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Analysis of the Content Validity of the Elementary Teacher Belief Instrument on TPACK and Its Use in Distance Learning

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ABSTRACT

Teachers are required to have adequate technological, pedagogical, and content knowledge (TPACK) in supporting distance learning. The purpose of this study is to prove validity of instrument content 1) to identify the elementary school teachers' towards the use of TPACK, and 2) the use of TPACK in distance learning. The two instruments in this study were developed into 7 indicators. This research method is a descriptive research method using quantitative descriptive analysis techniques. Where the results of proving the validity of the contents were carried out by experts and analyzed using Aiken's V formula with a minimum standard of V Aiken is ≥ 0.88. The results showed that the coefficient of validity of the contents of 30 aitems in the teacher's belief instrument against TPACK there were 28 aitems that were declared valid with a value of ≥ 0.82, while the instrument of use of TPACK in distance learning obtained for the coefficient of validity of the contents of 30 aitems there were 24 aitems that were declared valid with a ≥ value of 0.76. Therefore, this instrument can be used to identify the elementary school teachers' belief in Indonesia and Malaysia towards TPACK and its use in distance learning. The results of this research instrument are expected to contribute to readers, especially for future researchers in knowing the TPACK capabilities needed by an educator when carrying out the distance learning process and the impact of using TPACK in learning.

Keywords: *Instruments, Teachers Belief, TPACK, Validity of Content, Elementary School*

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INTRODUCTION

The COVID-19 pandemic that has spread in various parts of the world has had an impact on various sectors, including the education sector. In order for students to continue to have the right to proper education during the pandemic, various countries have issued distance learning policies, including Indonesia and Malaysia. Uno (2009) defines distance learning as a set of teaching methods where teaching activities are carried out separately from learning activities. The separation of the two activities can be in the form of location or conditions. Meanwhile, according to Rogers et al. (2009), distance learning is a learning system when teachers and students are separated geographically or technologically. Perkowski (2013) states

that distance learning can occur through various modes of communication, including synchronously, asynchronously, or a combination of both. Synchronous communication occurs at the same time and generally in the same place or real time, whereas asynchronous does not occur at the same time or in the same place and generally occurs in a virtual environment through a discussion platform or e-mail.

Distance learning is an effective solution in Indonesia and Malaysia to continue the learning process during the COVID-19 pandemic which does not allow face-to-face learning. Online learning implemented during the pandemic is used to replace practical learning is considered not fully effective (Aprilia et al., 2023; Hakim et al., 2022). However, the implementation of distance learning in schools still finds various challenges and obstacles. Some of the obstacles experienced by students, teachers and parents in distance learning activities in Indonesia and Malaysia include lack of mastery of technology, internet quota costs, limited internet access in some areas, limited devices owned by students, and erratic working hours so that there must be communication and coordination with parents, other teachers, and school principals (Fauzi & Sastra Khusuma, 2020; Febrianto et al., 2020; Suryaman et al., 2020). This obstacle is both a learning and a challenge for all parties to work together to create effective and fun distance learning.

Teachers become an essential factor in achieving the distance learning process. A teacher must have adequate competence in accordance with the demands of the times. Successful teachers in the 21st century are teachers who are able to utilize and use appropriate technology and teaching strategies in the classroom (Chai et al., 2013; İbrahim Çetin [1], 2018; Zelkowski et al., 2013). Mishra & Koehler (2006) added that it is important for teachers to have adequate knowledge of technology, pedagogical knowledge, and content knowledge or commonly referred to as TPACK (Technology Pedagogy Content Knowledge). The use of TPACK in online learning or distance learning is urgently needed. To measure teacher competence related to TPACK (Technology Pedagogy Content Knowledge), valid instruments are needed so that the survey results are in accordance with facts in the field. These results can be used as a reference for follow-up actions in order to improve and improve the quality of distance learning during the Covid-19 pandemic, so that students do not lose their rights to obtain quality learning in the context of distance learning.

Based on the explanation above, the purpose of this study is to prove the validity of the contents of the instrument 1) to identify the elementary school teachers' belief in Indonesia and Malaysia towards the use of TPACK, and 2) the use of TPACK in distance learning in

elementary schools. The two instruments in this study were developed into 7 indicators, namely technology knowledge (TK), content knowledge (CK), pedagogic knowledge (PK), pedagogic content knowledge (PCK), technology content knowledge (TCK), technology pedagogical knowledge (TPK), and pedagogical content knowledge technology (TPACK).

METHODS

This research method is a descriptive research method using quantitative descriptive analysis techniques. This research is part of research on the development of teacher belief instruments on TPACK and its use in distance learning in elementary schools. The target of this instrument will be used to measure primary teachers' belief in TPACK and its use in distance learning in Indonesia and Malaysia. The subjects of this study involved 2 experts from the field of educational technology and children's language, as well as 2 practitioners (elementary school teachers). The four experts were asked to review 2 instruments according to their areas of expertise. However, before the expert assessment is carried out, the two instruments are validated by measuring experts by referring to the dimensions of construct representation, clarity, and relevance.

The instruments used in data collection in this study were 2 questionnaires that were easy to quantify and there were notes from experts qualitatively. The data analysis technique used in this study is a quantitative descriptive analysis technique. Where the results of proving the validity of the contents carried out by experts are analyzed using the Aiken's V formula. In proving the validity of the content (Azwar, 2016), researchers can determine the number of rating categories desired. This study used a Likert scale with 5 rating categories and 4 raters (experts). The number of rating categories affects the content validity standards determined by Aiken. Based on the standard set by Aiken (1985) Aiken's minimum standard V for this study is ≥ 0.88. Therefore, an item that has an index V Aiken ≥ 0.88 then the validity of the contents of the item is considered valid or good. Aiken's coefficient of validity can be calculated by calculating the raw scores of experts totaling n. The value of Aiken's V coefficient has a range between -1 to 1 (Supahar & Prasetyo, 2015).

The data from the expert judgment assessment is analyzed with Aiken's formula (Aiken, 1985) where each aspect is calculated content validity index with the following calculation:

$$V = \sum s / [n(C-1)] \quad \text{.....1)}$$

Information:

S = r – lo

Lo = Lowest rating numbers

C = Highest rating numbers

R = Figures provided by the appraiser

RESULTS AND DISCUSSION

Results

TPACK is a finding of Koehler dan Mishra (2006) to achieve effective teaching through technology integration. Based on the findings and literature studies from the analysis of relevant scientific journals and books, 7 components in TPACK are determined including *technology knowledge* (TK), *content knowledge* (CK), *pedagogic knowledge* (PK), *pedagogic content knowledge* (PCK), *technology content knowledge* (TCK), *technology pedagogical knowledge* (TPK), *and pedagogical content knowledge technology* (TPACK). From the findings of the 7 components of TPACK, it is a reference indicator of this research instrument, both the instrument of teacher' belief in TPACK and the use of TPACK in distance learning in elementary schools. The grid of teachers' belief instruments on TPACK and the use of TPACK in distance learning in elementary schools can be seen in table 1.

Tabel 1. Research Instrument

No	Variabel	Indicators	Number of item
1	Teachers' belief in TPACK	Technology Knowledge (TK)	4
		Content Knowledge (CK)	4
		Pedagogical Knowledge (PK)	5
		Pedagogical Content Knowledge (PCK)	3
		Technological Content Knowledge (TCK)	3
		Technological Pedagogical Knowledge (TPK)	5
		Technological Pedagogical Content Knowledge (TPACK)	4
		Total	**28**
2.	Use of TPACK in Distance Learning in Elementary Schools	Technology Knowledge (TK)	3
		Content Knowledge (CK)	3
		Pedagogical Knowledge (PK)	5
		Pedagogical Content Knowledge (PCK)	3
		Technological Content Knowledge (TCK)	3
		Technological Pedagogical Knowledge (TPK)	3
		Technological Pedagogical Content Knowledge (TPACK)	3
		Total	**23**

Based on table 1. the teacher's belief instrument on TPACK and the use of TPACK in distance learning in elementary schools are a reference for researchers in compiling each item. Item writing is carried out by paying attention to the rules of writing that have been determined. This is done so that the instruments developed are in accordance with research objectives and reliable.

One of the steps that must be passed in proving the reliability of the instrument is the validity of the content. Azwar (2012) states that the validity of the content is done to ascertain whether the content of the instrument measures precisely the situation to be measured through rational analysis. Content validity is usually done during the early stages of instrument development. The use of expert panels, such as those used in the Delphi method, is a representative way to test the validity of content. The goal is to reduce the risk of errors in the development of instruments and increase the likelihood of obtaining a construction validity index.

The use of expert panels is carried out during the expert judgment process. The first validation is carried out by educational measurement experts to assess the validity of the instrument using an instrument review sheet consisting of dimensions of construct representation, clarity, and relevance. The results of the first instrument validation can be described as follows:

Table 2. Instrument Validation Results 1 and 2 First Stage

No	Aspects	Criterion	Rating Score	
			Instrument 1 (Teacher's Belief in TPACK)	**Instrument 2 (Use of TPACK)**
1	Material	Statements in accordance with the indicator formula in the grid	5	4
		Suitability of aspects measured at each game with the grid	4	4
		Conformity of indicators with statements on the grid	5	4
2	Construction	There are clear instructions on how to use	5	5
		The statement is clearly formulated	4	5
		The statement is firmly formulated	4	5
		The statement does not give rise to a double interpretation.	5	5
		Each item of the statement contains one idea.	5	5
		Statements do not contain social desirability	5	5
		Easy-to-understand instrument display	5	5

No	Aspects	Criterion	Rating Score	
			Instrument 1 (Teacher's Belief in TPACK)	**Instrument 2 (Use of TPACK)**
3	Language	The writing of the statement is in accordance with the rules of the Indonesian.	4	4
		Not using a specific regional language (cultural bias).	5	5
		Language used communicatively	5	5
		Clarity of language for users	5	5
Total Score			**66**	**65**
Average score			**4,71**	**4,64**
Information			**Very good**	**Very good**

From table 2 shows the validation score of instrument 1 obtained 4.71 with the very good category and the score of instrument 2 obtained 4.64 with the very good category. Based on the results of these acquisitions, both instruments have been eligible to continue the second stage of the validation process. In this second stage, validation was carried out by 4 experts consisting of 2 experts with experts in the fields of educational technology, and children's language, and 2 practitioners (elementary school teachers). The results of the assessment from experts / raters in quantitative form using Likert and qualitative scales (description). The results of the qualitative assessment can be seen in table 3.

Table 3. Qualitative Assessment Results from Experts

Instrument 1 (Teacher's Belief in TPACK)	
Expert 1 (Educational Technology)	• Parental involvement is included in pedagogical theory, because pedagogical talk is more to the teacher. It may be more to the carrying capacity but not only parents, but can be associated with other carrying capacity such as learning resources, techniques, message delivery, assignments, and so on. • For PCK points a and no. 1 distance learning process and less synchronized feedback, it may need an explanation. Including whether giving feedback is important but what the focus is on the assignment or the entire learning process or both need to be clarified the item to be in sync.
Expert 2 (Children's language)	• Use italic letters for foreign terms. • Have a final punctuation mark at the end of each statement.
Expert 3 (Elementary school teacher 1)	There are several sentences that need to be adjusted according to the advice per aitem
Expert 4 (Elementary school teacher 2)	Adjusting a few sentences appropriate for a particular aitem
Instrument 2 (Use of TPACK in distance learning)	
Expert 1 (Educational Technology)	• PK indicator section at point 2 teachers use offline, but the items written from the beginning use online, so it needs to be clarified • Need to be given additional points from PK items, there is an offline strategy, for example teachers design discussion methods / projects for certain materials, so that they are accommodated online, offline, and

	blended
Expert 2 (Children's language)	• Use italic letters for foreign terms. • Have a final punctuation mark at the end of each statement.
Expert 3 (Elementary school teacher 1)	There are several sentences that need to be adjusted according to the advice per aitem
Expert 4 (Elementary school teacher 2)	Adjusting a few sentences appropriate for a particular aitem

Table 3 shows experts recommend several items related to content, language, word selection, use of italic letters and punctuation, and tailor the content of statements to the measured latent construction. The detailed items of the two instruments can be described in tables 2 and 4. These improvements aim to facilitate respondents' understanding of item content and improve convergent and discriminant validity. Quantitatively, the validity of the content is indicated by the expert agreement index (CVI). An item is eligible if it has a CVI of ≥ 0.88. The results of the analysis of the validity of the contents of both instruments can be seen in tables 4 and 5.

Table 4. Aiken V Value of each Instrument Item 1 (Teacher's Belief in TPACK)

Item	V value	Information
1-4, 6-14, 16-28,	0,9375	Valid
5, 15	1	Valid
29	0,875	Invalid
30	0,8125	Invalid
Average Aiken V Index	**0,935417**	

Table 5. Aiken V Value per Instrument Item 2 (Use of TPACK in Distance Learning in Elementary)

Item	V	Information
1-4, 5-9, 11, 14-17, 19-21, 23-25	0,9375	Valid
12, 13, 18	1	Valid
10	0,8125	Invalid
22	0,75	Invalid
Average Aiken V Index	**0,9275**	

Based on tables 4 and 5 of the validity coefficient of the contents of the 30 aitems on the teacher's belief instrument against TPACK there are 28 aitems that are declared valid with an average value of ≥ 0.935, and 2 invalid aitems ≤ 0.88. While the instrument of the use of TPACK

in distance learning obtained for the validity coefficient of the contents of 25 aitems there are 23 aitems that are declared valid with an average value of ≥ 0.927 and 2 invalid aitems ≤ 0.88. Thus the 28 aitems on the teacher's belief instruments towards TPACK and 23 aitems on TPACK use instruments in distance learning have good content validity and support the validity of the overall content of the instrument.

The results of the overall content validity assessment have good validity because they have a content validity index above the standard. Because basically, content validity measures how many items on the scale have a strong correlation with the construction it measures. It should be noted that the validity of the content is not a guarantee in identifying the concept of measurement, but assessing the validity of the content supports the validity of the construct of the instrument (Yaghmale, 2003).

Discussion

The results of the questionnaire and FGD use of TPACK in distance learning during the Covid-19 pandemic, including supporting factors and obstacles are spelled out based on 7 indicators from TPACK, namely technology knowledge (TK), content knowledge (CK), pedagogical knowledge (PK), pedagogical content knowledge (PCK), technological content knowledge (TCK), technological pedagogical knowledge (TPK), and technological pedagogical content knowledge (TPACK). In detail, the results and discussions of the use of TPACK and supporting factors and inhibitors are spelled out as follows.

1. The Use of TPACK

Based on the results of the survey, most teachers have utilized internet technology to insert content that is in accordance with learning materials, learning goals, and learning strategies. The findings in the field showed that teachers at the elementary school level were skilled at using zoom and google meet. Both palications are the video communication applications most often used by teachers on various devices, both mobile and desktop. This is supported by some previous findings that Zoom has an impact on improving student performance in self-study, managing time and increasing motivation (Bawanti & Arifani (2021); Guzachev (2020)). This media is quite good in conveying information in detail but sometimes students and parents complain about it because it requires a lot of internet quotas.

Based on the results of group discussion forums with several elementary school teachers in Indonesia, skilled teachers insert technology in synchronous and asynchronous learning to create variety and minimize student boredom in learning activities. This is important because

asynchronous online learning supports constructivist theory, a student-centered approach that emphasizes the importance of interaction and strengthens self-learning in students (Shahabadi & Uplane,(2015)). This is generally done so that students can study anywhere and can spend their time studying topics they want to know with more flexible time (Malik et al., (2016)). Because asynchronous learning does not take place in real time, students' responses and work needs to get feedback from teachers in order to understand the topic well.

2. Elementary School Teachers' Belief in the Use of TPACK

Distance learning is done as one form of learning that does not require both parties to be physically present at the same place and time during the learning process. The learning process in distance learning can be done and delivered in a variety of ways, such as television, radio, video, audio graphics, chat rooms, email, or telephone communication, web-based sources, or other combinations (Burns, 2011; Das et al., 2018; Scholley, 2001). The success of distance learning requires a variety of considerations, such as infrastructure, teacher and student readiness, as well as expected learning outcomes. Therefore, teachers as an essential factor in the achievement of the distance learning process, especially during the COVID-19 pandemic must be able to create and provide useful and not boring learning conditions by utilizing various digital technologies. Technology is an important component in teaching and learning. Integrating technology into classroom learning is a challenge for elementary school teachers. Successful teachers in the 21st century are teachers who are able to utilize and use appropriate teaching technologies and strategies in the classroom (Chai et al., 2013; İbrahim Çetin [1], 2018; Zelkowski et al., 2013). Mishra & Koehler (2006)) added that it is important for teachers to have adequate technological knowledge, pedagogical knowledge, and content knowledge or commonly referred to as TPACK (Technology Pedagogy Content Knowledge).

Based on the results of the teacher confidence survey on TPACK shows the majority of teachers have good confidence in the components of technological knowledge (kindergarten), content knowledge (CK), technological content knowledge (TCK), pedagogical knowledge of technology (TPK), and pedagogical content of knowledge technology (TPACK), and excellent confidence in the pedagogical knowledge component (PK), pedagogical content knowledge (PCK). This is supported

by the opinion of Rahmadi ((2019)) and Restiana & Pujiastuti (2019) in their research that teacher mastery in pedagogy knowledge is higher than the teacher's mastery of technological knowledge with an age range of 22-23 years. The hope is that with teachers have good confidence in TPACK, the distance learning process can run optimally and reduce some existing obstacles, such as limited internet access in some areas, limited devices owned by students, as well as erratic working hours so that there must be communication and coordination with parents, other teachers, and principals (Fauzi & Sastra Khusuma, 2020; Febrianto et al., 2020; Suryaman et al., 2020). These barriers become learning as well as a challenge for all parties to work together to create effective and fun distance learning.

3. Supporting and Inhibiting factors in the use of TPACK in distance learning.

Supporting factor in the use of TPACK are teachers knowledge and ability to conduct learning based on TPACK. Meanwhile, there are several factors of supporting inhibiting the implementation of TPACK in distance learning during the Covid-19 pandemic, including the following: 1) Infrastructure facilities are inadequate, not all students have gadgets with supportive specifications (e.g. do not have google meet application, pdf reader, etc.); 2) Parents and students' insights about app use are low. Teachers want to apply innovative learning but the circumstances of parents are not supportive, such as parents working into the night while students do not have their own gadgets; 3) Student morale easily drops in learning in pandemic times; 4) The content or learning materials compiled by the teacher are not fully conveyed properly; and 5) Some economic circumstances of students' parents are inadequate, for example not having a supportive gadget, and some students are victims of divorce who get less attention from parents.

The integration of technology in learning activities plays an important role in educating future generations (Luthra & Mackenzie, (2020)). Simplification of the content has become an agreed thing to do because of adjustments to the conditions. Online distance learning has an impact on learning time that cannot be equated with face-to-face learning. Online learning presents challenges especially in student engagement and time management so teachers must design learning effectively (Goodson et al., (2020)). One of the teachers' efforts in utilizing TPACK in learning is through the use of teaching materials that are based on local wisdom in

the application of E-PUB. This application does not burden students by spending a lot of money on internet quota purchases. But its use still requires a large quota (Darihastining & Mardiana, 2022). In addition to digital books, teachers can also take advantage of youtube applications or learning management systems (LMS) such as google classroom, kelas kita, moodle, and so on in improving teacher competence in aspects of media development, so that the implementation of learning using TPACK can be achieved and make learning fun (Manalu, 2022; Utama & Sofyan, 2021). This is certainly an evaluation so that all teachers can adapt the curriculum to various situations including distance learning systems by integrating ICT in learning activities.

CONCLUSION

Distance learning is an effective solution in various countries including Indonesia and Malaysia to continue the learning process during the COVID-19 pandemic. The success of distance learning requires various considerations, such as infrastructure, teacher and student readiness, and expected learning outcomes. Therefore, teachers as an essential factor in the achievement of the distance learning process. Successful teachers in the 21st century are teachers who are able to utilize and use the right technology and teaching strategies in the classroom. It is important for teachers to have adequate technological knowledge, pedagogical knowledge, and content knowledge or commonly referred to as TPACK (Technology Pedagogy Content Knowledge). The use of TPACK in online learning or distance learning is urgently needed. Therefore, instruments are needed to measure teachers' belief in TPACK and its use in distance learning. Part of instrument development research requires content and construct validation so that the instruments used are valid and suitable for widespread use. Based on the results of content validation by expert judgment both quantitatively and qualitatively (description) shows both instruments are valid and feasible to use. It can be seen qualitatively that these two instruments only need improvements related to content, language, word selection, use of italic letters and punctuation, and adjusting the content of statements to indicators. Furthermore, quantitatively the content validity coefficient of 30 items on the teachers' belief instrument on TPACK there were 28 items that were declared valid ≥ 0.88, while the instrument of using TPACK in distance learning obtained for the content validity coefficient of 25 items there were 23 items that were declared valid ≥ 0.88. Thus both instruments have good content validity and support the overall content validity of the instrument. It is hoped that the instrument products that are the results of this research can

be used as a reference and reference for future research to find out more details related to the use of TPACK in distance learning and teachers' beliefs that there is TPACK in elementary schools.

CONFLICT OF INTEREST

This research went well thanks to a good relationship between researchers from Universitas Negeri Yogyakarta (UNY) and researchers from Sultan Idris Education University (UPSI). Therefore, there is no conflict of interest that is too significant, only need more intensive communication online between the two parties.

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