**FITRAH, Volume 7 Nomor 2 Tahun 2025**
E-ISSN: 2722-7294 | P-ISSN: 2656-5536

# EXPLORING TEACHERS' VOICES: CONCEPTUALIZATION AND INTEGRATION OF TPACK IN ISLAMIC EDUCATION

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**Abstract**

This qualitative case study explores the conceptualization and integration of Technological Pedagogical Content Knowledge (TPACK) among Islamic Education (PAI) teachers. It investigates how Islamic education teachers perceive and plan for technology integration in their teaching. Through in-depth interviews with five secondary school PAI teachers and principals across four schools in Banda Aceh and Aceh Besar, data were analyzed using qualitative coding techniques and a composite narrative strategy. Findings indicate that teachers and principals unanimously acknowledge the necessity and benefits of technology in PAI learning for student engagement and improved understanding. While teachers actively create digitized instructional materials and incorporate technology into their lesson plans (RPP), explicit awareness and understanding of the formal TPACK framework remain limited among most participants. Despite this, their pedagogical practices implicitly align with TPACK principles, utilizing various technologies to enrich learning. This study highlights a gap between implicit technological pedagogical content knowledge and explicit theoretical understanding. The research contributes valuable insights into the current state of TPACK integration in PAI, underscoring the importance of further professional development to formalize theoretical knowledge and optimize technology use in Islamic education.

**Keywords**: *Islamic Education; TPACK; Secondary Teachers; Technology*

## A. Introduction

The Islamic Religious Education (PAI) Study Program at the tertiary level, both state and private institutions, remains a popular choice for prospective students. This is evidenced by the consistent number of students selecting PAI as their field of study. The appeal of this program is undoubtedly linked to the potential career opportunities it offers as a religious teacher, given the demand for Islamic Religious Education across numerous educational institutions (Abidin, 2013), particularly within the province of Aceh.

Nevertheless, the PAI Study Program must continuously strive to enhance the quality of its graduates. This quality improvement must begin with the learning process within the PAI Study Program itself. The PAI Study Program needs to undertake several breakthroughs in the learning process so that its graduates can compete with contemporary workforce demands. In this case PAI lecturers are expected to be able to educate students to become prospective PAI teachers who possess comprehensive competencies, encompassing pedagogical, personal, professional, and social domains (Andina, 2018; Dudung, 2018, Rahmadi, 2019). This aligns with the broader need to equip educators with skills relevant to the current educational landscape (Framework for 21st Century Learning).

The necessity of integrating technology into learning has become imperative in the era of the Industrial Revolution 4.0. A defining characteristic of 21st-century learning is the inseparable nature of technology from educational institutions (Ajizah & Huda, 2020; Graham, 2011; Agyei & Voogt, 2012). For example, the use of online learning platforms such as Google Classroom, Canvas, Edmodo, and other online platforms is now unavoidable, especially during the COVID-19 pandemic, when online learning became a prudent choice. Therefore, PAI lecturers are expected to facilitate the integration of technology into the learning process, so that students later become graduates who are capable of integrating technology in learning. Lecturers' ability to integrate technology is a crucial requirement for the emergence of an effective learning process (Yurdakul et al., 2012; Shinas et al., 2013). There are several benefits to integrating technology into learning, including: enhancing student concentration, increasing motivation, and also improving student independence in learning (Mairisiska, Sutrisno, & Asrial, 2014; Rahayu, 2017; Ratheeswari, 2018).

However, the integration of technology into the learning process must be done comprehensively. That is, in the use of technology, a lecturer or teacher must be able to ensure that the learning platform chosen is in accordance with the learning objectives to be achieved (Koehler, Mishra, Kereluik, Shin, & Graham, 2014; Hofer & Harris, 2017). In addition, lecturers/teachers must also understand that certain technologies are only suitable for certain subjects or subject matter, and cannot be applied to other topics. Furthermore, a lecturer/teacher must also have good technological skills, so that they already have an adequate understanding of the technology that they will integrate into learning (Papanikolaou, Makri, & Roussos, 2017; Tanak, 2018).

For the successful implementation of technology in learning, PAI lecturers need to refer to a technology-based learning theory, called TPACK, namely Technological, Pedagogical, and Content Knowledge. This theory has been rapidly developed in America by Mishra and Kohler (2006). (Koehler & Mishra, 2005). TPACK theory consists of a combination of several knowledge domains that need to be integrated to produce a technology that is appropriate for use in learning. TPACK is a combination of three components, namely technology, pedagogy, and content or subject matter. Furthermore, in the TPACK framework, there are seven important components that are interconnected (Quddus, 2019; Harris, Mishra & Koehler, 2009):

1. **Technology Knowledge (TK):** Knowledge about technology, from the lowest to the highest levels, such as the ability to use pencils, pens, paper, blackboards, digital whiteboards or smart boards, the internet, software, and other technologies.
2. **Content Knowledge (CK):** Knowledge about a specific subject or course, that is, the ability of a teacher or lecturer in the material to be taught. [Page Break]
3. **Pedagogical Knowledge (PK):** Knowledge about teaching methods, methods and/or strategies for delivering subject matter, classroom management, lesson planning, preparation and development, and presentation of subject matter.
4. **Pedagogical Content Knowledge (PCK):** Knowledge or ability to teach content; PCK is not only the ability to understand subject matter but also the ability to understand subject matter and the ability to convey the subject matter effectively and efficiently.
5. **Technological Content Knowledge (TCK):** Knowledge in choosing the right technology for the appropriate material. Teachers and lecturers have the ability to choose and sort out what technology is suitable for use in certain materials
6. **Technological Pedagogical Knowledge (TPK):** Knowledge to adopt certain technologies in the learning process. Teachers and lecturers have the ability to choose the right technology in delivering the subject matter.
7. **Technological Pedagogical and Content Knowledge (TPACK):** Knowledge or ability of teachers in integrating technology into the process of learning certain subject matter. Teachers have a good ability regarding the content, technology that is suitable for the learning in teaching the subject matter.

The integration of these seven components of knowledge makes TPACK a significant theoretical framework in learning. Although TPACK has been widely developed in science learning (Mairisiska, Sutrisno & Asrial, 2014; Tanak, 2019; Rafi & Sabrina, 2019), and then developed to language learning (Liu, Liu, Yu, Li, & Wen, 2014; Syamdianita & Cahyono, 2021), the integration of technology through the TPACK theoretical framework has begun to be introduced and practiced. Some previous studies have found that TPACK can also be developed in PAI learning. A study conducted by Quddus (2019) provides information that the use of TPACK-based technology assists teachers, especially those involved in the Teacher Professional Education Program (PPG), in completing assignments during training programs and ultimately influences their ability to teach using technology. Other research conducted by Ajizah and Huda (2020) reviewed literature related to the benefits of TPACK in PAI learning and concluded that TPACK skills by PAI teachers are very influential on innovative and creative learning.

These two studies on TPACK related to PAI learning, gives an overview that TPACK has been integrated into PAI learning. The research shows that the TPACK theoretical framework has been applied in PAI learning. Nevertheless, it is believed that research related to the integration of TPACK in PAI learning is still limited, and therefore not all prospective teachers, even PAI lecturers, understand TPACK itself. Studies on the understanding of lecturers and PAI teachers regarding TPACK are important because this understanding is the basis for lecturers in implementing the TPACK theoretical framework in learning at the PAI Study Program, and ultimately producing graduates who understand the TPACK framework when they enter the teaching profession. Therefore, in order to fill the gap regarding the integration of technology into PAI learning, this research is important because it explores the perceptions and understanding of Islamic education teachers teaching in three secondary schools across Banda Aceh and Aceh Besar. This study is guided by at least two research questions: How do teachers perceive and understand the integration of technology into Islamic teaching? And how do teachers plan the integration of technology into Islamic education? These two main research questions would be explored in more in-depth this study.

**The Concept of Technological, Pedagogical and Content Knowledge (TPACK)**

The discussion of TPACK begins with the idea that the process of teaching is a complex activity. Various skills are needed to make a teaching process meaningful and effective. Teachers and/or lecturers are expected to have a good understanding of the *content* or subject matter that is in accordance with their respective fields. For example, a teacher or lecturer of English must have *content* competence, that is, material that is related to the English language, so that what they teach is truly *content* that is valid and in accordance with their respective scientific rules, as well as other subject teachers, they must master well and correctly what material they will teach.

However, apart from having a good understanding of *content*, an educator, teachers, are also expected to have good teaching skills. However, teaching skills or *pedagogy* should not stand alone and be separate from *content* skills. Teachers and lecturers must have good pedagogical skills to convey certain subject matter accurately, effectively and efficiently. Thus, P (pedagogy) competence and C (content) competence must be synergized so that PCK emerges, namely Pedagogical Content Knowledge. Therefore, the correct illustration to describe the combination of *content* and *pedagogy* is as follows according to Mishra and Koehler (2006; 2009).

This illustration shows the combination between Content competence and Pedagogy competence, which is called PCK, namely Pedagogical Content Knowledge where teachers and lecturers not only have good competence regarding Content, or subject matter, but also have adequate Pedagogy competence, namely the ability to transfer *content* effectively and efficiently.

Furthermore, Mishra and Koehler (2006; 2009) who are the two experts who initiated the emergence of TPACK, explained that learning in the era of revolution 4.0 like now, even heading towards revolution 5.0, all learning processes are encouraged to adopt technology in learning. This forces all institutions, including educational institutions, to incorporate technology into the learning process. Therefore, Mishra and Koehler (2006; 2009) offer a theoretical framework that incorporates technology and the learning process. However, the integration of technology in education should not only be done without having in-depth knowledge of technology and how to integrate it properly. The following illustration does not show good integration of technology between technology and learning.

This illustration from Mishra and Koehler (2006) is not sufficient to describe the integration of technology in teaching. This is because the use of

technology in teaching is not accompanied by a sufficient understanding of technology and the usefulness of the technology in teaching. Therefore, Mishra and Koehler (2006) offer another illustration that is more integrated between components or between knowledge.

This illustration shows the integration between *content, pedagogy* and *technology,* so that it creates an attractive, integrated and effective learning process. Then, the integration between *content, technology* and *pedagogy,* gives birth to a new conception that is more attractive and meaningful, namely the concept or theoretical framework called the TPACK framework. The following is an illustration of TPACK offered by Harris, Mishra and Koehler (2009). Mishra and Koehler (2006) developed the TPACK theoretical framework by combining several components of knowledge, such as *content, pedagogy* and *technology*. All of these knowledge are interconnected to produce a theory that can be applied in a learning effectively and efficiently.

The TPACK framework can be applied well in the learning process effectively and efficiently. All knowledge integrated in a learning theory framework provides strength in the learning process that is carried out.

**TPACK in Learning in Educational Institutions**

Research on TPACK has been carried out in various fields and institutions, both educational institutions and other institutions. Furthermore, research on the use of TPACK in learning has become a popular topic for discussion in the last two decades. For example, Koehler and Mishra (2005) conducted research related to the development of learning modules by integrating technology. The researcher conducted a survey of lecturers and S2 students regarding the development of their understanding of the importance of understanding various knowledge, such as *content knowledge, technological knowledge* and *pedagogical knowledge* in the preparation of technology-based learning modules. Then, Ferdig (2006) examined the importance of having various knowledge that are synergistic in terms of integrating technology into the learning process. The Ferdig (2006) study concluded that technology integration in education cannot be carried out without understanding the relationship between the technology and the material being taught and with the teaching method used.

Another study was carried out by Koçoğlu (2009) in the context of learning English as a foreign language. The research aimed to study the level of understanding of prospective English teachers regarding the integration of technology in learning. Students who took the Computer-Assisted Language

Learning (CALL) course learned to understand the TPACK theoretical framework in integrating technology into the English language learning process. Furthermore, the implementation of TPACK in developing effective learning was also carried out in the study by Doering et al., (2009); in the study by Kramarski and Michalsky (2009) it was also found that certain *interventions* implemented in research in developing the TPACK abilities of research participants. Harris, Mishra and Koehler (2009) also added that understanding TPACK is an important prerequisite in integrating TPACK in learning.

Furthermore, Harris et al., (2017) examined the differences in understanding of the TPACK theoretical framework between in-service and pre-service teachers, that is, the understanding of teachers who already have experience in using TPACK was examined, the results of which became recommendations for the development of TPACK for teachers who were still inexperienced. Research by Papanikolaou et al., (2017) revealed the importance of TPACK in developing the abilities of teachers in implementing technology in the learning process. The same results were also found in research by Rafi and Sabrina (2019) where TPACK can assist teachers in designing technology-based learning modules. Other research was carried out by Groth et al., (2009) Groth, Spickler, Bergner, and Bardzell (2019) to see how far the understanding of TPACK has developed after several training sessions regarding the use of TPACK in class. Similar research was also carried out by Syamdianita and Cahyono (2021) regarding improving teachers' abilities in designing learning modules through training on the TPACK theoretical framework. The research results show that understanding TPACK assists teachers in designing modules that are more effective and better.

## B. Research Methods

This is a qualitative case study research (Creswell, 2014; Glesne, 2015) exploring the perceptions of Islamic education teachers regarding the integration of technology in the PAI learning process. This study also explores these teachers' understanding of the conception of TPACK in teaching Islamic education instruction. As the study focuses on a single case, it relies on a single method of data collection recognized in qualitative research (Babbie, 2017; Silverman, 2017, 2019), which is in-depth interviews. This research interviewed five secondary school teachers, teaching Islamic Education. These five teachers were invited voluntarily to take part in this study; all of them agreed to spend around one hour or so to sit in the interview sessions. The research took place in four

secondary schools: SMA AH; SMA MB; SMA LAB; SMA DAS (all pseudonyms). In addition to teachers, principals of the four schools were also interviewed to grasp information on the policy implementation on technology integration. It is important to interview the principals as it allowed us to understand policies around technology implementation at school.

**Interviews**

To answer our research questions, these teachers and principals were interviewed. We employed in-depth interview as it allowed us to deeply explore and scrutinize these participants' voices. These interviews were conducted to obtain information related to the perceptions of Islamic education teachers and principals regarding the technology integration and the conception of TPACK in PAI learning. Our interviews were undertaken at a place and times convenient to the participants. The interviews were audio-recorded to allow us transcribe them for data analysis.

**Data analysis**

Data analysis was conducted based on qualitative research procedures, wherein data was analyzed in three main stages (Gibb, 2018; Silverman, 2020): First, the the interview data were transcribed verbatim, meaning that the interviews were transcribed in detailed; second; the raw data were organized and coded. The coding techniques used in data analysis are open coding, axial coding, and selective coding. Third, the selective coding was then taken as the the basis of our analysis in the finding section.

The data coding stage began with open coding, where the data generates several initial codes in accordance with the research questions developed. Next, the researchers reclassified the codes that have been found through the open coding technique using the axial coding technique. The third coding stage is selective coding, where the codes that have been selected in the second stage are narrowed down again, resulting in new, more standard codes, which will then be used as a theory. In our data analysis names of the teachers would be referred as 'Teacher + Initial', such as 'Teacher A'.

## C. Results and Discussion

To obtain and analyze information related to teachers' understanding of technology-integrated learning, we conducted interviews at three schools, consisting of five PAI (Islamic Religious Education). Data was also collected through in-depth interviews with principals from four Senior High Schools in

Aceh Besar and Banda Aceh. The data generated from the interview process with teachers yielded several important findings.

Data from interviews with was analyzed using a 'composite narrative' strategy (WIlis, 2019), which explains data collectively, adjusted to data codification, and does not explain data from individual sources (Dix, et al., 2020, Taylor, et al., 2016; Creswell, 2018). Data was obtained through. The data related to teachers' perceptions yielded the following codifications or categorizations: benefits of technology; digitalization of teaching materials; TPACK concept; technology integration in RPP (Lesson Plan); and improvement of learning quality.

**1. Benefits of Technology**

All teachers in four schools showed that all teachers participating in the interview agreed on the benefits of technology in PAI learning. One teacher at SMA AH for example, explained that integrating technology into PAI learning is a necessity in contemporary times:

> I strongly agree, Madam, that PAI lessons should be integrated with technology because it follows the times and has become a necessity. Unlike our schooling days, today's children are technology-literate. I think we have no choice but to follow the developments." (Teacher RD).

Teacher RD even asserted that the character of today's students is very technology-literate, making the integration of technology into PAI learning a necessity. Generally, for millennial students today, technology is an inseparable needs (Schwieger, 2018). Teachers from SMA DAS also added that their students are very familiar with various platforms, such as Canva, as conveyed by Teacher RT:

> Students are very familiar with things related to technology, such as using Canva. We only provoke them, and they immediately understand the platforms commonly used, like Canva (Teacher RT)

In addition to teachers from SMA AH, teachers from SMA MB also believe in the benefits of technology in PAI learning, and they are convinced that technology helps teachers in facilitating lesson delivery.

> We use technology as a tool to make teachers' work easier. If I conclude, all of it is a supporting tool, not an absolute necessity. Sometimes I use learning cards, some I buy, some I make myself based on the children's ideas, for example, the tajwid trees, even though this method is common among teachers who already know a lot. Nevertheless, I still use it, even though I use very simple technology." (Teacher SH)

Teacher SH believe that technology is very important for the effectiveness of PAI learning, as it is believed to help teachers in delivering lessons. However, she sees that technology in learning can take various forms, both sophisticated and simple technology, such as pictures and other simple media. The usefulness of this technology is also agreed upon by teachers from SMA DAS as stated by Teacher RT that "teachers can choose various forms of available technology, both sophisticated and simple technology."

The same point was also conveyed by teachers at SMA AH, who explained that technology in learning does not necessarily consist of sophisticated and luxurious technology; simple technology like YouTube to be used in learning can also be part of technology implementation.

> I just use facilities like YouTube, displaying videos that have been downloaded, displayed via infocus, right? So there's no kind of sophisticated technology being used, no ma'am, I don't know if other schools have it. Here, we have infocus, Wi-Fi, and laptops provided." (Teacher RD)

This teacher from SMA AH explained that they only use YouTube to deliver lessons, and this is already considered technology. Moreover, not all schools have complete facilities to support the implementation of technology in learning.

In line with the teachers, the principals of the four interviewed schools also understand the benefits of technology in learning. The principal at SMA LAB, for example, ensures that the use of technology has become a necessity. He stated, "we at SMA Lab School actually allow students to bring tablets because learning using technology has become an inseparable part, even quizzes and exams are done online, and of course, using technology." The principal of SMA DAS, SMA AH, and SMA MB also share similar views.

Our findings suggest that both teachers and principals see technology benefitting their students. There is no doubt that technology can be integrated in the teaching of all subjects, including Islamic Education subjects, which were seen as incompatible for technological integration.

### 2. Digitalization of Teaching Materials

Our findings with teachers and principals provided valuable insights into their perspectives on technology use across the four participating schools. Overall, the teachers agreed that technology has become an essential component of contemporary learning processes, including in Islamic Religious Education

(PAI). In line with this view, both teachers and principals emphasized that educators must be increasingly creative and innovative in developing instructional materials, and that the digitization of teaching materials is a critical step for all educators (Berret, et al., 2012). They further noted that digital learning resources are a defining feature of teaching practices in Society 4.0 and 5.0 (Kreijns, et al., 2013). These perceptions are consistent with previous research demonstrating that digital learning materials can enhance students' motivation and support their comprehension of classroom content (Lin, et al., 2017). Studies by Zulfan Fakhruddin, Amzah, and Nur Fadillah Nurchalis also show that students who are taught through technology-based materials tend to achieve a better understanding of subject matter compared with those who do not use such materials.

One teacher highlighted that teaching materials for Islamic Religious Education require particular attention. According to this teacher, engaging materials play a central role in maintaining students' focus and promoting motivation (Bouckaert, 2019), which ultimately supports deeper learning. As expressed during one of the interviews:

> Developing digital-based learning, game-based learning, and the essential interaction needed in PAI must continue. Because if we are careless for a second, they will be careless for an hour. If the teacher is careless, they will be careless as well (Teacher SH).

This statement illustrates teachers' awareness of the importance of integrating technology into PAI instruction. A teacher from SMA MB State High School explained that digitizing teaching materials is necessary to make lessons more engaging, as uninteresting materials risk reducing students' desire to learn (Fakhruddin, et al., 2019; Ghavifiekr, et al., 2012). Additional interviews at SMA LAB, SMA DAS, and SMA AH reflected similar viewpoints.

Another teacher offered a practical example of how digital materials are used to foster critical thinking:

> It depends on the material, ma'am. For instance, when teaching the topic of marriage, I first explain the theory-the pillars of marriage, the laws of marriage, whether obligatory, permissible, makruh, or forbidden. After explaining the theory, we show a video of how marriage is practiced. Then we ask students to critique it: the theory says one thing, but the practice shows something different. We sometimes purposely choose but are encouraged to think critically (Teacher RD).

This interview excerpt demonstrates that, while the digitalization of materials is important, the teacher's role remains indispensable. Digital tools

such as videos can enrich learning, but they do not replace the need for pedagogical guidance. Rather, technology and teacher expertise function together as a unified system. Learning materials are effective only when mediated by creative and skilled educators, who continue to serve as the primary designers of instructional content. Consequently, teachers must develop both pedagogical competence and technical skills to design engaging and meaningful learning materials.

### 3. TPACK: A Necessity

In general, all teachers involved in this study through FGDs understand the importance of technology in learning, including for PAI learning. Information from FGDs across all these schools believes that technology is a must and a necessity to be applied, and this is also relevant to the findings of Rehan, et al. (2019). Nevertheless, only one teacher from MOSA mentioned the TPACK concept as a whole. They explained as follows:

> I am very happy, ma'am, that you brought this research topic about the TPACK concept. Even though I am not very knowledgeable about technology, at least it gives me a new perspective. At a minimum, we should understand it before applying it. To apply something, we need new experiences, new knowledge, and new theories. Regarding TPACK, I strongly agree… TPACK does not necessarily require extravagant facilities. For example, we use Quizizz, interactive tools, Kahoot, Edmodo, or whatever. I see that it is truly important, especially with the current Merdeka Curriculum (Teacher SH)

From this excerpt, it can be understood that TPACK is a concept that can provide a new perspective; providing a new theory in the use of technology. One SMA MB teacher believes that TPACK is an important concept to understand. However, the interview data also highlights an important discourse that the TPACK concept is still not popular, especially in PAI learning.

Although the majority of teachers involved in this study did not mention the TPACK concept as a whole, they understand the importance of integrating technology in PAI learning. In the Indonesian context, the term TPACK is still not popular, but discussions about TPACK have significantly increased in the last 5 or 10 years. For example, Setiawan, et al. (2019) conducted a review of articles discussing TPACK published from 2011-2018 (Lye, 2013). Furthermore, research results also prove that the TPACK concept needs to be understood as a unified concept by all education practitioners (Chai, et al., 2017).

**4. Technology Integration in RPP (Lesson Plan)**

Interviews at four schools provided interesting information regarding the integration of technology into the RPP. Overall, these teachers stated that in integrating technology, teachers should integrate technology into learning through appropriate RPP design. However, technology integrated into the RPP certainly requires practical adjustments. One teacher from SMA AH explained as follows:

> Yes, in the RPP, multimedia usage, as mentioned, is already included. It's just that generally, because we make the RPP at the beginning, there are adjustments in the field (Teacher RD)

A similar narrative was conveyed by other teachers, including teachers from SMA LAB, such as RT and RI, who stated that "*learning must first be meticulously planned, such as preparing the RPP from the start, and planning specific technology usage*" (Teacher RT); similarly, another teacher emphasized the importance of technology integration in learning, starting with its inclusion in the RPP: "*RPP preparation must follow the directives from the school and curriculum vice principal, as well as the supervisors. After the learning objectives are determined, then we choose the type of technology or learning media to be used* (Teacher RI).[27]

These interviews indicate the seriousness of teachers in integrating technology into the RPP. This is because the preparation of the RPP must be done by all teachers at the beginning of the learning process; and this is an obligation for all teachers. Although in the RPP planning stage, teachers have determined the specific technology they want to use in learning, the form of technology or media used may change, according to the demands of the learning process. This was also expressed by other teachers at SMAN 05, such as Teacher MA and Teacher YN:

> For the RPP, we have already included fundamental technological elements, for example, LKPD (Student Worksheet). In the LKPD itself, there are technological elements, or by guiding children to find pictures related to the material, making it easier (Teacher YN)

The same thing was revealed from interviews in other schools. One teacher from SMA MB ensured that the RPP must contain specific media; the integrated media can consist of various forms of media. This was revealed from interviews with various sources.

> Our initial step in preparing the RPP is still on paper. Regarding what you asked earlier, we still include the media that are available, for example,

> using an infocus, and then there are things that are directly demonstrated." (Teacher KI)

This SMA MB teacher believes that media selection can be made based on the availability of the media itself. One available medium in almost all schools is the infocus. The integrated media need to be demonstrated to enhance students' understanding of the learning.

**5. Improving the Quality of Learning**

Improving the quality of learning is a positive impact of technology, and this opinion is echoed by all teachers and principals interviewed through interview. The technology used, whether simple or sophisticated, can help students improve their understanding of the lessons delivered.

> "...in such conditions, it is indeed very helpful, meaning that when the learning process is supported by adequate technology, it can increase effectiveness. With the presence of technology, for example, if I often use videos on YouTube, children can directly see, besides the explanation, how the tawaf process is, how the jumrah throwing process is, how people wear ihram clothing." (Teacher RD)

Lessons delivered with the aid of technology help students understand the lessons, for example, the Hajj material. Teachers can provide a real picture of various activities in Hajj worship. In this case, the teacher can bring downloaded videos from YouTube, for instance, to be shown in class through a video device or DVD player.

This finding is also supported by the results of several relevant studies, both in an international context and a local context, such as research by Ringstaff, (2002); John Schacter (1999); Ghavifekr, et al., (2014) and other studies proving that technology increases student motivation and learning outcomes. Furthermore, in the Indonesian context, researchers have also proven the positive impact of technology implementation in education; for example, research by Purnasari and Sadewo (2020) confirms that technology can boost student motivation, and teachers' ability to utilize technology also impacts their ability to manage classrooms and create enjoyable learning and similarly, research by Salsabila, et al., (2022) shows that technology has a positive impact on strengthening the learning process.

Data obtained through interviews with principals illustrate that a majority of PAI teachers have a comprehensive and in-depth understanding of technology integration in learning: they understand that technology can be utilized and is

very beneficial for learning any subject, including PAI; these teachers also understand that to get the benefits of technology, teachers must be able to digitize teaching materials, where teaching materials are designed in the form of e-materials and taught through e-learning; they also believe that the TPACK concept is an essential part that all teachers must understand, so that the technology used is truly appropriate, and therefore, learning technology must be included in the RPP.

## D. Conclusion

This qualitative case study meticulously explored the perceptions, understanding, and practical integration of Technological Pedagogical Content Knowledge (TPACK) among Islamic Education (PAI) teachers in secondary schools across Banda Aceh and Aceh Besar. The findings unequivocally demonstrate a strong consensus among PAI teachers and school principals regarding the necessity and benefits of technology integration in enhancing learning quality and student engagement within Islamic education. Teachers are actively digitizing teaching materials and employing a variety of digital tools, ranging from simple platforms like YouTube and Canva to more sophisticated applications, to make their lessons more dynamic and relevant to today's technology-literate students. Furthermore, the study reveals that PAI teachers conscientiously plan for technology integration within their lesson plans (RPP), adapting their technological choices based on available resources and pedagogical objectives. This indicates a proactive and practical approach to incorporating technology into their daily instruction. However, a critical insight emerged from this research: while PAI teachers implicitly apply many of the components and principles inherent in the TPACK framework through their effective use of technology, an explicit and formalized understanding of TPACK as a theoretical model remains limited among most participants.

The term "TPACK" itself is not widely popular or explicitly recognized by the majority of teachers, suggesting that their technological integration is often driven by practical needs and intuitive pedagogical reasoning rather than a deliberate application of the comprehensive TPACK framework. This distinction is significant. An explicit and robust understanding of TPACK would provide PAI educators with a structured lens through which to systematically analyze, design, and refine their technology-integrated lessons. It could enable more intentional pedagogical choices that strategically combine content, pedagogy, and technology for optimal learning outcomes, moving beyond ad-hoc

implementation to a more theoretically informed and reflective practice. Therefore, this study underscores the urgent need for targeted professional development initiatives designed to bridge this gap. Such programs should aim to formalize PAI teachers' implicit knowledge of technological pedagogical content by introducing the TPACK framework, connecting it to their existing effective practices, and guiding them in leveraging its full potential. By fostering a deeper, explicit understanding of TPACK, Islamic education institutions can ensure that their educators are well-equipped to navigate the demands of modern education, cultivate innovative learning environments, and effectively prepare students for an increasingly digital world while maintaining the rich pedagogical foundations of Islamic teaching.

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