Examining Labuan ESL Teachers' Mastery of TPACK in the Teaching of English

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Abstract

For English as a Second Language (ESL) instruction to be successful in this digital age, the incorporation of technology has become increasingly important in the dynamic field of language teaching. However, there is a dearth of research addressing teachers' Technological Pedagogical and Content Knowledge (TPACK) in Malaysia ESL classroom setting. Hence, this study examined ESL teachers' mastery of TPACK in the teaching of English in Labuan, Malaysia. Sixty-nine ESL Labuan ESL teachers participated this quantitative study by answering an online questionnaire distributed through Google Form via Telegram group. The results showed that teachers had a high level of understanding across all TPACK components. Among the four domains, teachers' technological knowledge was the highest, while teachers have the lowest mastery of pedagogical knowledge. No significant difference was found between teachers' TPACK level and their teaching experience. This study also reported there is a lack of a statistically significant difference in Labuan ESL teachers' TPACK level according to the professional development they have received. The findings of the research offer insight to educators and policymakers as Labuan teachers need to possess the necessary technology literacy skills to ensure the effectiveness of ESL teaching.

Keywords: English as a Second Language, Technological Pedagogical and Content Knowledge, TPACK, Technology, Labuan.

Introduction

The incorporation of technology has grown in importance in the ever-changing field of language teaching to create productive learning settings. The ability to effectively use technology, pedagogy, and topic knowledge has become a critical factor in determining the success of instruction for English as a Second Language (ESL) teachers in this digital age. The globe is witnessing the most recent technical advancements attributed to the fourth industrial revolution (IR 4.0) (Yunus et al., 2019) .The seamless integration of pedagogy and technology has shaped how teachers interact with a variety of student populations in ESL classes and opened new possibilities for innovative and dynamic language learning experiences. Ensuring accessible and high-quality education for all is emphasized in the fourth Sustainable Development Goal (SDG), which is consistent with the global commitment to the United Nations' 2030 Agenda for Sustainable Development (Boeren, 2019). This goal highlights how

important it is to use innovative approaches and resources to enhance learning outcomes and encourage possibilities for lifelong learning. The integration of techno-pedagogical approaches has brought about a remarkable revolution in the field of ESL instruction, signaling a substantial divergence from traditional teaching methodologies.

Due to the rapid advancement of technology, teachers now have the opportunity to redefine conventional language instruction (Yunus et al., 2012) and research innovative methods that accommodate the diverse learning preferences and styles of ESL students (Atsari, 2020). The development of information and communication technology has created more opportunities for English language instruction in ESL countries (Yunus et al., 2012). The Malaysian government has taken several of steps to encourage more information and communication technology (ICT) integration in order to improve the effectiveness of educational and training programs (Lubis et al., 2019). The utilization of technology to enhance learning quality is an essential component of the Malaysia Education Blueprint 2013–2025, given the swift progress of technology (James et al., 2022). As Wave 3 of the educational system (2021–2025) approaches, ICT should be fully included into the curriculum and pedagogy. This will not only maintain up the efforts to improve self-paced and remote learning, but it will also improve the curriculum of the educational system. Under the direction of Malaysia's Ministry of Education, the integration of technology into ESL classrooms thus appears as a strategic endeavor that ensures the relevance and adaptability of ESL education in the twenty-first century while concurrently meeting the need for English proficiency worldwide. Yoag et al (2012) carried out research in Labuan , a federal territory of Malaysia and the study's overall conclusions demonstrate that participants have recognized the value of incorporating interactive course materials into their historical teaching and learning processes as opposed to more conventional methods. Majitol & Yunus (2023) research study also reported that the majority of Labuan ESL teachers had a positive opinion of technology based self-regulate learning in the teaching and learning of English, firmly agreeing that it was essential with its significance in today's educational system.

The COVID-19 pandemic has also prompted an enormous shift in the method in which ESL is taught, requiring teachers to incorporate technology into their lessons more thoroughly. With the closure of schools and the implementation of social distancing measures, ESL teachers were faced with the unprecedented challenge of maintaining continuity in education while ensuring the safety and well-being of their students. In response to this exigency, educators were compelled to embrace technology as an indispensable tool for delivering instruction, engaging students, and fostering interactive learning experiences in virtual environments. ESL teachers had to quickly adjust to the abrupt shift to remote learning during the epidemic by using digital materials, virtual platforms, and communication technologies. While the transition to remote learning posed myriad challenges, it also presented opportunities for creativity, collaboration, and professional growth within the ESL teaching community. As we move into the post-COVID era, the knowledge and skills acquired during this difficult time have raised awareness of the ways in which technology can improve language teaching. After realizing the benefits of blended and online learning models for student engagement, flexibility, and customized language acquisition, ESL teachers are now more likely to integrate a range of digital tools, asynchronous learning resources, and adaptive technologies into their lessons. This paper is aimed to examine the technological, pedagogical and content knowledge (TPACK) level of Labuan ESL teachers in term of integrating techno-pedagogical approach in teaching of English.

English as a Second Language

English is regarded as a second language in Malaysia and is formally utilized in everyday life, such as business, school, and transportation, it plays a major part in the country's educational system (Thirusanku & Yunus, 2012). Since there are far more non-native English speakers than native English speakers worldwide Seidlhofer (2011), English is widely recognized as a global language (Galloway & Rose, 2019). English language competency is required for several reasons, such as communication, job requirements, improvements in science and technology, and more. It is embraced as "Foreign Language" (ESL/EFL) or "English as a Second Language" (ESL/EFL) to help those whose first language is not English. ESL classrooms serve students who are learning the language in a country where it is not the primary language or in a multilingual environment. English is an international language that is extensively spoken by non-native English speakers due to the trend of globalization, thus it is clear how vital it is to support ESL among these people. To facilitate non-native English speakers' effective language acquisition and competency development, the area of ESL encompasses a broad range of pedagogical approaches, techniques, and instructional strategies. Learning the English language is essential, particularly because it's used so widely in many educational sectors these days (Zakaria et al., 2019).

ESL teacher and Technology

ESL teachers have emerged as important stakeholders in the successful adoption of technology in language learning. The COVID-19 epidemic has expedited the evolution of educational technology, forcing ESL instructors to utilize digital technologies, virtual platforms, and online resources to improve language learning outcomes. These days, more teachers and students are utilizing the Internet, which is becoming increasingly popular in the teaching of second and foreign languages (Lu, 2006). By utilizing technology, ESL teachers may design engaging and interactive classes that accommodate a variety of learning preferences and help students develop global connections. Additionally, technology makes it possible for teachers to provide focused help and meet each student's competency level through personalized language training. English is the most widely used language on the Internet and in technology overall (Hariharasudan & Kot, 2018). To keep language instruction dynamic, interesting, and sensitive to the changing requirements of ESL students locally and internationally, ESL teachers are essential in embracing new tools and approaches as technology develops. A techno-pedagogical approach can assist bridge the gap between traditional teaching methods and the digital learning environment in ESL classes, as the need for English language competency grows in an increasingly connected world.

Technological Pedagogical and Content Knowledge (TPACK)

The development of digital literacy and 21st-century abilities in ESL students has been associated with the use of a techno-pedagogical approach (Aisyah et al., 2021). The phrase "techno-pedagogical approach" describes the intentional and planned use of various technological tools and strategies to enhance language learning outcomes in ESL classes. The use of technology in teaching and learning in today's classrooms is a result of the progress of education (Zakaria et al., 2019). When technology knowledge was adapted to the concept that Shulman (2011) refers to as Pedagogical Content Knowledge (PCK) Mishra & Koehler (2006), a new paradigm known as Technology Pedagogical and Content Knowledge (TPACK) emerged as a conceptual framework for analyzing teacher knowledge needed for technology integration. This concept pertains to teaching specific topic using well selected technologies

in combination with suitable pedagogical approaches and methodologies. Three primary knowledge domains—content knowledge (CK), pedagogical knowledge (PK), and technical knowledge (TK)—combine and synthesize to form TPACK. Teachers are expected to use their knowledge of subject, pedagogy, and technology into their teaching in order ensure that students learn effectively and efficiently.
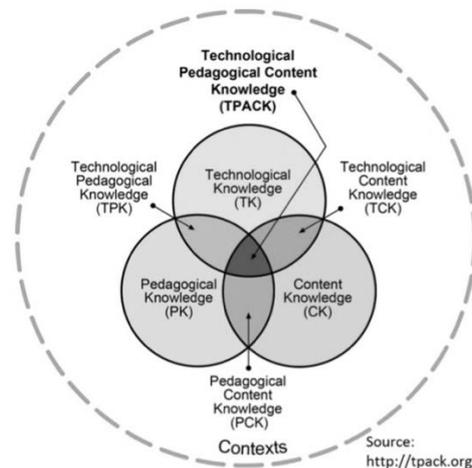

Figure 1. The TPACK Framework

Technological Knowledge (TK) refers to knowing how to make efficient use of technological resources and tools. It is imperative that educators possess knowledge regarding the features, uses, and consequences of diverse technologies within the framework of their instruction. Pedagogical Knowledge (PK) refers to the general concepts of teaching and learning that are understood. It involves comprehending teaching tactics, managing a classroom, using evaluation techniques, and being able to establish a productive learning environment. Content Knowledge (CK) refers to having a thorough comprehension of the material being taught. It entails being aware of the main ideas, theories, and research techniques in a certain field of study. Since CK serves as the foundation for both information transmission and the creation of meaningful learning experiences, it is essential for effective teaching. Ngu et al (2022) summarized the combination of each knowledge component within the TPACK framework into table below and described as:

Table 1
TPACK Knowledge Components and Description

TPACK Knowledge	Component Description
Technological Pedagogical Knowledge (TPK)	Knowledge of matching effective technology tools to different pedagogical designs and teaching strategies.
Technological Content Knowledge (TCK)	Knowledge of the appropriate technology tools to integrate alongside specific learning content of a subject matter.
Pedagogical Content Knowledge (PCK)	Knowledge of the teaching strategies or approaches to apply when teaching the subject matter.
Technological Pedagogical Content Knowledge (TPCK)	Knowledge of the constructive usage of technologies to teach subject matter through effective teaching strategies.

The knowledge component of TPACK is the outcome of the integration of these three types of knowledge. For technology integration in the teaching and learning process to be successful, there needs to be a specific blend created at the intersection of TK, PK, and CK. In addition to being adept at using technology, teachers who have a strong TPACK also know how to use it pedagogically to improve student learning outcomes and content delivery.

The Past Studies

There is a wealth of research on TPACK studies in many fields, particularly the social sciences, sciences, and mathematics, but there is a dearth of research on language instruction. A research study conducted by Farhadi & Oeztuerk (2023) in Turkey reported that pre-service EFL teachers generally exhibited a high degree of TPACK proficiency. According to Koh & Sing (2011) study's findings, preservice teachers' views of TPACK were significantly impacted by its components, while demographic variables like gender and age did not significantly influence this process. Kozikoğlu & Babacan (2019) also supported this finding and indicated that gender, project training, and professional development did not significantly impact the views of Turkish EFL teachers towards technology. However, Mohammadkarimi (2023) research study reported pre-service teachers and teacher educators have a high degree of proficiency in their understanding of pedagogical content and familiarity with basic traditional technologies but they had limited experience with professional technologies. When employing web-based technology to study preservice teachers' impressions of TPACK, Tseng et al (2022) also discovered that older teachers were less confident with technology. Nazari et al (2019) research finding revealed that the pedagogical knowledge and pedagogical content knowledge subscales were significantly higher for experienced teachers. When it came to their technology understanding, inexperienced teachers scored noticeably higher. Tseng et al (2022) reported there hasn't been much research on TPACK in language teacher education over the past ten years. In order to better understand Labuan ESL teachers' mastery of TPACK in the teaching of English, this study focused on two main questions:

1. What level of TPACK do Labuan EFL teachers have in terms of integrating technology into teaching of English?
2. Are there any statistically significant differences in Labuan EFL teachers' TPACK due to years of experience and the received professional development?

Methodology

Population and research sampling

The study was carried out by researcher at Malaysia's Federal Territory of Labuan. Respondents of this research were selected through population sampling method, the English language teachers across all primary and secondary schools in Labuan were the respondents of this research study. The number of English teachers teaching in Labuan was estimated around one hundred and eighteen (n=118), according to (Moe, 2020). Table 1 displays a basic graphic representation of the research participants. The distributed online questionnaire had a return rate of 81.17%, indicating that (N=69) respondents had taken part in the study. A pilot study had been conducted first, the return rate was calculated and determined (N=85) to be the targeted demographic.

Table 1
Respondents of research study

Gender	Frequency (N)	Percentage (%)
Male	19	27.5
Female	50	72.5
Total	69	100

Data Collection Method

Figure 2 provides a quick overview of the data collection process.

The research instrument was developed and acknowledged by experts.

A pilot study was carried out to test the reliability of the questionnaire.

The Google Form link of the questionnaire was sent to all Labuan ESL educators through telegram group

The questionnaire was answered by Labuan ESL teachers.

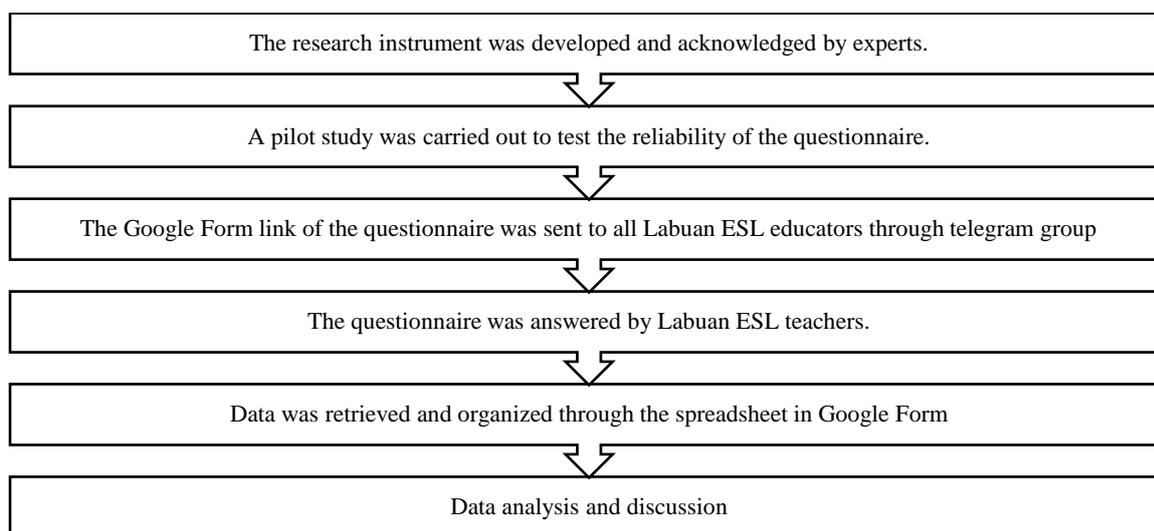| Data was retrieved and organized through the spreadsheet in Google Form |
|---|

Data analysis and discussion

Figure 2: Data collection method

The study instrument was first created and for validation purposes, the instrument was sent to three experts with diverse backgrounds in the ESL education sector. Appropriate amendments were made after reviews were received from validators. Pilot research was carried out to evaluate the validity of the questionnaire by calculating the Cronbach's Alpha

value for every items. Following the completion of the pilot study, the researcher carried out a comprehensive survey in the Federal Territory of Labuan. The questionnaire was distributed through Google Form as an online survey to all ESL teachers in Labuan's schools through a Telegram group.

Instrument

To answer the research questions in this study, data was collected through an online questionnaire using Google Form. The online questionnaire was adapted from Abubakir & Alshaboul (2023) on EFL teachers' mastery of TPACK, Schmidt-Crawford et al (2009) on TPACK: Development and Validation of an Assessment Instrument for Preservice Teachers and the Examining TPACK among K-12 Online Distance Educators by (Archambault & Crippen, 2009). The technological, pedagogical, and content knowledge (TPACK) framework, developed by Mishra & Koehler (2006) expanded on Shulman (1986) description of teacher knowledge was also referred to further clarify the items modification for the instrument.

The online questionnaire included three sections, with each section serving their own purpose. The first section was requesting respondents' consent to participate in this survey, their responses would be kept confidential and anonymous. This section was referred as "Respondents' consent". The second section was named "Respondents' Background" where researchers collected respondents' demographic background such as experience in teaching, age, gender and any other necessary information. The data was collected to answer the second research question; to determine the significant differences in EFL teachers' TPACK due to years of experience and the received professional development. The third section was collecting data on respondents' mastery of TPACK level to answer research question one; to examine what level of TPACK do Labuan EFL teachers have in terms of integrating technology into teaching of English. Items in this section were separated to four parts, where researcher collected data on the respondents' mastery of TPACK in terms of TK, PK, CK and the overall TPACK level of respondents on the integration of technology in the teaching of English.

The online questionnaire implemented a Likert-scale with five ordinal points. The Likert scale was developed to measure "attitude" in a manner that is recognized and validated by science (Joshi et al., 2015). The ordinal points consisted of: (1) Strongly Disagree, (2) Disagree, (3) Neutral, (4) Agree, and (5) Strongly Agree. For each item, respondents had to select a number between 1 and 5 that represented their opinion on different subject matter. The Google Form response sheet was used to record data, which was later extracted and analyzed in more detail for further discussions.

Reliability and Validity

The online questionnaire was submitted to a panel of three education experts from various universities for the purpose to verify the validity of the research instrument's content. The validations and suggestions of experts to amend specific items and use of language in the instrument were carried out accordingly. Furthermore, pilot research was conducted in advance, and the target population, N=85, was used to calculate and obtain the return rate. Pilot study was conducted to evaluate the reliability of the online questionnaire utilized in this study. The results for Cronbach's alpha of the four parts of items regarding on the respondents' mastery of TPACK in terms of Technological Knowledge, Content Knowledge, Pedagogical Knowledge and the overall TPACK level are presented in Table 2.

Table 2
Cronbach's Alpha result

Section	No. of items	Cronbach's Alpha
Technological Knowledge	6	.847
Content Knowledge	5	.852
Pedagogical Knowledge	5	.913
Technological pedagogical content knowledge (TPACK)	6	.877

36 participants answered the pilot test of the questionnaire which included a total of 22 items. The Cronbach's Alpha values stand at (α=0.847-0.913) which are acceptable and have a high value of internal consistency (Tavakol & Dennick, 2011).

Data Analysis

After receiving all the survey responses from the teachers, SPSS version 29 was used to analyze the quantitative data. To investigate the relationship between variables, the researchers used inferential statistics after computing means and standard deviations for items pertaining to teacher' knowledge. The differences between teachers' experiences and their TPACK were examined using one-way analysis of variance (ANOVA). Researcher performed the independent t-test to examine potential statistical difference between the teachers' TPACK and the professional development they received.

Results and Findings

Table 3 displays the demographic characteristics of respondents who participated in this study.

Table 3
Descriptive statistics of demographic characteristics.

Characteristics	Level	Frequencies	Percent
Gender	Male	19	27.5
	Female	50	72.5
Age	21-30	38	55.1
	31-40	20	29.0
	41-50	11	15.9
School type	Primary school	52	75.4
	Secondary school	17	24.6
English major/minor	Yes	57	82.6
	No	12	17.4
Educational qualifications	Bachelor's degree	58	84.1
	Master's degree	11	15.9
Teaching experience	1-5 years	35	50.7
	6-10 years	15	21.7
	11-15 years	11	15.9
	16-20 years	6	8.7
	More than 20 years	2	2.9

| Previous Professional Development | Yes | 54 | 78.3 |
| Related to Integrating Technology into teaching of English | No | 15 | 21.7 |

RQ1: What level of TPACK do Labuan EFL teachers have in terms of integrating technology into teaching of English?

The first question focused on the participants' current knowledge of technology integration in the teaching of English. Based on the range between the greatest and lowest results (5-1 = 4), the researchers divided the means into three categories (Table 4) to assess the degree of knowledge. After dividing the range by three, the result was approximately 1.33 (4 ÷3 = 1.33). Participants' level of knowledge was determined based on the means obtained according to Table 4.

Table 4
Level of knowledge according to the means

Weighted Average	Result Interpretation
1–2.32	Low
2.33–3.65	Moderate
3.66–5	High

Table 5. displays the overall comparison of participants' level of knowledge on four subdomains of TPACK.

Table 5
TPACK subdomains comparison

Item	Mean	Std. Deviation	Degree	Rank
TK	4.176	.61893	High	1
CK	4.098	.64500	High	2
PK	4.074	.69206	High	4
TPACK	4.095	.65084	High	3

In overall, participants have a high degree of knowledge in all four TPACK subdomains, according to Table 5's comparison of the subdomains. Of the four subdomains, technological knowledge (TK) has the highest mean value (M =4.176, SD=0.619). Content knowledge (CK) was ranked second with a mean value of (M=4.098, SD=0.645), participants' overall technological, pedagogical, and content knowledge (TPACK) was ranked third with a mean value of (M =4.95, SD=0.651), which was slightly lower than mean value of CK. Participants' pedagogical knowledge showed the lowest mean value (M =4.074, SD=0.692). Participants reported having a higher TK, among the four subdomains of TPACK, followed by CK, TPACK and PK.

Technological Knowledge (TK)
Table 6 displays the results of six items about participants' technological knowledge.

Table 6
Descriptive statistics of participants' technological knowledge (TK).

No	Item	Mean	Degree	SD	Rank
1.	I feel comfortable troubleshoot technological issues that may arise during ESL lessons such as connectivity issues, software glitches or hardware malfunctions.	3.87	High	0.984	5
2.	I am confident in my ability to effectively use technological tools relevant to ESL instruction.	4.07	High	0.913	3
3.	I can use content development tools (i.e., Word, PowerPoint, etc.).	4.49	High	0.816	1
4.	I know how to use computer devices such as printers, headphones, scanners, etc without assistance from anyone.	4.33	High	0.816	2
5.	I can operate computer settings such as installing software and establishing an Internet connection.	4.33	High	0.741	2
6.	I actively seek out new and innovative technological tools to enhance ESL teaching practices.	3.96	High	0.882	4

The findings show that participants have a high degree of technological proficiency overall (M =4.176). The item with the highest score (M =4.49) was one that highlights the participant's professional proficiency with content development tools, such as Microsoft Word and Microsoft PowerPoint. The confidence of participants in using computer devices and operate computer settings obtained the same mean score (M=4.33). The confidence of participants in effectively using technology tools obtained a mean score of (M=4.07) while item indicates that participants actively seek out new and innovative technological tools obtain a mean score of (M=3.96). The capability of participants to independently troubleshoot technological issues that may arise during ESL lessons was scored lowest (M =3.87) in their responses.

The item regarding participants ability to use content development tools such as Microsoft Word and PowerPoint achieved the highest mean score (M=4.49), this was in line with Abdullahi & Mohammed (2022) research that revealed Microsoft products can effectively solve several main issues that teachers encounter in classroom teaching. Escola et al (2022) research findings also indicate that Microsoft 365 was a suitable solution for the limitations given by the pandemic, and the majority of participants expressed great pleasure with its usage. Teachers must employ a variety of technical instruments to enhance the teaching-learning process for students, and these technological tools contribute to the process' effectiveness (Kouser & Majid, 2021). TK, a crucial element of the TPACK framework, interacts with PK and CK to influence effective English as a Second Language (ESL) classroom

practices. ESL teachers must be proficient in TK to properly use technology to improve language instruction in this era of digital integration. An in-depth understanding of TK gives ESL teachers the ability to choose and apply relevant digital tools and resources that support their pedagogical objectives and language learning targets. This includes being acquainted with educational software, digital media, online resources, and communication technologies designed to help ESL learners acquire and improve their fluency in the language. Additionally, ESL teachers' TK enables them to create dynamic and engaging learning environments for students by smoothly integrating technology into their teaching approaches. Teachers can use these modern technologies in the teaching-learning process to create assessments and distribute activities to students (Majid, 2020). The continuous development and improvement of TK within the TPACK framework by ESL teachers is essential to meet the changing demands of ESL learners and equipping them for success in a world that is becoming more digitally linked and digitally advanced.

Content Knowledge (CK)
Table 7 displays the results of five items about participants' content knowledge.

Table 7
Descriptive statistics of participants' content knowledge (CK).

No	Item	Mean	Degree	SD	Rank
1.	I align my ESL teaching content with language proficiency standards and curriculum guidelines.	4.07	High	0.929	3
2.	I can prepare learning materials that map to a specific level of proficiency among my students in teaching English.	4.04	High	0.848	4
3.	I adapt my content knowledge to meet the diverse needs and proficiency levels of ESL students in my classroom.	4.22	High	0.783	1
4.	I actively seek updates on changes and developments in the English language, and I incorporate these into my instructional strategies.	4.12	High	0.631	2
5.	I feel confident in my understanding of key linguistic components within ESL instruction, such as phonology, morphology, syntax, and semantics.	4.04	High	0.882	4

Findings result reveal that participants have a high degree of content proficiency in overall (M=4.098). Participants achieve highest score (M=4.22) on the item regarding the ability of adapting participants' content knowledge to meet the diverse needs and proficiency level of ESL students. For the item regarding participants incorporating development in ESL instructional strategies, mean score of (M=4.12) was achieved. In the capability of aligning ESL teaching content with language proficiency standards and curriculum guidelines, a mean score of (M=4.07) was achieved. The capability of participants to prepare learning materials and their confidences in understanding of key linguistic components were scored the lowest (M=4.04).

Effective ESL education is built around Content Knowledge (CK), as CK is the amount and organization of the knowledge in the teacher's mind, according to (Shulman, 1986). A wide range of language content, including as linguistic structures, communicative functions, cultural components, and subject-matter knowledge pertinent to English language learners, are included in the TPACK framework's definition of CK. The confidence of participant in understanding of key linguistic component achieved the lowest mean score among all five items in CK component, this case has to be taken into consideration as for a successful classroom learning, it requires careful thought, including what language skills should be taught, how to teach the skills, and which teaching methods to use (Karmadi, 2016). This is also align with Sahin (2011) statement, stating while different teachers have varied methods to teaching, teachers must self-develop their pedagogy, technology, and curriculum areas in order to be effective in the classroom. The significance of content knowledge in forming educational practices has also been stressed by Minor (2016). Additionally, CK guides teachers' evaluation procedures, enabling them to create tests that precisely gauge students' language competency and monitor their development over time.

The high degree of content knowledge acquired by participants in this study was inspiring, as in the ESL context, various literature has examined how content knowledge affects assessment strategies in the context of teaching ESL. Researchers like Jung Youn (2023) and Phothongsunan (2020) have shed light on the relationship between language teachers' proficiency and the creation of authentic, context-sensitive assessments. Additionally, the integration of CK into the TPACK framework gives ESL teachers the ability to create inclusive, culturally appropriate learning environments that respect the variety of linguistic backgrounds and life experiences of their students. Teachers who have a thorough understanding of cultural sensitivity know how important it is to integrate authentic texts, cultural components, and real-world circumstances into their lessons to foster empathy and cultural awareness in students. It is apparent that individual differences matter for student success, as Strange and Banning (2015) mentioned. ESL teachers may connect their students with real language and cultural experiences from around the globe with technology, which promotes intercultural competency and global citizenship. Sanger & Gleason (2020) reported it is socially and pedagogically good for teachers in various settings to anticipate and take into consideration the diverse backgrounds, skills, and interests of their students when designing lessons and curriculum. ESL teachers can establish immersive language learning environments that celebrate diversity, advance social justice, and equip students with the tools they need to communicate effectively across cultural boundaries by incorporating culturally relevant digital resources like podcasts, videos, social media platforms, and virtual exchange programs.

Pedagogical Knowledge (PK)
Table 8 displays the results of five items about participants' pedagogical knowledge.

Table 8
Descriptive statistics of participants' pedagogical knowledge (PK).

No	Item	Mean	Degree	SD	Rank
1.	I am adept at adapting teaching methods to meet the diverse needs and proficiency levels of ESL students.	4.01	High	0.899	4
2.	I regularly reflect on and adjust my teaching strategies to improve ESL instruction.	4.07	High	0.913	3

3.	I can organize and maintain classroom management using different pedagogical approach.	4.00	High	0.907	5
4.	I am familiar with a variety of pedagogical strategies that can enhance language learning in ESL.	4.10	High	0.750	2
5.	I can support ESL students' learning in accordance with their physical, mental, emotional, social, and cultural differences.	4.19	High	0.713	1

The findings show that participants have a high degree of pedagogical proficiency overall (M =4.074). The item with the highest score (M =4.19) was one that highlights the participant's capability to support ESL students' learning in accordance with their physical, mental, emotional, social, and cultural differences. Participants' familiarity with various pedagogical approach obtained a mean score of (M=4.10), while participants' attitude of reflection on teaching strategies obtained a mean score of (M=4.07). Participants' adaption of teaching methods on different students achieved a mean score of (M=4.01) while the capability of participants to organize and maintain classroom management using different pedagogical approach was scored the lowest (M =4.00) in their responses.

Finding result of participants' high degree level of PK is in contrast with Farhan et al. (2023) where their research reported participants had a low degree level of PK but both studies have provided insight into the relationship between the pedagogical knowledge of ESL teachers and implementation of classroom learning in the classroom. High mean score obtained by participants regarding their familiarity with teaching strategies is supported by Olds et al (2021), as their article mentioned it is important to comprehend the current methods that general education teachers employ to teach English language to their learners. The finding is also aligns with Akram et al (2021) research which reported enhancing teaching effectiveness and creating a motivating learning environment can be achieved by combining a strong grasp of the subject matter with effective teaching approaches. As participants reported the lowest mean score in item regarding classroom management, this is align with Sieberer-Nagler (2015) research, stating possibly the most challenging part of teaching for many teachers is managing the behavior of the students.

Pedagogical knowledge equips teachers with the theoretical and practical information required to create and carry out stimulating and successful language learning activities. Teachers' instructional decision-making processes are informed by a wide range of pedagogical concepts, strategies, and approaches. To develop teachers acquirement of PK, Raygan & Moradkhani (2022) study found that teachers' coursework, mentorship, and fieldwork had an impact on their pedagogical expertise. ESL instructors can choose effective teaching strategies, develop engaging lesson plans, and establish welcoming classroom environments that meet the many needs, interests, and learning preferences of English language learners with their PK. Additionally, PK guides teachers' assessment procedures, enabling them to create tests that accurately gauge students' language proficiency and offer insightful feedback to enhance learning.

Technological Pedagogical and Content Knowledge (TPAPK)
Table 9 displays the results of six items regarding participants' overall technological pedagogical and content knowledge.

Table 9

Descriptive statistics of participants' Technological Pedagogical and Content Knowledge (TPAPK)

No	Item	Mean	Degree	SD	Rank
1.	I can teach lessons that appropriately combine English, technologies and teaching approaches.	4.06	High	0.906	4
2.	I can actively engage in professional development to enhance my TPACK for ESL instruction.	3.90	High	0.860	6
3.	I can support students as they use technology to become independent English learner.	4.13	High	0.705	2
4.	I can support my professional development by using digital tools and resources to continuously improve my ability to teach ESL.	4.09	High	0.742	3
5.	I can support my professional development by using digital tools and resources to continuously improve my ability to teach ESL.	4.35	High	0.724	1
6.	I can use Web 2.0 tools (interactive presentation software, digital story tools, etc.) to develop students' language skills.	4.04	High	0.830	5

The findings show that participants have a high degree of technological pedagogical and content knowledge in overall (M =4.095). Participants achieve highest score (M=4.35) on the item regarding the ability of supporting participants professional development by using digital tools and resources. For the ability of supporting students in using technology, a mean score of (M=4.13) was reported. The capability of participants in supporting own professional development reported a mean score of (M=4.09) while the item that indicated participants could teach lessons that combine English, technologies and teaching approaches reported a mean score of (M=4.06). The ability of participants in using Web 2.0 tools achieved mean score of (M=4.04). The capability of participants to actively engage in professional development for enhancing TPACK were scored the lowest (M=3.90).

Participants' high degree level of TPACK aligns with various research studies (Abubakir & Alshaboul, 2023; Farhadi & Oeztuerk, 2023; Kozikoğlu & Babacan, 2019; Solak & Recep, 2014). Participants have strong belief (M=4.35) that digital tools and resources may support their professional development, and this is supported by Lee et al (2023), reported technology impacted teacher continuous professional development in their research study. Participants' perception on their ability to use Web 2.0 tools obtained the lowest mean score (M= 4.04) in the TPACK subdomain, this result is align with Hunutlu & Kucuk (2022) research, which reported that although English teachers have positive perceptions of TPACK, it appears that they do not often employ web 2.0 tools.

The COVID-19 pandemic has also led to a significant shift in the way ESL is taught, necessitating a deeper integration of technology into the curriculum by teachers. Mastery of TPACK by ESL teachers is essential for utilizing technology to design immersive and captivating language learning environments. ESL teachers who have a solid foundation in TPACK are skilled at choosing and using the right technologies into their lesson plans. Technology integration has been significantly impacted by the development of technical tools in education Sulaimani et al. (2017). Teachers may create engaging classes that meet the needs

of a variety of learning styles and hold students' attention by leveraging interactive language learning platforms, multimedia assets, and online collaboration. ESL teachers can increase students' motivation and excitement for learning English by strategically incorporating technology to encourage meaningful language use, active involvement, and engagement. As Yücedağ & Şevik (2021) mentioned in their study, since English is a worldwide language utilized not just for academic purposes but also as a language of communication in international and online platforms, educators are expected to constantly keep up with the latest theoretical and pedagogical developments in step with the advancements of the globalized world.

RQ2: Are there any statistically significant differences in Labuan EFL teachers' TPACK due to years of experience and the received professional development?

The study employed a one-way analysis of ANOVA to examine whether the teaching experience had any significant impact on teachers' knowledge. Table 10 shows the result of ANOVA for participants' TPACK knowledge by teaching experience.

Table 10
ANOVA for teachers' knowledge by teaching experience.

Domain		Sum of Squares	df	Mean Square	F	Sig.
TK	Between Groups	1.916	4	.479	1.270	.291
	Within Groups	24.133	64	.377		
	Total	26.049	68			
CK	Between Groups	1.291	4	.323	.765	.552
	Within Groups	26.999	64	.422		
	Total	28.290	68			
PK	Between Groups	2.891	4	.723	1.559	.196
	Within Groups	29.677	64	.464		
	Total	32.568	68			
TPACK	Between Groups	.485	4	.121	.274	.894
	Within Groups	28.319	64	.442		
	Total	28.804	68			

As Table 10 shows, there were no significant differences between TK (p=0.291, p>0.05), CK(p=0.552, p>0.05), PK(p=0.196, p>0.05), or TPACK (p=0.894, p>0.05) and teaching experience. Stated otherwise, there was no significant difference in the TPACK level of teachers based on the number of years of teaching experience they had.

The result obtained that reveals Labuan ESL teachers' TPACK levels did not significantly differ according to the number of years they had taught provides important insights into how teacher expertise changes over time and the challenges associated with integrating technology into language instruction. Tan et al (2023) also reported the same study result and revealed that age, and years of experience were not significant differentiators of respondents' TPACK level, which in contrast with Liu et al (2023) scoping review study that reported language teachers' perceptions of TPACK were influenced by their age and experience. This result challenges on traditional assumptions on the association between seniority and TPACK proficiency by indicating that a teacher's capacity to successfully incorporate technology into their lesson plans may depend on factors other than their years of experience. This data can be interpreted as teaching experience may help with professional development and pedagogical skill, but it might not always result in increased TPACK competency. To improve teaching and learning, TPACK includes a sophisticated grasp of how to successfully combine technology tools, pedagogical tactics, and subject matter content. Teachers' TPACK level may be influenced by a variety of factors, including individual variations in technological competency, attitudes towards technology, availability to technology resources, and institutional support. As stated by Chai & Tsai (2011), various factors impact instructors' perceptions of TPACK. As such, it is imperative that stakeholders in education embrace a comprehensive approach to professional development, addressing not only the technological competencies of teachers but also their attitudes, beliefs, and contextual elements that may influence their efficacious integration of technology.

The finding highlights the necessity of focused and continuous professional development programmes aimed to promote TPACK integration across the teaching profession in Federal Territory of Labuan. Though the pandemic has increased the demand for technology integration in education, education systems should place a higher priority on giving all teachers the chance to simultaneously improve their technological, pedagogical, and subject knowledge rather than presuming that experienced teachers have better TPACK abilities. This might involve offering access to instructional technology experts who can provide advice and support, promoting collaborative lesson preparation and the exchange of best practices, as well as conducting specialised training workshops. Bereiter & Scardamalia (2014); Janssen (2015) proposed that a professional development strategy that offered conceptual knowledge in real-life teaching challenges along with practical teaching might help teachers develop innovative lessons for their classroom instruction. This also emphasises how crucial it is for technology integration efforts to acknowledge and value the experience of both new and experienced teachers. Celik et al (2014) research also mentioned that teachers must possess a significant level of technological expertise to improve their technological content knowledge, which in effect influences their TPACK.

An independent sample t-test was implemented to determine if professional development related to integrating technology into teaching of English received had an impact on teachers' knowledge. Table 11 shows the result of t-test for participants' TPACK knowledge by professional development.

Table 11

Teachers' knowledge according to the professional development received

	Previous professional development	N	Mean	Std. Deviation	Std. Error Mean	F	Sig.	Two-Sided p
TK	Yes	54	4.2006	.59026	.08032	3.423	.069	.540
	No	15	4.0889	.72885	.18819			.591
CK	Yes	54	4.1778	.63444	.08634	.072	.789	.052
	No	15	3.8133	.62091	.16032			.057
PK	Yes	54	4.1259	.68987	.09388	.032	.859	.252
	No	15	3.8933	.69227	.17874			.261
TPACK	Yes	54	4.1574	.65909	.08969	.002	.963	.127
	No	15	3.8667	.58486	.15101			.110

The finding in Table 11 reveals that there is no significant difference in TK (p=0.540, p>0.05), CK (p=0.052, p>0.05), PK (p=0.252, p>0.05) and overall TPACK knowledge (p=0.127, p>0.05) between teachers who received professional development and those who did not.

The lack of a statistically significant difference in the TPACK level among Labuan ESL teachers according to the professional development they have received was differ with Abubakir & Alshaboul (2023) study that shows there was a statistically significant difference in the TPACK of instructors who were given professional development than those who were not. This highlights several important findings about the nature of teacher preparation, the integration of technology, and the challenges associated with improving pedagogical practices in language learning. This finding raises doubts about the assumption that involvement in professional development programmes alone causes ESL educators' TPACK proficiency to increase in a measurable way. It also emphasises the need for deeper comprehension of how ESL teachers in Labuan learn and apply TPACK in their teaching practices as S. Liu et al. (2014) study comes to the conclusion that the development of TPACK for EFL teachers is a link between two knowledge sources: the practical knowledge of using technology and the formal knowledge and skills offered and supported by schools and the teaching community.

The impact of professional development on TPACK competency may vary depending on several factors, even while it surely offers educators invaluable opportunity to learn about innovative teaching strategies and best practices in language education. The issue of teacher professional development has gained attention due to recent shifts in politics, technology, society, economy, and the globalisation of communication networks in the new century (Alibakhshi, 2019). This becomes essential as educators adapt to the post-COVID-19 educational environment where technology integration is becoming increasingly prevalent. The effectiveness and length of the professional development programme, the degree to which the training material is in line with the goals and instructional needs of teachers, the degree of implementation support offered are a few examples of these variables. According to Macià & García (2016), the effective execution of professional development depends on the availability of resources, time, teamwork, and a long-term commitment.. Therefore, it appears that attending training sessions alone may not be sufficient to provide demonstrable increases in technology integration abilities, as there is no significant difference between received professional development of Labuan ESL teachers and their TPACK level. According

to Wilkerson et al (2016), simply offering professional development programs does not maximize educators' technological proficiency; rather, integrating these tools into the curriculum, whether through live or virtual lessons, to bring out and enhance pre-existing knowledge, abilities, resources, and strengths is necessary to maximize the effects of their instruction on student learning. It is emphasised how crucial it is to support an innovative and continuous learning culture in educational institutions. There is an accepted view that the degree of support teachers receive to engage in professional development activities or the obstacles they face influence how intensely they participate in these activities (Mahmoudi & Özkan, 2015). Since technology continually evolves, educators need to be ready to adapt their methods of instruction to stay ahead of the pace.

The need for the government and educational institutions to provide long-term professional development programmes for teachers has increased in the post-COVID-19 era. ESL teachers need to continuously improve their TPACK expertise in order to successfully integrate new technologies into their classrooms, given the pandemic's acceleration of technology adoption in education. Therefore, in order to support Labuan educators in successfully integrating new technologies into their classrooms, professional development programmes must take into account teachers' existing knowledge and skills, offer opportunities for hands-on practice and experimentation, and provide ongoing support and feedback. Nazari et al (2019) research findings showed that EFL teachers with varying levels of experience preferred diverse professional development programs that catered to their specific demands. It is recommended that policy makers allow participants some degree of autonomy in determining professional development offerings (Badri et al., 2017).

Limitation and Future Research
Researcher acknowledges the following limitations despite the findings. The study instrument presents a significant limitation. The self-reported survey answers may not accurately reflect instructors' actual TPACK practices in ESL classrooms and may be biased. Nonetheless, we implemented measures to ensure the reliability and precision of the survey tool and the data it produced. In order to guarantee strong and accurate results, the investigators employed suitable statistical methods to examine the gathered information. To gain a more comprehensive understanding of ESL teachers' classroom practices, future research can include qualitative data through interviews and classroom observations. Besides that, only primary and secondary school teachers in Federal Territory of Labuan participated in this study. As a result, it is impossible to generalise TPACK findings of different populations and settings. Thus, to have a full understanding of ESL teachers TPACK level in the teaching of English, future researchers could investigate teachers' views in various grade levels and location.

Conclusion
In conclusion, this research study sheds light on the critical intersection of TPACK and English ESL instruction in the context of Labuan, Malaysia. The results show that Labuan ESL teachers have a relatively high degree of confidence across all TPACK subdomains. Among the four TPACK components, TK was ranked highest by the participants and PK was ranked the lowest among all. The study also reveals that Labuan teachers' TPACK level is not influenced by years of experience and professional development they received. All four subdomains of TPACK level are not having any significant difference with teachers' teaching experience and their receive of professional development.

As educators adapt to new forms of education and remote learning environments in the post-COVID-19 era, the incorporation of technology into the ESL classroom becomes even more significance. While incorporating technology into the classroom opens exciting opportunities for student engagement, individualised instruction, and language acquisition, it also puts teachers in the position of having to navigate a complex landscape of digital resources, instructional techniques, and subject matter expertise. The study highlights the need of continuous professional development programmes aimed to assist Labuan educators in gaining the information, abilities, and self-assurance required to successfully integrate technology into their teaching methods by looking at ESL instructors' mastery of TPACK. The research also highlights the significance of cooperation between educators, administrators, policymakers, and educational stakeholders to guarantee that ESL instructors in Labuan receive the necessary tools and assistance to effectively use technology into their teaching methodologies. The increasing significance of technology in education necessitates that educator constantly seek out innovative ways to incorporate technology into their lesson plans, while simultaneously making sure they have the tools and resources they need to execute these integrations successfully. Teachers and policymakers can collaborate to create an environment in ESL classes where the use of technology is valued and encourages student participation, innovation, and success in learning the language by utilising the study's results. In the post-COVID-19 era and beyond, ESL educators can effectively utilise technology to improve language learning results by utilising the study's findings and cultivating a collaborative and supportive culture.

This article represents a significant contribution to the existing body of knowledge in the field of English language teaching, particularly within the context of Labuan. By focusing on TPACK, this research delves into the intricate intersection between technology, pedagogy, and content knowledge, highlighting its relevance in enhancing ESL teachers' instructional practices and student learning outcomes. In a rapidly evolving educational landscape, where the integration of technology in language teaching has become increasingly prevalent, understanding ESL teachers' proficiency in TPACK is crucial for ensuring effective teaching methodologies and fostering digital literacy among students. This study aims to fill a gap in the literature by investigating the specific challenges and opportunities faced by Labuan ESL teachers in navigating the complexities of technology integration in their teaching, ultimately contributing to informed pedagogical decision-making and professional development initiatives tailored to the local context. Through its theoretical framework and contextual insights, this research not only advances scholarly understanding of TPACK but also offers practical implications for enhancing English language instruction in Labuan and beyond.

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