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The relations between technological knowledge, technological content knowledge, technological pedagogical knowledge, technological pedagogical content knowledge and inventive skills among malay language teachers

Ezwafahmey Ahmad Kusaini[1]*, Zamri Mahamod[1], Wan Muna Ruzanna Wan Mohammad[2]
[1]SMK Tun Syed Zahiruddin, Malaysia National
[2]University of Malaysia, Malaysia
*Corresponding Author: ezafrin86@gmail.com

ABSTRACT

Through the use of technology in the classroom, teachers can improve their ability to deliver effective and relevant content. Teachers should be more prepared to apply this technology to ensure that students will have more fun and have a high interest in continuing to learn in the era of globalization which is based on the use of these information communication technology elements in the classroom during the teaching and facilitation process. Thus, this study was to identify the relationship between technological knowledge, technological content knowledge, technological pedagogical knowledge, technological pedagogical content knowledge, and inventive skills for teachers. The questionnaire was distributed to 400 teachers who teach Malay language subjects at Secondary schools in Malaysia. To test the hypothesis, the structural equation using a PLS-SEM framework was used. The results showed that technological knowledge, technological content knowledge, technological pedagogical knowledge, and technological pedagogical content knowledge have a positive relationship with inventive skills for teachers.

Keywords: technological knowledge, technological content knowledge, technological pedagogical knowledge, technological pedagogical content knowledge, inventive skills

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INTRODUCTION

New technologies have created new challenges and opportunities for individuals all around the world. In order to meet the new demands of today's society, teachers need to have all the necessary knowledge and skills to succeed. To prepare teachers for the future, they have started to reform their teaching and learning methods using technology. They have also looked into the various aspects of the curriculum to make it more relevant to the 21st century. The ability of teachers to use and apply technology is highly demanded to work on effective teaching strategies in addition to being able to attract students' interest to participate in every learning activity carried out in class. The 4IR demands have become more prevalent in today's classrooms, which means that teachers must adopt new teaching methods that are geared toward the needs of the 21st century. One of the most important factors that teachers should consider is the shift toward Education 4.0, which is a concept that aims to align the human and technology resources to enable new possibilities. The rapid emergence and evolution of new technologies such as artificial intelligence, the Internet of Things, and robotics are expected to have a significant impact on the future employment of humans. This is why it is important that students develop the necessary

skills to be successful in the 21st century workforce. To ensure that students are equipped with the necessary skills to succeed in the workforce, teachers and schools must continuously train them (Shafie, Majid & Ismail, 2019).

However, some teachers are less sensitive to the current development of technology to be highlighted as teaching aids in the classroom. Even though technology equipment has been available in schools, teachers are still not efficient enough to take advantage of the space and opportunities to facilitate the teaching and facilitation process. This coincides with the views of Cansoy and Parlar (2018), and Joo et al. (2018) who stated that the lack of knowledge of teachers to apply technology is one of the factors that contribute to the weakness of students to expert skills such as communication, critical thinking, and problem-solving. The use of technology in the classroom can provide the best possible presentation of a subject. It can also help the teacher facilitate the learning process by making it easier for the students to understand the content.

The issues that are often raised are the failure of teachers to implement quality teaching and facilitation processes, the absence of a complete basic infrastructure, the problem of a lack of qualified teachers (options), limited teaching material resources and the most significant is due to drastic curriculum changes. Although classes have access to and are equipped with technological facilities, several conditions affect the implementation of technology in the classroom such as incomplete infrastructure, insufficient technological equipment, ineffective professional development, teachers' self-efficacy, and teachers' perceptions (Ravendran & Daud, 2019). This sign shows that the level of skills and knowledge of teachers in applying technology is still at a rather worrying level (Roslee & Tisebio, 2020; Hatlevik & Hatlevik, 2018). The use of technology in the classroom can help teachers deliver effective and systematic content. It can also help them make their teaching more engaging. To ensure that students have fun and are exposed to more relevant lessons, teachers should be better prepared to use technology in the classroom. This will allow them to continue learning in the 21st century.

Furthermore, many teachers are still not able to effectively integrate technology into their classrooms. They are also not able to convey the content of the lessons to the students. Studies conducted by Roslinda and Janet in 2020 revealed that many teachers have a hard time using technology in their daily work. They cited several factors that can prevent them from effectively using technology, such as the lack of knowledge and skills and the time it takes to learn it. The results of the studies revealed that knowledge about the use of technology in the classroom is very important to improve the teaching process.

A study carried out by Norhayati and Aida Hanim (2018) concluded that only 71 percent of teachers only apply technology for their use and not for the teaching and facilitation process. As many as 71 percent of these teachers apply this technology only to keep records and grade grades only at school. This shows that there is a lack of knowledge and mastery regarding the use of technology in schools. This is especially true when it comes to the facilitation of learning and teaching (Mohammad Rusdi, 2017). Most teachers are more likely to use technology for educational management than for the facilitation of the classroom. They also tend to keep away from using technology for teaching purposes even though it can provide them with various advantages (Norhayati & Aida Hanim, 2018).

If seen from the context of inventive skill, which is one of the most important criteria in 21st-century skills as intended by the Ministry of Education and Culture to form someone capable of thinking critically and innovatively. So, teachers need to be prepared and always try to find solutions with new and fresher methods to apply these inventive skill elements to the students at school. However, there are still teachers who are unable to implement the teaching and facilitation process by applying the elements of thinking skills to the students based on the application of technology to provide an impact on the teaching process that is effective and relevant to the current development of the world today. As evidence, Mohd Qhairil Anwar (2018) concluded that Malay teachers were not able to implement the necessary teaching and facilitation methods that can help improve the learning environment. This is said because the elements of KBAT are a challenge in the 21st century in the field of education that leads to a more dynamic and conducive learning atmosphere in the classroom. Therefore, teachers need to be creative, have a curious

nature, and always need to adapt to the current state of development in the education system at school to apply these elements of higher-order thinking skills to the students at school.

In addition, the lack of existing experience, style, interest, and exposure to the elements of inventive skill among teachers is the main obstacle to preparing students who are all skilled and think creatively. This is in line with the view of Ngaewkoodrua and Yuenyong (2018) who states that teachers who have knowledge related to the elements of inventive skill can think positively, dare to take risks, be creative and be able to teach effectively and can change the students' views on the Malay subject itself. Therefore, teachers need to equip themselves with the elements found in this inventive skill which aims to produce students who are not only highly skilled but also able to think creatively. To change the views of these students, Malay teachers need to play a role in attracting students' interest and focus more on the process of teaching and facilitating Malay based on 21st-century education (Hasin & Nasir, 2021). Thus, Malay teachers need to work to improve all weaknesses and try to improve skills, knowledge, and teaching techniques to attract students' interest.

Therefore, there is a need to carry out a study that aims to identify the relationship between technological knowledge, technological content knowledge, technological pedagogical knowledge, technological pedagogical content knowledge, and inventive skills for teachers. The results of this study can help the concerned parties, especially the Ministry of Education and school management to design and develop the competence of teachers' knowledge of integrating technology. The research findings about the composition of technological pedagogical content knowledge and inventive skills components among Malay teachers can contribute to the curriculum design and structure of effective teacher professional development training programs, especially in the field of educational technology.

Literature Review

Technological Knowledge and Inventive Skills for Teachers

The study conducted by Sakdiah and Jamilah (2022) sought to analyze the perceptions of students on various platforms and the use of technology in their studies. It revealed that 67.5% of students think that Google forms are the most appropriate tool for learning. The most common use of information technology in the classroom is to improve the efficiency and effectiveness of learning. According to the survey results, most of the respondents cited this as the most significant use of technology in the classroom. The study was conducted to provide a comprehensive view of the various factors that influence the development and implementation of information technology in schools. It also aims to provide a basis for the development of effective instructional technology. At present, information technology is commonly used by students to find, share, and discuss various topics.

Additionally, a study by Setyaningsih and Dayu (2022) sought to identify the interest of primary school mathematics teachers in using the Quizizz application as a technology medium for the teaching and learning process. It utilized qualitative and quantitative methods to gather information. The data collected during the study were analyzed using inferential and descriptive statistical methods. The results of the study revealed that about 68% of the respondents took courses using Quizizz, and 94% of them were able to access the website. Most of the respondents indicated that they were very positive about the Quizizz application. They also said that their teaching experience did not influence their decision-making process when it came to using the application. According to the study, teachers are more likely to adopt new teaching methods as the education system continuously changes. The Ministry of Education has proposed the use of the quiz application as a learning tool that can help teachers collect information about the student's level and acquisition of the learning experience. It can also be used to enhance the teaching and learning processes by integrating gamification.

H1: There is a relationship between technological knowledge and inventive skills.

Technological Content Knowledge and Inventive Skills for Teachers

According to Gupta and Jain (2017), the use of technology in the classroom can help improve the learning experience for students. With the help of these technological elements,

teachers will be able to create a fun learning environment while delivering content to their students. This can indirectly provide motivation and enjoyment to students to continue the learning process in a good environment to enable them to learn based on 21st-century education. The study of Shafie, Majid, and Ismail (2019) was carried out to explore the concept of content pedagogic technology knowledge that is directly related to the teaching process of 21st-century skills. Due to the progress and development of the industrial revolution and educational technology, the educational scenario is also changing towards 21st-century education where the focus is more on the use of 21st-century technology and skills (Huang, 2019).

The role of teachers is changing, and they are required not only to teach the main subject, but they also need to teach and train students with these 21st-century skills. In addition, A study conducted by Razak et al (2018) revealed that the importance of incorporating technology into the teaching process is acknowledged by the Ministry of Education. This is because the integration of technology can help improve the quality of education in the country. The integration of technology into the teaching process can make it easier for instructors to deliver effective and systematic content. This can be done through the use of various forms of media such as video, audio, and graphics (Asad et al., 2021). With the knowledge related to this technology, teachers can deliver the content in a better, quality way and can help the students towards more excellent academics in the classroom.

H2: There is a relationship between technological content knowledge and inventive skills

Technological Pedagogical Knowledge and Inventive Skills for Teachers

Akhwani and Rahayu (2021) study found that technological pedagogical knowledge components can have a direct impact on the improvement of teacher inventive skills elements during the teaching and facilitation process in the classroom. This is said to be so because the 21st century requires teachers to always be able to modify their teaching techniques, approaches, strategies, and methods. The technological pedagogical knowledge component is one of the types of knowledge that teachers should master in the 21st century. A study carried out by Arifin and Yunus (2017) can prove that with the help of technology tools in the teaching and guidance process in the classroom, more effective, interesting, and interactive teacher-teaching practices can meet the needs of the students' learning process. This can indirectly attract interest and increase the student's motivation to continue learning the subject. In other words, in the 21st century, teachers not only need to master this element of technology, but also need to be smart in planning various activities that are fun for the students in the classroom. In addition, Kusaini et al (2022) also conducted a study related to this component of technological pedagogical knowledge which clearly shows that technological facilities can adapt the teaching and facilitation strategies of teachers more widely. This is said because the students' learning process needs to be carried out in a meaningful way based on the integration of these technological elements in the classroom.

In other words, the students will be more motivated, more interested, and able to help them to achieve the learning goals that have been set (Puspitarini & Hanif, 2019). Teachers in schools need to be fully equipped with this technological pedagogical knowledge component, in addition to needing to be prepared to practice more up-to-date, relevant, effective, and systematic teaching methods during the teaching and facilitation process in the classroom (Alwaished et al., 2020). The changing times and aspects of current development also need to be taken seriously to ensure that the teaching and facilitation process for a subject remains relevant.

H3: There is a relationship between technological pedagogical knowledge and inventive skills

Technological Pedagogical Content Knowledge and Inventive Skills for Teachers

A study conducted by Chai et al. (2019) revealed that the use of technological pedagogical knowledge can improve the skills of teachers. It can also create a favorable impact on the students' performance. This approach can be used to develop a more suitable teaching and learning environment. In 2013, a study conducted by the same researchers revealed that the use of technology in the teaching process can improve the skills and knowledge of teachers. They also recommend using this approach to guide the development of the teachers' abilities to be effective

in the 21st-century classroom. This study aims to analyze the various aspects of teaching and learning using technology in five teacher education institutes. The findings of this study revealed that although there is a lot of knowledge about the use of technology in the classroom, there is still a lack of attention paid to the importance of developing early literacy skills using technology.

Although there are experts in the field who can help them develop their skills, these individuals find it hard to be creative and innovative. Koh and Chai (2014) published a study that analyzed the various aspects of the technological pedagogical knowledge component. They found that it is a framework that aims to help teachers and students improve their skills and knowledge. Although the concept of technological content knowledge has been used in numerous studies related to the teaching of technology, this study explores the relationship between these knowledge frameworks and the development of teachers (Tanak, 2020). The study also revealed that the various aspects of technical and pedagogical knowledge are related to the use of ICT in the classroom. The results of the study revealed that when the use of technology is implemented in the classroom, teachers are more confident about their ability to develop a technological pedagogical knowledge framework. They also noted that it is easier for them to build this type of knowledge framework when it is based on a teaching design that uses ICT (Malik et al., 2019).

H4: There is a relationship between technological pedagogical content knowledge and inventive skills.

Research Model

The concept of the relationship between technological knowledge, technological content knowledge, technological pedagogical knowledge, technological pedagogical content knowledge, and inventive skills for teachers is presented in Figure 1.

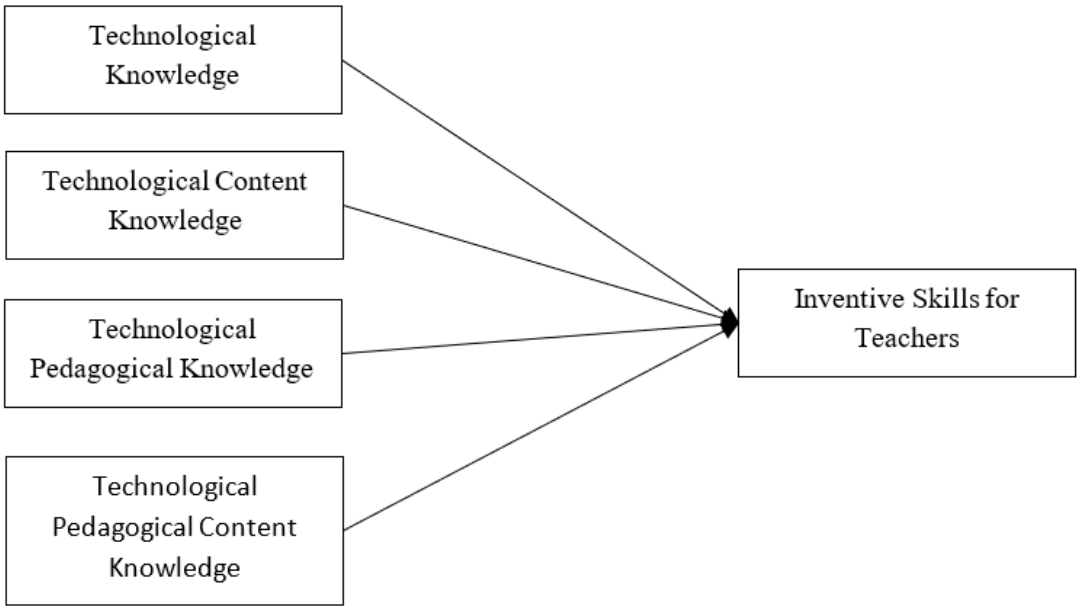

Figure 1. Research Model

METHOD

The data collected through the questionnaire were used to gather information about the teachers of Malay language subjects in Malaysia's national secondary schools. A total of 46,613 teachers participated in the study. A structural equation modeling procedure was conducted to test our hypotheses. The models use data collected from measures and latent variables. These data are then used to produce a statistical analysis (Williams et al., 2009). The PLS-SEM approach was chosen after following the accepted procedure for choosing a structural equation model (Ringle et al., 2012). We performed the analysis using the SmartPLS 3.3 software (Ringle et al., 2014),

which was developed by the late Wold (1982). The algorithm used to estimate the parameters were derived from the previous's work.

FINDINGS AND DISCUSSION

Although the measurement and structural model parameters are estimated in one step, the results should be presented in a way that allows the researcher to evaluate both models and their statistical significance (Hair et al., 2014). This method ensures that the conclusions drawn from the analyses are reliable and valid. Figure 2 shows the results of the PLS algorithm.

Measurement model

This section aims to analyze whether or not the research model is correctly measured using the indicators or variables. The first step is to determine whether or not the indicators are reliable. Then, we'll look into the validity of the measurement and whether or not it is done consistently and stably. The reliability analysis is a process that involves evaluating the various factors that affect the reliability of a particular item. It involves examining the difference between the factors that affect the item's reliability and the latent variables that are related to it. An indicator can be considered a standard in the measurement model if it has factor loadings greater than 0.60 (Hair et al., 2017). Thus, all the indicators are above 0.60 and meet the requirement.

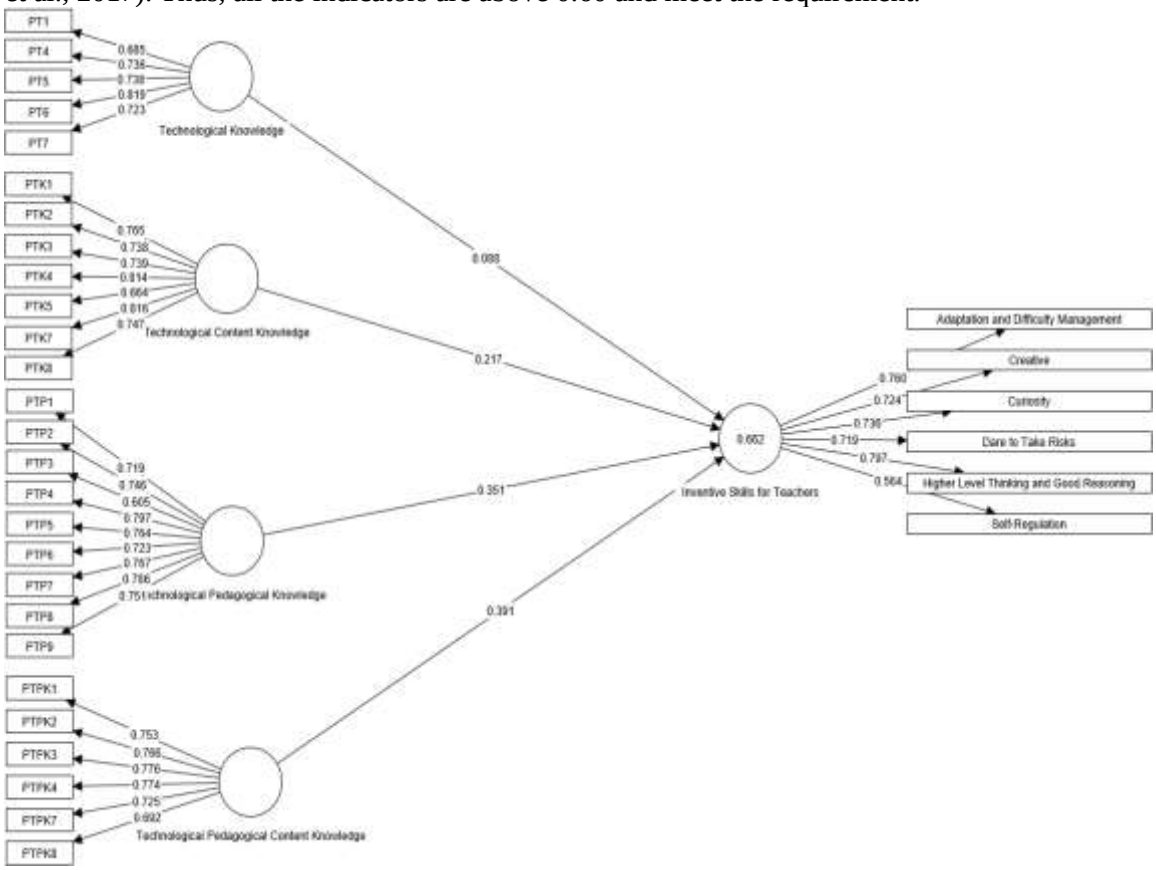

Figure 2. Measurement Model

Scale reliability is a process utilized by researchers to ensure that the various indicators used in measuring concepts are consistent. This is done through the use of composite reliability. For basic research, Nunnally (1978) recommends using a 0.70 for small reliability. As shown in Table 1, all the constructs that are related to this concept comfortably exceed these values which are above 0.70 requirements.

Table 1. Reliability and validity indicators

Indicator	Loading	CR	AVE
Technological Knowledge		0.804	0.550
PT1	0.685		
PT4	0.736		
PT5	0.738		
PT6	0.819		
PT7	0.723		
Technological Content Knowledge		0.879	0.572
PTK1	0.765		
PTK2	0.738		
PTK3	0.739		
PTK4	0.814		
PTK5	0.664		
PTK7	0.816		
PTK8	0.747		
Technological Pedagogical Knowledge		0.898	0.550
PTP1	0.719		
PTP2	0.746		
PTP3	0.605		
PTP4	0.797		
PTP5	0.764		
PTP6	0.723		
PTP7	0.767		
PTP8	0.786		
PTP9	0.751		
Technological Pedagogical Content Knowledge		0.844	0.560
PTPK1	0.753		
PTPK2	0.766		
PTPK3	0.776		
PTPK4	0.774		
PTPK7	0.725		
PTPK8	0.692		
Inventive Skills		0.831	0.519
Adaptation and Difficulty Management	0.760		
Creative	0.724		
Curiosity	0.736		
Dare to Take Risks	0.719		
Higher Level Thinking and Good Reasoning	0.797		
Self-Regulation	0.564		

The validity analysis is carried out to evaluate the convergent and divergent validity of a construct. It involves taking into account the various indicators that are related to the underlying construct. The AVE, which is a statistical measure of variance, is used to perform this procedure. According to Fornell and Larcker (1981), the AVE should be above 0.5, which means that more than 50% of the variance in a construct can be attributed to its indicators. Table 1 shows that all the major constructs have values exceeding this level.

Discriminant validity is a measure of how different a given construct is from other constructs. Fornell and Larcker's (1981) established a criterion that states that a construct should have more variance with other models than with the variance shared by other constructs. This means that a construct's AVE should be greater than its variance with the other models. To determine the correlation between the various constructs, we must first show that the AVE is lower than the square root of the variance (Table 2).

Table 2. Discriminant Validity

	Inventive Skills for	Technological Content	Technological Knowledge	Technological Pedagogical Content	Technological Pedagogical Knowledge
Inventive Skills for Teachers	0.720				
Technological Content Knowledge	0.554	0.756			
Technological Knowledge	0.392	0.570	0.742		
Technological Pedagogical Content Knowledge	0.705	0.442	0.250	0.748	
Technological Pedagogical Knowledge	0.659	0.321	0.235	0.555	0.742

Table 2 shows that the square root of the AVE model's latent variables is greater than the correlations between them. This means that the constructs are more likely to be related to each other than to the other indicators.

Structural model

After validating the fit of the measurement model by examining its relation between variables, we can then analyze its structural model. This process involves evaluating the significance and strength of the relationships between the variables. The analysis involves taking into account the variance explained by the endogenous variables and their path coefficients or beta. The R2 value of a model is a measure of its predictive power. It indicates the share of variance that the model has explained. Cohen (1988), suggests the thresholds such as from 0.35, "substantial"; from 0.15, "medium"; and from 0.02, "small". Thus, for this study, the R2 value obtained in this model is substantial for the variable inventive skills (R = 0.662).

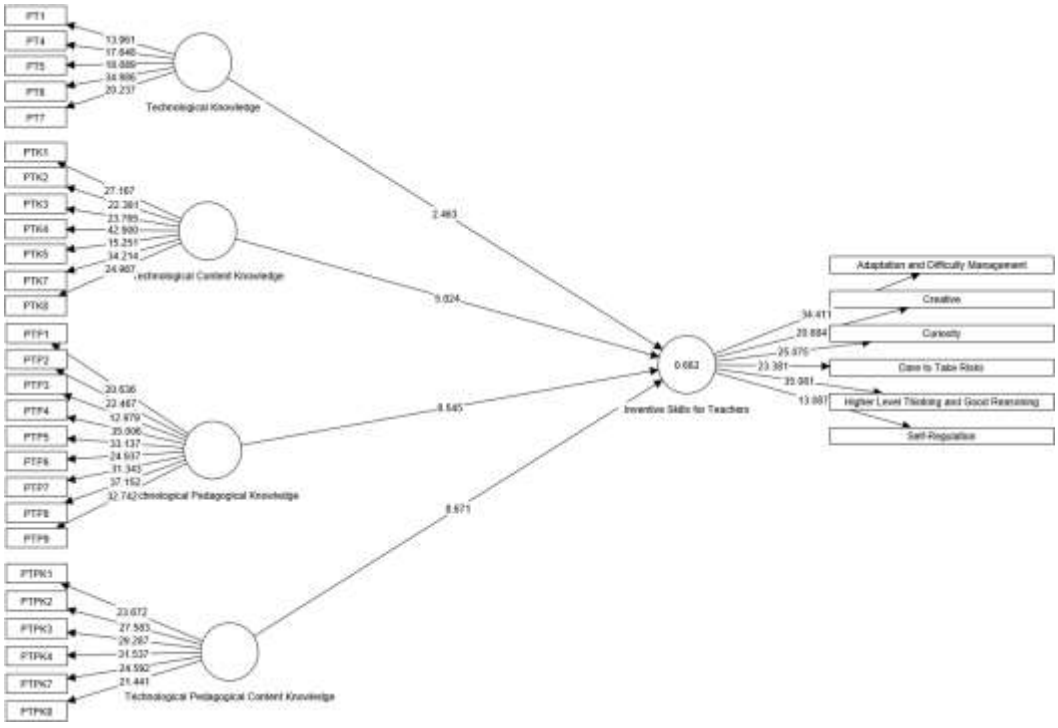

Figure 2. Structural Model

The evaluation of the path coefficients' significance is carried out using a resampling technique known as the bootstrapping method. The subsamples are produced with 5,000 observations, the subsamples were extracted at random and replaced with the original data. This ensures that the results are stable and conform to the literature's recommendations (Hair et al., 2017). Table 3 shows the p values results.

Table 3. Result of Structural Model

	Beta	Standard Deviation	T Statistics	P Values	R^2
H1: Technological Knowledge → Inventive Skills	0.088	0.036	2.463	0.007	0.662
H2: Technological Content Knowledge → Inventive Skills	0.217	0.043	5.024	0.000	
H3: Technological Pedagogical Knowledge → Inventive Skills	0.351	0.041	8.545	0.000	
H4: Technological Pedagogical Content Knowledge → Inventive Skills	0.391	0.045	8.671	0.000	

The results provide support for Hypothesis 1 (ß = 0.088; p-value = 0.007), hypothesis 2 (ß = 0.217; p-value = 0.000), hypothesis 3 (ß = 0.351; p-value = 0.000), and hypothesis 4 (ß = 0.391; p-value = 0.000). Technological knowledge, technological content knowledge, technological pedagogical knowledge, and technological pedagogical content knowledge makes increase inventive skills. The most dominant variable with high relation is the variable technological pedagogical content knowledge whose beta value is 0.391.

Discussion

This study aimed to identify the relationship between technological knowledge, technological content knowledge, technological pedagogical knowledge, technological pedagogical content knowledge, and inventive skills for teachers. Based on the statistical results for hypothesis 1, there is a significant relationship between technological knowledge and inventive skills confirmed, thus it is supported. This finding is consistent with the preceding study by Rahayu (2021) who found that this technological knowledge component was able to have a positive effect on teachers' inventive skills. It is mean the technological knowledge component is one of the aspects of improving the elements of inventive skills among teachers. in other words, teachers' knowledge related to the application of technology can help them to teach by using aspects of technology knowledge in the integration of effective teaching methods. This clearly shows that the teacher's knowledge in terms of the technology needs to be given due attention by the teacher because the elements related to this technology can facilitate the teaching and facilitation process and can create a learning environment that is more focused on the students in the class. In the meantime, the results of this study also found that teachers have confidence in technology skills in the use of teaching that involves technology which the teacher's level of mastery is at a good level. This is said to be so because the changes in the education system that occur in terms of technology are always changing from time to time according to the latest trends in the development of technology. Although teachers are skilled in this aspect, they have to equip themselves with the latest knowledge involving technology that has various latest applications, need to learn and master the curriculum that is constantly changing and added to the new syllabus. Although teachers have good knowledge in terms of technology, however, the needs in the field of education require teachers to learn new things and compete with the world of ICT which causes this aspect to have a good relationship with inventive skill (Syahputra, 2018).

Hypothesis 2, there is a significant relationship between technological content knowledge and inventive skills is confirmed, thus it is supported. The findings of this study coincide with the study carried out by Chee et al. (2018) who found that the technological content knowledge component can have a good effect on the improvement of teachers' inventive skills where the content delivered by the teacher to the student's needs modification with the use of appropriate application medium or technology. Gupta and Jain (2017) also support and asserts that the integration of technology during the teaching process and facilitation in the classroom is considered an additional teaching tool in producing a successful learning session for students. With the presence of this technology element, teachers will be able to create a fun learning atmosphere while delivering the content to the students. This is indirectly able to provide motivation and enjoyment to the students to continue learning in a conducive learning environment based on 21st-century education. In addition to that, the results of this study as a whole are in line with the results of studies carried out by Amran and Rosli (2017) which prove that teachers' methods or ways to implement a more creative and innovative teaching and facilitation process can influence the results of 21st-century education by applying technology elements in the classroom. This is said to be so because the creative and interesting teaching and facilitation process involving various technological mediums and appropriate activities in the classroom can generate thinking and can increase the student's motivation to continue learning. Teachers also need to master content standards and learning standards, students' existing knowledge, technology selection, preparing materials, and choosing the appropriate combination of strategies and skills to need to be emphasized by teachers (Arifin & Yunus, 2017).

Hypothesis 3, there is a significant relationship between technological pedagogical knowledge, and inventive skills confirmed, thus it is supported. The findings of this study are parallel and supported by studies carried out by Akhwani and Rahayu (2021) who found that technological pedagogical knowledge components can have a direct impact on the improvement of teachers' inventive skills elements. This also coincides with the view of Arifin and Yunus (2017) who stated that more effective, interesting, and interactive teacher pedagogical practices aided by the use of technological tools during the teaching and facilitation process implemented in the classroom can meet the needs of 21st-century education. This means that teachers not only need to master the elements of this technology, but the teacher also needs to be smart to plan various types of interesting activities in the classroom. Furthermore, the study carried out by Hazram and Effandi (2018) also proved that technological facilities can adapt teaching strategies and teacher facilitation more widely. This is said because the students' learning process needs to be carried out in a meaningful way through the learning-by-doing approach where the students are stimulated to think and build their understanding with the teacher acting as a facilitator and guiding the students in the activities carried out in class based on the elements of this technology. In other words, the students will be more motivated and more interested and able to help the process of achieving the learning goals that have been set. Therefore, teachers in schools need to fully equip themselves with this component of technological pedagogical knowledge, in addition to being prepared to practice relevant, effective, and systematic teaching methods. Changes in the times as well as aspects of current development also need to be taken seriously to ensure that the teaching and facilitation process in Malay subjects continues to be relevant and achieve the vision set in facing the 21st century.

Hypothesis 4, there is a significant relationship between technological pedagogical content knowledge, and inventive skills confirmed, thus it is supported. The findings of this study are in line with and supported by studies carried out by Kamary and Hamzah (2019) who found that the technological pedagogical content knowledge component affects the improvement of teachers' inventive skills where this technological pedagogical content knowledge component is a teaching and facilitation strategy capable of producing a positive effect or impact on the students in the class to form a situation that is more relevant to the 21st century. Technological pedagogical content knowledge teachers are the skills and knowledge of teachers to use and apply the same technology to deliver the content of knowledge or curriculum for the teaching process and facilitation of subjects taught in school. This means that all components in this technological

pedagogical content knowledge must be owned and mastered by teachers who are facilitating agents or facilitators to deliver content input in certain subjects with various types of activities planned based on 21st-century education that can provide enjoyment to students. In the meantime, the overall findings of this study are also consistent with the findings of Srisawasdi (2014) and Voogt et al., (2013) who found that this technological pedagogical content knowledge Model is very suitable to be used as a guide in building the knowledge and skills that must be mastered by teachers to be an effective teacher in the 21st century. Likewise, the results of the study by Koh and Chai (2014) also asserted that the technological pedagogical content knowledge component is one of the frameworks of the technology integration model that focuses on the effective integration of technology related to mastery, knowledge, skills, abilities, and competence among trainee teachers and teacher in service at school. Chai et al (2019) study found that the technological pedagogical content knowledge component will be mastered by teachers who are not optional in certain subjects by explicitly receiving specialized training.

CONCLUSION

Overall, this study has been able to identify the relationship between technological knowledge, technological content knowledge, technological pedagogical knowledge, technological pedagogical content knowledge, and inventive skills for teachers. The most dominant variable is technological pedagogical content knowledge towards inventive skill among Malay language teachers. The study also found that Malay language teachers have a good level of mastery of inventive skill elements in implementing teaching and facilitation processes that involve elements of self-adaptation and difficulty management, self-regulation, curiosity, creativity, daring to take risks and high-level thinking, and good reasoning. In connection with that, this study can give a positive impact on Malay teachers, especially to empower teaching practices in a more effective direction. The emphasis on the components of technological pedagogical content knowledge and inventive skill needs to be given serious attention by teachers to ensure that the teaching and facilitation process implemented can have an impact especially in producing more effective and creative teacher teaching.

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