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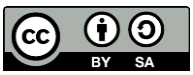

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Designing an Instrument for Assessing Junior High School English Teachers' TPACK in Jayapura Papua

Ince Rezky Naing[1], Rommy D.B. Rambet[2]
[1,2]Pendidikan Bahasa Inggris, FKIP Universitas Cenderawasih
Corresponding E-Mail: incerezkyn@gmail.com

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Abstract

In the digital era, the expectation for teachers to use technology effectively as part of their pedagogy continues to rise. However, many English teachers especially in Papua face significant challenges due to limited digital infrastructure, lack of training, and minimal contextualized assessment tools. To date, no standardized or context-sensitive instrument has been available to measure the Technological Pedagogical Content Knowledge (TPACK) of junior high school English teachers in Papua, particularly in Jayapura. To address this gap, this study developed and validated an instrument in the form of a self-report questionnaire to measure English teachers' Technological Pedagogical Content Knowledge (TPACK) at the junior high school level in Jayapura, Papua. Using the ADDIE (Analysis, Design, Development, Implementation, Evaluation) model as a development framework, the questionnaire covered seven TPACK components and consisted of 28 context-based items. Expert validation and pilot testing with 34 teachers confirmed satisfactory construct validity ($r > 0.30$) and high reliability (Cronbach's Alpha = 0.966). The Content Validity Index (CVI) of 0.92 indicated strong relevance and clarity. The findings confirm that the developed self-report questionnaire is valid, reliable, and well-suited to Papua's educational context. It functions both as a measurement tool and as a means for teachers' self-reflection, supporting future research and professional development initiatives

Keywords: *Assessment, English Teachers, Self-Report Questionnaire, Technology Integration, TPACK*

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Introduction

The recent advancements in science, technology, and the arts within the field of education demand that teachers also possess knowledge of technology integration in pedagogical activities (Rahmadi, 2019). As noted by Szymkowiak et al., (2021), technology now holds a pivotal element in the educational landscape. It has significantly reshaped instructional methods and classroom practices.

In the field of English language teaching, technology has had a highly significant impact on the learning experience. Infusion of technology into pedagogy is considered vital for improving the quality and effectiveness of instruction (Naing & Wiedarti, 2023). This approach yields several advantages, notably by increasing the level of learner engagement and contributing to better educational achievement (Iswibowosari & Baharuddin, 2023). The use of technology contributes to the refinement of pedagogical approaches while enriching students' cognitive development (Khairunnisa & Nurmalasari, 2023). In addition, the infusion of technology into English classrooms has been shown to improve students' motivation and self-confidence (Ghavifekr et al., 2016). As a driving force of globalization, technology also influences education and culture as a whole (Hidayat & Khotimah, 2019).

One of the prominent conceptual frameworks that emphasizes the infusion of technology in education practices is Technological Pedagogical Content Knowledge (TPACK). The TPACK framework illustrates a teacher's capacity to seamlessly integrate technology, instructional methods, and subject matter knowledge in educational settings (Janah, 2022). Koehler & Mishra (2009) formulated the TPACK theoretical framework to explain the positive relationship among seven essential knowledge domains: Pedagogical Knowledge (PK), Content Knowledge (CK), Technological Knowledge (TK), Technological Pedagogical Knowledge (TPK), Technological Content Knowledge (TCK), Pedagogical Content Knowledge (PCK), and the integrated Technological Pedagogical Content Knowledge (TPACK).

By achieving a balanced understanding of these dimensions, teachers are able to design learning experiences that are more interactive, adaptive, and aligned with students' needs. Thus, TPACK has become a crucial competency for educators to meet the demands of teaching in the digital era. Although numerous studies have examined TPACK in various educational contexts, most focus on general teacher populations or regions with well-established digital infrastructures.

However, the incorporation of technology poses significant challenges for educators at all levels of the school system, ranging from acquiring new technological tools to adapting curricula and instructional strategies to incorporate emerging educational technologies. A significant number of English teachers in Indonesia still encounter difficulties in embedding technology within their teaching materials (Naing, 2025). Taopan et al., (2020) in their study identified several significant challenges in the technology incorporation, including the absence of clear technology-related policies, technophobia, inadequate resources, a shortage of

qualified technology instructors, maintenance and technical issues, security risks and concerns, low parental involvement, insufficient time, and the complexity of computer-related jargon. Moreover, the majority of teachers were found to utilize technology without taking into account critical components such as pedagogy and content.

Liu et al., (2017) categorize these challenges into four key aspects: embedding technology within educators' existing knowledge structures, aligning new learning with what is already known, enhancing their readiness to adopt novel digital tools, and tackling the challenge of limited technological competence. More specifically, English teachers in Papua encounter unique obstacles in adopting technology for classroom use, including limited digital infrastructure, restricted access to resources, and insufficient pedagogical readiness to effectively incorporate technological tools into their teaching. However, limited attention has been given to developing contextually validated self-report instrument that reflects the unique challenges faced by English teachers at the junior high school level in Jayapura, Papua. This study addresses that gap by designing and validating a self-report questionnaire tailored to this specific educational context

Therefore, this study is deemed essential to develop an assessment instrument in the form of self-report questionnaire specifically designed to measure English teachers' TPACK proficiency in a contextualized manner that reflects the educational conditions in Papua. Strengthening TPACK mastery among in-service English teachers in Jayapura is critically important because they often face distinctive challenges, such as limited access to digital infrastructure, insufficient professional development opportunities, and a lack of culturally relevant teaching resources. These constraints hinder teachers' ability to effectively integrate technology into their instruction, which, in turn, affects students' engagement and learning outcomes.

The novelty of this study lies in the development of a context-specific TPACK self-report questionnaire designed exclusively for junior high school English teachers in Jayapura, Papua, a group that has not been the focus of previous TPACK measurement tools. Unlike existing self-report questionnaire, which typically assume adequate ICT access and are developed for general or non-language subjects, this self-report questionnaire incorporates contextualized, Papua-relevant items that reflect local technological constraints, linguistic needs, and teaching realities. It therefore captures dimensions of teachers' technological practice that existing self-report questionnaire are unable to measure.

Addressing this issue, through a valid and reliable TPACK self-report questionnaire will not only identify teachers' current competence levels but also guide targeted interventions to enhance technology-integrated English teaching in the Papuan context. Accordingly, this study seeks to answer the following research questions:

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1. How can a valid and reliable self-report questionnaire be developed to assess the TPACK proficiency of English teachers at the junior high school level in Jayapura, Papua?
2. How effective is the developed self-report questionnaire in measuring teachers' competence in integrating technology into English language teaching?

Method

This study employed a Research and Development (R&D) design using the ADDIE model (Analysis, Design, Development, Implementation, Evaluation). The target population consisted of all junior high school English teachers in Jayapura City, Papua. A total of 34 teachers were selected through a stratified random sampling technique.

Participant Demographics

Participants included 34 junior high school English teachers aged 24–55 years. Their teaching experience ranged from 2–20 years. The sample consisted of 31 females and 3 males. Teachers came from public and private schools. This demographic information was collected to ensure the self-report questionnaire was tested across diverse teacher profiles in Jayapura.

Analysis Phase

The analysis phase involved collecting foundational information to guide the development of the TPACK self-report questionnaire. First, teacher characteristics and contextual conditions in Jayapura were examined, including technological access, ICT readiness, and instructional challenges. Existing TPACK self-report questionnaire were reviewed to identify limitations, particularly their lack of contextual relevance for English teachers in low-connectivity regions such as Papua. The analysis phase concluded with defining the objectives and scope of a context-specific TPACK self-report questionnaire.

Design Phase

In the design stage, the TPACK framework was operationalized into seven components: 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). Each component was represented by one competency indicator, which was expanded into 3–7 statements measured using a four-point Likert scale (1 = Strongly Disagree, 4 = Strongly Agree), where higher scores indicated stronger perceived competence. All questionnaire items were written in Indonesian.

Development Phase

During the development stage, the draft questionnaire was evaluated through expert judgment. Two experts were selected based on the following credentials:

- **Expert 1:** Ph.D. in English Education, over 20 years of experience in teacher professional development, and specialization in Technology-based instructional design.
- **Expert 2:** Ph.D. in English Education with specialization in Educational Measurement and Evaluation, with 20 years of experience in test development and educational assessment.

Experts assessed item clarity, relevance, and alignment with TPACK constructs using a validation sheet. Their qualitative feedback and relevance ratings were used to revise the self-report questionnaire prior to pilot testing.

Implementation Phase

The revised self-report questionnaire was pilot-tested with the 34 participating teachers. The questionnaire was administered online via Google Forms and teachers completed it individually within approximately 10 minutes. Responses on the four-point Likert scale produced numerical data used for statistical analysis. Item validity was examined using item–total correlation analysis, with items considered valid if $r > 0.30$, a commonly used threshold indicating acceptable discrimination in educational measurement. Reliability was assessed using Cronbach's Alpha. All statistical analyses were conducted using SPSS version 29.

Evaluation Phase

The evaluation phase reviewed each stage of the ADDIE process to ensure that the final self-report questionnaire met its development goals, demonstrated adequate psychometric properties, and aligned with the instructional and technological realities of English teachers in Papua. Feedback from experts and pilot-test results informed the final revision.

Ethical Considerations

All participants received detailed information about the study objectives, procedures, and their rights. Participation was voluntary, and written informed consent was obtained. Confidentiality and anonymity were ensured throughout data collection and reporting.

Results

This research adopted the ADDIE instructional design model, encompassing five sequential phases: Analysis, Design, Development, Implementation, and Evaluation. The primary aim of the study was to construct an assessment tool for

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evaluating the TPACK competency of junior high school English teachers. Throughout the research process, several expert judgments were employed to evaluate the self-report questionnaire, serving as criteria for the success of the TPACK self-report questionnaire development.

Analysis Phase

The analysis phase focused on identifying the specific characteristics and needs of junior high school English teachers in Jayapura City regarding the integration of technology into their pedagogical practices. Data obtained from preliminary surveys involving 34 teachers indicated that the primary challenges identified included limited access to school-owned digital devices, reported by 20 teachers (58.8%), inadequate participation in recent ICT or TPACK-related training, experienced by 26 teachers (76.5%), and low confidence in integrating technology into classroom instruction, with only 12 teachers (35.3%) feeling comfortable doing so. Classroom technology use was also limited, as merely 9 teachers (26.5%) reported using digital tools at least once per week.

Interview findings further supported these results. Several teachers expressed difficulties in adapting to new digital platforms, with one participant noting, *"We want to integrate technology, but we are not confident because we were never trained to use these tools effectively."* Another teacher highlighted the contextual challenge, stating, *"Schools in our area do not always have stable internet access, so many tools recommended in national guidelines are not realistic for us."* These insights highlight not only the skill gaps but also the infrastructural constraints affecting technology integration.

Additionally, the review of existing TPACK self-report questionnaire revealed that most tools were developed in contexts significantly different from Papua, often assuming stable technological access and consistent teacher digital proficiency. Such assumptions do not align with the conditions in Jayapura. Therefore, the need for a valid and reliable TPACK assessment that is responsive to the unique educational realities of Jayapura City is strongly justified.

Design Phase

In the design phase, the development of the TPACK self-report questionnaire was guided by the conceptual framework of Koehler and Mishra (2009), which outlines seven essential knowledge domains: Pedagogical Knowledge (PK), Content Knowledge (CK), Technological Knowledge (TK), Technological Pedagogical Knowledge (TPK), Technological Content Knowledge (TCK), Pedagogical Content Knowledge (PCK), and the integrated Technological Pedagogical Content Knowledge (TPACK). This stage focused on defining each component operationally, formulating achievement indicators, and constructing the questionnaire items accordingly. The following table outlines the framework of the self-report questionnaire's design.

Table 1. Operational Definition and Indicator of Each TPACK's Aspect

No	Aspect	Operational Definition	Indicator
1	Pedagogical Knowledge (PK)	Teachers' understanding of effective teaching methods, classroom management, and learning strategies	Demonstrates knowledge of effective classroom teaching strategies.
2	Content Knowledge (CK)	Mastery of English subject matter based on the junior high school curriculum.	Demonstrates mastery of English subject content
3	Technological Knowledge (TK)	Proficiency in using general digital tools for educational purposes	Demonstrates ability to operate commonly used educational technologies
4	Technological Pedagogical Knowledge (TPK)	Ability to integrate digital tools into teaching strategies effectively	Demonstrates ability to select appropriate technologies to enhance teaching strategies
5	Technological Content Knowledge (TCK)	Ability to represent English subject content using digital media and tools	Demonstrates ability to explain English content using digital media
6	Pedagogical Content Knowledge (PCK)	Competence in aligning pedagogical techniques with specific English language materials	Demonstrates ability to apply suitable pedagogical strategies for English instruction
7	Technological Pedagogical Content Knowledge (TPACK)	Proficiency in harmonizing subject matter, pedagogy, and technology to underpin effective teaching and learning	Demonstrates ability to integrate pedagogy, content, and technology effectively

After outlining the operational definitions and identifying the indicators for each TPACK component, the following section presents the statements that have been developed based on those indicators, tailored to the local context of Papua. For each indicator, 4 statements were developed, resulting in a total of 28 items (7 components × 4 items). Each TPACK component was assigned four items to ensure balanced construct representation and maintain comparability across the seven domains. Using four items also aligns with psychometric recommendations that a construct should have at least three indicators, while still keeping the questionnaire concise and manageable for teachers. This structure provides adequate coverage of each component without increasing respondent burden. Each statement aimed to assess the teachers' self-perceived competence on a four-point Likert scale (1=Strongly Disagree, 2=Disagree, 3=Agree, and 4=Strongly Agree).

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Table 2. Questionnaire Statement

No	Component	Questionnaire Statement
1	PK	1. *Saya dapat mengelola kelas dengan strategi pembelajaran yang disesuaikan dengan kondisi lokal siswa saya.* (I can manage the classroom using instructional strategies that are adapted to my students' local context)
		2. *Saya dapat merancang pembelajaran yang melibatkan budaya lokal agar siswa lebih tertarik* (I can design lessons that incorporate local culture to increase student engagement)
		3. *Saya dapat memilih metode pembelajaran sederhana namun efektif dalam keterbatasan fasilitas (*I can select simple yet effective teaching methods despite limited facilities)
		4. *Saya memahami cara mengevaluasi hasil belajar siswa meskipun tanpa perangkat digital (*I understand how to assess student learning outcomes even without digital devices)
2	CK	5. *Saya memahami materi Bahasa Inggris sesuai kurikulum SMP dan mampu menyesuaikannya dengan latar belakang siswa Papua (*I understand English subject matter based on the junior high school curriculum and can adapt it to the backgrounds of Papuan students)
		6. *Saya dapat menjelaskan kosakata Bahasa Inggris dengan contoh-contoh yang relevan dengan kehidupan di Papua (*I can explain English vocabulary using examples that are relevant to everyday life in Papua)
		7. *Saya memahami struktur teks Bahasa Inggris dan dapat mengaitkannya dengan konteks local (*I understand the structure of English texts and can connect it to local contexts)
		8. *Saya dapat memberikan contoh penggunaan Bahasa Inggris dalam situasi sehari-hari di lingkungan sekitar sekolah (*I can provide examples of English usage in daily situations within the school environment)
3	TK	9. *Saya dapat menggunakan perangkat digital sederhana seperti handphone atau speaker aktif untuk mendukung pembelajaran (*I can use simple digital devices such as mobile phones or speakers to support learning)
		10. *Saya dapat memanfaatkan aplikasi ringan yang bisa digunakan meskipun jaringan internet terbatas (*I can utilize lightweight applications that work even with limited internet access)
		11. *Saya terbiasa menggunakan perangkat dasar seperti proyektor atau laptop jika tersedia di sekolah (I* am familiar with using basic devices such as projectors or laptops when they are available at school)
		12. *Saya memanfaatkan media sosial atau grup WA untuk menyampaikan materi atau informasi pembelajaran (*I use social media or WhatsApp groups to deliver learning materials or share instructional information)
4	TPK	13. *Saya dapat memilih alat teknologi sederhana yang efektif untuk pembelajaran di kelas saya (*I can select simple technological tools that are effective for teaching in my classroom)

		14. *Saya dapat menggabungkan metode mengajar tradisional dengan penggunaan teknologi sederhana (*I can combine traditional teaching methods with the use of simple technology)
		15. *Saya tahu kapan saat yang tepat menggunakan alat teknologi untuk meningkatkan pemahaman siswa (*I know when it is appropriate to use technological tools to enhance students' understanding)
		16. *Saya menyesuaikan penggunaan teknologi dengan kondisi infrastruktur sekolah saya (*I adjust my use of technology based on the school's infrastructural conditions)
5	TCK	17. *Saya menggunakan gambar, audio, atau video sederhana untuk menjelaskan materi Bahasa Inggris (*I use simple images, audio, or video to explain English material)
		18. *Saya memilih bahan ajar digital yang bisa diakses offline oleh siswa (*I select digital learning resources that students can access offline)
		19. *Saya dapat membuat bahan ajar visual sederhana untuk membantu pemahaman siswa (*I can create simple visual learning materials to support student understanding)
		20. *Saya menjelaskan materi Bahasa Inggris menggunakan media yang mudah dijangkau, seperti poster atau rekaman audio (*I explain English material using accessible media such as posters or audio recordings)
6	PCK	21. *Saya memilih pendekatan mengajar Bahasa Inggris yang sesuai dengan karakter siswa Papua (*I select English teaching approaches that are suitable for the characteristics of Papuan students)
		22. *Saya memahami kesulitan siswa di daerah saya dalam belajar Bahasa Inggris dan menyesuaikan cara mengajarnya (*I understand the difficulties faced by students in my area when learning English and adjust my teaching approach accordingly)
		23. *Saya dapat merancang aktivitas pembelajaran yang kontekstual dan menyenangkan (*I can design contextual and enjoyable learning activities)
		24. *Saya menjelaskan materi Bahasa Inggris dengan contoh dari budaya atau lingkungan local (*I explain English material using examples related to local culture or environment)
7	TPACK	25. *Saya dapat merancang pembelajaran Bahasa Inggris yang menggabungkan teknologi sederhana dan pendekatan local (*I can design English lessons that integrate simple technology and local approaches)
		26. *Saya dapat membuat rencana pelajaran yang realistis dan sesuai dengan kondisi sekolah di Papua (*I can create lesson plans that are realistic and appropriate for school conditions in Papua)
		27. *Saya dapat mengevaluasi keberhasilan penggunaan teknologi dalam pembelajaran saya secara reflektif (*I can reflectively evaluate the effectiveness of technology use in my teaching)
		28. *Saya dapat menyesuaikan materi, metode, dan teknologi agar cocok untuk siswa saya di Papua (*I can adapt materials,

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		methods, and technology to suit the needs of my students in Papua)

Development Phase

In the development phase, the TPACK self-report questionnaire, which had been designed with 28 contextually relevant statements, was constructed and subjected to expert validation to ensure its content validity and clarity. The first step involved the preparation of the draft questionnaire in Indonesian language, incorporating the revised statements tailored to the educational conditions in Jayapura, Papua. Each item was arranged according to the seven TPACK components and was formatted using a four-point Likert scale, ranging from 1 (Strongly Disagree) to 4 (Strongly Agree).

Next, the draft self-report questionnaire underwent expert judgment by two specialists, one with expertise in teacher competency development and the other in educational assessment and evaluation. These experts were asked to assess the self-report questionnaire based on specific criteria, including the relevance of each statement to the corresponding TPACK component, the clarity and cultural appropriateness of the language, and the suitability of each item for junior high school English teachers operating within the contextual challenges typical of Papua. To quantify the experts' evaluations, a validation sheet was utilized. Each item in the questionnaire was assessed using two criteria: relevance and clarity. For each criterion, a binary scoring system was applied, items were rated as 1 if deemed relevant or clear, and 0 if considered not relevant or in need of revision.

Based on the experts' feedback, minor revisions were made to enhance clarity without altering the essence of the statements. For example, some terms were simplified to align better with the everyday language used by teachers in Papua, and examples in the items were refined to include more familiar cultural references. The Content Validity Index (CVI) was assessed based on expert considerations, which assessed two key components: relevance and clarity. The self-report questionnaire obtained a CVI score of 0.91 for relevance and 0.93 for clarity. The overall average CVI across all components was 0.92, indicating a very high level of content validity. According to established benchmarks, a CVI score above 0.80 is considered excellent, thus confirming that the self-report questionnaire items were both highly relevant and clearly formulated.

After incorporating the experts' suggestions, the final version of the TPACK questionnaire consisted of:

1. 7 components (PK, CK, TK, TPK, TCK, PCK, TPACK),
2. 28 statements (4 statements per component),
3. Structured in an easy-to-follow format for respondents,
4. Written fully in *Bahasa Indonesia* with contextual relevance for Papua.

This finalized self-report questionnaire was then ready to be implemented for pilot testing with junior high school English teachers during the next phase.

Implementation Phase

The implementation phase was accomplished to examine the practicality, validity, and reliability of the developed TPACK questionnaire. A total of 34 English teachers from public and private junior high schools in Jayapura City were involved in this phase. The sample was selected using a stratified random sampling technique to ensure diverse representation across different school conditions.

Each respondent completed the self-report questionnaire consisting of 28 statements, 4 items per each of the 7 TPACK components rated on a 4-point Likert scale (1 = Strongly Agree (*Sangat Tidak Setuju)*, 2 = Disagree (*Tidak Setuju)*, 3 = Agree (*Setuju)*, 4 = Strongly Agree (*Sangat Setuju*). The collected data were analyzed in three major steps: descriptive analysis, validity testing, and reliability testing.

1. Descriptive Analysis

The descriptive analysis aimed to identify the average TPACK profile of the teachers based on their responses. The results are presented in **Table 3** below.

Table 3. Descriptive Analysis

No.	TPACK's Components	Number of Item	Average	Standard Deviation
1	Pedagogical Knowledge (PK)	4	3.24	0.72
2	Content Knowledge (CK)	4	3.39	0.57
3	Technological Knowledge (TK)	4	3.38	0.67
4	Technological Pedagogical Knowledge (TPK)	4	3.33	0.57
5	Technological Content Knowledge (TCK)	4	3.33	0.60
6	Pedagogical Content Knowledge (PCK)	4	3.29	0.63
7	TPACK (Integrated Knowledge)	4	3.26	0.58
—	**Average**	**28**	**3.31**	**0.62**

As shown in the table, teachers scored the highest on Content Knowledge (CK) (M = 3.39), followed by Technological Knowledge (TK) (M = 3.38), and Technological Pedagogical Knowledge (TPK) and Technological Content Knowledge (PCK) (M = 3.33). The lowest score appeared in Pedagogical Knowledge (PK) (M = 3.24), suggesting that despite strong technological and subject-matter knowledge, pedagogical proficiency remains a challenge.

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2. Validity Testing

Construct validity was examined using item-total correlation analysis. The results showed that all 28 items had Pearson correlation coefficients exceeding 0.30, with values ranging from 0.510 to 0.896, indicating that each item is valid and contributes significantly to the measurement of its respective construct. The summary of item validity is displayed in **Table 4.**

Table 4. Validity Test Results (Pearson Correlation Coefficient)

Item No.	1	2	3	4	5	6	7	8	9	10
Pearson Correlation	,692	,748	,510	,537	,854	,820	,721	,836	,708	,513
Status	Valid	Valid	Valid	Valid	Valid	Valid	Valid	Valid	Valid	Valid

Item No.	11	12	13	14	15	16	17	18	19	20
Pearson Correlation	,516	,766	,618	,774	,668	,810	,773	,565	,796	,769
Status	Valid	Valid	Valid	Valid	Valid	Valid	Valid	Valid	Valid	Valid

Item No.	21	22	23	24	25	26	27	28
Pearson Correlation	,801	,828	,873	,681	,806	,796	,713	,896
Status	Valid	Valid	Valid	Valid	Valid	Valid	Valid	Valid

3. Reliability Testing

The reliability of the self-report questionnaire was calculated using Cronbach's Alpha, resulting in a value of 0.966, which is categorized as very high reliability. This indicates that the self-report questionnaire consistently measures teachers' TPACK proficiency across respondents and components.

Evaluation Phase

The evaluation phase ensured that all stages of development produced a valid, reliable, and contextually appropriate TPACK self-report questionnaire for junior high school English teachers in Jayapura. Formative evaluation was conducted throughout the ADDIE process, incorporating expert feedback such as *"clarify distinctions between TK and TCK items"* and *"ensure wording reflects infrastructural constraints."* Teachers' comments during implementation also guided refinement; many noted that the items were clear and aligned with their teaching realities (e.g., *"the questions reflect our actual classroom conditions"*), although several suggested adding more localized examples and simplifying longer statements. These insights highlighted both the strengths and the contextual resonance of the self-report

questionnaire.

The evaluation also revealed several limitations, including difficulties completing the digital version in areas with unstable internet, uncertainty with items referencing rarely used technologies, and rushed responses due to limited time. Summative evaluation confirmed the self-report questionnaire's robustness, reflected in its high CVI (0.92), strong construct validity, and excellent reliability (α = 0.966). Looking ahead, future iterations should incorporate broader pilot testing across Papua, include optional guiding examples for technology-related items, and allocate more time for cognitive interviews to refine item interpretation. These reflections will enhance clarity, adaptability, and scalability in subsequent development cycles.

Discussion

The results of this study demonstrate that the developed TPACK questionnaire possesses strong psychometric properties and is suitable for assessing English teachers' technological, pedagogical, and content-related competencies in Jayapura. The descriptive findings indicate that teachers rated themselves highest in Content Knowledge (CK) (M = 3.39) and Technological Knowledge (TK) (M = 3.38). These high scores suggest that teachers feel confident in subject-matter knowledge and in basic technology use, reflecting broader trends in Indonesian schools where mobile devices and basic digital tools are increasingly familiar. In contrast, Pedagogical Knowledge (PK) produced the lowest mean (M = 3.24), indicating that teachers may still face challenges in selecting or adapting instructional strategies, especially in resource-limited contexts. This pattern underscores the need for targeted pedagogical training that complements technology-related skills.

Item-level performance further supports the self-report questionnaire's robustness. All 28 items met the validity threshold ($r > 0.30$), with correlations ranging from 0.510 to 0.896. The strongest items were those in the Content Knowledge and TPACK integrated domains (e.g., Items 5, 7, 25, and 28), which may reflect teachers' familiarity with curricular content and the practical relevance of integrating technology with pedagogy and context. The weakest items, although still valid (e.g., Items 3, 10, 11 with $r \approx 0.510–0.516$), were associated with pedagogical and basic technological skills. These results are consistent with earlier needs-analysis findings indicating variability in teachers' pedagogical confidence and uneven access to technology, supporting the self-report questionnaire's sensitivity in detecting actual competence differences.

Compared with widely used TPACK self-report questionnaire (Archambault & Crippen, 2009; Baser et al., 2016; Schmidt et al., 2009), the present self-report questionnaire differs in three important ways. First, existing self-report questionnaire were developed in technology-rich environments, whereas this study focuses on a low-infrastructure context, making its items more realistic for teachers in Papua. Second, the current self-report questionnaire uses contextualized and

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practice-based statements rather than abstract indicators, ensuring better interpretability among teachers with limited technological exposure. Third, the balance of four items per construct allows for comprehensive content coverage while maintaining practicality for in-service teachers.

Several limitations should be acknowledged. The sample size (n = 34) restricts generalization, and some teachers reported unfamiliarity with technologies mentioned in the items, which may have influenced response patterns. Additionally, the study relied solely on self-report data, which may introduce bias, and confirmatory factor analysis (CFA) was not conducted due to sample constraints. Future research should expand the participant pool, include classroom observations to complement teacher self-perceptions, and conduct CFA to validate the factor structure.

Conclusion

This study aimed to design a Technological Pedagogical Content Knowledge (TPACK) assessment instrument tailored for junior high school English teachers in Jayapura City. The development process, based on the ADDIE model, resulted in an empirically validated and contextually grounded self-report questionnaire.

The key scientific finding of this research is the successful construction of a TPACK self-report questionnaire that is both statistically valid and contextually appropriate, particularly within the socio-educational challenges of Papua. The self-report questionnaire effectively captures teachers' competencies in infusing technology, pedagogy, and content, and serves as a practical tool for assessing and improving professional teaching practices.

Therefore, the research objective has been achieved: the development of a reliable self-report questionnaire that can measure the level of TPACK mastery among English teachers in a specific regional context.

Future study is hoped to expand the implementation of the TPACK assessment self-report questionnaire in broader educational contexts beyond Jayapura, including rural and inland areas of Papua, where technological and infrastructural challenges are more severe. The self-report questionnaire can also be adapted and tested for other subject areas and educational levels to enhance its applicability and generalizability.

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