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BSE Practice Teacher's Level of TPACK Knowledge In Teaching

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Abstract: *The study assessed the knowledge on Technological Pedagogical and Content Knowledge (TPACK) of BSE practice teachers at Bukidnon State University. The study involved 50 participants from all five Bachelor of Secondary Education (BSE) program majors. A descriptive-quantitative study was conducted using a survey questionnaire adopted from the TPACK-21 questionnaire. The results were analyzed using SPSS version 29 and JASP version 0.9. The study concluded that student interns had "advance knowledge" of the seven TPACK components, with Pedagogical Knowledge (PK) having a more significant impact on their Technological Pedagogical and Content Knowledge applications than Technological Content Knowledge (TCK). The study highlights the ongoing implementation of Technological Pedagogical and Content Knowledge, providing a foundation for the University's College of Education and students particularly practice teachers to continue training*.

Keywords—TPACK; Practice Teachers

1. INTRODUCTION

In modern education, to teach students who will be able to access, search, and use information in the future, high-quality, ongoing education is essential (Xu & Chen, 2016), which traditional education is unable to adequately address these problems (Boisandi et al., 2021). Modern classrooms are incorporating technology for teaching, necessitating educators to possess skills for effective integration. However, without a strong pedagogical foundation, teachers may struggle to fully leverage technology's benefits.

According to Voogt et al. (2013), educators need to be knowledgeable about various pedagogical strategies to fully utilize technology and assist students in developing 21st-century abilities. Therefore, instead of focusing solely on teaching technology, educators should consider it a tool to enhance strategies for teaching science, math, and other disciplines (Baydaş et al., 2017). Teachers need a strong foundation in pedagogy and content knowledge to effectively integrate technology into their teaching methods. Technological Pedagogical Content Knowledge (TPACK) measures how well teachers can teach using technology.

This study aims to assess the level of TPACK knowledge of Bachelor of Secondary Education (BSED) practice teachers, as it is essential for strengthening teaching effectiveness, developing instructional strategies, and ensuring preparedness for contemporary students in a technologically advanced society.

1.1 Framework of the Study

A technological pedagogical content knowledge (TPACK) theory explains what teachers need to know about teaching effectively and using technology in the classroom. (McHill, 2019). In addition, it identifies the knowledge teachers need to integrate technology into teaching while addressing the multifaceted, situated, and complex nature of teacher knowledge (Santos & Castro, 2021).

Figure 1 shows the conceptual framework for TPACK that distinguishes between pedagogical knowledge (PK), content knowledge (CK), technological knowledge (TK), and amalgamation of pedagogical content knowledge (PCK), technological content knowledge, and (TPK) technological pedagogical knowledge (TPK). TPACK comprises three components: content, pedagogy, and technology (Valtonen et al., 2017). Shulman's (1986, 1987) pedagogical content knowledge (PCK) framework forms the basis of the TPACK framework. In teaching, PCK refers to the knowledge base of pedagogy and content (Shulman, 1987). Based on the article of Dr. Serhat Kurt (2018), Teachers face various challenges when integrating educational technology (ed-tech) into the classroom. However, the 2006 TPACK framework by Punya Mishra and Matthew J. Koehler, which emphasizes technological knowledge, pedagogical knowledge, and content knowledge, offers a helpful solution to several ed-tech issues. The TPACK framework describes the critical components of any effective ed-tech integration as content.

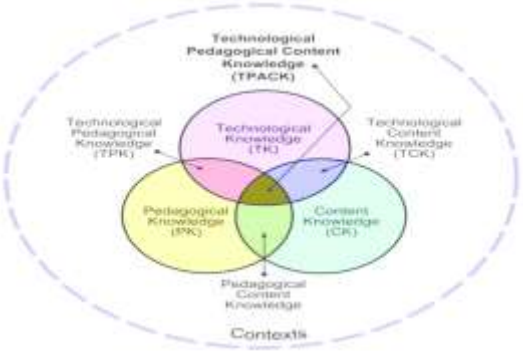

Fig. 1. *TPACK framework (©2012 tpack.org.)*

1.2 Statement of the Problem

The main objective of this study is to assess Bachelor of Secondary Education (BSED) practice teachers' level of TPACK knowledge at Bukidnon State University, Malaybalay City Bukidnon, for the first semester of the academic year 2022-2023.

Specifically, this study sought to answer the following questions:

1. What is the level of BSE- practice teacher's knowledge of the following:

a. Pedagogical Knowledge (PK),

b. Technological Knowledge (TK),

c. Content Knowledge (CK),

d. Pedagogical Content Knowledge (PCK),

e. Technological Pedagogical Knowledge (TPK),

f. Technological Content Knowledge (TCK), and

g. Technological, Pedagogical, Content Knowledge (TPCK)

1.3 Significance of the Study

This study aimed to provide information and knowledge regarding the Bachelor of Secondary Education (BSED) practice teacher's level of TPACK knowledge at Bukidnon State University.

The following were the anticipated study's beneficiaries:

BSED Practice teachers. This study would help the BSED practice teachers in different specializations to assess their level of TPACK knowledge.

Instructors. This study would help the instructors formulate techniques to help BSED practice teachers improve their level of TPACK knowledge in the classroom setting.

Administrators. This study would help the administrators impose programs and promote advocacy on enhancing TPACK knowledge, particularly for the BSED practice teachers.

Future Researchers. This study benefits future researchers in uncovering practice teachers' level of TPACK knowledge.

University. This study benefits the University because it helps produce technologically equipped graduates to deliver content knowledge.

1.4 Scope and Delimitation of the Study

The general purpose of this study is to assess the level of TPACK knowledge of Bachelor of Secondary Education (BSED) practice teachers at Bukidnon State University. The study will only involve the BSED practice teachers and not involve other programs as participants. Out of the total number of BSED practice teachers, only fifty (50) are encouraged to participate in the study. There will be 10 participants coming from each significant/specialization under the BSED program. The study will assess the Bachelor of Secondary Education (BSED) level of TPACK knowledge. It will also give the researchers an idea of the BSED practice teachers' level of TPACK knowledge of the said University in teaching.

2. Methods or Methods and Materials

Presented in this chapter is the methodology for collecting data for the study. It contains the research design, research locale, research participants, research instrument, scoring procedures, data gathering procedure, and data analysis.

2.1 Research Design

The researcher employs a descriptive-quantitative study. The researchers shall determine the BSED practice teachers' level of TPACK knowledge in teaching. Descriptive research consists of surveys and fact-finding investigations of different kinds. The primary purpose of descriptive study is to explain the circumstances and events surrounding a particular phenomenon (Mishra & Alok, 2022). Descriptive research aims to accurately represent the current state of the population under investigation and explain the patterns within the collected data.

2.2 Study Setting and Participants

The study was conducted at Bukidnon State University, College of Education, Casisang Annex Campus. The researchers chose the place of implementation because it would provide the needed information to measure the level of TPACK knowledge in the teaching of the BSED practice teacher.

The researchers employed simple random sampling methods to select the participants. Initially, the researchers determined the overall number of populations comprising one hundred thirty-four BSED-practice teachers and then ascertained the sample size, which is a subset of fifty individuals. The researchers then utilized a random number generator. All the names of the participants were compiled and then selected based on a random number assignment. This procedure ensures that every member of the population has a fair chance of being selected, hence eliminating any potential bias in the selection process. The respondents were chosen based on their practice teaching experiences during their on-campus teaching, for these respondents can provide the best information that is significant to the aims of our study.

2.3 Ethical Consideration

The researchers employed a Google Form questionnaire to administer the survey. The initial portion of the Google form includes an informed consent statement due to the online nature of this survey. Participants are given the option to consent to participate voluntarily. The data privacy statement is provided to protect participants' data privacy. The personal

information of participants is maintained confidentially, and the data collected was only utilized for this research.

2.4 Procedure and Data Collection Methods

The researchers used a questionnaire through a Google form adopted from the Technological Pedagogical Content Knowledge for Twenty-First Century Skills (TPACK-21) questionnaire of Valtonen et al. (2017). The questionnaire contains seven sections: (1) pedagogical knowledge, (2) technological knowledge, (3) content knowledge, Interaction between (4) pedagogical and content knowledge, Interaction between (5) technological and pedagogical knowledge, Interaction between (6) content and technological knowledge, and Interaction between (7) pedagogical, technological, and content knowledge. Each section consists of questions/statements ranging from four to seven items. The questions/statements are answerable by a rating scale of 1-5, where 1- needs a lot of knowledge about the topic, 2- needs some additional knowledge about the topic, 3- needs a little additional knowledge about the topic, 4- has good knowledge about the topic, and 5- has strong knowledge about the topic.

After administering the questionnaire, the participants responded. The results were then collected and tabulated. The data underwent analysis and interpretation employing the most suitable statistical procedures.

2.5 Data Analysis

After the research instrument was distributed, retrieved, and tabulated, it was then subjected to the following statistical procedures. The mean represented the typical value and functions as an average for all observations. Researchers calculate the mean to determine the average value of a collected dataset. Facilitates simpler conclusion-making by enabling the researchers to recognize the overall trend or pattern in the data set. Standard deviation quantifies the extent to which individual data points differ from the mean in a given data set. Comprehending the standard deviation is essential for researchers to evaluate the reliability of findings or conclusions derived from the data.

The researchers employed statistical tools to assess the data collected in the study. The statistical software utilized in this study was the Statistical Package for the Social Sciences (SPSS) version 29 and Jeffrey's Amazing Statistics Program (JASP) version 0.9. The data acquired was initially subjected to analysis using the SPSS tool, followed by additional analysis using the JASP tool. The researchers employed this dual analysis approach to validate the obtained results from both statistical tools. Researchers compared the results obtained from both statistical tools and found that all the results were consistent and reliable. After the analysis of the data, it was then interpreted.

3. RESULTS AND DISCUSSION

This chapter presents, analyzes, and interprets the gathered data from the survey conducted on Practice Teachers of Bukidnon State University. The survey aims to determine the level of pedagogical (PK), technology (TK), content (CK), pedagogical content (PCK), technological pedagogical knowledge (TPK), technological content (TCK), and TPACK knowledge and their level of understanding in applying TPACK in the teaching process. The data were arranged according to the problems presented in this study.

3.1 Pedagogical Knowledge (PK)

Table 1 shows the data on Practice Teachers' pedagogical knowledge (PK), which is specialized information about effective learning methods for students. It includes instructional techniques, curriculum development, classroom management, assessment methods, and understanding student challenges. Measuring PK is crucial for improving teacher quality and determining student learning outcomes. The results indicate that PK is a vital factor in enhancing student learning.

Table 1: Level of Pedagogical Knowledge (PK) of Practice Teachers

Pedagogical Knowledge (PK) **As a student intern I can:**	**Mean**	**SD**	**QD**	**QS**
Support students' creative thinking.	4.28	0.730	SK	Expert
Support students' reflective thinking.	4.26	0.664	SK	Expert
Guide students' discussions during group work (2-5 students)	4.24	0.744	SK	Expert
Guide students to make use of each other's thoughts and ideas during group work (2-5 students).	4.24	0.716	SK	Expert
Support students' critical thinking	4.04	0.669	GK	Advance
Guide students in planning their learning.	4.04	0.669	GK	Advance
Support students' problem-solving skills.	4.02	0.670	GK	Advance
Overall Mean and Standard Deviation:	4.19	0.695	GK	Advance

As the table shows, practice teachers have a Good Knowledge (GK) level in pedagogical knowledge. The results for PK level indicate that the participants better understand

their students' abilities, learning strategies, developmental levels, attitudes, motivations, and prior knowledge of the concepts to be taught. It means that the participants thoroughly understand how students form mental habits and learner dispositions, as well as how they gain knowledge and skills in diverse ways. By having a good knowledge of the pedagogy, they can adjust their teaching strategies to suit the student's needs better, eventually improving the quality of education. It confirms the findings of Hamka & Pranata (2023) that teachers with advanced knowledge in PK are more likely to provide high-quality instruction according to student perception. It also supports the study of Shah (2023), which stated that with strong PK, educators can make evaluations and assessments that precisely reflect the learning results of their students.

Moreover, ULUÇINAR (2021) described PK as the knowledge teachers hold about teaching and learning; it contains academic knowledge and knowledge derived from experiences in the classroom. UNESCO (2018) mentioned that learning depends on teachers' pedagogical approaches in the classroom. Overall, the BSE-student interns' good knowledge of PK allows them to establish productive teaching and learning settings, raise student performance, and provide appropriate and relevant assignments.

3.2 Technological Knowledge (TK)

TK is about comprehending technologically integrated education, thinking about how it could be used in a particular subject area, knowing when it will help or hinder learning, and continuously learning about and adjusting to new technological advancements (Kurt, 2019). Table 2 presents the gathered data on the practice teachers' level of technological knowledge. Measuring the level of technological knowledge of the in-service teachers is essential to assess whether they can successfully or effectively apply technology in teaching.

Table 2: Level of Technological Knowledge (TK) of Practice Teachers

Technological Knowledge (TK) **As a student intern I can:**	**Mean**	**SD**	**QD**	**QS**
I can use new technologies.	4.08	0.853	GK	Advance
I know several websites about new technology.	4.04	0.755	GK	Advance
I am familiar with new technologies and their features	3.94	0.913	GK	Advance
I can solve ICT related problems.	3.82	0.873	GK	Advance
Overall Mean and Standard Deviation:	3.97	0.848	GK	Advance

As shown in the table, practice teachers have a Good Knowledge (GK) level in technological knowledge. It implies that the participants can successfully incorporate technology into their instructional strategies, which could improve the student's learning outcomes. Being technologically literate helps prepare students for the future as technology plays an increasingly significant role in society. It supports the study of Murray (2020) that technologically literate educators can guarantee that every student has fair access to technology and is not left behind owing to a lack of access or understanding.

It is essential to assess the practice teachers' technological literacy to ensure they are equipped to advocate for appropriate technology, effectively incorporate technology into the teaching-learning process, and prepare the students for the real world. Başak (2021) mentioned that educators with good technological knowledge are competent at recognizing and utilizing the different technologies that are most appropriate for various teaching and learning tasks.

3.3 Content Knowledge (CK)

Table 3 presents the gathered data on the Practice Teachers' level of content knowledge (CK). The data gives the researchers an idea of how well the participants know what they are teaching. CK is the comprehensive understanding and expertise in a specific subject. Proper dissemination of knowledge by having a solid foundation and understanding of the lesson's content helps the learners to enhance their problem-solving, critical thinking, and practical application.

Table 3: Level of Content Knowledge (CK) of Practice Teachers

Content Knowledge (CK) **As a student intern I can:**	**Mean**	**SD**	**QD**	**QS**
I have sufficient knowledge in developing contents in my major.	4.18	0.800	GK	Advance
I know the basic theories and concepts of my major.	4.18	0.661	GK	Advance
I know the history and development of important	3.98	0.742	GK	Advance

theories in my major.				
I am familiar with recent research in my major.	3.74	0.986	GK	Advance
Overall Mean and Standard Deviation:	4.02	0.800	GK	Advance

As shown in the table, practice teachers have a Good Knowledge (GK) level in content knowledge. It implies that the participants better understand the content of the subject they are teaching in class. By better understanding the content of a subject matter, teachers would avoid confusion during the lesson demonstrations; hence, having a good level of CK allows a smooth transfer of knowledge to the learners. It is stated by Putman (2021) that educators should possess good content knowledge to implement an effective teaching process.

The practice teachers' level of CK impacts their interpretation of goals, response to questions, clear explanations, flexibility, and ability to push students to be more interested in the subject matter. CK is crucial for teachers since it encompasses theories, principles, and concepts of a discipline, focusing on effective teaching methods and student learning strategies.

3.4 Pedagogical Content Knowledge (PCK)

The practice teachers' pedagogical and content knowledge levels are essential to determine the effectiveness of the practice teachers as teachers. However, Shah (2021) mentioned that improving student outcomes requires more than raising content knowledge. The impact of professional development on student outcomes is greater when it incorporates pedagogy and content. Table 4 presents the gathered data on the practice teachers' level of pedagogical content knowledge (PCK). PCK is a specialized education concept that merges the two components: pedagogical knowledge (PK) and content knowledge (CK). It mainly helps to develop the teacher's teaching approaches to meet the learners' needs despite the learners' diversity.

Table 4: Level of Pedagogical Content Knowledge (PCK) of Practice Teachers

Pedagogical Content Knowledge (PCK) **As a student intern I can:**	**Mean**	**SD**	**QD**	**QS**
In my major, I know how to guide students' reflective thinking.	4.22	0.679	SK	Expert
In my major, I know how to guide students' content related problem solving in groups (2-5 students).	4.18	0.596	GK	Advance
In my major, I know how to guide students' critical thinking.	4.18	0.629	GK	Advance
In my major, I know how to guide students' creative thinking.	4.18	0.629	GK	Advance
In my major, I know how to guide students in planning their own learning.	4.16	0.710	GK	Advance
In my major, I know how to guide students to make use of each other's thoughts and ideas in group work (2-5 students).	4.16	0.681	GK	Advance
Overall Mean and Standard Deviation:	4.18	0.654	GK	Advance

The table shows that practice teachers have a Good Knowledge (GK) level in pedagogical content knowledge (PCK). It implies that the participants display a deep understanding of how to relate their pedagogical knowledge with their content knowledge. The participants know how to identify what type of teaching strategies need to be applied based on the contents of a subject matter.

Irvine (2018) stresses that experience and, specifically, content understanding have a poor association with good teaching. It might mean that even a good knowledge of CK needs to be improved to deliver an effective learning process. CK mainly focuses on the content teachers will teach; this means they must also have a good knowledge of the pedagogy to deliver the lesson successfully. Thus, integrating CK and PK to develop a way to attain an effective learning experience.

Gaining a solid foundation in PCK can help educators improve student engagement in learning (Bowen, 2022). Furthermore, PCK helps teachers convert CK into engaging, meaningful forms for students, enabling them to develop strategies, create challenging lessons, and foster successful learning experiences.

3.5 Technological Pedagogical Knowledge (TPK)

Technological pedagogical knowledge is a concept that applies technology to the teaching process. It shows the teacher's understanding of integrating technology into their teaching methods. Utilizing various technological resources

will enhance student learning in modern education. Integrating technology into teaching is essential because technology will significantly enhance teaching and learning experiences. Table 5 presents the level of technological pedagogical knowledge (TPK) of the practice teachers.

Table 5: Level of Technological Pedagogical Knowledge (TPK) of Practice Teachers

Technological Pedagogical Knowledge (TPK) **As a student intern I can:**	**Mean**	**SD**	**QD**	**QS**
I know how to use ICT in teaching as a tool for sharing ideas and thinking together.	4.12	0.659	GK	Advance
I know how to use ICT in teaching as a tool for students' critical thinking.	4.08	0.601	GK	Advance
I know how to use ICT in teaching as a tool for students' reflective thinking.	4.06	0.740	GK	Advance
I know how to use ICT in teaching as a tool for students' problem solving in groups (2-5 students).	4.06	0.652	GK	Advance
I know how to use ICT in teaching as a tool for students' creative thinking.	4.06	0.620	GK	Advance
I know how to use ICT in teaching as a tool for students to plan their own learning.	4.04	0.755	GK	Advance
Overall Mean and Standard Deviation:	4.07	0.671	GK	Advance

The table shows that practice teachers have a Good Knowledge (GK) level in technological pedagogical knowledge (TPK). It implies that the participants have a thorough understanding of how to incorporate technology into their lessons in a way that could improve the learning process for their students. It supports Pappas's (2023) idea that technologies can introduce new pedagogical advantages and constraints, impacting teaching and learning experiences. Proficiency in technological pedagogy enables educators to apply pre-existing knowledge to foster and improve learning outcomes.

3.6 Technological Content Knowledge (TCK)

Technological content knowledge is the integration of technology into the subject matter. It includes the ability of the teacher to enhance the learning content of the subject matter through technological application. Its main goal is to support student learning through the proper use of technology. Table 6 presents the level of technological content knowledge (TCK) of the practice teachers.

Table 6: Level of Technological Content Knowledge (TCK) of Practice Teachers

Technological Content Knowledge (TCK) **As a student intern I can:**	**Mean**	**SD**	**QD**	**QS**
I know websites with online materials for studying my major.	4.06	0.867	GK	Advance
I know ICT-applications which I can use to better understand the contents of my major.	3.96	0.807	GK	Advance
I know technologies which I can use to illustrate difficult contents in my major.	3.88	0.849	GK	Advance
I know ICT-applications which are used by professionals in my major.	3.88	0.799	GK	Advance
Overall Mean and Standard Deviation:	3.95	0.831	GK	Advance

The table shows that practice teachers have a Good Knowledge (GK) level in technological content knowledge (TCK). The results imply that the participants are highly knowledgeable about using technology to improve student learning outcomes and teaching strategies. Canada (2021) mentioned that integrating technology into the teaching process could enhance both students' teaching and learning outcomes. Applying technological knowledge to content knowledge fosters a more dynamic learning experience for the students. The participants with a strong foundation in TCK are more proficient at utilizing technology in the classroom to improve student learning experiences. It agrees with Durak (2019) that to use technology effectively, teachers must have sufficient knowledge and skills in using technology.

3.7 Technological Pedagogical Content Knowledge (TPACK)

The TPACK framework in education focuses on the skills and knowledge needed to apply or integrate technology in this digital age to ensure effective learning and teaching. TPACK consists of three concepts: (1) technological knowledge (TK), (2) pedagogical knowledge (PK), and (3) content knowledge (CK). TPACK was established to explain the body of information that teachers need to possess to successfully instruct students and use technology (McGraw-Hill, 2019).

Table 7 presents the Level of Technological Pedagogical and Content Knowledge (TPACK) of practice teachers. Understanding TPACK (Technological Pedagogical Content Knowledge) is crucial for modern educators to integrate technology into their teaching practices effectively. This framework explains the knowledge teachers need to teach subjects effectively and use technology.

Table 7: Level of Technological Pedagogical and Content Knowledge (TPACK) of Practice Teachers

Technological Pedagogical Content Knowledge (TPACK) **As a student intern I can:**	**Mean**	**SD**	**QD**	**QS**
In teaching my major, I know how to use ICT as a tool for sharing ideas and thinking together.	4.06	0.793	GK	Advance
In teaching my major, I know how to use ICT as a tool for students' reflective thinking.	4.06	0.620	GK	Advance
In teaching my major, I know how to use ICT as a tool in group work (2 -5 students).	4.06	0.620	GK	Advance
In teaching my major, I know how to use ICT in teaching as a tool for students' critical thinking.	4.04	0.605	GK	Advance
In teaching my major, I know how to use ICT as a tool for students' creative thinking.	4.02	0.622	GK	Advance
In teaching my major, I know how to use ICT as a tool for students' problem solving in groups (2 -5 students).	3.96	0.605	GK	Advance
Overall Mean and Standard Deviation:	4.03	0.644	GK	Advance

As shown in the table, practice teachers have a Good Knowledge (GK) level of knowledge in technological pedagogical and content knowledge (TPACK). It implies that the participants have a strong understanding of integrating technology into their teaching practices for a good level of TPACK (Canada, 2021). They can improve student learning outcomes and their pedagogical practices by using technology effectively.

Having a good level of TPACK is also more likely to have strong levels of self-efficacy when using the internet for education, which can help the student interns even more, when incorporating technology into their lesson plans. The participant's ability to use technology to improve student learning outcomes and teaching practices depends heavily on their level of TPACK. TPACK is crucial for educators to understand how technology can enhance pedagogical practices and student learning experiences (Pappas, 2023). It is essential for blended learning classrooms, as effective learning requires teacher knowledge integration, making TPACK a vital component.

3.8 TPACK Application

Table 8 presents the summary of the overall mean on practice teachers' level of PK, TK, CK, PCK, TPK, TCK), and TPACK knowledge of the practice teachers.

Table 8: Summary of Practice Teachers' Level of PK, TK, CK, PCK, TPK, TCK, and TPACK

Technological Pedagogical Content Knowledge (TPACK) Framework Domains	**Mean**	**SD**	**QD**	**QS**
Pedagogical Knowledge (PK)	4.19	0.695	GK	Advance
Interaction between pedagogical and content knowledge (PCK)	4.18	0.654	GK	Advance

Interaction between technological and pedagogical knowledge (TPK)	4.07	0.671	GK	Advance
Interaction between pedagogical, technological, and content knowledge (TPACK)	4.03	0.644	GK	Advance
Content knowledge (CK)	4.00	0.800	GK	Advance
Technological Knowledge (TK)	3.97	0.848	GK	Advance
Interaction between content and technological knowledge (TCK)	3.95	0.831	GK	Advance
Overall Mean and Standard Deviation:	4.06	0.735	GK	Advance

The table shows that practice teachers are Advance (A) in applying TPACK in the classroom. It implies that the interns deeply understand TPACK and its application in the teaching process. It promotes dynamic, effective, and relevant learning experiences. According to Santos, and Castro (2021), TPACK is a paradigm that evaluates the effectiveness of technology integration in delivering assignments, focusing on the careful and expert emulsion of knowledge. The application of TPACK in the classrooms still needs to be focused on effectively delivering lessons.

TPACK framework aids educators in integrating technology into instruction and enhancing their technological literacy. It helps preservice teachers integrate technology with subject content and teaching techniques. With its emphasis on technological knowledge (TK), pedagogical knowledge (PK), and content knowledge (CK), the TPACK framework provides a valuable solution to several challenges that educators encounter when integrating educational technology into the classroom (Kurt, 2019). TPACK will develop student learning, inspire educators and families, and make schools more fascinating and valuable for learners, providing equal opportunities for each learner and leading to professional improvement for teachers (Malik et al., 2019).

4 Conclusion

4.1 Based on the results and findings of the study, the following conclusion is made:

1. Bachelor of Secondary Education (BSE) practice teachers have good technological, pedagogical, and content knowledge (TPACK) and are able to apply theoretical concepts to classroom. They are adequately prepared to apply what they have learned about TPACK to the collaborating schools. Based on the highest and lowest mean results, PK had a more significant impact on BSE practice teachers' TPACK applications than TCK. Therefore, it is important for practice teachers to develop their TPACK knowledge, especially in the area of TCK, to effectively integrate technology into their teaching practices and support student learning.

4.2 Recommendation

1. BSE practice teachers are encouraged to familiarize themselves with appropriate technology to integrate into their subject areas.
2. Instructors may provide BSE practice teachers with opportunities to work with technology in a hands-on manner. It can include allowing them to experiment with different tools and software fit to their specialization and providing them with opportunities to create their own digital content in instructional planning.
3. The administrators may provide programs to enhance BSE practice teachers' technological content knowledge to integrate technology in their major subject area properly.
4. TPACK is a valuable tool for future researchers of BSE practice teachers to understand how to integrate technology into their teaching practices. Further research is recommended for universities to develop alternate teaching methods for twenty-first-century learners, enhancing BSE practice teachers TPACK and its application.

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