00
PU6	4	4	1.00
Average CVI			**0.89**

As shown in Table 4, there are 37 items that score the I-CVI of 1.00 and 10 items that score the I-CVI of 0.50. According to Davis (1992), the acceptable CVI score of a content validation that involves two experts is at least 0.80. The average CVI of the developed survey questionnaire is 0.89 which indicates it has achieved an acceptable level of content validity. In other words, all the items are relevant to the measured domain.

However, there are some minor modifications needed upon experts' comments and suggestions on the 10 items that score I-CVI lower than 0.80. There are two items which are CK1, "I have sufficient knowledge about English" and TCK1, "I know about technologies that I can use for teaching specific concepts in English" that need to be removed. Expert 2 pointed out that item CK1 is not appropriate to be included as the respondents are all qualified English language teachers who are for sure have sufficient knowledge in English. On the other hand, TCK1 needs to be removed as it has a similar meaning to item TCK2. For CK3, "I can create materials that map to a specific level of proficiency among my students in teaching English", Expert 2 suggested removing the word specific to make the statement sounds more general. Another item, PK1, "I know how to assess student performance in a classroom", the word "performance" can be changed to "learning".

In addition, item CK4, "I can decide on the scope of concepts taught within my class", it is suggested to make the statement related to teaching English context. The phrase "scope of concepts" can be replaced with English language skills. The same goes for item TPACK3, "I can use strategies that combine content, technologies and teaching approaches that I know", the word "content" can be replaced by "English" so it is related to the context of teaching English. The expert also recommended the tenses and sentence structures of item TPK3, "I am thinking critically about how to use technology in my classroom" and TPK4, "I can adapt to the use of the technologies that I am learning about different teaching activities" can be refined to avoid ambiguity. Besides, Expert 2 suggested removing the phrase "understand or" in item PK2, "I can adapt my teaching based upon what students currently understand or do not understand" to avoid a double-barrelled statement. Another double-barrelled statement, PK6, "I am familiar with common student understandings and misconceptions" can be split into two items.

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Furthermore, Expert 1 suggested that both the operational definitions for technologies/technology and e-learning can be included. Specific examples can be given to help respondents relate to the items. For example, educational technology or applications available at school or provided by the Ministry of Education can be included to make it clear that the technology mentioned is for educational purposes, and not for social or recreational purposes. Overall, both experts stated that all items are relevant and some minor improvements can be done based on the suggestions given.

Face Validity

For face validity, all the 47 items were reviewed by 10 Malaysian English teachers and the FVI for each item (I-FVI) and the FVI average are presented in the table below.

Table 5: I-FVI and Average FVI

Item	Rater 1	Rater 2	Rater 3	Rater 4	Rater 5	Rater 6	Rater 7	Rater 8	Rater 9	Rater 10	I-FVI
TK1	3	3	4	3	3	4	3	4	4	4	1.00
TK2	3	4	4	3	3	4	3	4	4	4	1.00
TK3	3	4	4	3	4	4	3	4	4	3	1.00
TK4	3	4	4	2	4	4	3	4	4	4	0.90
TK5	3	4	4	3	4	4	4	4	4	4	1.00
TK6	3	4	4	3	3	4	3	4	4	4	1.00
TK7	3	4	4	2	3	4	3	4	4	4	0.90
CK1	3	4	4	3	3	4	3	4	4	4	1.00
CK2	3	4	4	3	3	4	4	4	4	4	1.00
CK3	2	4	4	2	3	4	4	4	4	4	0.80
CK4	3	3	2	3	3	4	4	4	4	4	0.90
PK1	3	4	4	3	3	4	4	4	4	4	1.00
PK2	2	4	4	3	3	4	4	4	4	4	0.90
PK3	3	4	4	2	3	4	4	4	4	4	0.90
PK4	2	4	4	3	3	4	4	4	4	4	0.90
PK5	3	4	4	3	3	4	4	4	4	4	1.00
PK6	3	3	4	3	3	4	4	4	4	4	1.00
PK7	3	4	4	3	3	4	4	4	4	4	1.00
PCK1	3	4	4	3	3	4	4	4	4	4	1.00
PCK2	3	4	4	4	3	4	4	4	4	4	1.00
TCK1	3	4	4	2	3	4	4	4	4	4	0.90
TCK2	3	4	4	3	3	4	4	4	4	4	1.00
TPK1	3	4	4	2	3	4	4	4	4	4	0.90
TPK2	3	4	4	2	3	4	4	4	4	4	0.90
TPK3	3	4	4	3	3	4	4	4	4	4	1.00
TPK4	3	4	4	3	3	4	4	2	4	4	0.90
TPK5	2	4	4	2	3	4	4	4	4	4	0.80
TPACK 1	3	4	4	3	3	4	4	4	4	4	1.00
TPACK 2	3	4	4	3	3	4	4	4	4	4	1.00
TPACK 3	3	4	4	3	3	4	4	4	3	4	1.00

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TPACK 4	3	4	4	2	3	4	4	4	4	4	0.90
TPACK 5	3	4	4	2	3	4	4	4	4	4	0.90
TPACK 6	3	4	4	3	3	4	4	4	4	4	1.00
TPACK 7	3	4	4	2	3	4	4	4	4	4	0.90
TPACK 8	3	4	4	3	3	4	4	4	4	4	1.00
PEU1	3	4	4	2	3	4	4	4	4	4	0.90
PEU2	3	4	2	2	3	4	4	4	4	4	0.80
PEU3	3	4	2	2	3	4	4	4	4	4	0.80
PEU4	3	4	2	2	3	4	4	4	4	4	0.80
PEU5	3	4	4	3	3	4	4	4	4	4	1.00
PEU6	3	3	4	3	3	4	4	4	4	4	1.00
PU1	3	3	4	2	3	4	4	4	4	4	0.90
PU2	3	4	4	2	3	4	4	4	4	4	0.90
PU3	3	4	4	2	3	4	4	4	4	4	0.90
PU4	3	4	4	2	3	4	4	4	4	4	0.90
PU5	3	4	4	3	3	4	4	4	4	4	1.00
PU6	3	4	4	3	3	4	4	4	4	4	1.00
Average FVI											**0.94**

As shown in Table 5, there are 24 items that score the I-FVI of 1.00, 18 items that score I-FVI of 0.90, and 5 items that score the I-FVI of 0.80. There is none of the items scored I-FVI lower than 0.80. In addition, the average FVI is 0.94 which indicates that the developed survey questionnaire has achieved the acceptable level of face validity for an online survey (Chin et al., 2018 & Mahadi et al., 2018). In other words, all the items have an FVI of higher than 0.80 which indicates that all the items are clear and comprehensible to the targeted respondents. Based on the written comments given by the raters, two of them pointed out the spelling error of "ease" in item PEU6, "I would find e-learning ease to use", where the correct spelling would be "easy". The spelling will be corrected upon the raters' comments. Overall, they pointed out that the items are clear and understandable.

Conclusion

In short, there are two items, CK1 and TCK 1 that are removed. Several items which are CK3, CK4, PK1, PK2, TPK3, TPK4, TPACK3 and PEU6 are revised based on experts' and raters' suggestions. PK6, a double-barrelled statement is split into two items which produced PK6 "I am familiar with common student understandings" and PK8, "I am familiar with common student misconceptions". The finalised number of items is 46 items as shown in the table below.

Table 6: Finalised Number of Items

Construct	Number of Items	Item Number
TK	7	TK1, TK2, TK3, TK4, TK5, TK6, TK7
CK	3	CK2, CK3, CK4
PK	8	PK1, PK2, PK3, PK4, PK5, PK6, PK7, PK8
PCK	2	PCK1, PCK2

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TCK	1	TCK2
TPK	5	TPK1, TPK2, TPK3, TPK4, TPK5
TPACK	8	TPACK1, TPACK2, TPACK3, TPACK4, TPACK5, TPACK6, TPACK7, TPACK8
PEU	6	PEU1, PEU2, PEU3, PEU4, PEU5, PEU6
PU	6	PU1, PU2, PU3, PU4, PU5, PU6
TOTAL		**46 ITEMS**

The results of CVI (0.89) and FVI (0.94) show that the developed survey questionnaire is found to achieve a satisfactory level of both content validity and face validity. Thus, it can be used for further study.

Acknowledgements
The authors would like to acknowledge Global Academic Excellence (M) Sdn Bhd, who granted the Publication Grant Scheme for this project.

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