EXPLORING THE INTEGRATION OF TECHNOLOGICAL PEDAGOGICAL CONTENT KNOWLEDGE (TPACK) IN ONLINE TEACHING AMONG EFL LECTURERS

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Abstract: This investigation is carried out in light of the necessity of technology literacy for lecturers in online learning. Finding out the TPACK (Technological Pedagogical Content Knowledge) profile of English Language Education lecturers in online learning was the aim of this research. In particular, this study analysed the level of TPACK along with the TPACK forming components of 3 lecturers who teach English Language Education. This research applied a mixed method by implementing a concurrent embedded design. Three lecturers from the Faculty of Teacher Training and Education, Kuningan University were involved to participate in this research. Since TPACK is knowledge or competence that integrates 3 basic knowledge, namely content knowledge (CK), pedagogical content knowledge (PCK) and technology (TCK), so in collecting research data, there are 3 instruments that were used, namely self-report questionnaires, performance assessments and observations. With regard to the TPACK level of English language education lecturers, the analysis results suggest that most English lecturers rate themselves as good or high in most of the domains examined in this study, covering CK, PCK, TCK, TPK, and TPACK. They do, however, rate themselves highly in two areas: technological knowledge (TK) and pedagogical knowledge (PK). This is consistent with the findings of lesson plans and analyses of actual teaching, which indicate a high level of technological integration.
Keywords: *EFL lecturers; online teaching; TPACK.*

INTRODUCTION

According to Kozikolu and Babacan (2019), TPACK is the effective application of technology in the teaching-learning process as well as teachers' enrichment of their pedagogical subject knowledge using technology. The TPACK framework, to put it briefly, is described as a model of framework that integrates the three elements of content, pedagogy, and technology knowledge (Nisa et al., 2022).

Globally, TPACK research has been conducted, and various researchers have made significant contributions. To enhance instructors' instructional skills and students' academic achievement, teacher training is essential (Spear & da Costa, 2018). It is

crucial to help instructors (both pre-service and in-service) enhance their technical skills and the desire to use technology into their lessons (Muhaimin et al., 2019). The UNESCO and nations all over the world make significant efforts to train teachers and employ a variety of strategies to support their professional development (Ariffin et al., 2018; Barnes et al., 2018). For instance, Zhang *et al.* (2019) explored teachers' TPACK in online collaborative discourse. Their study found that teachers' knowledge were mainly pedagogical content knowledge and general pedagogical knowledge. This underscores the need for multi-method approaches to assess TPACK levels, a

consideration that could be taken into account in this recent study.

Another notable study was conducted by Wen and Shinas (2020) who measured TPACK. The study stresses the need for further investigation into the practical implications of TPACK for teaching, pointing to an area this recent study can contribute to.

Studies by Bingimlas (2018) and Yalley (2017) further expanded the exploration of TPACK through surveys. These works collectively show how TPACK can vary across different educational contexts, thus supporting the relevance of this focus on English Language Education lecturers.

In terms of TPACK implementation, research from Koh (2019) focused on the teacher professional development model through the TPACK framework. Their work provides practical guidelines for leveraging TPACK for teacher development, underscoring the real-world benefits of this theoretical model.

A literature study by Willermark (2018) and Tseng et al. (2020) provides an overarching synthesis of TPACK research, demonstrating the ongoing interest and diverse applications of this framework. Their work suggests an ongoing need for additional context-specific research into TPACK, which the present study could contribute to.

In sum, prior research into TPACK provides a foundation for this study but also underscores the need for further exploration into practical applications, context-specific variations, and robust measurement of TPACK components. The research thus far has validated the TPACK model and shown its applicability across various situation, but gaps remain in our understanding of how to leverage this knowledge for teacher development and practice, particularly in the specific context of English Language Education lecturers engaged in online teaching.

Recent studies have examined instructors' TPACK using performance evaluation of lesson plans and content analysis of teacher conversations (Akyuz, 2018; Tseng et al., 2019).

Another investigation by Cheng & Xie (2018), Scherer et al. (2018), and Tuzahra et al. (2021) revealed a possible link between instructors' personal traits and their TPACK. Their findings may be pertinent to this research, particularly in the context of online education inspired by COVID-19, as they may highlight the necessity for thorough support systems to encourage TPACK among educators.

In terms of teacher profession education, a study by Apriliaswati (2019) focused on the attitudes of in-service English teachers toward pedagogical competence by technology literacy at Tanjungpura University showed that the participants' use of technology helped them improve their technological skill. Quddus (2019) conducted a study on the use of technology integration in teacher preparation programs and found that using TPACK through online learning effectively boosted instructors' competence. Similar to this, Ahmed et al.'s 2019 study found that instructors' use of technology improved their professional development. Designing interventions to improve TPACK among English Language Education lecturers may benefit greatly from these findings.

Taken together, these studies highlight the multifaceted nature of TPACK and the range of factors that can influence its development. They underscore the importance of both individual factors, such as personal belief systems and self-efficacy beliefs, and external factors, such as peer learning opportunities and practical experiences, in developing TPACK. These insights could provide valuable direction for this research into the TPACK of English Language Education lecturers in online learning.

A study by Jang and Chen (2010) designed an online course to improve pre-service teachers' TPACK and found that such courses can assist pre-service teachers enhance their TPACK and gain confidence in integrating technology into their classroom instruction. This suggests that intentionally designed online courses could be an effective way to improve TPACK of lecturers, which is particularly relevant to this research within the context of distance learning.

In a study including pre-service teachers, Chai et al. (2013) discovered a substantial association between the teachers' epistemological beliefs and their TPACK. The study highlighted the importance of fostering sophisticated epistemological beliefs to improve TPACK, indicating the importance of teachers' underlying beliefs in successful technological integration.

Another investigation by Kopcha et al. (2014) discovered that a mix of learning technology by design, learning technology in context, and learning about technology in context can help teachers create TPACK. This supports the idea of employing a multipronged approach to enhancing TPACK among educators.

A study by Tondeur et al. (2017) proposed a framework that explains the integration of

technology in the classroom based on teachers' TPACK. Their research shows that teachers' pedagogical beliefs, school culture, and access to resources influence the development of TPACK and its application. This means that the effective creation and deployment of TPACK is influenced not only by the individual teacher's knowledge and skills, but also by the setting in which they work.

In sum, these studies offer further evidence of the multifaceted nature of TPACK, emphasizing the importance of belief systems, practical application, environment for learning, and contextual factors in the development and application of TPACK. These studies' findings could be put to use to inform the design of interventions to improve TPACK among English Language Education lecturers in online learning.

METHOD
In general, the investigation begins with developing issues and then setting research goals. The phenomenon that is currently happening is the change in teaching patterns that were previously offline to online, so that the topic of TPACK or the knowledge and competence of lecturers in integrating technology in teaching becomes very interesting to research. After that, literature review is then carried out in conjunction with the preparation of indicators for self-report questionnaires, tests, observations and performance assessments based on the results of literature studies. The instrument that is ready is then used to collect data to be processed and analyzed so that a conclusion is produced that is in accordance with the study aims.

This research adopts a mixed method, which is a methodology that blends qualitative and quantitative data retrieval techniques, integrates the two data, and applies a specific design. (Creswell, 1994).

This study was undertaken at Kuningan University with the participation of three instructors from the Faculty of Teacher Training and Education.

TPACK is knowledge or competency that incorporates three basic knowledges: subject knowing, pedagogy knowledge, and technology knowledge, therefore in collecting research data, there were four instruments that were used, namely self-report questionnaires, performance assessments, tests and observations. By using these instruments, it is hoped that it will produce more valid and accurate data related to the TPACK level of English Language Education lecturers.

Several stages in taking research data include first distributing self-assessment questionnaires. The questionnaire used is adapted from Bingimlas (Bingimlas, 2018). The questionnaire consists of 39 items that measure the lecturer's TPACK with the following details; 6 items each to measure TK, PK, CK, and TPK, 5 items each to measure PCK, TCK, and TPACK.

The questionnaire results then certainly be strengthened by data from the test instrument so that the second stage is to provide an English proficiency test to the lecturers. The test given is the TOEFL Prediction test or the English Proficiency Test where this test is more specific to measure the content ability (CK) of English lecturers or the professional competence of lecturers.

The next stage to measure the lecturer's TPACK level is by performance assessment. In this stage, lecturers or research participants were requested to prepare a lesson plan on a specific topic in the English course. This instrument is used to find out whether lecturers apply the TPACK framework in their lesson plan and what it looks like. To strengthen the data, observations were also made in teaching learning process directly as the final stage of data collection. This observation aims to investigate kind of technology integration lecturers apply in online learning.

Regarding data analysis techniques, Data from self-report surveys and tests are quantitatively evaluated using descriptive and inferential statistics; the average, percentage, and frequency derived for each item using the SPSS program are shown. The greatest and lowest average scores, as well as the frequency of responses to questionnaire items, were reviewed. Meanwhile, various sorts of data gathered through observation and performance evaluation of lesson plan papers are qualitatively examined through three steps, namely "categorization", "description" and "synthesis". With the application of this data triangulation, it is hoped that the correctness of the research results will be more accurate and the level of validity will be higher.

RESULTS AND DISCUSSION
Technological Pedagogical Content Knowledge (TPACK) level of English language education lecturers
Based on analysis of various data sources, namely questionnaires, lesson plans, and observations of the learning process carried out by lecturers, it shows that lecturers have generally high TPACK levels in online learning.

Using the Bingimlas (2018) category level, which is shown in Table 4.1, it is clear that English language education lecturers have a high degree of TPACK (Technological Pedagogical Content Knowledge). The high TPACK level of the lecturers is not only from the results of the questionnaires, but also seen from of the lesson plan analysis and observations results on their online teaching.

Table 1. *Category of lecturer's TPACK level*

Score of Average	Level of TPACK
1.0 – 1.9	Very low
2.0 – 2.9	Low
3.0 – 3.9	Moderate
4.0 – 4.9	High
5.0	Very high

This study was adapted from Bingimlas (2018). It used 39 questionnaire items to measure the knowledge of the English language education lecturers on the 7 TPACK subscales. Technology Knowledge (TK), Pedagogical Knowledge (PK), Content Knowledge (CK), Technological Pedagogical Knowledge (TPK) consist of 6 items for each, while Pedagogical Content Knowledge (PCK), Technology Content Knowledge (TCK), and Technological Pedagogical consist of 5 items for each. The questionnaire statements were modified in order to make the questionnaire more useful for teaching English. Furthermore, the questionnaire was created using Google forms. The lecturers then answered to the 39 questionnaire items on the five-point Likert scale. They are Strongly Agree, Agree, Neutral, disagree and strongly disagree.

The TPACK level of English language education lecturers was assessed using SPSS program and the mean score and frequency obtained for each. The lowest and highest average scores, as well as the frequency of responses to questionnaire items, are also reviewed.

Table 2 shows data taken from a self-report questionnaire which indicates that English Language Education lecturers assess themselves as moderate to high in terms of TPACK.

Table 2. *Average score for TPACK domain*

No.	Domain	Average
1.	Technological Knowledge (TK)	3.97
2.	Pedagogical Knowledge (PK)	4.13
3.	Content Knowledge (CK)	4.00
4.	Technological Pedagogical Knowledge (TPK)	3.83
5.	Pedagogical Content Knowledge (PCK)	3.88
6.	Technological Content Knowledge (TCK)	3.92
7.	Technological Pedagogical Content Knowledge (TPACK)	3.48
	Total average	3.89

Based on Table 2, English Education lecturers' TPACK level is generally moderate (Mean = 3.9), indicating that English Language Education lecturers have adequate knowledge on TPACK. The scores of mean suggested that English Language Education lecturers considered themselves to have adequate levels in the majority of the TPACK categories studied, including TK (Mean = 3.97), TCK (Mean = 3.92), PCK (Mean = 3.88), TPK (Mean = 3.83), and TPACK (Mean = 3.48). Furthermore, they describe themselves as having a high degree of knowledge in two domains: Content Knowledge (Mean = 4.00) and Pedagogical Knowledge (Mean = 4.13). The next sections will go through the TPACK level of English Education lecturers for items in each area.

Technological Knowledge (TK)
Technological Knowledge (TK) is the first domain of TPACK. It is defined as knowledge of several technologies which range from low-tech technologies i.e. pencil and paper to digital technologies i.e. the internet, digital video, interactive whiteboards, and software program. This contains the six factors listed in Table 4.3, which decided technological knowledge (TK) level of English Language Education lecturers.

Table 3. *Technological knowledge average score*

No.	Statement	Average
1.	I am able to use public application software such as a word processor (Word), presentation graphics (PowerPoint), Kahoot, Memrise & Quizlet.	4.4
2.	I am familiar with social media platforms (Twitter, Facebook, blogs & Wiki).	4
3.	I am able to use basic computer-attached devices for instance a printer, image scanner, digital camera, projector, and smart board.	3.8
4.	I am able to install software items that I require.	4
5.	I am capable of resolving simple technical issues with computers and their accessories.	3.8
6.	I am capable at creating and editing video.	3.8
	Total average	3.97

Based on the Table 4.3, the technological knowledge (TK) level of English Education lecturers is in the moderate level (Mean = 3.97). In addition, it can be informed that almost all participants valued the items positively and all the average scores gained were above 3 which means that they have good technological knowledge. The highest average score was obtained for participants' capability to use common application software and social media (Mean = 4.4), though all indicated items also had a high average score.

Based on findings, it can be concluded that English Language Education lecturers have adequate technological knowledge (TK), namely in operating computers, tablets, video recorders, projectors, speakers, and other electronic devices properly.

Pedagogical Knowledge (PK)

Pedagogical Knowledge (PK) is the second domain of TPACK. It is well-defined as knowledge about teaching methods and processes which includes knowledge in managing classroom, assessing students, preparing the lesson plans, and student learning. Table 4.4 shows the average score of the six items that determine the Pedagogical Knowledge (PK) level of English Education lecturers.

Table 4. *Pedagogical Knowledge (PK) average score*

No.	Statement	Mean (After)
7.	I am capable of managing my classroom.	4.6
8.	I'm able to link a wide range of concepts to pupils.	4
9.	I'm conscious of the most prevalent errors and mistakes among my students.	4
10.	I'm able to evaluate my pupils in a variety of scientific ways.	3.8
11.	I am capable of using a wide range of teaching methods (including cooperative learning, problem-solving approaches, active learning, discovery learning, and project-based learning).	4
12.	I'm able to organize the group activities of pupils.	4.4
	Total average	4.13

Table 4 shows that Pedagogical Knowledge (PK) level of English Education lecturers is in high

level (Mean = 4.13). Additionally, it can be conveyed that almost all participants rated the items positively and all the average scores gained were above 4 which means that they had high pedagogical knowledge. The highest average score was obtained for the capability of participants to manage the class (Mean = 4.6), while all indicated items also had high average scores. To conclude with, the questionnaire results show that English Education lecturers have high pedagogical knowledge on managing classroom, assessment, preparation of lesson plans, and student learning.

Content Knowledge (CK)

Content Knowledge (CK) is the third domain of TPACK. It is described as knowledge about the actual subject matter to be learnt or taught. The average score of the six items that assess the level of Content Knowledge (CK) of English Education lecturers is shown in Table 4.5.

Table 5. *Content Knowledge (CK) average score*

No.	Statement	Mean
13.	I am self-assured enough to teach any subject expertise.	4.2
14.	I am sufficiently knowledgeable about my field of study.	4.2
15.	The capacity to assist my colleagues with knowledge and abilities in my field of study	3.8
16.	I am acquainted with specialists and scholars in my field of study.	4
17.	I keep up with fresh sources and current developments (books/journals/articles) in my subject expertise.	3.8
18.	I am aware of conferences and events in my subject expertise.	4
	Total average	4

Table 5 shows that Content Knowledge (CK) level of English Education lecturers is in high level (M = 4). Moreover, it can be seen that the descriptive statistics for CK reveal that almost all participants rated the items positively and almost all of the average scores obtained were 4 which mean that they had high content knowledge. The highest average marks were received for sufficient participant information and confidence to teach any subject specialization. (M = 4.2), while all indicated items also have a high average value.

To conclude with, the questionnaire results show that English language education lecturers have high content knowledge (CK) of the actual subject matter to be learned or taught. The result is also in line with the results of their English

proficiency test which achieved high scores or more than 550.

Technological Pedagogical Knowledge (TPK)
TPACK fourth domain namely Technological Pedagogical Knowledge (TPK). It relates to knowledge on the utilization of several technologies in education and how it changes the way teachers teach. Table 4.6 shows the average score for the six elements that define English Education lecturers' Pedagogical Technology Knowledge (CK).

Table 6. *Technological Pedagogical Knowledge (TPK) average score*

No	Statement	Mean
19	I believe in my ability to select relevant new technology to drive my students to learn.	4
20	I am able to use new technologies to improve my teaching methods.	3.8
21	I have the skill to leverage new technology to boost student learning commitment.	4
22	I am capable of evaluating students in a variety of methods using new technologies.	3.2
23	I am capable of using social media in the classroom.	4
24	I am capable of managing classes well that are supported by modern technologies (smart classrooms).	4
	Total average	3.83

TPK descriptive statistics discovered that virtually all respondents assessed the points positively, and the majority of the average scores received were greater than 3, indicating that they had adequate Pedagogical Technology Knowledge. The competence to select suitable new technology to stimulate students to learn, utilization of new technology to increase student learning commitment, use social media in teaching, and manage classrooms well supported by new technology (smart classroom) received the highest average scores. While the final item is also indicated, it has a high average score.

Finally, the survey results suggest that English Education instructors have enough Pedagogical Technology Knowledge (TPK) (overall M = 3.83).

Pedagogical Content Knowledge (PCK)
Pedagogical Content Knowledge (PCK) is the fifth domain of TPACK. It relates to comprehension on linking lecturer knowledge of content and pedagogy, including the way lecturers teach, understand the context of the class, and the particular needs of students. The average scores for the five items that determined English lecturers' Pedagogical Content Knowledge (PCK) are shown in table 7.

Table 7. *Pedagogical Content Knowledge (PCK) average score*

No	Statement	Mean
25	In my topic specialization, I am familiar with acceptable teaching strategies.	4
26	In my topic area, I am capable of planning successful actions.	4
27	I am capable of achieving the objectives in my lesson plan.	3.8
28	I am capable of assisting my students in connecting concepts from my topic area with concepts from other disciplines.	4
29	I have the skills to create evaluation tools for pupils, particularly in my topic specialization.	3.6
	Total average	3.88

The questionnaire results indicate that English Education lecturers possess sufficient Pedagogical Content Knowledge (PCK) (M = 3.88), with high scores for teaching methods, effective activities, and connecting concepts. Most participants rated items positively, indicating their knowledge is adequate.

Technological Content Knowledge (TCK)
Technological content Knowledge (TCK) is the sixth domain of TPACK. It describes knowledge about how technology can develop new illustration for particular material and how teachers can alter the way students apply and comprehend concepts in certain topic areas by employing certain technologies. Table 4.8 shows the average score of the five items that assess the level of Technological Content Knowledge (TCK) of English lecturers.

Table 8. *Technological Content Knowledge (TCK) average score*

No	Statement	Mean (After)
30	I am able to conduct scientific research on the internet in my field of expertise (subject area).	4.2
31	I can manage social media to expand my understanding in my specialty (subject area).	4
32	I am capable of expanding my knowledge in my specialty by utilizing new technology.	3.8

33	I am knowledgeable about emerging technology connected to my specialty.	4
34	I am capable of representing the content of my specialist using relevant modern technologies (such as multimedia, simulation, and modeling).	3.6
	Total average	3.92

The descriptive statistical analysis for TCK showed that nearly all respondents assessed the items positively and that all average scores received were greater than 3, indicating that they possessed enough Technology Content Knowledge. The highest average score was obtained for point number 30 addressing the capacity to utilize the internet in academic research in their profession. While the other things highlighted have a high average value as well.

To summarize, the study found that English lecturers possess sufficient Technological Content Knowledge (TCK) (M = 3.92), with the highest average score for item 30 addressing internet use in scientific research.

Technological Pedagogical Content Knowledge (TPACK)
Finally, Technological Pedagogical Content knowledge (TPACK) is the last area of TPACK. It describes the information that teachers require in order to effectively incorporate technology in any content area into their teaching. The average results for the five items that determined English lecturers' level of Technological Pedagogical Content Knowledge (TPACK) are shown in table 4.9

Table 9. *Technological Pedagogical Content Knowledge (TPACK) average score*

No	Statement	Mean
35	In my discipline, I am able to organize successful teaching approaches with relevant new technologies.	4
36	I might be a leader in assisting others in teaching topics in my specialty by using a suitable teaching technique and relevant new technologies.	3.6
37	In my specialty, I am capable of designing instructional activities that make use of appropriate modern technologies.	3
38	In my specialty, I am capable of designing efficient educational activities using social media (such as Facebook, chat applications, blogs, and wikis).	3.2

| 39 | I am capable of teaching my specialty (subject) LMS such as (Moodle, Blackboard, e-class). | 3.6 |
| | Total average | 3.48 |

Descriptive statistics for this study showed that almost all respondents assessed the points positively, and all average scores found were greater than 3, indicating that they possessed enough Technology Pedagogical Content Knowledge. The capacity to blend successful teaching techniques with appropriate modern technologies received the highest average score for item number 35. While the other items mentioned have a high average value as well. In summary, the questionnaire results reveal that English lecturers have adequate Technological Pedagogical Content Knowledge (overall M = 3.48).

The total average score of 3.48 for all items in the TPACK questionnaire suggested that English instructors made strong judgments about themselves and were confident and aware of their own ability in general. They feel they have a solid understanding of Technological Pedagogical Content Knowledge, such as identifying how to successfully incorporate technology into the curriculum, including teaching modalities that are not only teacher oriented but also student centered, and incorporating integrated learning to generate new instructional communications. Furthermore, the findings of the TPACK questionnaire analysis suggest that lecturers of English class are able to choose the technology types and utilize technology to aid student learning based on the content and context, as well as employ learning management systems such as hybrid classrooms. The TPACK level of English lecturers in the medium category is also bolstered by analysis of lesson plan results and observations of their actual teaching.

Observations illustrate that all lecturers maximize their use of technology in the online classroom. They can utilize technology as well as pedagogy to formulate content for teaching. All professors were discovered to utilize technology to develop materials for teaching. They formulated many educational technology equipment such as laptops, tablets, speakers, and overhead projectors. Apart from that, they are also very good at implementing online learning by combining several applications. For example, when doing online learning using Zoom or Google meetings, they insert several audios, videos, teaching materials, and student worksheets that can be accessed by simply clicking the link given by the lecturers.

The incorporation of technology in English education has not only assisted lecturers in preparing for class, but has also assisted in making their e-classes more student-centered and engaging students in topic learning. In conclusion, the observation data reveal that all instructors used integrated technology in their learning processes. The findings of questionnaire and lesson plan analysis, as well as observations of lecturers teaching, reveal that the Technological Pedagogical Content Knowledge level of English lecturers is mostly high. Lecturers assume that they own the subjects that they teach. They are proficient as well in technology understanding and implementation.

CONCLUSION

The present study's conclusion is that although there are some limitations, this study succeeded in answering questions that reveal the TPACK level of English language education lecturers.

With regard to the TPACK level of English language education lecturers, the analysis results suggest that the majority of English lecturers rate themselves as being adequate or high in the majority of areas of this research, including CK, PCK, TCK, TPK, and TPACK. They do, however, rate themselves as having high levels of Technological Knowledge (TK) and Pedagogical Knowledge (PK). This is consistent with the findings of lesson plans and actual teaching analysis, which indicate a high level of technological integration.

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