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EXAMINING THE TECHNOLOGICAL, PEDAGOGICAL, AND CONTENT KNOWLEDGE (TPACK) OF PRE-SERVICE SOCIAL STUDIES TEACHERS

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Acceptance Page

This paper prepared by **NINEVETH E. EMLANO** with the title: **"EXAMINING THE TECHNOLOGICAL, PEDAGOGICAL, AND CONTENT KNOWLEDGE (TPACK) OF PRE-SERVICE SOCIAL STUDIES TEACHERS"** is hereby accepted by the Faculty of Education, University of the Philippines Open University, in partial fulfillment of the requirements for the Master of Arts in Social Studies Education

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Dedication

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This work is wholeheartedly dedicated to my family, who have been my inspiration and who continually provided their moral, spiritual, emotional, and financial support.

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Abstract

The study examined the preparedness of pre-service Social Studies teachers to assume the role of a beginning teacher at the secondary level using the Technological Pedagogical and Content Knowledge (TPACK) framework. The study also sought to determine the factors that influenced the development of TPACK among these teachers as they teach the Social Studies subject. This case study employed mixed methods research, specifically the convergent parallel design among 43 fourth-year pre-service teachers engaged in the practice teaching course of Alonso Teachers College in Laguna. The mixed-method design was used to address the limitation of self-report measures in terms of accurately measuring the respondents' knowledge of the seven domains of TPACK. The quantitative data was collected using a modified TPACK survey instrument while the qualitative data was gathered using open-ended questions and focus group discussions.

The result of the study showed that the perceived level of knowledge of the seven domains of TPACK is adequate. Among the seven domains, PK had the highest mean score followed by TPK, PCK, TCK, TK, and CK are the three domains that have the lowest overall mean. The development of TPACK among the respondents was influenced by the mode of instruction, ICT infrastructure, teacher factor, field study and teaching internship, and personal characteristics.

Keywords: TPACK, content knowledge, pedagogical knowledge, technological knowledge, preservice social studies teachers

Chapter 1

INTRODUCTION

1.1. Background of the Study

Social Studies occupies a very important position in the basic education curriculum because it is given the task of citizenship education. The 2016 K to 12 curriculum guides for Araling Panlipunan states that the goal of Araling Panlipunan is to mold the youth to become “functionally literate and developed Filipinos” who possess the following characteristics – “mapanuri, mapagmuni, mapanagutan, produktibo, makakalikasan, makabansa at makatao na may pambansa at pandaigdigang pananaw at pagpapahalaga sa mga usaping pangkasaysayan at panlipunanan” (DepEd, 2016). These are characteristics that every citizen must have to be able to meaningfully participate in nation-building and strengthen the democratic values enshrined in the 1987 Constitution. Moreover, the problems of the contemporary world are transnational in nature.

However, the results of the National Achievement Test, which is regularly conducted by the Department of Education, show that Social Studies education may be falling short of its goal. The report of the Second Congressional Commission on Education in 2024 said that the result of the National Achievement Test (NAT) for grade 6 during the school year 2020-2021 showed that the mean percentage score in Araling Panlipunan of Grade 6 students is 44% which translate to low proficiency. Results of the NAT for the school year 2017 – 2018 showed that the Grade 10 students are not proficient in the 21st-century skills in Araling Panlipunan. The mean percentage score suggests that the students were nearly proficient in problem-solving and information literacy while their proficiency level in critical thinking is low. Grade 6 students were

not proficient in critical thinking skills while the level of proficiency in problem-solving and information literacy was low. The Basic Education Exit Assessment of Grade 12 students in the school year 2018 – 2019 showed that Grade 12 students have low proficiency in Social Science, Philosophy, and Humanities (dela Fuente, n.d.).

The EDCOM II year 1 report cited several factors that could explain the current state of the educational system. One of these factors is the low level of mastery in subject matter knowledge and pedagogical competencies of teachers in the early grades and high school levels. DepEd in its department order 24 series 2022 said that one of the major challenges in the teacher management is the quality of entry-level teachers. It also noted that teachers showed poor skills in analysis, synthesis, and evaluation. The low content knowledge could also be due to the out-of-field teaching. According to the EDCOM II year 2 report, 62% of high school teachers are handling subjects they did not major in college. Among the Araling Panlipunan teachers, 51% and 68% of the teachers in Junior High School and Senior High School, respectively teach outside of their field of specialization.

One of the important steps to address the low proficiency of students in Araling Panlipunan is to improve the knowledge of the in-service and pre-service Social Studies teachers in the areas of content, pedagogy, and technology since students' attitude towards Social Studies is influenced by the teacher's competency and behavior and the use of technology in the teaching and learning process (Gonzales and Hermosa, 2023). Students' attitudes in turn affect the students' academic achievement. Hence, teacher education institutions (TEI) must be able to prepare their pre-service teachers majoring in Social Studies to assume the role of beginning teachers. To achieve this, TEIs should have a way to measure whether their pre-service teachers have the core knowledge needed to teach Social Studies effectively.

A framework that can be used to assess the knowledge of the pre-service and in-service teachers is the Technological Pedagogical and Content Knowledge (TPACK) introduced by Mishra and Koehler (2006). It is based on the Pedagogical Content Knowledge (PCK) framework of Shulman (1986) which asserts that effective teaching requires that teachers understand the content, pedagogy, and the different ways of presenting the subject so that it can be easily understood by the learners. With the advent of digital technology and the increasing role of technology in the teaching and learning process, technological knowledge was added to Schulman's PCK framework.

1.2. Problem Statement

Canuto (2022) acknowledged that Social Studies education could help address the perennial problems of Philippine society. However, the EDCOM II reports and the result of the National Achievement Test showed a troubling state of Social Studies Education in the Philippines. The low proficiency in problem-solving and critical thinking skills among Filipino students implies that Social Studies education may be failing in its mission. This problem has to be addressed if the Philippines is to achieve its vision as enunciated in the Preamble of the 1987 Constitution, that is to create a just and humane society with a government that promotes the common good.

The EDCOM II reports cited the quality of teaching as one of the reasons for the current state of Social Studies education. Hence, the TEIs should ensure that future teachers of Social Studies possess the requisite knowledge to effectively teach the subject. To do this, TEIs should be able to explore other ways to determine whether their pre-service teachers have the core knowledge needed to teach Social Studies effectively. The TPACK framework identified content knowledge, pedagogical knowledge, technological knowledge, and the interplay between these three as

essential to successful teaching. The various self-report measures developed through the years provide a means of measuring the level of knowledge of the different components of TPACK among pre-service teachers. Hence, the TPACK framework could be used as an analytic lens to assist TEIs in transforming their teacher education program to prepare their graduates to successfully teach Social Studies with technology.

1.3. Research Questions

This study examined the level of content, pedagogical, and technological knowledge of preservice Social Studies teachers in one of the teacher education institutions in Laguna using the TPACK framework. It aimed to describe the content, pedagogical, and technological knowledge of the preservice Social Studies teachers, examine factors that enable Social Studies teachers to develop TPACK, determine the perceived learning needs of Social Studies teachers in the areas of TPACK, and propose strategies to address these learning needs. Additionally, the study modified the existing TPACK self-report measures to include the specific knowledge and competencies expected from effective Social Studies teachers.

Therefore, this study sought to examine the readiness of the preservice Social Studies teachers to teach Araling Panlipunan subjects at the secondary level using the TPACK framework. This study aimed to answer the following research questions:

1. What are the perceived levels of preparedness in terms of content, pedagogical, and technological knowledge of the Social Studies preservice teachers as described by the TPACK framework?
2. What are the factors that influence the development of TPACK among the preservice teachers?

3. What are the perceived learning needs of the preservice Social Studies teachers to develop TPACK?

1.4. Significance of the Study

The result of the study may be used as a basis to improve the teacher education curriculum of secondary education with Social Studies as the field of specialization and to design TPACK-based intervention which would contribute to the professional growth of both the preservice and in-service teachers. It is important to equip the teachers with the needed knowledge to effectively teach Social Studies since they could influence the attitudes of the students towards the subject. In turn, students' attitudes toward Social Studies will not only affect their academic achievement but also how they will perform their future roles as citizens in a democratic society and as global citizens in an increasingly interconnected world. Hence, there is a need to give careful attention to how TEIs prepare their preservice Social Studies teachers.

For the TEI where the study will be conducted, the result of the study is likewise foreseen to inform and improve the pedagogy and practice of its teacher educators or faculty members. Several studies found that modeling by teacher educators can enhance the TPACK development of preservice teachers (Lee et al., 2022; Wang, Schmidt-Crawford & Jin, 2018). As such, the findings from this study can guide faculty members when making changes in the content of course syllabi and improving their course delivery of teacher education courses.

Currently, the said TEI uses a generic instrument to evaluate the performance of their preservice teachers during their internship and their final demonstration regardless of the field of specialization. The modified instrument used in this study will provide a detailed evaluation of the performance of their preservice Social Studies

teachers and more importantly, their learning needs as teaching professionals. This study will also give the preservice teachers an opportunity for self-reflection so that they can assess their strengths and weaknesses. This self-assessment could be the basis for further self-improvement. The ability to reflect and do self-assessment is a valuable skill that future teachers must have as this will help them in their professional growth. A corps of highly competent Social Studies teachers will ensure that the students will learn the knowledge and skills that are essential so that they will thrive in the 21st century. Thus, this study is an initial step to assess the level of TPACK of the preservice Social Studies teachers. Future researchers can improve the self-report measure used in the study by developing a performance-based measure that will provide validation to the self-rating of the preservice teachers.

1.5. Limitations of the Study

The limitations of the study are related to the use of self-report measures and the number of respondents in the study. As stated by Abbitt (2011), self-report measures such as the SPTKTT are a valuable instrument in assessing the level of TPACK of preservice teachers but their ability to accurately measure the knowledge of the seven TPACK domains depends on the ability of the respondents to assess their knowledge and respond appropriately to the survey items. Moreover, self-report measures do not provide enough evidence of the respondents' ability to integrate technology in the classroom. Since the study also collected data through qualitative measures and a mixed methods approach then the results and analysis go beyond the self-report measures aimed at ensuring the use of TPACK to further inform teacher education of preservice Social Studies teachers to benefit Social Studies classrooms and the Education as a field of study in general.

The respondents in the study were from one TEI only hence the result cannot be generalized and applied to other TEIs. Second, is the probability of positivity bias since the participants were former students of the researcher. The answers that participants gave in the open-ended questions and during the FGD could be what they perceived as expected from them by the researcher who was their former teacher, which may have possibly influenced some of their responses. To resolve this area and preempt any form of bias, students were properly oriented with the objectives, processes and procedures entailed of the study. As such they were given ample time and opportunity to fully understand what was expected of them and decide whether to participate or not. Once decided to become participants, their contributions were deemed as honest, fair and valid being respondents who are adults aware of the study and have given full consent to participate.

Chapter 2

REVIEW OF RELATED LITERATURE

This Review of Related Literature will focus on the methods used to measure TPACK, the trends, and the results of the research done among preservice teachers in the Philippines and other countries. The TPACK research on Social Studies will be discussed since the purpose of this study is to examine the readiness of fourth-year preservice Social Studies teachers to teach at the secondary level with the use of the TPACK framework. The last part of the review will discuss the gaps in TPACK research.

2.1. TPACK

The technological, pedagogical, and content knowledge framework has been extensively studied since it was first introduced by Mishra and Koehler (2006). A bibliometric analysis undertaken by Lee et al. (2022) showed that 700 articles on TPACK were published between 2011 to 2020. Several systematic Reviews of Literature have been undertaken by Abbitt (2011), Chai et al. (2013), Willermark (2018), Wang et al. (2018), Saubern et al. (2020), Irwanto (2021), and Lee et al. (2022). The studies they reviewed dealt with the development of the TPACK framework and the instruments and methods used in measuring the TPACK of preservice teachers (Abbitt, 2011; Wang et al., 2018); investigation of ICT integration using the TPACK framework; the general characteristics of TPACK studies, and an analysis of how the framework has been applied to identify teachers' TPACK (Lee et al., 2022); and the direction of the research scholarship in the area of TPACK (Saubern et al., 2020; Irwanto 2021).

Lee et al. (2022) found that research on TPACK was done mostly in the United States, Turkey, and Australia. They also noted that early research in TPACK was focused on preservice teacher knowledge development but later more research was undertaken to explore more subject-specific knowledge. According to Willermark (2018), the studies on TPACK dealt primarily with “examining teacher TPACK from the perspective of knowledge rather than competence” (p.339). This is a cause of concern since there is usually a discrepancy between displayed knowledge and the application of this knowledge.

2.2. Measures of TPACK

Koehler et al. (2012) reviewed 33 studies to identify the commonly used TPACK measures and test each TPACK measure in terms of reliability and validity. They found that the commonly used techniques were self-report measures (23%), performance assessments (23%), interviews (21%), observations (20%), and open-ended questionnaires (13%). The open-ended questionnaire was the least used technique because of the “complexities of coding and analyzing data from open-ended instruments” (p.23).

2.3.1 Self-report measures

Self-report measures are measures that use a survey instrument that enables the participants in the research to rate their self-perceived knowledge of content, pedagogy, and technology domains of TPACK, and the interaction between the three domains. Since the introduction of TPACK, several instruments have been developed for this purpose. The most used instrument is the Survey of Preservice Teachers’ Knowledge of Teaching and Technology (SPTKTT) which was introduced by Schmidt et al. (2009). It was designed to measure the knowledge development in each of the

seven components of TPACK among elementary and or early childhood education preservice teachers.

According to Abbitt (2011), the SPTKTT is a valuable instrument for assessing the TPACK knowledge of preservice teachers in terms of reliability and efficiency. However, he added that its ability to accurately represent knowledge in the seven TPACK domains is dependent on the “ability of the respondents to assess their knowledge and respond appropriately to the survey items” (p.291).

Chai et al. (2011) and Chai et al. (2016) found two issues with the SPTKTT. The first pertains to the “validation process which was conducted separately for each area of TPACK (i.e. PK, TK, CK, TPK, PCK, and TCK) using principal component analysis” while the second relates to the “operationalization of the content-related constructs of TPACK” (as cited in Valtonen, 2017, p. 18). As such, problems for the interpretation may arise when several different types of content are simultaneously examined. The SPTKTT was modified by several researchers to suit their context for example, there were changes from the 7-point to a 5-point Likert scale. Questions were also revised to incorporate the required subject matter for the preservice teachers to teach in Singapore. Nordin & Ariffin (2016) and Barii et al. (2017) also modified the SPTKTT to take into consideration the Malaysian and Croatian educational systems, respectively. Sahin (2011) developed a survey that consists of seven subscales of the TPACK model. This survey was the basis of the 55-item Likert scale developed by Akman and Given (2015) to analyze the TPACK and self-efficacy perceptions of the social sciences teachers and teacher candidates in Turkey.

According to Koehler et al. (2012), there is a need to develop survey instruments that are customized to specific content knowledge bases. Hence, several types of research were done that led to the development of survey instruments for

educational technology (Ozden, 2015), Social Studies (Akman & Guven, 2015), and Mathematics (Leendertz et al., 2015). In the Philippines, Morales et al. (2019) developed a self-rating tool to determine the proficiency of Philippine Higher Education Science, Technology, Engineering, Agri-Fisheries, Mathematics (STEAM) educators.

Citing the need to develop a TPACK measurement instrument that emphasizes pedagogical approaches that support the development of 21st-century skills such as collaboration, communication, ICT literacy, social and/or cultural competencies, creativity, critical thinking, and problem-solving, Valtonen et al. (2017) introduced the TPACK-21 questionnaire. In this questionnaire, TPACK and the subdomains that are related to pedagogical knowledge (PK, TPK, PCK, TPACK) are anchored on the development of 21st-century skills. The questionnaire was validated using confirmatory factor analysis (CFA).

Miguel-Revilla et al. (2020) examined whether the TPACK-21 model is a coherent and useful assessment tool for assessing the digital competence of preservice Social Studies teachers' initial training. They found that it is a valuable tool because it showed an adequate degree of internal consistency. Citing Seixas (2017) and van Boxtel and van Drie (2018), they also asserted that the TPACK-21 model "has made it possible to address how teacher education can promote different competence areas, in consonance with the planning and design of the intervention and with many of the key principles that guide Social Studies education" (p.7). They concluded that integrating the TPACK model is beneficial to preservice teachers.

While data from self-reported surveys can provide important findings on TPACK, "there is always the potential for recall error" (Egbert et al., 2002, as cited in Wang et al., 2018, p. 252). Moreover, data from self-reports do not show one's ability

to integrate technology in the classroom (Marquez et al., 2004 as cited in Wang et al., 2018, p.252).

2.3.2 Performance-based TPACK measures.

Using performance-based measures is one way to overcome the limitation of self-report measures identified by Marquez et al. (2004, as cited in Wang et al., (2018). Performance-based measures are also commonly used in TPACK research. It examines the participants' knowledge of TPACK and its subdomains through the artifacts created (Abbitt, 2011), their performance on given tasks that are designed to represent complex, authentic, real-life tasks (Koehler et al., 2012), or by creating a scenario or problem-based questions that participants need to solve (Graham et al., 2009).

One of the performance measures described by Abbitt (2011) in his review of the methods and instruments used in TPACK research is the Technology Integration Assessment Rubric developed by Harris et al. (2010) which uses the lesson plan created by the preservice teacher to investigate their decision-making and pedagogical reasoning. Its focus on TPK, TCK, and TPACK makes it suitable for the contexts of many teacher education programs and to be used in multiple content disciplines. Finally, he said that the SPTKTT and the Technology Integration Assessment Rubric are highly complementary since the rubric would serve to demonstrate how the perceived knowledge measured through SPTKTT is evident in instructional planning.

The combination of the SPTKTT and the Technology Integration Assessment Rubric would indeed provide a more accurate measurement of the level of TPACK of preservice teachers. Since the present study is an initial attempt to measure the

TPACK of preservice Social Studies teachers, it will focus more on customizing the SPTKTT AND TPACK-21 to include the knowledge that is needed by beginning Social Studies teachers. Once a self-reported measure is established, future research can focus on developing a measure like the Technology Integration Assessment Rubric which can supplement the self-report measure.

2.3. TPACK and Preservice Teachers

This section will present the perception of secondary preservice teachers on TPACK and its components (Redmond & Lock, 2019), and the Review of Literature by Wang, et al. (2018) which synthesized the result of the research on TPACK development of preservice teachers that was done between 2006 and 2015. A review of the results of the previous studies on TPACK of preservice teachers is important to identify possible research areas that could contribute to the development of TPACK of preservice teachers.

According to Redmond and Lock (2019), the pre-service teachers had a positive attitude towards TPACK and they would like to further develop their knowledge and skills so they can integrate technology into the teaching and learning process. Their perceptions of CK and PK are aligned with Shulman's PCK construct while their perception of CK is congruent with the definition of Valtonen, et al. (2017). In terms of TPK content, Redmond and Lock (2019) reported that the preservice teachers seemed well-versed. The connection between TK and teaching practices was realized. TPK was viewed as a "means of engaging students and providing a more relevant and flexible approach to meet learners' needs" (p. 49). However, in terms of TK and TCK, Redmond and Lock (2019) indicated that the preservice teachers' understanding is

misaligned with the definitions and descriptions found in the literature. Many of the respondents seemed confused and limited in their knowledge about TCK. For example, technology was perceived as a means to find content and resources on the internet such as YouTube videos or online quizzes. Moreover, the use of ICT in their teaching was limited to the generic use of Excel, PowerPoint, and Movie Maker. They failed to acknowledge that technology can change the content and that they need a deeper understanding of how to choose technologies that would be appropriate for teaching a particular content (Redmond & Lock, 2019).

The findings of Redmond and Lock (2019) in terms of TK and TCK affirmed the prior study by Valtonen, et al. (2017) which found that preservice teachers are weakest in the technology-related domains of TPACK. Additionally, Wang et al. (2018) reported that several studies concluded that preservice teachers feel that they are not adequately prepared to effectively use technology in their classrooms. The weakness of the preservice teacher in the TK could harm their TPACK development. Studies show (Meric, 2014; Chuang and Ho, 2011; Kabakci et al., 2014) that TK is strongly correlated with TPACK development, and technology usage influences TPACK competency (Wang et al., 2018). In contrast to the finding of Redmond and Lock (2019), Wang et al. (2018) reported on several studies which found that preservice teachers typically lack pedagogical knowledge which would make it difficult for the preservice teacher to develop their TPK, PCK, and TPACK.

On the other hand, Redmond and Lock's (2019) assertion that the perceptions of their respondents on CK and PK are aligned with those established in the literature found support from Kopcha et al. (2014) as cited in Wang et al., (2018). However, they noted that while many preservice teachers understand TPACK, they found it difficult

to apply that understanding in creating planning documents that used technologies to support the content standards

The results of the research cited above show that preservice teachers need to develop deep knowledge and understanding of TPACK so they can apply it when they start teaching.

2.4. TPACK Research in the Philippines

There were five research on preservice teachers' TPACK conducted and reported in the Philippines from 2014 to 2021. The research of Cacho (2014) and Mercado and Ibarra (2019) measured the TPACK of the elementary preservice teachers while Aquino (2015) focused solely on secondary preservice biology teachers. Ramos et al. (2020) compared the TPACK of the secondary and elementary preservice teachers. Santos and Castro (2020) did not specify whether the respondents were secondary or elementary preservice teachers. To measure the TPACK of the preservice teachers, self-report measures such as the SPTKTT and TPACK-21 were used in three out of five research. The other research combined the self-report measure with observation and interviews.

In terms of the knowledge of TPACK and its subdomains, the respondents in the research of Ramos et al. (2020) and Cacho (2014) gave the highest rating to their pedagogical knowledge followed by the domains that combined pedagogy with technological and content knowledge. The respondents in the study of Mercado and Ibarra (2019) rated themselves the highest in terms of technological content knowledge while the cooperating teachers in the study of Santos and Castro (2020) gave the preservice teachers the highest rating in technological pedagogical knowledge. Conversely, technological knowledge got the lowest rating in the study of

Ramos et al. (2020), Mercado and Ibarra, (2019), and Cacho (2014). In the study of Santos and Castro (2020), CK and TCK had the lowest mean scores.

The study by Ramos et al. (2020) showed that the respondents were highly confident in their PK, PCK, and TPK but their confidence in these domains was not always demonstrated in their practice. CK and TCK were the more frequently practiced domains of TPACK although confidence in the learning experience in CK and TCK got the lowest mean score. This finding further supports the need to combine the different methods of measuring TPACK.

2.5. TPACK Research in the Social Studies

Research on the TPACK of preservice teachers in various content areas has been extensively studied but very limited in the Social Studies content area. According to Willermark (2020), TPACK research on Social Studies accounted only for less than 3% of the studies that were reviewed. Similarly, a literature review on PCK research conducted by Lotivio-Bedural et al. (2018) showed that from 1986 to 2018, there were only 41 PCK research in Social Studies. Most of the research (66%) was conducted from 2010 – to 2018 in the United States (81%) while Japan, Korea, and Taiwan contributed 1 published research each. Most of the participants in the studies were Social Studies teachers (46%) followed by History teachers (27%), Geography teachers, and Civics teachers at 3% each. Aside from the PCK framework of Shulman (1986), other researchers also used the Model of Pedagogical Content Reasoning by Wilson et al. (1987), Substantive and Syntactical Knowledge of Schwab (1978), Content Knowledge of Ball et al. (2008), Key components of PCK by Grossman (1990), Continuum Model of PCK by Gess-Newsome (1999), TPACK by Mishra and

Koehler (2006), and the Substitution-Modification-Augmentation-Redefinition (SMAR) model by Puentedura (2012).

After the PCK framework by Shulman (1986), the TPACK model was the most commonly used with seven published research that dealt with technology integration in Social Studies. According to Powell (2017), the scarcity of PCK research in Social Studies is due to the differing views on the aims and purposes of Social Studies and on widespread distrust of traditional academic disciplines and the scholarship they produce. These two factors make it difficult for researchers to formulate an effective strategy to prepare Social Studies teachers. He proposed that Social Studies should "resolve its relationship to the disciplines" so that "a more coherent conceptualization of teacher education in Social Studies could come into focus" (p. 1). This will enable also the "Social Studies teacher educators to contribute to the knowledge base on PCK, particularly about the transformation of disciplinary content into school curriculum" (Powell, 2017, p.1).

The results of the research on preservice Social Studies teachers conducted in the United States (Spazak, 2013; Byker 2014), Spain (Colomer et al., 2018; Miguel-Revilla et al., 2020), and Turkey (Adalar, 2021) are presented next. All the studies use self-report measures to determine the preservice teachers' readiness to integrate technology in the classroom (Spazak, 2013), self-efficacy beliefs (Adalar, 2020; Colomer et al., 2018; Miguel-Revilla et al. 2020), and TPACK awareness (Byker, 2014). Spazak (2013) studied secondary preservice teachers from 14 Pennsylvania State System of Higher Education schools to determine their readiness to integrate technology in the classroom. The result of the study showed that the preservice teachers have a high level of knowledge in each of the subscales of the TPACK domain with the TK subscale having the lowest mean score. They also have a high

level of confidence in technology integration. Based on these two indicators, she concluded that the preservice teachers are prepared to integrate technology into the classroom. The preparedness of the teachers may be attributed to the effective modeling from the teacher educators and cooperating teachers.

Byker (2014) investigated the TPACK awareness of 25 preservice Social Studies teachers at a Midwestern University. The result of his study showed that while preservice teachers see the usefulness of technology in teaching, the level of technological knowledge relative to TPACK could be described as beginner. They are not sure how to “integrate Social Studies content and pedagogical knowledge with their technological understandings” (Byker, 2014, p. 111). Because they do not know how to integrate the three core components of TPACK, they are likely to separate technological knowledge from pedagogical and content knowledge when working on a Social Studies activity. The preservice teachers also exhibited a sense of ambiguity towards the integration of technology within the Social Studies classroom because they questioned the practicality of using Social Studies technology applications. “The ambiguity found among this study’s sample may indicate preservice teachers need a stronger understanding of TPACK” (Byker, 2014, p.113).

The study by Colomer et al. (2018) involving 153 students with a Degree in Teaching in Primary Education showed that preservice teachers have greater self-knowledge of pedagogical or technological content, compared to the disciplinary ones making it difficult to “develop an effective teaching digital competence for the development of critical didactics in Social Sciences” (p. 107). Redmond and Peled (2018) compared the TPACK of preservice teachers between disciplines in Australia and Israel. Their result showed that in both countries, preservice teachers in the Humanities and Social Studies scored low in TPACK, TPK, and TK while the CK and

PK had the highest score. Miguel-Revilla et al. (2020) assessed the digital competence of educators in Social Studies preservice teachers and the effectiveness of a teaching intervention based on the DigCompEdu framework. The result of the study showed that before the teaching intervention was implemented, the preservice teachers showed a low degree of confidence regarding their capabilities of integrating technology with pedagogical and content knowledge. However, progress toward competence was found when the result obtained after the intervention was compared with the result before the intervention. This means that the intervention was effective in improving the self-perception of prospective teachers. Although initially, the participants in the study lacked technological competence they do not advocate that the initial teacher training should focus attention on TK exclusively but it should focus on the interaction of technological knowledge with pedagogical and content knowledge following the comprehensive model of Bower (2017).

Adalar (2021) studied 349 third-year and fourth-year students from three state universities in Turkey's Central Anatolia region in the AY 2018 – 2019 to determine the Social Studies teacher candidates' self-efficacy beliefs for their TPACK knowledge and the factors that influence their self-efficacy beliefs. The variables that were thought to affect the self-efficacy beliefs of the respondents were gender, year in college, grade point average, ownership of a personal computer, perceived technology competency, use of content-sharing platforms for professional purposes, and the score in the instructional technology and material development course. The result showed that Social Studies teacher candidates' self-efficacy beliefs for overall TPACK are generally at a sufficient level with a mean score of 3.66. The lowest mean score was obtained in the technological knowledge (3.46) sub-dimension while they scored high in pedagogical knowledge (3.74) and content knowledge (3.71) sub-components. The

variables that were found to be important predictors of self-efficacy beliefs about TPACK are perceived technology competency and the use of content-sharing platforms for professional purposes. Four of the five studies on the TPACK of preservice Social Studies teachers showed that technological knowledge always got the lowest mean score.

2.6. Factors that Influence TPACK Development

This section will discuss the factors that influence the development of TPACK among preservice teachers. The study analyzed by Wang et al. (2018) indicated that the modeling provided by teacher-educators and in-service teachers plays a vital role in the enhancement of preservice teachers' TPACK, particularly regarding the incorporation of technology in diverse teaching contexts. It was observed that preservice teachers often replicate the technology integration activities they experienced in the classroom. Aside from modeling, peer mentor feedback, field experience, and field instructors play a major role in preservice teachers' TPACK development. According to Darsih et al. (2024), the mentoring provided by the cooperating teachers bridges the gap between the theories learned by the PSTs in their teacher preparation courses and the application of these theories in real-world situations.

The role of field experience in the development of TPACK is supported by the study of Redmond and Lock (2019). The respondents in their study considered real-life experiences and those obtained during the teaching practicum as the keys to developing a strong PCK. This is supported by Tembrevilla et al. (2024) who observed that collaborative mentoring during teaching practicum enhances preservice teachers' collective knowledge of the nature of learning and diverse student development which

in turn will enhance their competence and confidence in managing diverse teaching and learning situations.

The attitude of the preservice teachers toward technology also plays an important role in the preservice teachers' TPACK. Scherer et al. (2018) found that there is a positive relationship between attitudes toward technology and TPACK. Their study showed that more positive attitudes toward ICT are associated with higher self-efficacy in TPACK, and vice versa. Hence, they recommended that instructional approaches in teacher education programs should encourage the development of positive attitudes toward ICT. Teacher educators should showcase the usefulness and ease of ICT use for educational purposes and allow the preservice teachers to gain mastery in using technology.

A similar result was obtained by Hidayat et al. (2024). Their study showed that there is a significant and positive correlation between technological pedagogical content knowledge (TPACK) and the belief in teaching with technology among pre-service mathematics teachers. They noted that when preservice teachers know how to effectively use technology with pedagogy and content, their beliefs about the advantages and effectiveness of incorporating technology in mathematics education become more positive.

Among English preservice teachers, Darsih et al. (2024) found that aside from the support of mentor teachers, access to tools and technologies, prior exposure to technology serves as a strong foundation for TPACK development. The availability of professional development opportunities also affects the development of TPACK among preservice teachers. They considered access to tools and technologies a fundamental element in enhancing TPACK. This is supported by Abedi et al. (2024), who stressed that the availability of appropriate technological resources significantly

enhances teachers' ability to engage with and integrate technology effectively. An earlier study by Aksin (2023) showed that the TK levels of preservice Social Studies teachers with a home computer were significantly higher than those of participants who did not have a home computer.

The studies conducted in the Philippines showed that the development of core competencies of TPACK is affected by the quality of the learning experience (Ramos et al., 2020) and the academic performance of the respondents in the technology-related courses (Mercado and Ibarra, 2019).

The pandemic in 2020 caused a shift in the mode of learning from face-to-face classes to online classes. The shift in the mode of learning had positive and negative effects. Backlund et al. (2021) found that learning of course content was negatively affected by the shift in the mode of learning. The respondents in the study attributed this to the loss of interpersonal interaction. The challenges in learning content during online classes were also experienced by the preservice Social Studies in South Africa (Nwati & Thuthukile (2021) and the Philippines (Laguitao et al., 2021; Capule et al., 2024). In the Philippines, online learning has become challenging because of the weak or absence of an internet connection in some areas and the cost of having a stable internet connection (Laguitao et al., 2021). Additionally, the respondents in the said study felt that their experience in student teaching was not enough because they did not learn the rigors of teaching in an actual classroom setting. Hence, they are not confident about their ability to teach after graduation.

However, the shift to online learning also had a positive impact on the technology-related knowledge of the preservice teachers. Brianza et al. (2023) said that it provided an opportunity for preservice teachers to learn new technological tools and resources, and to develop new designs and approaches in their teaching.

The factors identified in the studies that were reviewed were used as a basis for generating the initial codes that were used in the thematic analysis of the qualitative data that was obtained from the focus group discussion.

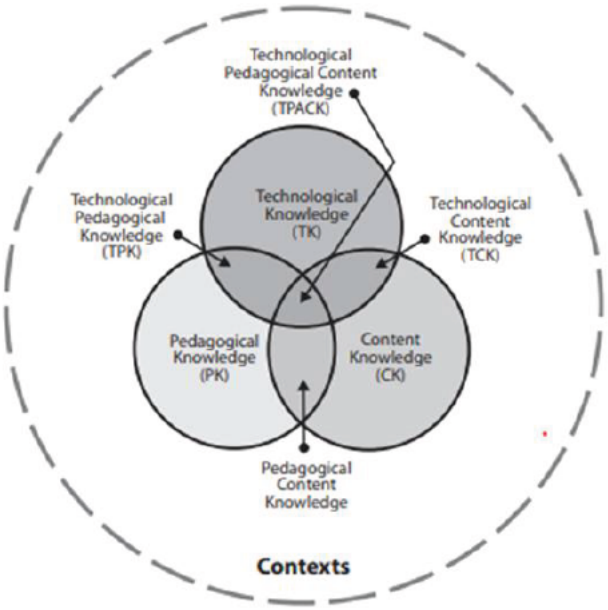
2.7. Conceptual Framework

The EDCOM II reports and the result of the National Achievement Test showed a troubling state of Social Studies Education in the Philippines. To address this, EDCOM II asserts the need to improve teacher quality to improve student learning outcomes. This could be undertaken through research that seeks to ascertain where our preservice teachers are in terms of the acquisition of the core knowledge needed to become an effective Social Studies teacher. Hence, this study is being undertaken to examine the preparedness of preservice Social Studies teachers to assume the role of a beginning teacher at the secondary level and more importantly to identify their learning needs. The result could be used to improve the curriculum of secondary education with Social Studies as the field of specialization and to design interventions that would contribute to the professional growth of preservice and in-service teachers.

The framework used in this study to assess the readiness of preservice teachers is the TPACK framework of Mishra and Koehler (2006). This framework identifies the core knowledge needed for effective teaching and may rightfully applied to Social Studies pre-service teachers. The three core components in this framework are content, pedagogy, and technology. The interaction between the three components produced four additional knowledge bases which are pedagogical content knowledge (PCK), technological content knowledge (TCK), technological pedagogical knowledge (TPK), and technological, pedagogical, and content knowledge (Figure 1). The seven domains of TPACK are described in Table 1.

Figure 1

TPACK Framework by Koehler and Mishra (2009)



Note. From "What is Technological Pedagogical Content Knowledge?" by M. J. Koehler and P. Mishra, 2009, Contemporary Issues in Technology and Teacher Education, 9(1), p. 63 (https://citejournal.org/volume-9/issue-1-09/general/what-is-technological-pedagogicalcontent-knowledge) Copyright 2016 by CITE Journal.

The TPACK framework also considers the context where the teaching and learning process happens. In this study, the context will refer to the enabling factors and barriers to the development of the pre-service teachers' TPACK. The study used the self-report measure developed by Schmidt et al. (2009) but with modifications to incorporate the specific knowledge expected from a Social Studies teacher. The changes in the self-report measure took into consideration the nature of Social Studies as "the integrated study of the social sciences and humanities" (NCSS, 1992, para 1). It also considered the attitudes, skills, and knowledge that Social Studies intends to develop among the students which are critical thinking, problem-solving, creativity and innovation, and collaboration. Hence, the TPACK-21 developed by Valtonen et al. (2017) was incorporated into the modified self-report measure. The TPACK-21 was

designed to incorporate 21st-century skills which are collaborating, problem-solving, creative and innovative thinking, and the ability to take advantage of information and communication technology (ICT) applications.

Table 1

Description of the Seven Domains of TPACK

Domain	Definition by Mishra and Koehler (2006)	Additional discussion by other authors
Content knowledge	"knowledge about the actual subject matter that is to be learned or taught" (p. 1026)	"The amount and organization of knowledge per se in the mind of the teacher… Teachers must not only be capable of defining for students the accepted truths in a domain. They must also be able to explain why a particular proposition is deemed warranted, why it is worth knowing, and how it relates to other propositions, both within the discipline and without, both in theory and in practice" (Shulman, 1986, p.9).
Pedagogical knowledge	"deep knowledge about the processes and practices or methods of teaching and learning and how it encompasses, among other things, overall educational purposes, values, and aims" (p. 1026)	
Technological knowledge	"knowledge about standard technologies, such as books, chalk and blackboard, and more advanced technologies, such as the Internet and digital video" (p. 1027)	
Pedagogical content knowledge	"knowing what teaching approaches fit the content, and likewise, knowing how elements of the content can be arranged for better teaching (p. 1027)	"the ways of representing and formulating the subject that make it comprehensible to others… Pedagogical content knowledge also includes an understanding of

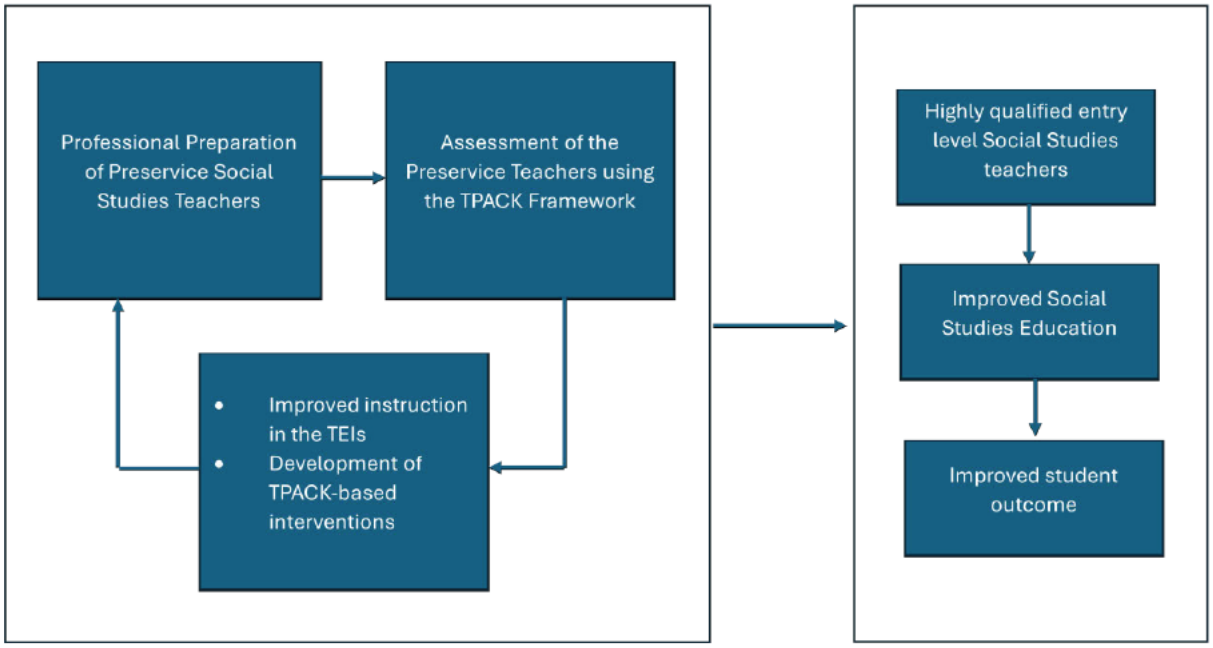
		what makes the learning of specific topics easy or difficult: the conceptions and preconceptions that students of different ages and backgrounds bring with them to the learning of those most frequently taught topics and lessons" (Shulman, 1986, p.9).
Technological content knowledge	"knowledge about the manner in which technology and content are reciprocally related" (p. 1028)	
Technological pedagogical knowledge	"knowledge of the existence, components, and capabilities of various technologies as they are used in teaching and learning settings, and conversely, knowing how teaching might change as the result of using particular technologies" (p. 1028)	
Technological pedagogical content knowledge	"An understanding that emerges from interactions among content, pedagogy, and technology knowledge that requires an understanding of the representation of concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how technology can help redress some of the problems that students face; knowledge of students' prior knowledge and theories of epistemology; and knowledge of how technologies can be used to build on existing knowledge and to develop new epistemologies or strengthen old ones" (Koehler & Mishra, 2009, p. 66).	

The self-report measure was supplemented by open-ended questions at the end of each section of the research instrument and the focus group discussion. This is based on the recommendation of Wang and Schmidt-Crawford (2018) to use the triangulated approach for data collection to better understand the development of preservice teachers in the different domains of TPACK. This enabled the researcher to examine additional responses in support of the self-rating given by the participants.

The current state of Social Studies education necessitates that the professional preparation of preservice Social Studies be improved. This could be done by conducting research that seeks to ascertain where the preservice teachers are in terms of the acquisition of the core knowledge needed to become an effective Social Studies teacher. This study is an initial step towards that end. Figure 2 shows how the researcher intends to achieve the objective of the study which is to determine the level of TPACK of the preservice Social Studies teachers and their learning needs. The TPACK framework was used to assess the knowledge of the preservice teachers of the seven domains of TPACK. The result of the assessment can be used as a basis for improving the curriculum and instruction of the TEIs and in developing TPACK-based intervention for the preservice teachers so that they will have the knowledge and skills required to become effective Social Studies teachers in the 21st century.

Figure 2

The Conceptual Framework of the Study



The findings of the research can serve as a basis for creating interventions aimed at improving preservice teachers' TPACK. The recommendations of the study were presented using the Synthesis of Qualitative Evidence (SQD) model of Tondeur et al. (2012). The SQD model identified the twelve essential factors that must be considered when designing training programs for preservice teachers on technology usage. These factors are organized into two main categories. The first category, depicted by the two outer circles, encompasses the essential conditions at the institutional level, including technology planning and leadership, staff training, resource accessibility, and collaboration within and across institutions. The second category, illustrated by the inner circle, comprises six micro-level strategies: role models, reflection, instructional design, collaboration, authentic experiences, and feedback (Figure 3).

Figure 3

Synthesis of Qualitative Evidence Model

Note. From "Teacher Educators as Gatekeepers: Preparing the Next Generation of Teachers for Technology Integration in Education" by J. Tondeur, E. Baran, F. Siddiq and T. Valtonen, 2019

2.8. Operational Definition of Terms

As follows are important definitions of terms included in this study:

Enabling factors - factors that help the pre-service teachers in developing TPACK

Technology - digital computers and computer software the Internet and the applications supported by it.

Content knowledge - knowledge about the actual subject matter that is to be learned or taught. This includes knowledge of central facts, concepts, theories, and procedures within a given field; knowledge of explanatory frameworks that organize and connect ideas; and knowledge of the rules of evidence and proof (Shulman, 1986).

Pedagogical knowledge - includes knowledge about techniques or methods to be used in the classroom; the nature of the target audience; and strategies for evaluating student understanding.

Pedagogical content knowledge - includes knowing what teaching approaches fit the content, and likewise, knowing how elements of the content can be arranged for better teaching. It includes knowledge of how to represent and formulate concepts so that learners can easily understand them, knowledge of what makes learning specific topics easy or difficult, and knowledge of students' prior knowledge about the topic (Shulman, 1986)

Technological knowledge - includes the ability to learn and adapt to new technologies and skills required to operate particular technologies.

Technological content knowledge - knowledge about how the content can be changed by the application of technology and knowledge about the varied ways by which a concept can be represented using the different available technologies.

Technological pedagogical knowledge - includes knowledge of tools for maintaining class records, attendance, and grading; knowledge of generic technology-based ideas such as WebQuests, discussion boards, and chat rooms; and the ability to choose appropriate tools for a particular teaching strategy.

TPACK - the basis of good teaching with technology which includes an understanding of the representation of concepts using technologies; the ability to choose a technology that can facilitate learning of difficult concepts; and pedagogical techniques that use technologies in constructive ways to teach content.

2.9. Summary

Numerous studies on TPACK have been done since it was first introduced in 2006. In their review of 22 research papers published after 2015, Saubern et al. (2020) found that most of the research dealt with exploring, critiquing, and validating the structure of the TPACK diagram and its seven components. These prior studies do not address the key goals of TPACK and help in understanding what effective teaching with technology is all about. They recommend that the direction of the research on TPACK should focus on identifying and understanding the knowledge that teachers must possess to effectively use technology for teaching and learning; and how this knowledge can be developed among preservice and in-service teachers.

One of the problems in measuring TPACK is that the data obtained from self-reported measures and the observation conflict with each other. Hence it is recommended that quantitative surveys should be paired with an assessment rubric that would evaluate actual technology use by the participants (Abbitt, 2011). Aside from providing evidence on technology preparedness, this will also validate the results obtained using the TPACK survey Spazak (2013). Adalar (2021) suggested study designs that include performance measures that cover several years so that researchers will be able to identify contextual factors that are driving and hindering TPACK development.

Since there are few studies on PCK and TPACK in Social Studies, Lotivio-Bedural et al. (2018) advocated for more PCK research in Social Studies in general and the other subject areas of Social Studies such as Geography, Civics, and Economics. Moreover, Miguel-Revilla et al. (2020) recommended that emphasis should be given to the examination of new instruments and theoretical frameworks that can be adapted to Social Studies education. This is in line with the

recommendation of Koehler et al. (2012) that the instruments should be customized to specific content knowledge bases and the suggestion of Chai et al. as cited in Wang et al (2018) to combine TPACK with other theoretical frameworks related to the study of technology integration.

Therefore, this study intends to examine the level of TPACK of pre-service Social Studies teachers using a modified instrument that incorporates the specific skills needed by a beginning Social Studies teacher. In seeking to understand their TPACK, this study is foreseen to recommend ways teacher education of preservice Social Studies can be improved. The next chapter shall describe the methodology by which this study shall be conducted.

Chapter 3

METHODOLOGY

The research methodology used in the study will be discussed in this chapter. Included in the discussion are the research design, research participants, research instrument, data gathering and analysis, and the ethical issues related to the research.

3.1. Research Paradigm

A research paradigm is a set of shared beliefs that shape how a researcher sees the world. The choice of a research paradigm guides the research activities such as the research methods that will be used and how the data will be collected, analyzed, and interpreted (Lather, 1986; Guba & Lincoln, 1994; Mackenzie & Knipe, 2006). Considering the limitations of the study that are related to the use of self-reported measures and the respondents in the study, the researcher used the pragmatic paradigm. This paradigm allows the use of both quantitative and qualitative data and thus the research can take advantage of the strengths of the two sources of data so that the researcher will have a better understanding of the problem and answer the research questions on the enabling factors and barriers to the development of TPACK among the participants. Since the research was conducted only in one teacher education institution, the use of the case study method was also appropriate. The use of the case study method enabled the researcher to create a clearer and more detailed picture of the experiences of the preservice Social Studies teacher as a student in the university undertaking a teaching internship. Their lived experience as reported in this study can be used in improving and enhancing instruction at the university.

This study used the instrumental case study. According to Stake (2000), the primary purpose of an instrumental case study is to gain a deeper understanding of an issue, problem, or dilemma within the case. In this study, the researcher aimed to assess where the preservice teachers are in terms of TPACK and identify the factors that influenced the development of TPACK and how these enabled or hindered the preservice teachers in developing their TPACK.

3.2. Research Design

The study is a mixed methods research whose objective was to determine the level of TPACK of the preservice Social Studies teachers, their learning needs, and the factors that contributed to the development of their TPACK. Creswell (2014) defined mixed methods research as:

> an approach to inquiry involving collecting both quantitative and qualitative data, integrating the two forms of data, and using distinct designs that may involve philosophical assumptions and theoretical frameworks. The core assumption of this form of inquiry is that the combination of qualitative and quantitative approaches provides a more complete understanding of a research problem than either approach alone (p. 4).

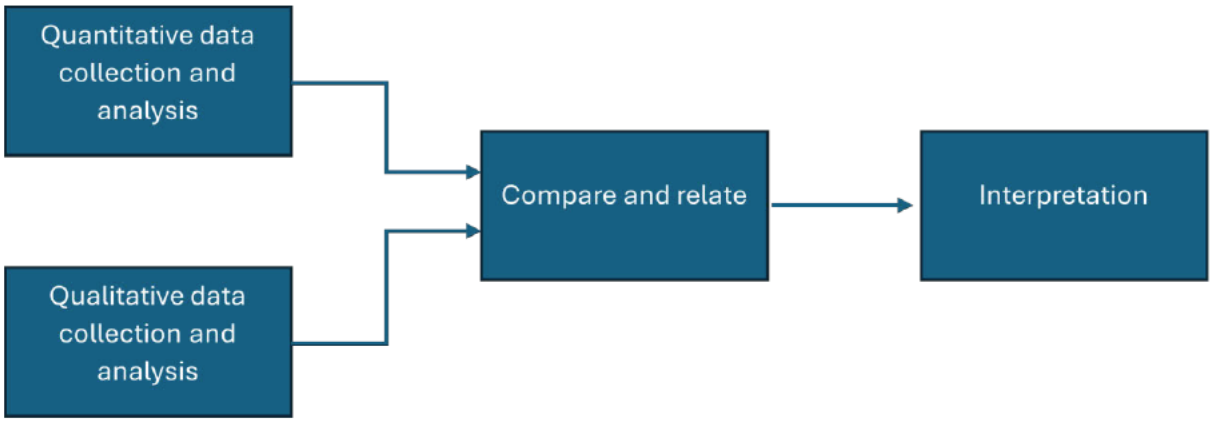
Creswell (2014) identified three basic mixed-method research designs, namely, convergent parallel design, explanatory sequential design, and exploratory sequential design. The convergent parallel design was used in the study (Figure 4). In this design, quantitative data and qualitative data will be collected at the same time but analyzed separately, and then the results will be combined during the interpretation. The

quantitative data was collected using a self-report measure while the qualitative data was collected using open-ended questions and focus group discussions.

This design provides a better understanding of the research problem being studied. It provides corroboration of the results obtained from the analysis of the quantitative data. This is important because the study used a self-report measure to measure the TPACK level of the participants. One limitation of the use of a self-report measure is the tendency of the participants to underestimate or overestimate their knowledge of the different components of TPACK. The use of this design will address this limitation. The qualitative data that was gathered from the open-ended questions and focus group discussion was used to confirm the scores on the quantitative instrument.

Figure 4

The Convergent Parallel Research Design Used in the Study



Note. Adapted from "A Convergent Parallel Mixed-Methods Study of Controversial Issues in Social Studies Classes: A Clash of Ideologies" by S. B. Deemir and N. Pismek, 2018, Educational Sciences: Theory and Practice, 18, p.124. Copyright 2018 by EDAM.

3.3. Setting, Participants and Sampling

The participants in the study were 43 fourth-year preservice teachers specializing in Social Studies in a teacher education institution at Alonso Teachers College. They completed their Bachelor of Secondary Education during the second semester of the academic year 2023 – 2024.

Convenience sampling was used in selecting the participants for the quantitative and qualitative data collection for this study.

3.4. Data Collection

The collection of data was done during the second semester of the academic year 2023 – 2024. Before starting the data collection, the researcher met the potential respondents to discuss the nature and purpose of the study and to obtain their permission to participate in the study. This study used a mixed-method design hence both quantitative and qualitative data were collected. The quantitative data was collected using a TPACK survey instrument while the qualitative data was collected using open-ended questions which are embedded in the TPACK survey instrument, and focus group discussions.

The TPACK self-assessment portion of the research instrument is a combination of the Survey of Preservice Teachers' Knowledge of Teaching and Technology (SPTKTT) developed by Schmidt et al. (2009) and the Technological Pedagogical Content Knowledge for Twenty-first Century Skills (TPACK-21) questionnaire developed by Valtonen et al. (2017). The items from the questionnaire developed by Valtonen et al. (2017) were included to measure the readiness of the respondents for teaching the 21st-century skills needed by the students. The skills include communication, critical thinking, collaborating, problem-solving, creative and

innovative thinking, information and media literacy, and technology skills and digital literacy. A table comparing the instrument items for this study to that of items in the instruments developed by Schmidt et al. (2009), and Valtonen et al. (2017) is found in Appendix A.

The research instrument has three parts: demographic questions, TPACK self-assessment, and open-ended questions (Appendix B). It is composed of 66 items that describe the respondents' level of knowledge in the seven domains of TPACK. Table 2 presents the number of items for each domain of TPACK.

Table 2

Number of Items for each TPACK Domain

TPACK Domain	Number of items
Content knowledge	17
Pedagogical knowledge	11
Technological knowledge	4
Pedagogical content knowledge	13
Technological content knowledge	5
Technological pedagogical knowledge	12
Technological pedagogical and content knowledge	4
Total	66

Since the SPTKTT and TPACK-21 were not designed for preservice Social Studies teachers, some items were added or the existing items in both instruments were modified to incorporate the content, pedagogical, and technological knowledge expected from a beginning Social Studies teacher at the secondary level. The items that were added to the modified instrument were taken from the Philippine Professional Standards for Teachers (PPST), the CHED Memorandum Order (CMO 75, Series of 2017), and the Matatag AP Curriculum.

The Philippine Professional Standards for Teachers is based on the National Competency-Based Teacher Standards (NCBTS). The seven domains in the PPST define teacher quality and describe what teachers should know, do, and value to be effective teachers in the 21st century. The seven domains are:

1. Domain 1 – Content Knowledge and Pedagogy
2. Domain 2 – Learning Environment
3. Domain 3 – Diversity of Learners
4. Domain 4 – Curriculum and Planning
5. Domain 5 – Assessment and Reporting
6. Domain 6 – Community Linkages and Professional Engagement
7. Domain 7 – Personal Growth and Professional Development

The seven domains comprise 37 strands that describe the specific dimensions of teacher practices. Some of the strands from domains 1 to 5 were incorporated in the PK, TPK, and PCK sections of the modified instrument.

The CMO 75 contains the policies, standards, and guidelines that govern the offering of the Bachelor of Secondary Education program and the core competencies expected from graduates of the program. Some of the performance indicators listed in the program outcomes for Social Studies were incorporated in the CK, PK, and TPK sections of the modified instrument. The themes of the AP curriculum listed in the Matatag AP Curriculum Guide were incorporated in the CK section of the modified instrument.

The scale used in the self-report measure was adapted from the scale used by Valtonen et al. (2017) but the Likert scale was changed from a 6-point to a 4-point scale. This scale was used in the study because it is more descriptive of the TPACK level of the respondent compared to the scale used by Schmidt et al. (2009). The scale

was changed from a 6-point to a 4-point scale because the researcher believes that scales 2 and 3 are just another way of describing scales 4 and 5. Table 3 presents a comparison of the scale used by Valtonen et al. (2017) and the scale to be used in the study.

The modified survey instrument was checked and validated by experts before it was distributed to the respondents. Likewise, permission to use the SPTKTT was obtained from Dr. Denise Schmidt (Appendix C).

Table 3

Comparison of the Scale Used in TPACK-21 and the Scale Used in the Study

Valtonen et al. (2017)	Scale to be used in this study
1. I need a lot of additional knowledge about the topic	1. I need a lot of additional knowledge about the topic
2. I need some additional knowledge about the topic	
3. I need a little additional knowledge about the topic	
4. I have some knowledge about the topic	2. I have some knowledge about the topic
5. I have good knowledge about the topic	3. I have good knowledge about the topic
6. I have strong knowledge about the topic	4. I have strong knowledge of the topic

While self-report measures such as the SPTKTT are a valuable instrument in assessing the level of TPACK of preservice teachers, their ability to accurately measure the knowledge of the seven TPACK domains depends on the ability of the respondents to assess their knowledge and respond appropriately to the survey items (Abbitt, 2011). Moreover, self-report measures do not provide enough evidence of the respondents' ability to integrate technology in the classroom (Marquez et al., 2004, as

cited in Wang & Schmidt-Crawford, 2018). Because of these limitations, Wang and Schmidt-Crawford (2018) recommended the use of the triangulated approach for data collection to better understand the development of preservice teachers in the different domains of TPACK. With this in mind, the study included open-ended questions at the end of each section of the research instrument to enable the researcher to validate the rating given by the participants in the self-assessment portion of the research instrument.

Focus group discussion (FGD) as a method for gathering data in educational research became popular in the 1990s (Gizir, 2007). She reported that in educational research, FGDs are usually used to assess students' needs, interests, and problems; and the development, evaluation, and/or assessment of an educational program. FGD is also used to "clarify, extend, qualify or challenge data collected through other methods" (Mishra, 2016, p. 2).

In this study, the FGD was used to clarify, confirm, and validate the data collected using the research instrument. Moreover, the FGD was also used to answer the research questions on the enabling factors and perceived learning needs of the preservice teachers to develop their TPACK. Three FGDs were conducted which were participated by 13 preservice Social Studies teachers. They were chosen based on their availability since at the time the FGD was conducted, the participants had already graduated and some of them were already reviewing for the LET.

In summary, Table 4 outlines the data collection for the research questions this study sought to examine.

Table 4

Data Collection and Analysis for the Research Questions

Research Question	Data Collection	Data Analysis
What are the perceived levels of preparedness in terms of content, pedagogical, and technological knowledge of the preservice Social Studies teachers as described by the TPACK framework?	The Likert-scale section of the TPACK instrument	Quantitative analysis through Descriptive statistics
What are the factors that enabled the preservice teachers to develop TPACK?	The open-ended questions of the TPACK instrument and the focus group discussions	Qualitative analysis through thematic analysis
What are Social Studies preservice teachers' perceived learning needs to develop TPACK?	The open-ended questions of the TPACK instrument and the focus group discussions	Qualitative analysis through thematic analysis

As seen above, each question corresponds to a data collection instrument to be employed. The data analysis is discussed further in the next section.

3.5 Data Analysis

The quantitative data used in the study was collected through a self-report measure which is composed of Likert-type data and Likert scale data. Boone & Boone (2012) suggested a procedure for analyzing these two types of data. The recommended procedure is presented in Table 5.

Table 5

Suggested Data Analysis Procedure for Likert-type and Likert Scale Data

	Likert-type data	Likert-scale data
Central tendency	Median or mode	Mean
Variability	Frequencies	Standard deviation

This study will adopt the aforementioned recommendation.

Thematic analysis was used in analyzing data obtained from the open-ended questions and the focus group discussion. Thematic analysis is more appropriate since it is easily understood and can be learned quickly because there are simple

prescriptions and procedures (Braun & Clarke, 2006 and King as cited in Nowell et al., 2017). Moreover, Xu & Zammit (2020) stated that this kind of data analysis is compatible with FGD as a data collection tool. The 6-step thematic analysis by Braun and Clarke was used in analyzing the qualitative data. The six steps are as follows:

1. Familiarizing oneself with the data
2. Generating initial codes
3. Searching for themes
4. Reviewing themes
5. Defining and naming themes
6. Producing the report

A priori coding was used to generate the initial codes to identify the factors that influence the TPACK development of preservice teachers since several studies have been done in this area but in other fields of specialization. The codes were derived from the results of previous research. However, during the analysis, there were some responses from the participants that did not fit the predetermined code, hence, a new code was added to the list.

The result of the study was presented using a side-by-side comparison. The quantitative statistical results will be presented first followed by the qualitative findings that may either confirm or disconfirm the quantitative analysis result.

3.6. Ethical Considerations

The ethical considerations undertaken in the study involved ensuring voluntary participation, including the right to withdraw, informed consent of research participants, and privacy and confidentiality of participant information. The researchers oriented the participants to discuss the nature and purpose of the study, to get their consent to

voluntarily participate in the study, and to assure them that the information that they will provide will be confidential. The participants were provided with the proper research information to obtain their informed consent. These were properly indicated through the rightful research participant forms and informed consent forms distributed.

Likewise, consent was sought from the developers of the TPACK instruments to modify and use the instrument developed in the study. Permission to use the instrument was sought by email from Dr. Denise Schmidt.

Chapter IV

RESULTS AND DISCUSSION

The purpose of this research study was to examine the content, pedagogical, and technological knowledge of preservice Social Studies teachers and examine the factors that affect the development of their TPACK. The convergent parallel design was used to achieve the objective of the study. The TPACK survey instrument was used to gather the quantitative data about the knowledge of the seven domains of TPACK while the qualitative data was collected using open-ended questions which were embedded in the TPACK survey instrument, and focus group discussions.

4.1. Socio-demographic Profile of the Participants

The participants in the study were 43 fourth-year preservice teachers specializing in Social Studies in a teacher education institution at Alonso Teachers College who conducted their teaching internship at the public secondary schools in the province of Quezon and Laguna. They completed their Bachelor of Secondary Education during the second semester of the academic year 2023 – 2024.

The researcher identified two relevant characteristics of the participants - the types of ICT devices they owned and their internet access methods. Table 6 shows the devices that the participants own.

Table 6

Type of ICT Devices Owned by the Participants

Gadgets Owned	Frequency
Cellular phone, Laptop, Printer/scanner	13
Cellular phone, Laptop	10
Cellular phone, Laptop, Tablet, Printer/scanner	5
Cellular phone	4
Cellular phone, Desktop computer, Laptop, Tablet	3
Cellular phone, Desktop computer, Printer/scanner	2
Cellular phone, Desktop computer	2
Cellular phone, Laptop, Tablet	1
Cellular phone, Tablet, Printer/scanner	1
Cellular phone, Desktop computer, Laptop	1
Cellular phone, Desktop computer, Laptop, Printer/scanner	1
Total	43

Most of the participants accessed the internet using either pre-paid or post-paid internet services. Conversely, three participants depended exclusively on the school's Wi-Fi network to connect to the Internet (Table 7).

Table 7

Mode of Accessing the Internet

Mode of accessing the Internet	Frequency
Pre-paid internet service	12
Post-paid internet service	11
Pre-paid internet service; WiFi network of the school	6
Post-paid internet service; WiFi network of the school	4
Post-paid internet service and pre-paid internet service	3
WiFi network of the school	3
Others	2
Post-paid internet service; Pre-paid internet service; WiFi network of the school	1
WiFi network of the school; Others	1
Total	43

4.2. Pre-service Teachers' Level of Knowledge in the Seven Domains of TPACK

This study sought to answer three questions regarding the level of knowledge of the preservice Social Studies teachers of the seven domains of TPACK and the factors that affected its development. The first research question is about their perceived levels of content knowledge, pedagogical knowledge, and technological knowledge. The modified TPACK survey instrument was used to determine their level of knowledge. The TPACK survey instrument is divided into seven sections with each section focusing on a specific TPACK domain.

The scale used to describe the respondents' level of knowledge are:

1 – Needs a lot of knowledge

2 – Some knowledge

3 – Good knowledge

4 – Strong knowledge

To determine the level of knowledge in each domain, the overall mean score for each domain was computed. The interpretation that corresponds to the computed overall mean is presented in Table 8.

Table 8

Interpretation of the Value of the Overall Mean

Range	Interpretation
1.00 – 1.74	Needs a lot of knowledge
1.75 – 2.49	Some knowledge
2.50 – 3.24	Good knowledge
3.25 – 4.00	Strong knowledge

In the following discussion, the perceived levels of knowledge in the seven TPACK domains are presented.

4.2.1. Content Knowledge

Content knowledge is knowledge about the actual subject matter that is to be learned or taught. This includes knowledge of central facts, concepts, theories, and procedures within a given field; knowledge of explanatory frameworks that organize and connect ideas; and knowledge of the rules of evidence and proof (Shulman, 1986). The study measured the respondents' knowledge about the philosophical and theoretical perspectives in Social Studies, the seven themes in Social Studies, and the basic theories and concepts in History, Society and Culture, Geography, Economics, and Politics and Governance.

Among the items under content knowledge, 95.40% of the respondents said that they have good to strong knowledge of Social Studies. This is not surprising since 95.30% of the respondents also said that they have good to strong knowledge of the various ways and strategies of developing their understanding of Social Studies (Figure 5). The respondents relied on several websites to increase their understanding of Social Studies. This includes history.com, National Geographic, DepEd tambayan, DepEd TV, facinghistory.com, britannica.com, the Official Gazette, Coursera, Library of Congress, studocu.com, Course Hero, STARBOOKS, Philippine Institute for Development Studies, Researchgate, Academia, Slideshare, and Scrib.

The mean for the knowledge about the different philosophical and theoretical perspectives in Social Studies is 2.66 which translates to good knowledge. However, a significant number of respondents said that they only have some knowledge or need a lot of knowledge about the ecological systems theory (Figure 6).

Figure 5

Knowledge of Social Studies and Strategies for developing understanding of Social Studies

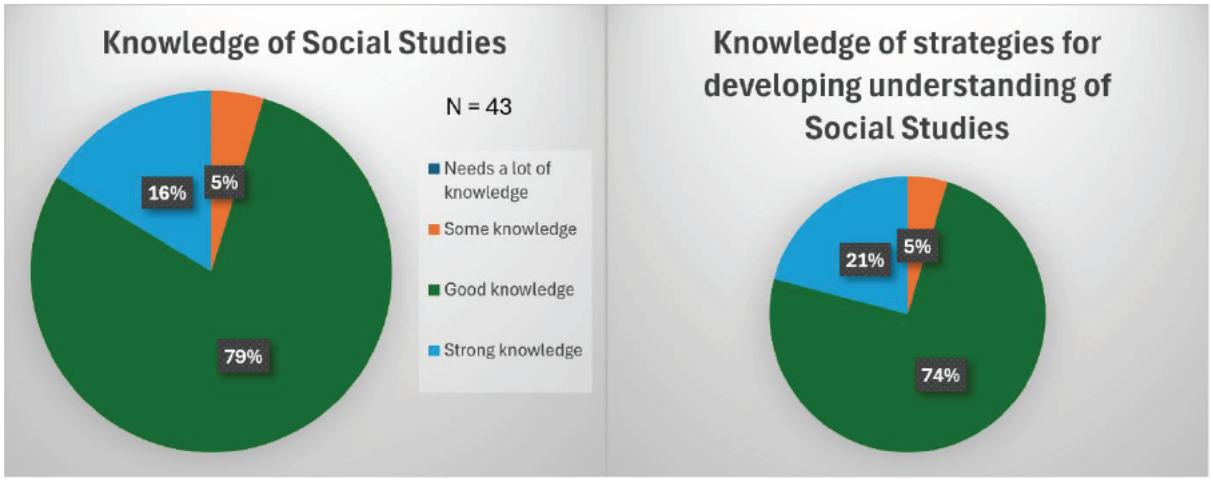
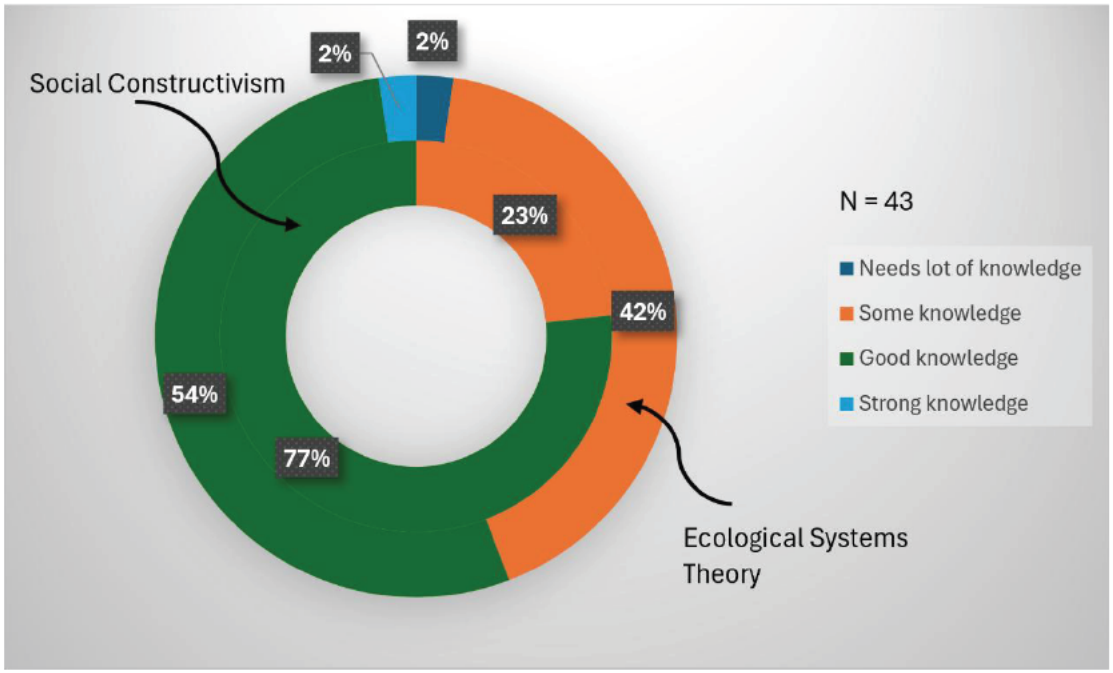


Figure 6

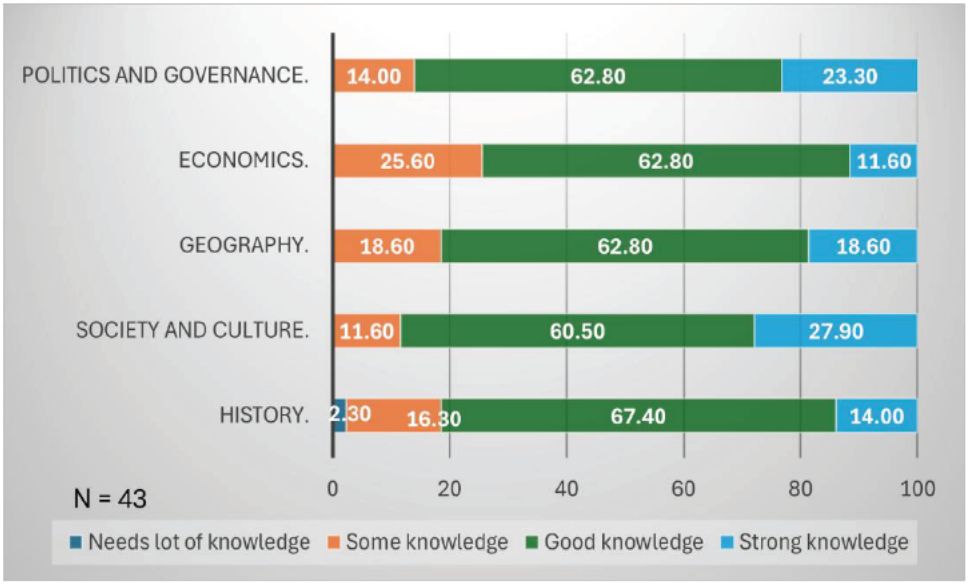
Level of Knowledge about the Theoretical Perspectives in Social Studies



In terms of knowledge about the basic theories and concepts of the various disciplines within Social Studies, knowledge about Economics was lowest among the respondents. Only 74.70% of the respondents said that they have good to strong knowledge of Economics compared to more than 80% of the respondents in the other disciplines (Figure 7).

Figure 7

Level of Knowledge about the Basic Concepts of the Various Disciplines in Social Studies



Comparing the knowledge of the respondents about the different themes in the Social Studies curriculum, knowledge about rights, responsibility, and citizenship and knowledge about power, authority, and governance were highest. Ninety-three percent of the respondents rated their knowledge of these items as good to strong knowledge. Media outlets in the country, whether traditional media or social media, highlight political issues in their news reports, and these supplemented what the respondents learned from their subjects which falls under Political Science. The

sources of news of the respondents were television (93%), social media (88%), radio (58%), and newspaper (35%). Fallahi et al. (2023) found that the use of mass communications had a significant relationship with the level of awareness of citizenship rights. Moreover, according to Intyaswati et al. (2021), the use of social media had an indirect effect influence on the political knowledge of Indonesian students. They found that the use of social media provided political information that was used as material for online and face-to-face discussions about politics.

On the other hand, the respondents with good to strong knowledge about the theme of regional and international relations were only 55% - the lowest among the seven themes (Figure 8). A study by Winship (2004) found that the frequency of news media access influenced geographic knowledge. The respondents in the study have access to news media, however, news about world affairs is rarely reported in the local media. Moreover, the way Geography was taught in high school could have affected the respondents' readiness for the study of Geography. Dizon (2021) did a content analysis of the K to 12 Junior High School Geography curriculum and found that the anthropocentric, factual, and determinist approaches dominated the curriculum. He surmised that these approaches led the students to have a negative attitude toward geography and to be ill-prepared to appreciate the complex concepts in political ecology when they entered Grades 9 and 10.

Figure 8

Level of Knowledge about the Themes in Social Studies

The level of content knowledge of the respondents is presented in Table 9. The overall mean for content knowledge is 2.99. Hence, the level of content knowledge of the respondents is good.

Table 9

Level of Content Knowledge

	Mean	Interpretation
Knowledge about Social Studies.	3.12	Good knowledge
Knowledge of historical way of thinking.	2.98	Good knowledge
Knowledge of strategies for developing my understanding of Social Studies.	3.16	Good knowledge
Knowledge of the philosophical and theoretical perspectives in Social Studies.	2.66	Good knowledge
Knowledge of the basic theories and concepts	3.01	Good knowledge
Knowledge of the themes in the Social Studies curriculum	3.02	Good knowledge
Overall mean	2.99	Good knowledge

4.2.2. Pedagogical Knowledge

Pedagogical knowledge includes knowledge about techniques or methods to be used in the classroom to develop the skills needed in the 21st century such as

critical thinking, reflective thinking, problem-solving skills, and creative thinking. It also includes knowledge about the nature of their learners, strategies for evaluating student understanding, and classroom management.

The level of pedagogical knowledge is presented in Table 10. In general, the respondents' knowledge in the pedagogical domain is good. Among the items included in the pedagogical knowledge, over 90% of the respondents said that they have good to strong knowledge about guiding students' discussion during group work (95.3%), assessing student performance (93.0%), and adapting their teaching strategies to different learners (93%). Based on the mean score, the level of knowledge in guiding students' discussion and assessment of student performance can be described as strong. The strong knowledge of the respondents in guiding students' discussion was also observed by Valtonen et al. (2020). The preservice teachers in their study felt confident in guiding and helping their pupils during lessons.

Table 10

Level of Pedagogical Knowledge

	Mean	Interpretation
I know how to assess student performance in my class.	3.37	Strong knowledge
I can adapt my teaching based on what students currently understand or do not understand.	3.19	Good knowledge
I can adapt my teaching strategies to different learners.	3.21	Good knowledge
I can assess students' learning in multiple ways.	3.19	Good knowledge
I am familiar with common student understandings and misconceptions about Social Studies concepts.	3.14	Good knowledge
I know how to organize and maintain classroom management.	3.14	Good knowledge
I can guide students' discussion during group work.	3.35	Strong knowledge
I can use a wide range of teaching strategies to develop my students' critical thinking.	3.19	Good knowledge

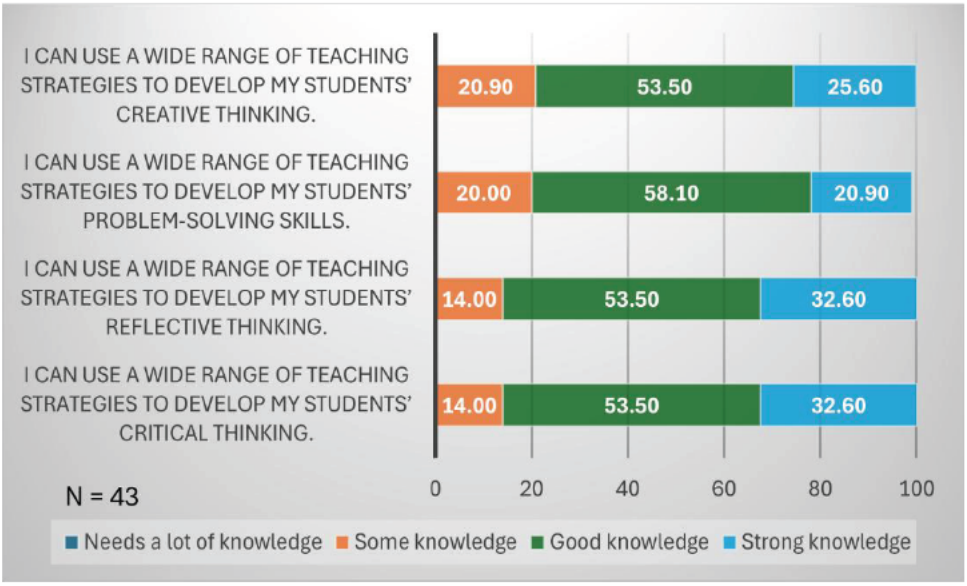
I can use a wide range of teaching strategies to develop my students' reflective thinking.	3.19	Good knowledge
I can use a wide range of teaching strategies to develop my students' problem-solving skills.	3.00	Good knowledge
I can use a wide range of teaching strategies to develop my students' creative thinking.	3.05	Good knowledge
Overall mean	3.18	Good knowledge

Aside from the traditional paper and pencil assessment, the respondents also used portfolio assessment and performance-based assessment which includes individual and group presentations, role plays, and making posters and slogans. The assessment techniques that the respondents used were exit tickets and concept mappings such as Venn diagrams, graphic organizers, and data retrieval charts. These techniques were supplemented using online assessment tools such as Quizziz, Kahoot, Pear Deck, Quizlet, Classmarker, Google Forms, zipgrade, and FB messenger polls.

In terms of knowledge about the different teaching strategies to develop 21st-century skills, the respondents were more knowledgeable about the teaching strategies that will develop the student's critical and reflective thinking than the teaching strategies that will develop the student's creative thinking and problem-solving skills (Figure 9). The respondents used a variety of teaching methods and strategies to develop the 21st-century skills of their students. These are asking high-order thinking questions, inquiry-based learning, problem-based learning, reflective learning, differentiated instruction, debates, picture analysis, brainstorming, solving puzzles, mind mapping, and gamified activities.

Figure 9

Level of knowledge about Teaching Strategies



Asking high-order thinking questions was the favored strategy by most of the respondents. The questions usually dealt with contemporary issues, real-life situations, and real-world problems that allowed the students to analyze and apply their knowledge to real-life situations. The respondents used the following activities to promote reflective thinking among their students:

1. Asking open-ended questions so that students can reflect on their learning experience and make connections between their past experiences and the current lesson
2. Watching videos with guide questions which will be answered after watching the video
3. Asking the students to give their insights on the quotes, memes, and images that are related to the topic
4. Completing a KWL chart

5. Giving timely feedback so they can reflect on their performance and motivate them to give their best.

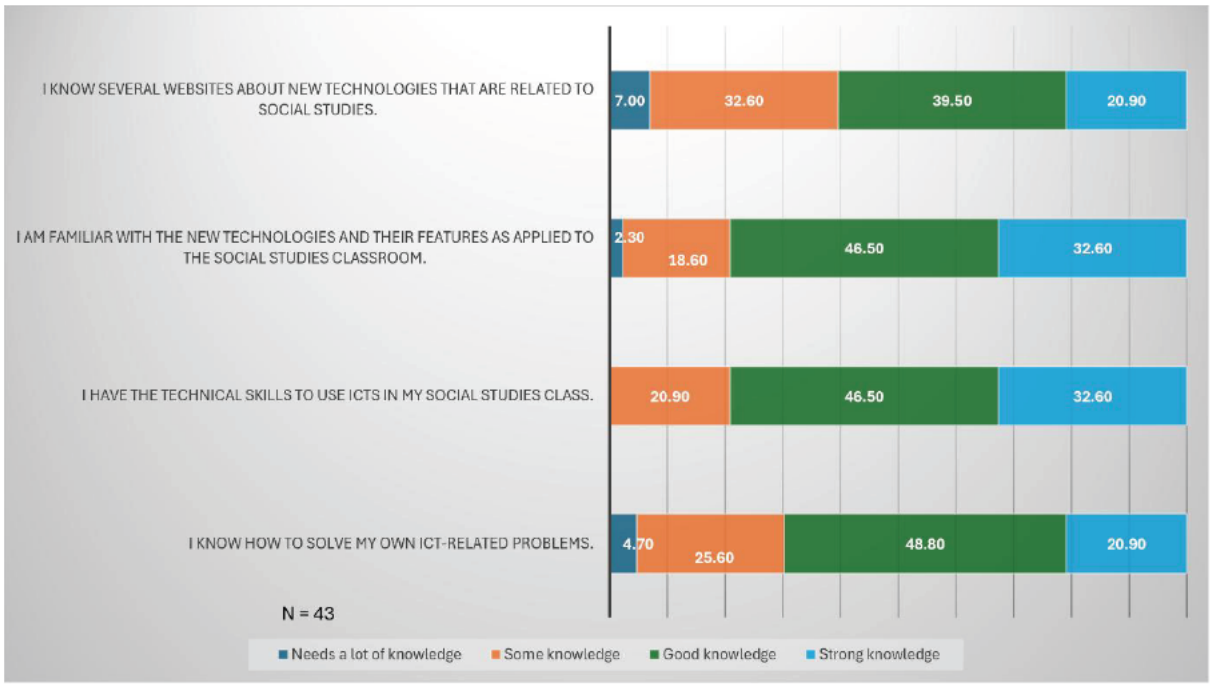
Differentiated instruction which customizes lessons to meet the student's individual needs and interests can be done in four main areas – content, process, product, and environment. The focus of the differentiated instruction of most respondents was in the product area. The respondents usually grouped their students, and different output was assigned for each group through draw lots. The expected outputs were usually role-playing, diorama, radio broadcasting, slogan and poster making, collage, and writing stories and poems. Some respondents mentioned that they encouraged their students to think out of the box and explore and try new ideas.

4.2.3. Technological knowledge

Technological knowledge includes the ability to learn and adapt to new technologies and skills required to use technologies in their classrooms and solve ICT-related problems that they encounter. Four items were used to measure the respondents' technological knowledge (Figure 10). Of the four, the item on knowledge about solving ICT-related problems had the highest number of participants who said that they have good knowledge (48.8%), however, the mean for that item is the second from the lowest. Its mean score was pulled down by the 30.3% of the respondents who said they need lots of knowledge or have some knowledge about solving the ICT-related problems that they encountered.

Figure 10

Level of Technological Knowledge

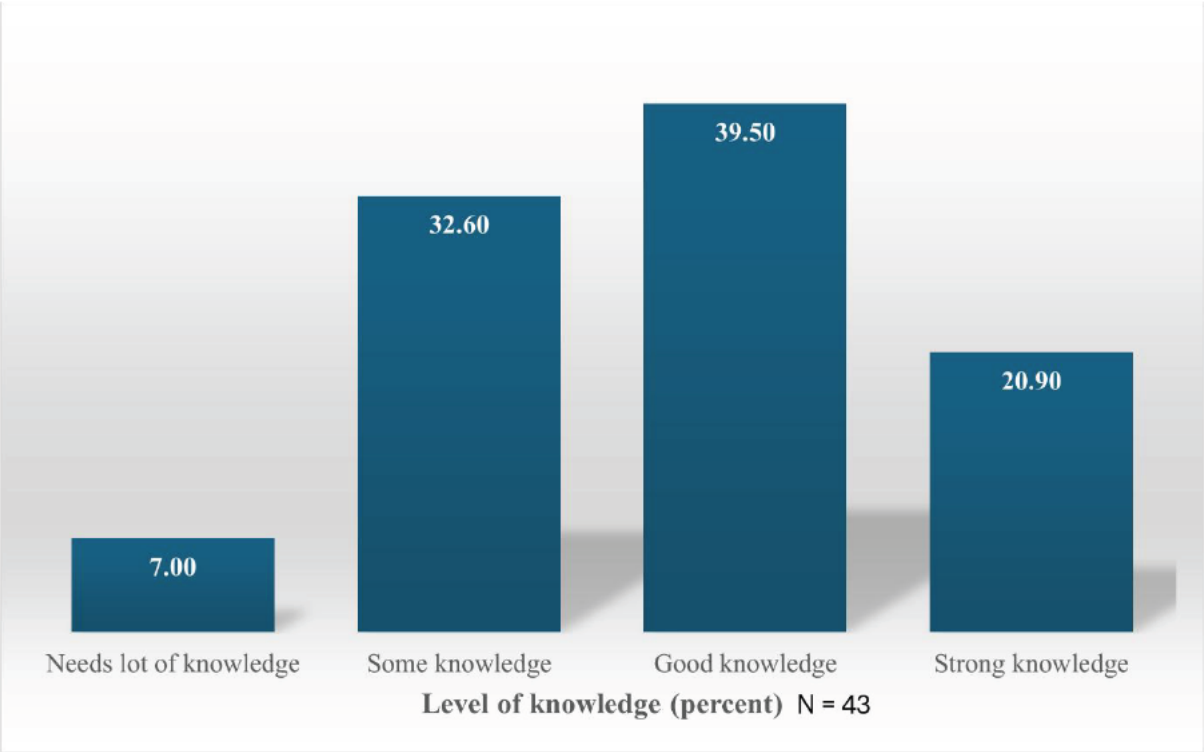


Only 46.5% of the respondents said that they have good knowledge about new technologies and their features, and have the technical skills to use ICTs in their Social Studies class. But they have the highest mean score as it was pulled up by the 32.6% of the respondents who said that they have strong knowledge. The data suggests that the respondents not only know new technologies that can be used in teaching Social Studies but they also have the skills to use them in their classrooms.

Considering the responses in all the items in technological knowledge, the mean score obtained for this domain is 2.95. Hence, the technological knowledge of the respondents can be described as good. However, the level of TK could still be improved if the they would have more exposure to the different websites where they can learn about new technologies that are used in Social Studies teaching. A significant proportion of the respondents have some knowledge only of these websites (Figure 11).

Figure 11

Level of Knowledge about Websites about New Technologies Related to Social Studies.

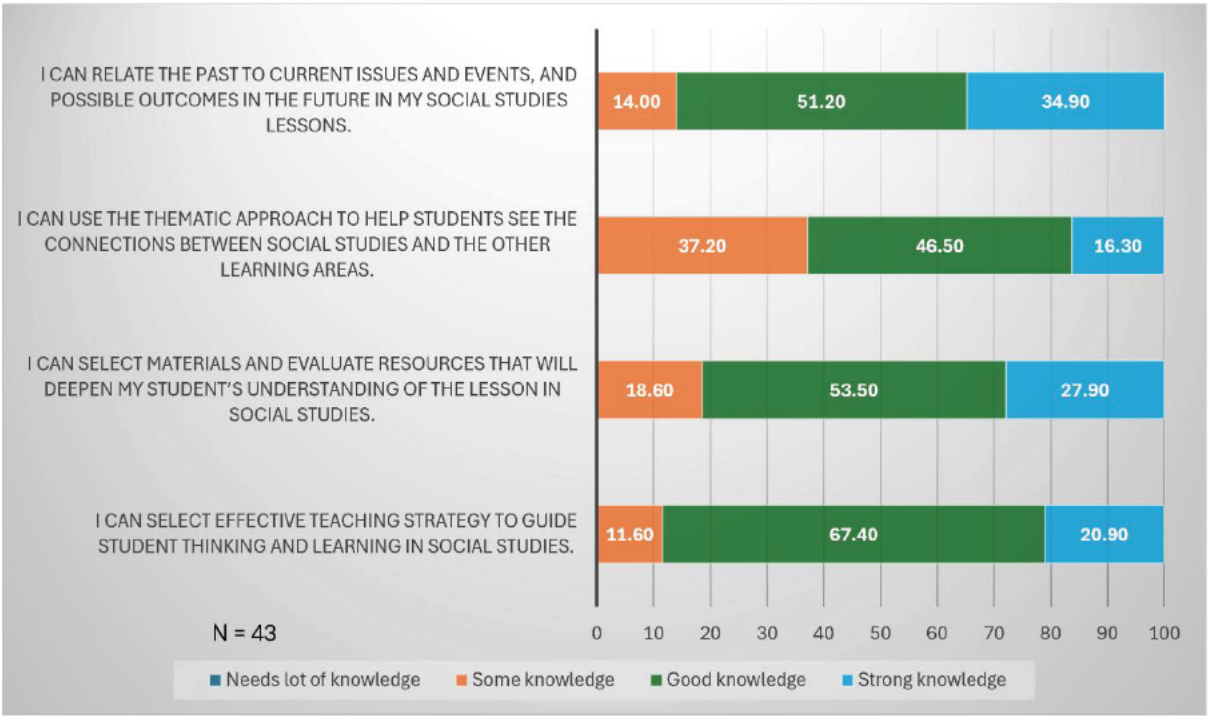


4.2.4. Pedagogical Content Knowledge

Pedagogical content knowledge includes knowing what teaching approaches fit the content, and knowing how elements of the content can be arranged for better teaching. It includes knowledge of how to represent and formulate concepts so that learners can easily understand them, knowledge of what makes learning specific topics easy or difficult, and knowledge of students' prior knowledge about the topic (Shulman, 1986).

Figure 12

Level of Pedagogical Content Knowledge



Among the seven items in the PCK domain, the respondents were least knowledgeable in using the thematic approach in teaching Social Studies (Figure 12). Less than 50 percent of the respondents said they have good knowledge of thematic teaching. Since they are not that knowledgeable in the use of thematic teaching, they also had difficulty in integrating and applying the seven themes in their lesson planning. These items in the PCK domain had the lowest overall mean score.

The ability to create instructional materials, whether traditional or ICT-based, is an important skill a teacher should have. Instructional materials facilitate and reinforce learning of difficult concepts and sustain students' interest in the topics being discussed. For traditional instructional materials, the respondents created visual aids using manila paper which they called tarpapel, puzzles that were used in group activities, charts, standee, and graphic organizers. They also wrote modules and handouts to support the asynchronous mode of learning. For ICT-based instructional

materials, the respondents created presentations using PowerPoint and Canva. They also used videos from YouTube and other sources from the Internet. For assessment purposes, they created activity sheets, worksheets, and online quizzes using Google Forms.

Fifty-three percent of the respondents said that they have good knowledge in developing both traditional and ICT-based instructional materials. However, a higher percentage of the respondents (37.2 %) said they have strong knowledge of developing traditional instructional materials, hence the overall mean for the item on developing traditional instructional materials was higher than ICT-based instructional materials (Figure 13). The overall mean for traditional instructional materials is equivalent to strong knowledge while for ICT-based instructional materials, it was only good knowledge. One of the possible reasons was the lack of equipment and gadgets in the schools where they were assigned, hence, they resorted to creating tarpapel and flashcards. Some participants in the focus group discussion shared that the school where they were assigned lacked the equipment that was needed to use ICT-based instructional materials.

Knowledge of integrating the seven themes of Social Studies in lesson planning has a mean score of 3.01 which translates to good knowledge. Of the seven themes of Social Studies, most of the respondents exhibited good to strong knowledge of integrating rights, responsibility, and citizenship in lesson planning while knowledge of integrating regional and international relations in lesson planning had the lowest number of respondents who said that they have good to strong knowledge (Figure 14). The result is not surprising when content knowledge about these themes is taken into consideration. The respondents have strong knowledge of the themes of rights, responsibility and citizenship, hence it was easy for them to integrate it in planning

their lessons. Content knowledge of regional and international relations had the lowest mean score among the seven themes.

Figure 13

Knowledge about Creating Instructional Materials

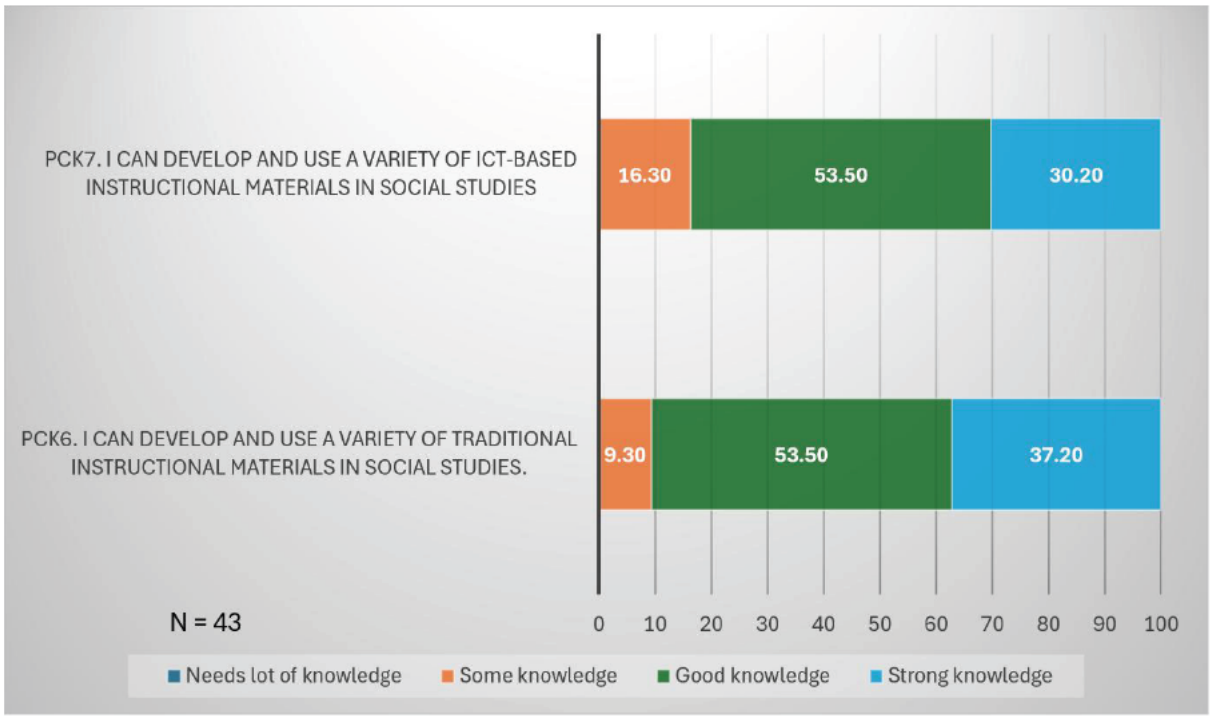


Figure 14

Level of Knowledge in Integrating the Seven Themes of Social Studies in Lesson Planning

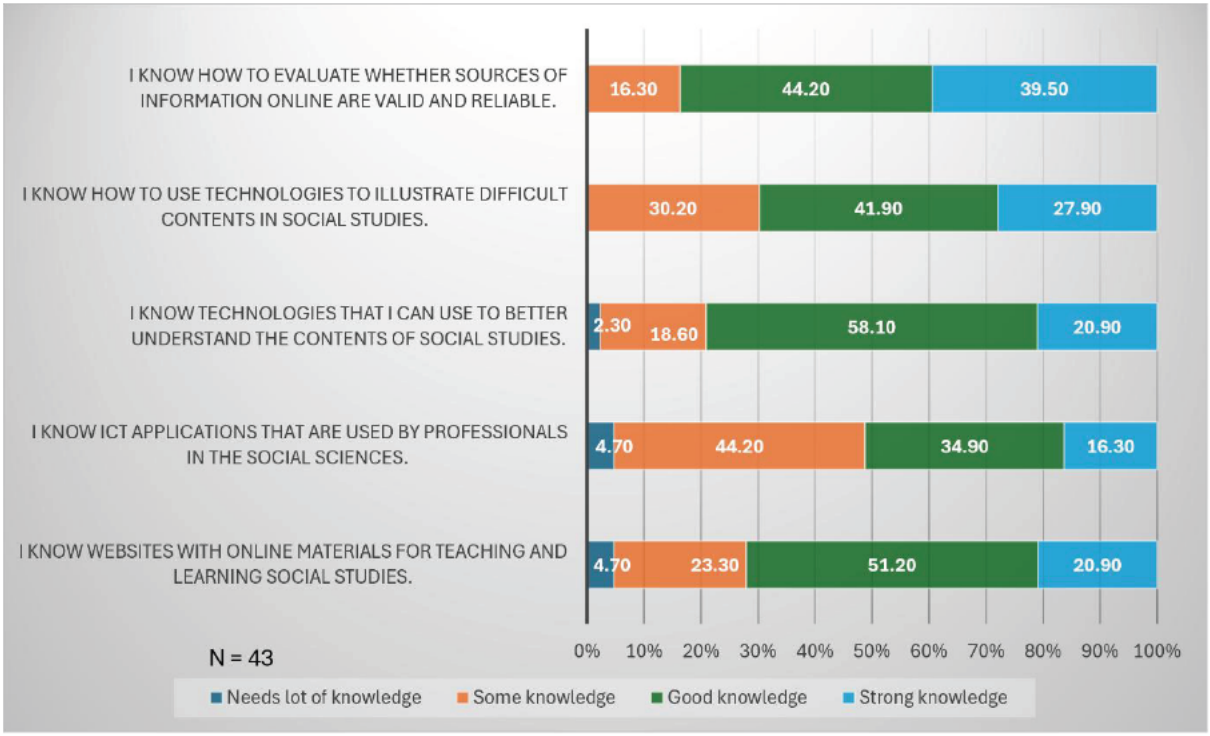
4.2.5. Technological Content Knowledge

Technological content knowledge is knowledge about how the content can be changed by the application of technology and knowledge about the varied ways by which a concept can be represented using the different available technologies. It also includes knowledge on how to evaluate the validity and reliability of the different sources of information that are found online.

The level of technological content knowledge is shown in Figure 15. Five items were used to evaluate the technological content knowledge of the respondents. The mean score for this domain of TPACK is 2.94 which means that the perceived technological content knowledge is good.

Figure 15

Level of Technological Content Knowledge



Among the items in the TCK domain, the item about knowledge of the ICT applications used by professionals in the Social Sciences had the largest number of respondents who said that they need lots of knowledge or some knowledge about it. Knowledge about evaluating the validity and reliability of the different sources of information that are found online has the highest mean score (3.23). Although less than fifty percent of the respondents said that their knowledge in evaluating the validity and reliability of information online is good, a significant number (39.5) said their knowledge is strong thus pulling up the overall mean for the item. The respondents are products of the K to 12 curriculum which includes a subject in Media Literacy and this could explain their confidence in their ability to evaluate information online. Moreover, some of the respondents said that the activity on fact-checking regarding the martial law myths in one of their major subjects and attendance to the 2-day virtual

training on fact-checking which was conducted by Vera Files in their school helped in developing their ability to evaluate information.

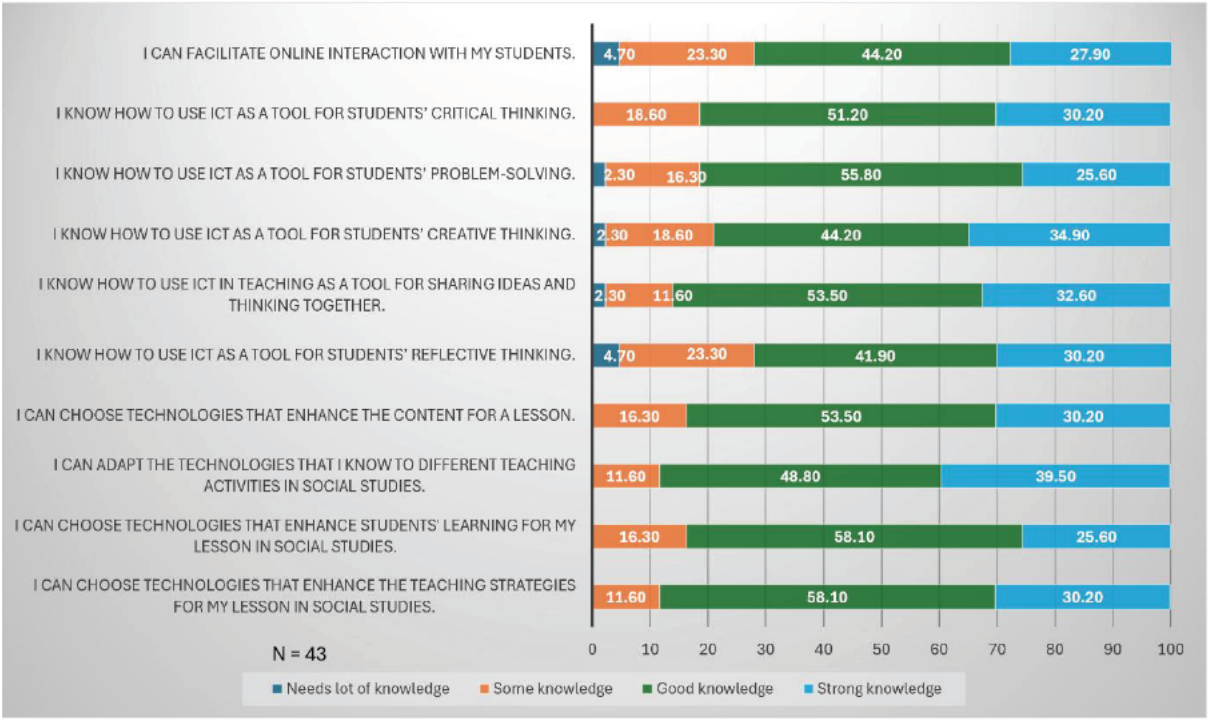
4.2.6. Technological Pedagogical Knowledge

Figure 16 shows the TPK of the respondents. This includes the ability to choose the appropriate tools in the teaching-learning process, implementing online instruction, and knowledge about how to use ICT tools to facilitate the sharing of ideas among the students and to develop reflective thinking, creative thinking, critical thinking, and problem-solving skills.

The respondents have strong knowledge of implementing online instruction. Of the two methods of online instruction, the respondents had stronger knowledge about synchronous instruction than asynchronous instruction (Figure 17). This result is not surprising since the respondents have experienced these methods of instruction from the first year to the third year. During the focus group discussion, one of the respondents said that the experience allowed them to observe first-hand how their instructors implemented synchronous and asynchronous instruction and how to use the different tools for online teaching. Another item in the TPK domain where the respondents have strong knowledge is adapting the technologies that they know to the different activities in Social Studies.

Figure 16

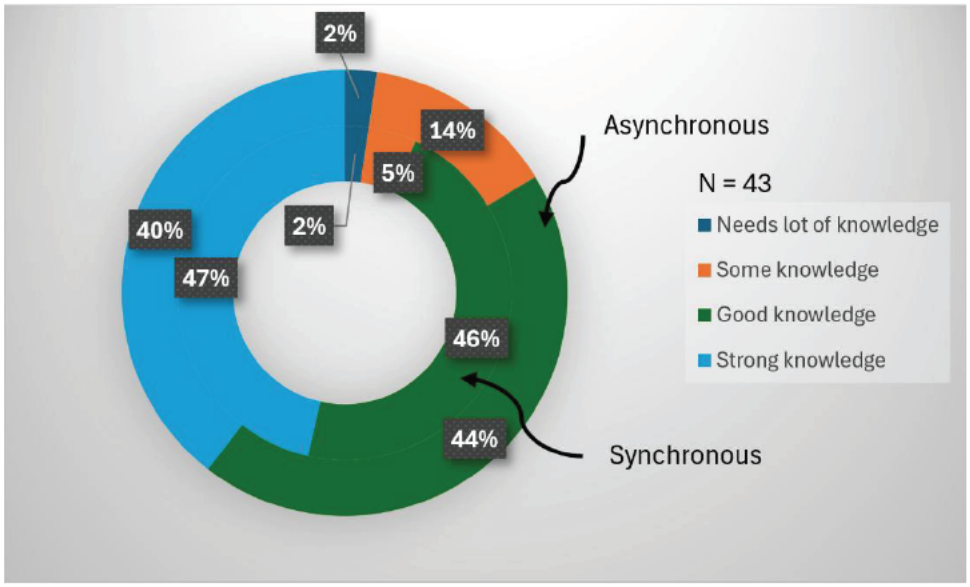
Level of Technological Pedagogical Knowledge



The knowledge of the respondents in using ICT tools to develop students' reflective thinking, creative thinking, critical thinking, problem-solving skills, and sharing ideas can be described as good as the majority of the respondents said that they have good knowledge. Knowledge about using ICT as a tool for sharing ideas was highest as 86.1% of the respondents said they have good to strong knowledge. The result complements the result obtained in the pedagogical domain regarding knowledge about guiding students' discussion in group work where 95% said that they have good to strong knowledge.

Figure 17

Level of Knowledge in Implementing Online Instruction



4.2.7. Technological Pedagogical and Content Knowledge

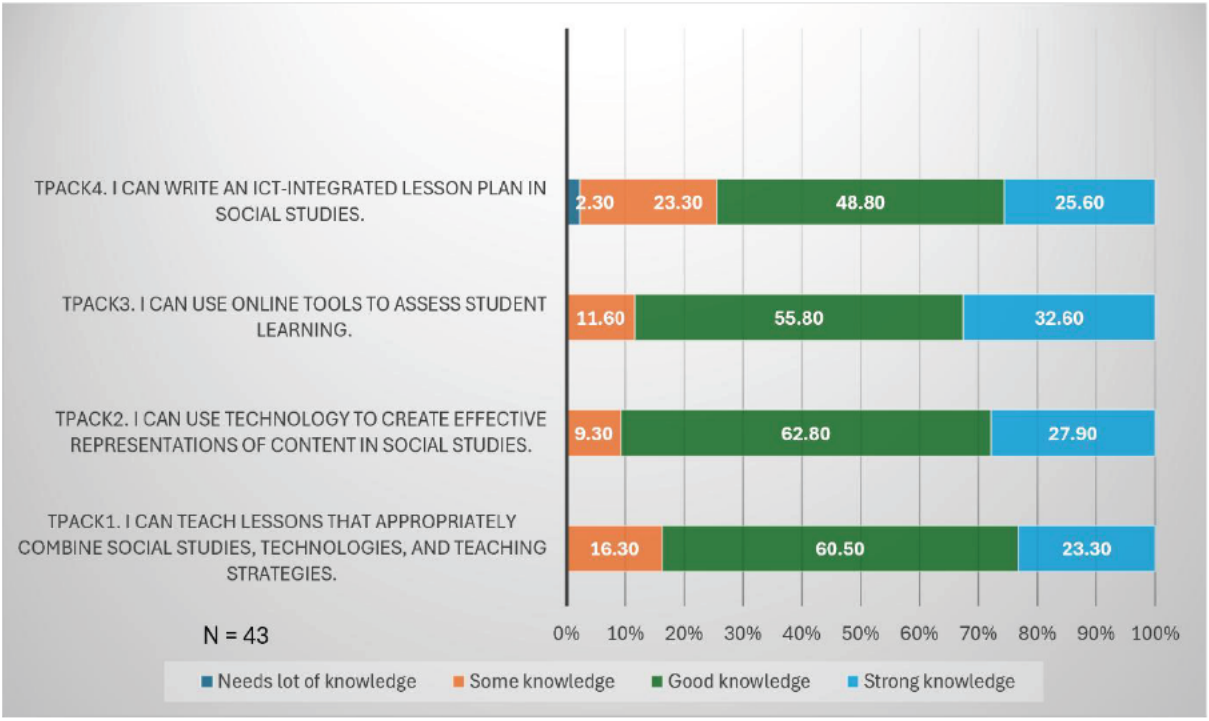
TPACK is the basis of good teaching with technology which includes an understanding of the representation of concepts using technologies; the ability to choose a technology that can facilitate learning of difficult concepts; and pedagogical techniques that use technologies in constructive ways to teach content.

Four items were used to evaluate the respondents' TPACK (Figure 18). Of the four, items that are related to the integration of CK, PK, and TK got the lowest overall mean score. These are the knowledge about integrating Social Studies concepts, technologies, and teaching strategies in their lesson and writing an ICT-integrated lesson plan in Social Studies. This shows that there is a need to improve the respondents understanding of how to integrate the three core components of TPACK into their teaching practices. Koehler and Mishra (2005) asserted that teacher education institutions should go beyond merely training preservice teachers in the use of technology. Teacher educators should not only present examples of how the

integration of these three components is done but they should also model this in their teaching. Additionally, Kimmel (2015) asserted that TEIs should also provide preservice teachers with opportunities to reflect on the role of technology integration in improving and transforming existing teaching practices (Kimmel, 2015).

Figure 18

Level of Technological Pedagogical and Content Knowledge



4.2.8. Summary

Table 11 shows the perceived level of knowledge in the seven domains of TPACK. The respondents' perceived level of knowledge of the seven domains can be described as good. The domain with the highest mean score is pedagogical knowledge which means that the respondents are more knowledgeable about methods and strategies to be used in the teaching and learning process and evaluating student understanding. This is similar to the findings of Redmond and Peled (2018),

Valtonen (2020), and Adalar (2021) which found the pedagogical knowledge of preservice Social Studies teachers was highest in the pedagogical domain. Consequently, the subdomains that are related to pedagogical knowledge also have high mean scores. Because the respondents were knowledgeable about the different teaching strategies, they can select the appropriate teaching strategy that will match the technological tools that will facilitate the learning of a particular content.

Table 11

Summary of Pre-service Teachers' Perceived Level of TPACK

Domain	Number of items	Mean	Interpretation
Content knowledge	17	2.99	Good knowledge
Pedagogical knowledge	11	3.18	Good knowledge
Technological knowledge	4	2.95	Good knowledge
Pedagogical content knowledge	13	3.06	Good knowledge
Technological content knowledge	5	2.94	Good knowledge
Technological pedagogical knowledge	12	3.14	Good knowledge
Technological pedagogical and content knowledge	4	3.11	Good knowledge

Scale: 1.00 – 1.74 Needs a lot of knowledge; 1.75 – 2.49 Some knowledge; 2.50 – 3.24 Good knowledge; 3.25 – 4.00 Strong knowledge

On the other hand, TCK had the lowest overall mean implying that the respondents had difficulty selecting a technology that will make it easy for the learners to understand the content being discussed. The low score in the TCK domain could be explained by the low rating in the TK of the respondents. According to Greene et al. (2023), TK plays a more significant role in the development of TCK and TPK of preservice teachers. A high score in the TCK and TPK would also lead to high TPACK. The low mean score in the content domain also contributed to the low score in TCK. Some of the participants in the FGD attributed the low rating in the content knowledge

to the nature of Social Studies. They said that it is too broad, especially History. There are so many details that need to be memorized.

The current study confirms the finding of several studies on the level of TPACK of preservice Social Studies teachers which found that the level of knowledge in the domains related to technology is lower compared to the other domains of TPACK (Spazak, 2013; Byker, 2014; Redmond and Peled, 2018; Miguel-Revilla et al. 2020; Adalar, 2021). Additionally, Byker (2014) discovered that preservice Social Studies students were uncertain about how to integrate Social Studies content with pedagogical knowledge, and technological knowledge. This finding of Byker (2014) is confirmed by the study. The overall mean score for the items that are related to the integration of CK, PK, and TK got the lowest mean score. This implies that the respondents may have difficulty in integrating the content, pedagogy, and technology in their lesson planning.

4.3. Factors that Influenced the Development of TPACK among Preservice Social Studies Teachers

The second research question aimed to identify the factors that influenced the development of the respondents' TPACK. Three focus group discussions with a total of thirteen participants were conducted to answer the question. Thematic analysis was used to analyze the data from the FGD and determine the factors that influenced the development of their TPACK. A priori coding was used to identify these factors since several studies had been done in this area but in other fields of specialization. However, during the analysis, there were some responses from the participants that did not fit the predetermined code, hence, a new code was added to the list.

Five factors were identified to have influenced the development of TPACK of the participants. These are the mode of instruction, ICT infrastructure, teacher factor, field study and teaching internship, and personal characteristics of the respondents.

4.3.1. Mode of instruction. Mode of instruction refers to how a class component is delivered in each semester. The common modes of instruction are online, hybrid, and face-to-face instruction. In 2020, the pandemic forced schools to shift from face-to-face instruction to online instruction. The respondents in the study were the batch that entered college at the start of the pandemic, hence from the first year up to the first semester of their third year, the mode of instruction was online. This learning modality made learning difficult for them.

Challenges encountered during online classes. The participants identified several challenges that made learning difficult during online classes. Participant 3 said *"Siguro para sa'kin po, medyo nahirapan din po ako na magkaroon ng pagkatuto kasi po syempre online parang hindi ko ramdam na nasa school ako, hindi ko ramdam na napasok ako. Parang pakiramdam ko ay wala, andito lang ako sa bahay. Parang puro assignment lang po 'yung ginagawa ko. 'Yun po 'yung nararamdaman ko po noon. Parang ambilis ko pong madistract po, kasi po syempre, minsan biglang may bibili sa'min o kaya may kukuha or minsan naman ang ingay ng mga hayop po dito sa paligid namin." (I found learning difficult because it was online. I did not feel I was attending a class and I am easily distracted by the noise from the surroundings).*

Another challenge mentioned by two participants is sometimes their parents ask them to do some chores thinking that they are not doing anything. One of the participants mentioned, *"Isa pa po ay since nasa bahay lang po kami nung time ng pandemic, akala po nung parents namin eh wala po kaming masyadong ginagawa. Nasa bahay lang naman po kami nag-aaral ganiyan. Isa pong epekto ng pandemic ay*

'yung kumbaga ay iisipin ay wala ka namang ginagawa kaya hirap ka ring isabay 'yung pag-aaral mo sa responsibilidad mo sa bahay niyo tulad ng gawaing-bahay ayun po, isa po 'yun." (During the pandemic, since classes were conducted while I was at home, my parents thought I was not doing anything. It was difficult to study and do household chores at the same time).

Participant 11 noted that the environment at home was not conducive to learning – *"mas nakaapekto po nung time na 'yon ng pandemic ay 'yung learning environment po na meron kami sa bahay kasi po kami po ay may tindahan. Kumbaga maingay, 'pag may nabili tapos 'pag wala pang bantay, may time po na habang nagkaklase, iintindihin namin 'yung bumibili. Tapos wala po kaming sariling space para mag-aral kasi wala naman po kaming sariling kwarto, walang sariling table. May time po na sa phone lang kami gumagawa ng mga activities, sa phone lang kami nag-aaral." (The learning environment at home affected me. The surroundings were noisy and sometimes I had to mind the store while I was attending online classes. Also, I did not have my own space where I could study. I only used a phone to do the assigned activities).*

Additionally, Participant 13, said that the online instruction made learning Economics difficult for her, *"sa'kin po personally, isa po sa nakaapekto sa'kin dun sa pagsasagot ng survey is nung time po ng discussion about Economics ay nasa online class po tayo which is nakaapekto po 'yung environment namin sa pag-intindi po ng mga terms especially po may Math siya. Para po kasi sa'kin, mas maganda siya na naididiscuss face-to-face para po 'pag may mga question po kami, nararaise po talaga namin especially po sa'kin ma'am medyo hindi ko po talaga siya ganoon naintindihan nung time po na dinidiscuss po natin siya. Although nadiscuss po talaga siya pero sa environment po kasi na meron ako nung time na 'yon is nahihirapan po akong*

intindihin at magsink in lahat ng information sa utak ko po." (The online learning environment made it difficult for me to understand economic concepts especially because it has Math. For me, it would have been better if Economics was discussed in a face-to-face class so that we could easily raise our questions. With the kind of learning environment we had during that time, it was really difficult to understand the different concepts that we discussed).

From the responses of the participants and the overall mean for CK, it can be inferred that the mode of learning negatively affected the development of their content knowledge. All their content courses were taken during the first two years of college when the mode of learning was online. The result of this study confirmed the findings of Capule et al. (2024) who studied the lived experience of beginning Social Studies teachers who were graduates of the university where this study was conducted. Their respondents said that they struggled during their online class because their interactions were limited and there was no one to whom they could turn to help them understand the lessons that are better taught in face-to-face classes. Some of their respondents also worked on the side during the pandemic so they were not able to focus on their studies, especially in their major subjects. As a result, they felt that they did not have mastery of content knowledge when they taught for the first time. The preservice teachers in the study conducted by Backlund et al. (2022) and Nwati & Thuthukile (2021) also reported that they experienced difficulties in absorbing the content of the lectures, which they attributed to the loss of interpersonal interaction.

Although the respondents in the study viewed the online mode of instruction negatively, it also had a positive effect on the development of their TK. Online instruction allowed the preservice teachers to learn how to use digital tools that they can use in the future (Backlund et al., 2022) and to be more confident in their general

TK (Brianza et al., 2023). The study supports the findings of Backlund et al. (2022). The mean score for knowledge of implementing synchronous instruction is 3.37 which translates to strong knowledge. This result is not surprising because the respondents experienced online instruction from their first year to the third year, so they were able to observe first-hand how their instructors implemented synchronous and asynchronous instruction and how to use the different tools for online teaching.

4.3.2. Teacher factor. One of the important factors in the development of preservice teachers' TPACK is modeling by teacher educators on how technology is integrated with content and pedagogy. Gill and Dalgarno observed that preservice teachers tend to replicate the technology integration activities they experienced in their classroom which in turn encouraged the development of TPACK among preservice teachers (as cited in Yawan & Ihsan 2023).

During the FGD, one of the themes that emerged was the influence of their teachers on their TPACK development and in preparing them for their teaching internship. It was also mentioned the Araling Panlipunan teachers in the secondary school also influenced them.

Influence on TK development. Participant 7 said that she learned how to use online tools from her professional education teachers. This was supported by Participant 8 who said *“I think nakatulong po yung mga professors in a way that they provided a polished and complete learning experience. Actually, yun po ang una’t huli pong time na kung saan yun lang po nakapagface-to-face is actually enjoyable po dahil they incorporated technologies and actually enriched us in the content po.” (I think our professors helped us because they provided a polished and complete learning experience. We had only one face-to-face class but I enjoyed it because they incorporated technologies and enriched the content.)* Another participant added that

one of their teachers taught them the different approaches that can be used in teaching History and the ICT application that can be integrated when teaching Social Studies. This knowledge helped them during their internship.

Influence on PK development. Two participants said that the important contribution of their teachers in college was in pedagogical knowledge. Participant 2 said he observed different teaching strategies from his teachers and he used them during his teaching internship. Participant 11 described how her teacher helped her understand thematic teaching and integrative learning – "*tinulungan po talaga kami ni Ma'am na intindihin muna yung concept ng thematic teaching, integrative learning ganyan para po mai-apply namin. Minold na niya po kami… tinuruan niya po kami magdemo tapos ang nirequire niya po sa amin ay thematic. Kaya po talagang namaster po namin nung time na yon kung paano yung thematic teaching". (Our instructor helped us understand the concept of thematic teaching, integrative learning. She taught us how to execute demo teaching using thematic teaching. As a result, we were able to master the implementation of thematic teaching).*

Influence on CK development. The participants also mentioned that their teachers in college were instrumental in developing their content knowledge. Participant 3 said "*sila 'yung dahilan kaya mas lumalim 'yung pagkakaunawa ko po pagdating po sa Araling Panlipunan and then 'yung pagkakaunawa ko po sa ating society, culture" (They were the reason my understanding of Social Studies, our society, and culture, was enhanced).* Participant 4 added *"yun po ang pinaka naging malaking factor bakit kami nakapagdeliver nang maayos sa sa klase po" (that was the most important factor why were able to deliver our lesson in class).*

Influence on TPACK. While majority of the students agreed that they observed the integration of content, technologies and pedagogy among their teachers in Social

Studies education, technology for teaching, professional education, and general education (Table 12), some respondents mentioned during the focus group discussion that they did not observe the integration of content and technology. Participant 9 said "*madalang po akong makakita ng teachers na gumagamit nang magkasabay ng technology at content. Though gumagamit po sila ng powerpoint at kung ano pa, ang nagiging labas po ay parang traditional pa rin. Ginagamit nila as a visual tas ipapaliwanag lang nila." (I rarely saw teachers who integrated technology with content. Although they used PowerPoint, the mode of teaching was still traditional. They just used it as a visual aid while explaining the lesson).* This was supported by participant 5 who said that *"parang nakafocus na lang din po sa powerpoint presentation para po magmukhang 21st century yung style of teaching po. Pero kung tutuusin po, familiar na rin po yung bata don at alam na din po ng bata kung paano po gamitin yun. Kaya hindi rin po masyadong nakikita kung paano po pinagsasama yung content at technological." (They were focused only on the PowerPoint presentation to make it look like 21st century style of teaching. But, the students already know how to use it. I did not see how technology was integrated with content).*

This observation shows that there is also a need to develop the TPACK of teacher educators. Semiz & Ince held that teacher educators should have a thorough understanding of their own TPACK, otherwise, preservice teachers can get discouraged with technology integration or even show no development improvement in the TPACK domains (as cited in Wang et al. 2018). The training of teacher-educators should be complemented by an improvement in the ICT infrastructure as inadequate access to ICT resources and the quality of ICT infrastructure are some of the barriers faced by Social Science teachers when using ICT in the teaching and learning process (Karunakaran & Dhanawardana, 2023).

Table 12

Models of TPACK

	1 Strongly disagree	2 Disagree	3 Neither agree nor disagree	4 Agree	5 Strongly agree
1. My Social Studies education instructors/professors appropriately model combining content, technologies, and teaching strategies in their teaching.	0	0	2	22	19
2. My teachers in Technology for Teaching and Learning appropriately model combining content, technologies, and teaching strategies in their teaching.	0	0	2	22	19
3. My teachers in the Professional Education subjects appropriately model combining content, technologies, and teaching strategies in their teaching.	0	0	2	20	21
4. My teachers in the General Education subjects appropriately model combining content, technologies, and teaching strategies in their teaching.	0	0	4	23	16
5. My cooperating teachers appropriately model combining content, technologies, and teaching strategies in their teaching.	0	0	7	18	18

Preparation for Teaching internship. Their teachers were not only helpful in developing their content, pedagogical and technological knowledge but according to Participant 2 "*malaki din po ang naitulong po ng mga prof po namin para ihanda po kami bago po kami ilabas sa internship po namin. Hindi lang po basta content lang 'yung tinuro, tinuro din po 'yung attitude po, 'yung behavior po namin, kung paano po*

kami makisalamuha." *(Our professors prepared us for the internship. Aside from content, they also taught us the right attitude, right behavior and how to interact with others).* Participant 5 also said that *"mas naging confident kami para makapagturo nang maayos sa bata tapos po mahandle yung mga situation na unexpected, mga situation po na sa tingin po ng teacher namin dati na mahihirapan kami is naihanda po kami ng teacher po na yun kaya confident po kaming humarap sa bata." (We became more confident that we could teach our students well and handle unexpected situations because of the preparation that our teachers provided).* Participant 11 believes that they were taught well by their teachers in college. She said *"kami ay naturuan nang maayos ng mga teachers namin kaya hindi rin po naging sobrang struggle nung teaching internship po namin pati po itong ngayon naming pagtuturo kahit na may konting adjustments po or nahihirapan mag-adjust." (Our teachers taught us well so we did not have a hard time during the teaching internship).*

Influence of secondary schools teachers. Aside from her teachers in College, a participant said that her former teachers in high school also influenced her. She said *"isa rin po ay naalala rin po namin 'yung former teachers po namin, mga kung paano po sila nung kami po'y nag-aaral. Ano po 'yung strategies na ina-apply nila lalong-lalo na sa AP. Kunyari, laging may balitaan, laging interactive. Tapos isa pa pong factor ay bukod po doon sa mga teacher namin dati na role model para sa amin, 'yung teacher din po na ayaw naming maging. Kumbaga 'yun na rin po 'yung naging reminder sa amin na hindi dapat ganoon. Kaya din po na-improve din po namin 'yung aming teaching strategies." (I remember my former teachers and the strategies they used in teaching Social Studies, it was interactive, they were our role models. But there were also teachers that we don't want to emulate. They reminded us that teaching should*

not be done that way. Our former teachers also helped us in improving our teaching strategies).

From her description of her teachers, they can be categorized as positive role models and negative role models. Positive role models are those who pass on formal and informal competencies to their recipients as a result of social and professional interactions throughout life (Bandura, 1977 as cited in Coppell, 2020). On the other hand, negative role models "show negative behaviors and consequences to those behaviors that observers or recipients of those behaviors then take as examples of behaviors to avoid" (Lockwood et al., 2002 as cited in Coppell, 2020).

4.3.3. ICT infrastructure. ICT infrastructure refers to the hardware and software components that support the teaching and learning process. One of the challenges mentioned by the participants that hindered the development of ICT skills was the lack of necessary equipment they needed to integrate the technologies they knew in their teaching so it would be more engaging to their students. Participant 13 mentioned she is confident about her technical skills but the problem is *"kung paano po siya i-iintegrate sa loob ng classroom kasi hindi naman po lahat ng school ay may available na TV, na internet saka mga projector para mas makapag-integrate po kami ng mga ganong klaseng application sa loob po ng classroom which is makakatulong po sana para mabigyan po namin ng engaging discussion 'yung studyante."*. *(how can I integrate various apps into my lessons when the school lacks television, internet, and a projector Having these apps would help to make the discussion more engaging for the students).* Participant 12 added that there were times when they wanted to use a particular app but were not able to because their students did not have mobile phones. The sentiments of the two participants are similar to the observation of Rahardjo (2016) who asserted the importance of the technological structure and how the lack of

it will make the realization of certain classroom activities very difficult. Furthermore, Abedi et al. (2024) asserted that the lack of technology resources in the schools where the preservice are assigned is a lost opportunity for them to apply their TK in actual classroom situations and see for themselves the power and limitations of technology in the teaching and learning process.

The absence of ICT devices in the classroom is a disincentive for the preservice teachers to further explore and learn new technologies. Participant 12 said *“dahil nga po wala namang gamit ‘yung mga ihahandle ko, ‘yun na rin po ‘yung parang nagpapalayo sa akin na mag-explore pa dahil wala naman po akong pag gagamitan. Kaya wala na rin po akong kumbaga initiative na alamin pa ‘yung mga ‘yon.”. (I lacked the motivation to explore and learn new technologies because I don’t have any use for them, as the students I will be teaching do not own the necessary devices).*

Access to the internet and the quality of the internet connection is another factor that could have influenced the development of the different sub-domains of TPACK. Forty-seven percent of the respondents accessed the internet through pre-paid internet service. Participant 1 said since she is only using data to access the internet, this made it difficult for her to explore and learn about technology. Two other participants agreed that the limited access to the internet prevented them from finding information that they could use in the class discussion. The quality of the internet connection posed a problem too. Their connection is not stable hence sometimes during online classes, they were cut off and as a result, they could not follow and understand what their teacher discussed. Another participant said that sometimes it can be stressful for her because she was unable to submit her assignments before the due date even though she wished she could. Finally, participant 4 mentioned that there

are websites that they find useful but they cannot access them because they need to have a subscription with the website.

The challenges related to ICT infrastructure should be addressed since access to tools and technology is one of the important elements in the development of TPACK. According to Abedi et al. (2024), the lack of technological resources such as lack of internet access and computer resources, negatively impact the training and readiness of preservice teachers to use technology in their future classrooms.

4.3.4. Field study and teaching internship. In their fourth year, the preservice teachers conduct the field study during the first semester and the teaching internship during the second semester. During the field study, the preservice teachers are allowed to observe their cooperating teacher's teaching strategies, classroom management practices, and students' behavior. They also assist in the preparation of instructional materials, activities related to the assessment of learning, and other classroom routines. According to the participants, the field study helped in improving their pedagogical knowledge. Through observations, they learned the different strategies used by their cooperating teacher in teaching and managing the class. They also observed the different types of learners and the correct way to deal with them. According to Participant 3, *"ung naitulong po sa'kin ng observation ay nagkakaroon po ako ng idea doon sa tamang approach po sa mga students po… may iba't iba pong behavior, iba't ibang ugali kung paano siya pakikisamahan po. Parang 'yun po 'yung isa sa tumatak sa'kin during my observation." (The observation showed me the correct way to handle the various attitudes and behaviors of students).* What they learned during the field study, they applied when it was their time to teach as mentioned by Participant 4. She noted that "*yung mga strategies na ginagamit ng mga cooperating teacher, na-a-adapt din po namin tsaka nagagamit po namin kung paano mahahandle*

yung isang klase." (we adopted the strategies used by our cooperating teachers in managing a class).

Eighty-three percent of the respondents said that their cooperating teachers modeled the integration of content, pedagogy, and technology in their teaching. During the FGD, the respondents said that the mentoring they received from their cooperating teachers helped them improve their pedagogical knowledge. The statements below show how their cooperating teachers mentored them:

> Participant 3: *"Nakatulong po 'yung cooperating teachers ko po sa pagbuo po ng ng lesson plan … at nagsa-suggest po siya ng mga dapat kong gawin or dapat na ginagawa pong activities. And then, 'pag ka naman po sa klase po, sinasabi niya po sa'kin 'yung ano bang dapat kong gawin, dapat na approach ko, dapat na mannerism ko po kapag nasa harapan ng mga students." (My cooperating teachers assisted me in writing lesson plans… she recommended activities I could implement in the classroom. She guided me on the appropriate approach to use and the proper demeanor to maintain while teaching the students).*

> Participant 4: "*gaya nga po ng nasasabi ko na mahusay po yung cooperating teacher na napapunta po sa akin … Sinesendan niya po ako ng mga sites or yung mga magagamit po para po mas maging engaging yung pagtuturo po namin ng Social Studies. Sa content po, nagpoprovide din po yung cooperating teacher ko ng maaari pong resources na ginagamit po talaga nila sa pagtuturo. Hindi niya po ako nililimitahan na ito lang yung gamitin mo. Marami po siyang binibigay tsaka hinahayaan din po niya ako na mag-explore po on my own." (My*

cooperating teacher is good. She provided me with websites that can help make Social Studies teaching more engaging. She shared the resources she uses in teaching and allowed me to explore on my own).

Participant 8: *Siguro po one of the best na naitulong ng teacher ko is yung openness po niya for collaboration … parehas po kami at sabay po kami nagcocollaborate to come up with the best strategies and technology to use to teach the content po. Kaya with her mastery po and yung mga fresh ideas, nakakapagcome up naman po kami with effective strategies po." (One of the best contributions my cooperating teacher made was her openness to collaboration. Together, we devised the most effective strategies and technologies for teaching the content. With her mastery and fresh ideas, we came up with effective strategies).*

The experience of the PSTs confirms the role of the cooperating teachers in developing the different domains of TPACK. According to Darsih et al. (2024), the mentoring provided by the cooperating teachers bridges the gap between the theories learned by the preservice in their teacher preparation courses and the application of these theories in real-world situations. This is supported by Tembrevilla et al. (2024) who observed that collaborative mentoring during teaching practicum enhances preservice teachers' collective knowledge of the nature of learning and diverse student development which in turn will enhance their competence and confidence in managing diverse teaching and learning situations.

4.3.5. Personal characteristics. The development of TPACK among preservice teachers is not influenced by external factors only but also the

characteristics of the preservice teachers such as ownership of ICT devices, exposure to technology during their secondary education, and the initiative to explore and learn new technologies. Participant 12 said that she was using only a cellphone during their online class when she was in first year college. Among the problems she encountered because of that were *"yung cellphone po na ginagamit namin ay naghahang and output-wise po hindi naman po kami nakakagawa nang maayos dahil nung mga panahon na cellphone lang 'yung meron kami, Google Docs lang hindi maayos 'yung pagfoformat, pagla-layout. Kaya kung ako po ay tatanungin, halimbawa estudyante, babalik po sa modality ng online class parang nakakawalang gana po 'yun dahil hirap po... hindi naman po kasi lahat ng mga estudyante ay privileged, pare-pareho ng mundo na ginagalawan sa bahay." (My cellphone freezes, and since we rely on a cellphone, the quality of our output suffers. We are unable to format and arrange the Google documents properly. I do not want to return to the online learning because it is difficult. Not every student is privileged and fortunate enough to have the same living conditions).* Among the 43 respondents, four respondents reported that they do not own a computer. A look at their self-rated TK and TCK revealed that three of the four respondents ranked in the bottom 20 percent in TK while two respondents were at the bottom 20 percent in the TPK and TPACK. The result of the study of Aksin (2023) showed that the TK levels of preservice Social Studies teachers with a home computer were significantly higher than those of participants who did not have a home computer. Having a home computer allows them to practice hence they can improve their basic computer skills and their TK.

Exposure to technology during their secondary education is another theme that emerged during the focus group discussion. According to Participant 5, "*sa TLE po namin sa junior high, marami pong choices at hindi po kami na-expose sa ICT kahit*

po isa siya don sa pwede naming pagpilian. Parang sa higher sections lang po yung ICT, kaya hindi po kami nagkaroon ng chance na makagamit ng lab kaya rin po siguro hindi masyadong na-expose don sa paggamit ng computer." *(during junior high school, we did not have access to ICT. The computer laboratory was reserved for students in the upper sections, so we did not have the opportunity to use computers).* This was supported by participant 7 who said that he also lacked access to the computer laboratory so he was not able to use the computer during his junior high school. Participant 2 attributed his limited exposure to technology to their economic status. He said that *"hindi naman po ako lumaki sa magarbong pamumuhay so parang ngayon lang ako like gumamit ng mga technology"* … *nahirapan po ako na i-adopt 'to sa teaching strategy ko po. 'Yun din po 'yung isa sa iniimprove ko po ngayon… ineexplore ko po." (I did not come from a well-off family, so it is only now that I started using technology so it was difficult for me to integrate it into my teaching strategy. This is an area I am trying to improve and explore).*

The lack of exposure to technology harms the development of TPK as shown by the experience of Participant 2. This is unfortunate since prior exposure to technology is one of the foundations on which the development of TPACK rests. Preservice teachers who have previous technology experience are more adaptable and strategic when integrating technology into pedagogy (Chen et al., 2024 as cited in Darsih et al., 2024) and can design learning environments that are more interactive and effective (Zhang et al., 2024 as cited in Darsih et al., 2024).

The respondents did not only attribute their difficulty with technology integration to the lack of ICT devices, but they also cited lack of initiative to explore and learn new technologies. Participant 11 said *"feeling ko po, bukod po doon sa kakulangan po sa mga gadget, siguro ay nasa sa amin na din po kumbaga eh kakulangan na rin po ng*

initiative na matuto or i-explore po 'yung technology, available technology na meron. … Kunyari po, Excel, 'yung Excel nung high school po kami naturuan kung paano gumamit ng Excel, 'yung mga basics. Ngayong alam na po namin 'yung basics, kumbaga wala na pong kaming initiative na i-explore namin 'yung formula, kung papaano ba mas nagiging madali sa Excel bukod sa pag-encode ka diyan ng kung ano-ano." (In addition to not having enough devices, we also lacked the initiative to explore and learn the available technologies. For instance, we learned the fundamentals of Excel in high school. Since we are already familiar with the basic functionalities, we lost interest in discovering its additional features). When asked why they were not motivated to explore further, she answered *"siguro po ay nakuntento na.. na ay alam ko naman 'yan, ito lang naman ang kakailanganin diyan. Saka bukod po doon ay siguro busy din po kaya hindi na alam kung paano isasabay. Kumbaga may iba rin pong priorities, hindi na rin po napagtutuunan ng time na alamin at i-explore 'yung technology na available." (This could be due to our satisfaction with our current knowledge, as those features are the only ones that are useful to us. Furthermore, our busy schedules have prevented us from doing various tasks at the same time. We also had other priorities, which left us with little time to become familiar with the available technologies).*

The respondents in this study see the importance of integrating technology in teaching Social Studies. Participant 9 believes that *"kung iintegrate ang technology o mas magiging interactive, magkakaroon ng motivation ang bata na mas higit na matuto. Kapag nakita po nila, napupukaw na agad ang attention nila. Nandon ang history at iba pang paksa pero iba po yung dating sa kanila. Kaya mahalaga po talaga na may technology." (integrating technology into the lessons is important. It makes learning interactive so students will learn more. Using technology catches their*

attention). Their attitude towards technology integration can be harnessed to develop their TPACK. Previous studies showed that there is a link between TPACK and the attitudes and beliefs about technology use in teaching. The study of Scherer et al. (2017) found that positive attitudes toward ICT are associated with higher self-efficacy in TPACK among pre-service teachers, and vice versa while Hidayat et al. (2024) showed that there is a significant and positive correlation between technological pedagogical content knowledge (TPACK) and the belief in teaching mathematics with technology among preservice teachers. The result of these studies shows the importance of developing the right attitudes towards ICT and TPACK self-belief. Scherer (2017) suggested that instructional approaches in teacher preparation programs should showcase the usefulness and ease of ICT use for educational purposes and allow the preservice teachers to gain mastery of ICT as these are valuable sources of the preservice teachers' self-beliefs in using technology.

Although the participants mentioned their lack of initiative to learn new technologies, it is noteworthy that they also realized the need for them to cultivate their skills and to be flexible so that they can adapt to different situations. Participant 11 said *"ngayong alam na po namin 'yung theories, alam na po namin 'yung basics na kailangan naming gawin dito sa field ng education, ang pinaka kailangan na lang talaga po naming linangin is 'yung skills na meron kami most especially po 'yung aming flexibility .... Ang pag-aaral hindi naman po 'yan natatapos sa totoong buhay. Kumbaga ay 'yung life skill ba na marunong kang um-adapt at maging flexible sa lahat ng pagkakataon. 'Yun po 'yung para sa akin ay very important, 'yun po 'yung pinakanecessary po na kailangan naming linangin more than the theories na natutunan namin nung kami ay college. Talagang 'yung adaptive skills and flexibility po talaga." (now that we know the theories and the things that we need to do in the*

field of education, it is important to enhance our skills. We need to be flexible. Learning is a life long process. We must adapt and be flexible at all times. Beyond just theories, it is important to develop our ability to adapt and be flexible).

4.3.6. Summary of the factors affecting the development of TPACK. The development of TPACK among the preservice teachers was influenced by the mode of learning, teachers, ICT infrastructure, field study and teaching internship, and personal characteristics of the preservice teachers. The online mode of learning negatively affected the development of their content knowledge due to the many distractions during their online classes such as being asked to do some chores by their parents, the noise in their surroundings, and the absence of a dedicated space that they can use while doing online classes.

Aside from helping them develop their CK, PK, and TK, the respondents said their teachers in college also were instrumental in instilling the right attitudes and behaviors which helped them deal with real-life situations in their classroom during their teaching internship and boost their self-confidence. Because they were adequately prepared, they did not struggle much during their teaching internship. The secondary school teachers of the respondents also influenced their pedagogical practices. They also served as role models on how teaching should be done.

The inadequacy of ICT infrastructure, such as lack of ICT devices, limited access to the internet, and the quality of the internet connection hindered the development of the TPACK domains which are related to technology. These inadequacies prevented the respondents from integrating technologies in their teaching to make it more engaging to their students. Also, it made online learning difficult which could have negatively influenced the development of their content knowledge.

The field study and the teaching internship helped in improving their pedagogical knowledge. Through observations, they learned the different strategies for teaching and managing the class and dealing with different types of learners. The knowledge gained during the field study was applied by the respondents in their internship which further improved their PK. All these were made possible by the cooperating teachers who modeled the integration of content, pedagogy, and technology in their teaching and by mentoring them throughout the internship period.

The personal characteristics that negatively affected the development of the TPACK domains which are related to technology are lack of ICT devices, minimal exposure to technology during their secondary education, and lack of initiative to explore and learn new technologies. This made it difficult for the respondents to integrate technology into their teaching practice. The lack of initiative to explore and learn new technologies can be related to the inadequacy of the ICT infrastructure. This inadequacy makes technology-related classroom activities not feasible. This in turn will be a disincentive for the preservice teachers to learn new technologies since they cannot apply them in their teaching anyway.

4.4. Learning Needs of the Pre-service Teachers

The third research question examined in this study was the respondents' perceived learning needs to enhance their TPACK. The answer to this question was derived from the focus group discussion and by looking at the mean score of the different domains of TPACK. Based on the mean score of the TPACK domains, there is a need to strengthen knowledge in the content and technology-related domains, namely, TK and TCK. These domains had the lowest mean score among the seven domains of TPACK. Among the three, TCK had the lowest mean score (2.94) followed by TK (2.95) and CK (2.99).

4.4.1. Content knowledge. In the content knowledge domain, there is a need to focus on improving the knowledge about the different philosophical and theoretical perspectives in teaching Social Studies, the theories and concepts related to history and how to do historical thinking, and the different themes in the Social Studies curriculum with emphasis on regionalism and international relations. The participants in FGD said that they had difficulty in selecting the themes that were appropriate for the topic that they would discuss. They suggested that their teacher should give more in-depth discussions and more activities that will show how the different themes can be integrated into their lesson plans.

4.4.2. Technology-related domains. The low score in the TCK domain implies that the respondents have difficulty in the integration of technology and content. This difficulty is evident in the low overall mean for knowledge about writing an ICT-integrated lesson plan. Twenty-five percent of the respondents said that they have only some knowledge about writing an ICT-integrated lesson plan. The difficulty encountered by some of the respondents is due to the low level of CK and TK. As stated previously, these two domains have the lowest overall mean among the seven TPACK domains. The low level of TK could be explained by the quality of the ICT infrastructure, ownership of computers and other ICT devices, and prior exposure to technology.

To strengthen the TK, the participants in the FGD said they need to be introduced to the different websites and applications that they can use in teaching Social Studies. They said that in one of their Prof Ed subjects, the websites and technologies that were discussed were applicable only for use in Math, English, and Science. The limited knowledge about the available websites and technologies that they can use in Social Studies teaching combined with a relatively low rating on the

content knowledge made the integration of technology and content difficult for the respondents.

4.4.3. Pedagogical Knowledge. While the mean score in the PK is the highest among the seven domains, some participants in the FGD mentioned that they need more knowledge in the areas of classroom management, assessment, and how to use thematic teaching.

Classroom management. Uribe-Zarain et al. (2019) also noted that classroom management is one of the areas that need more preparation in teacher education program. Two participants noted that they need more knowledge on how to set boundaries between their students and themselves. Participant 11 noted that she had difficulty handling Grade 7 students while Participant 13 said she had difficulty handling grade 11 and 12 students due to the age difference between her and her students. Describing her experience, she said that *"yung tinuruan ko po kasi ay Grade 11 and Grade 12 na 'yung age gap po namin ay sobrang liit lang po kaya 'yung respeto po minsan sa kanila ay parang nakukulangan ako. Parang hindi po nila ako ganoong nirerespeto katulad ng ibang guro" (I taught students in grades 11 and 12. The age difference between my students and me is relatively small. I sensed that I was not receiving the same level of respect from them as other teachers did).*

Assessment. Two participants said the had difficulty on how to assess their students. Participant 12 said that her difficulty was caused by her high expectations from her students. She said that *"masyado ko po silang inover estimate nung una, parang may pinagawa po akong performance task na ang binigay nila sa'kin ay parang mga utak po nila ay kakalabas pa lang ng elementary" (Initially, I had high expectations for my students. I assigned them a performance task, but their outputs were similar to what you would expect from elementary-level students)*. Moreover, Participant 11 said

that *"nahihirapan po ako ijudge kung ano ba 'yung dapat kong ibigay. Kung mataas ba or mas mababa. ... 'yung cooperating teacher ko po, minsan sinasabi parang masyadong mababa 'yung binibigay mo or minsan ay masyado namang mataas. Parang hindi ko po alam kung saan ako lulugar" (I struggled with giving grades to my students. My cooperating teacher occasionally informs me that the grades I gave were either too low or overly high. I am confused and I do not what to do in those situations)*.

Thematic teaching. There is also a need to improve the knowledge about thematic teaching and how to integrate the seven themes of Social Studies in their lesson planning. Given the limited time allotted to Social Studies and its broad scope, knowledge about how to use the thematic approach will enable teachers to cover the topics that need to be discussed. More importantly, thematic teaching helps students to connect the past and the present and see the connections between the different disciplines used in the study of society. This will enable the students to see the bigger picture and make Social Studies more meaningful to them.

4.4.4. Integration of pedagogy and content. Two participants said they had difficulty integrating pedagogy and content due to the limited time allotted to Social Studies. Participant 9 said that *"nahihirapan po akong pagtugmain yung dalawa, pedagogy at content. Lalo na kapag isinasaalang-alang yung oras ng pagtuturo dahil minsan ang ganda ng pedagogy na gagamitin mo pero dahil kinconsider yung time, wag na lang. Baka hindi kayanin o baka maghabol. Ang binabagsakan, maglelecture na lang." (I struggled to align pedagogy with content, especially if you consider the time available for instruction. Sometimes, I felt that the pedagogy I planned to implement was good, but I worry that the time allotted may fall short, so I resorted to lecturing during class).* The reaction of the respondent is supported by Burstein et al. (2006) who said that the short time allotment for Social Studies has led to the use of

teacher-centered strategies so that they can cover all the materials that need to be taught (as cited in Dundar & Rapoport, 2014).

4.4.5. Summary. Based on the mean score of the TPACK domains, priority should be given to strengthening the knowledge in the TCK, TK, and CK domains. These domains had the lowest mean score among the seven domains of TPACK. There is a need to improve the preservice teachers' ability to create an ICT-integrated lesson, by strengthening their TK and CK. The TK could be strengthened by introducing them to the different websites and applications that they can use in teaching Social Studies. In terms of content knowledge, there is a need to focus on improving the knowledge about the different philosophical and theoretical perspectives in teaching Social Studies, the theories and concepts related to history and how to do historical thinking, and the different themes in the Social Studies curriculum with emphasis on regionalism and international relations. It is also imperative that teacher educators should teach and model how the integration of technology and content is done. In the PK, the learning needs that the respondents identified is knowledge about classroom management specifically how to set boundaries between their students and themselves. In the PCK domain, the response in the TPACK survey instrument showed that there is also a need to improve the knowledge about thematic teaching and how to integrate the seven themes of Social Studies in their lesson planning.

Chapter 5

CONCLUSION

This chapter presents the summary, conclusion, and recommendation to improve the preservice social studies teacher's TPACK, and areas for further research. The objectives of the study were to describe the content, pedagogical, and technological knowledge of the pre-service Social Studies teachers, identify the factors that influenced the development of their TPACK, determine their learning needs, and propose strategies to address these needs.

5.1. Summary

This research sought to assess the readiness of preservice Social Studies teachers to teach at the secondary level using the TPACK framework. Additionally, it intended to identify the factors that affected the development of TPACK. The results of the research could be utilized in creating interventions aimed at improving the instruction and curriculum of secondary education with Social Studies as the field of specialization.

The study used the pragmatic research paradigm and the mixed method research design specifically the convergent parallel design to address the limitations related to the use of self-report measures. Pragmatic research allows the use of both quantitative and qualitative data to gain a deeper insight into the issue and address the research questions. The qualitative data would provide corroboration of the results obtained from the analysis of the quantitative data. The forty-three participants involved in the study were chosen through convenience sampling.

Among the seven domains, PK had the highest mean score followed by TPK, PCK. TCK, TK, and CK are the three domains that have the lowest overall mean score.

The shift to the online mode of learning negatively influenced the development of TPACK. The domain of TPACK that was most affected was the content domain as evidenced by the low overall mean for CK. The respondents took all their content courses during the first two years of college when the mode of learning was online.

The inadequate ICT infrastructure in terms of availability of ICT devices, and unstable and limited access to the internet hurt the development of TK, TPK, and TCK of preservice teachers. These factors made it difficult for the preservice teachers to explore and learn new technologies and integrate the technologies they already knew in their lessons. The poor quality of the internet connection posed a problem too as they were cut off during online classes and as a result, they could not follow and understand what their teacher discussed.

The teacher factor refers to the university-based teachers and the teachers of the respondents at the secondary level. The university-based teachers had a positive impact on the development of the respondents' TPACK, especially the CK, PK, and TK. The teachers in the secondary level of the respondents also influenced them because they modeled how teaching Araling Panlipunan should be done. Their experience with their AP teachers when they were at the secondary level also taught them how not to teach AP.

In terms of the Field Study and the Teaching Internship, these helped in improving the participants' pedagogical knowledge. The guidance and mentorship of the cooperating teachers were instrumental in the development of the PK of the preservice teachers.

The personal factors refer to the ownership of ICT devices, exposure to technology during their secondary education, and their attitude towards learning new technologies. The lack of ICT devices and their minimal exposure to technology during

their secondary education made it difficult for the preservice teachers to integrate technology into their teaching practice.

In terms of the learning needs of pre-service Social Studies teachers, this study found that based on the mean score of the TPACK domains, there is a need to strengthen technological knowledge, content knowledge, and the integration of technology with content. The low score in the TCK domain implies that the respondents had difficulty choosing the appropriate technological tools for teaching specific content in Social Studies. The weakness in the TCK and TK domains is reflected in the low overall mean for knowledge about writing an ICT-integrated lesson plan and a significant number of respondents (25%) who said that they needed more knowledge or they have some knowledge about it.

While the mean score in the PK is the highest among the seven domains, some participants in the FGD mentioned that they need more knowledge in the areas of classroom management, assessment, and how to integrate the seven themes of Social Studies in their lesson planning.

In the content domain, there is a need to strengthen the teaching of Geography, especially in the themes dealing with regional and international relations. This is especially relevant in the light of the situation in the West Philippine Sea. There is also a need to enhance their historical thinking skills and broaden their understanding of the Social Constructivism and Ecological Systems Theory.

5.2. Conclusion

This study aimed to address three questions regarding the preparedness level of Social Studies preservice teachers concerning their content, pedagogical, and technological knowledge, the factors that affected the development of their TPACK,

and their learning needs for further enhancing their TPACK. The overall mean score in each of the seven domains of TPACK ranged from 2.94 to 3.18 which is translated as good knowledge. In terms of frequency, most of the respondents (from 51 to 95 percent) rated themselves as having good to strong knowledge of all the items that measured TPACK. The data suggests that the perceived level of knowledge of the seven domains of TPACK is adequate. This implies that most of the the respondents are confident with their content knowledge, pedagogical knowledge, technological knowledge, and their ability to combine the three domains to teach effectively.

However, there is a need to focus on enhancing the TCK, TK, and CK of the respondents in the development of interventions aimed at better preparing preservice Social Studies teachers for their roles as beginning teachers at the secondary level. TCK had the lowest mean score at 2.94 followed by TK (2.95) and CK (2.99). These three domains had the lowest overall mean due to a significant number of respondents who said that they need more knowledge or they have some knowledge of the items in these domains.

The weakness in the TCK domain may be resolved by addressing first the learning needs in CK and TK. Teachers must have a deep understanding of the different philosophical and theoretical perspectives in teaching Social Studies theories and concepts of the various disciplines of the Social Sciences, and the themes in the Social Studies curriculum. At the same time, they should know the different technological tools that can be used in teaching Social Studies. A deep understanding of the subject matter complemented by knowledge of the different technological tools will help teachers in creating effective representations of content in Social Studies. The integration of CK and TK makes learning engaging which can lead to improved student outcomes. Furthermore, when planning these interventions, it is important to

consider the factors that influenced the development of TPACK. These factors include the mode of learning, the ICT infrastructure, the influence of teachers, field study and teaching internship experiences, as well as personal factors.

5.3. Recommendations

This section outlines the recommendations that may be undertaken to improve the TPACK of the preservice Social Studies teachers as derived from the study and its implications to pedagogy and practice, professional development, and further research. The recommendations is based on the Synthesis of Qualitative Evidence (SQD) model. The SQD model identified twelve key themes that must be present in TEIs to support the preservice teachers' TPACK. These 12 themes were grouped into two categories. The first category includes the necessary conditions at the institutional level, such as technology planning and leadership, training staff, access to resources, and cooperation within and between the institutions. The second category includes six micro-level strategies: role models, reflection, instructional design, collaboration, authentic experience, and feedback.

5.3.1. Implications for Pedagogy and Practice

Teacher educators play a crucial role in nurturing the skills and understanding that preservice teachers require to successfully incorporate technology into their teaching methods. By showing how to integrate technology effectively into instruction, they provide preservice teachers with examples of how TPACK is being implemented classroom setting. In general, the respondents agreed that their university-based instructors modeled the integration of content, pedagogy, and technology. However, during the FGD some participants noted that some of their teachers did not model the

integration of technology in their teaching. The lack of role models makes it hard for preservice teachers to integrate technology with content and pedagogy, especially when writing an ICT-integrated lesson plan.

At the micro-level, this can be addressed in the two Technology for Teaching and Learning (TTL) and Methods courses. First, TTL instructors might want to create a curated online resource such as videos that show teachers effectively using technology to support specific pedagogical and content goals. These videos can be presented in class to allow preservice teachers to examine examples of technology use by teachers. The curated online resource may also include a video of their students who successfully implemented an ICT-integrated lesson plan in Social Studies.

It is also recommended that the Technology for Teaching and Learning (TTL) courses provide preservice teachers the opportunity to collaborate in designing technology-enhanced instructional materials and reflect on TPACK and the role of technology in education. Additionally, the reflection should also include the preservice teachers' attitudes toward technology and its use in the educational setting. Knowledge about their attitude towards technology can be harnessed to develop their TPACK. This is supported by previous studies that showed that positive attitudes toward ICT are associated with higher self-efficacy in TPACK among preservice teachers. The discussion and reflection about technology in the TTL courses should also focus on artificial intelligence, how it can be harnessed to improve educational outcomes, the benefits and risks of using AI, and the ethical and responsible use of AI.

One of the skills needed to successfully navigate a rapidly changing world is the ability to collaborate with other people to achieve a common goal. The TTL

teachers can help the preservice teachers develop this skill by using collaborative learning in the technology integration activity. This will lead to better learning outcomes since the students can share ideas and constructive criticism to further improve their work. Moreover, when students are working in groups, learning becomes more enjoyable and therefore reduces students' anxiety.

Technology integration in the teaching process should not be context-neutral but it should connect technology with content. Hence, it is recommended that TTL lessons should not focus solely on teaching how to use the different educational technologies but more importantly, it should teach the preservice teachers how a particular technology could be used in Social Studies teaching to transform or represent a particular content so that it can taught effectively to their future students. The collaboration of instructors in TTL, methods courses, and content courses is also recommended so that the preservice teachers can develop an ICT-integrated plan that is aligned with discipline-specific content and pedagogy.

Authentic classroom experience during teaching internships is important in the development of TPACK of the preservice teachers. It allows them to see how the application of their theoretical knowledge in integrating the three core components of TPACK is affected by actual conditions in the classroom. One of the classroom variables mentioned by the preservice teachers that affected the implementation of their lessons is the lack of ICT resources in the schools where they were assigned. Given that not all schools have enough ICT resources to handle the execution of technology-rich lessons, the TTL and methods courses should also continue teaching strategies that are not dependent on ICT but can still make learning engaging and interactive and develop 21st-century skills of the students such as critical thinking and problem-solving skills. One instructional approach that can help Social Studies

Education develop civic skills among the youth is contextualized pedagogy such as community of inquiry (CoL) and Philosophy for/with children (P4C). CoI and P4C emphasize the development of critical thinking skills, dialogue, and collaboration. This instructional approach requires that teachers be skilled in facilitating discussions. Hence, preservice teachers should also be trained to become facilitators of learning. While this approach has the potential to improve Social Studies Education in the Philippines, according to several studies Filipino teachers are not knowledgeable about this pedagogy.

At the institutional level, the university may provide the necessary ICT infrastructure to support the development of the technological subdomains of TPACK among preservice teachers and teacher educators. The university may invest in establishing a computer laboratory in the College of Teacher Education with a reliable internet connection. This will help students who do not own computers or with limited access to the internet. Aside from investing in hardware, the university may consider investing in various software and applications that could help the students in developing their TPACK. The proposed computer laboratory and the investment in software could be used in various professional education subjects so that students will have hands-on experience in integrating technology into their teaching practice.

An online repository may be created that will contain information regarding technologies and references that could help enrich the pedagogical knowledge, and content knowledge about Social Studies and the Social Sciences. Students and teachers alike can upload materials to the repository. The online repository may reduce the time spent by the preservice teachers searching for information that will help them in their coursework and technology integration projects. This will address the problem

of limited access to the internet which affected the CK and TK of the preservice teachers.

To address the learning needs in the content area, the following actions are suggested:

1. Strengthening the teaching of the different philosophical and theoretical perspectives in teaching Social Studies in their major and professional education subjects. Preservice teachers need to have a deeper understanding of the different philosophical and theoretical perspectives because these will help them create an environment that is conducive to learning, make informed decisions about the methods and strategies that they will use in teaching social studies, and select the appropriate assessment methods.
2. Most of the preservice teachers (74%) have a good understanding of historical thinking. However, there is still a need to reinforce their understanding of historical thinking to address the two issues that emerged during the FGD. First is the belief that Social Studies especially history is all about memorizing dates and events. Second, the conflicting accounts about the same topic in the History textbooks of Grade 7 and Grade 8. A deeper understanding of historical thinking will help future social studies teachers see that history is about understanding what happened in the past and connecting this to the present and future. Moreover, it equips them with the skills to assess different sources and understand that history involves various viewpoints and experiences of different groups.

3. One of the difficulties encountered by the preservice teachers is how to integrate the seven themes in the Social Studies curriculum in their lesson especially the theme on regionalism and international relations. Hence, teachers in the various content courses should give more in-depth discussions on the themes that are relevant to the subject they are teaching. For example, teachers in The Contemporary World and Human Geography may give more emphasis on regionalism and international relations by allotting more time to the discussion of these topics. The teachers in Readings in Philippine History and Comparative Politics could integrate into their discussion how regionalism and international relations can influence the policy choices made by the President of the Philippines as the architect of Philippine foreign policy. Given the limited time allotted to Social Studies and its broad scope, knowledge about how to use the thematic approach will enable teachers to cover the topics that need to be discussed. More importantly, thematic teaching helps students to connect the past and the present and see the connections between the different disciplines used in the study of society. This will enable the students to see the bigger picture and make Social Studies more meaningful to them.

5.3.1. Implications for Professional Development

At the institutional level, the College of Teacher Education might consider the following to enhance the ability of their teacher educators to effectively integrate technology into their instruction:

1. Conduct a survey to determine the ICT profiles of the teacher educators. The result of the survey can be a basis for developing a faculty development plan that will enhance their TPACK.
2. Conduct a regular Learning Action Cell where instructors of technology for teaching and learning can introduce to the members of the faculty the latest educational technologies that they can apply in teaching social studies.
3. Conduct seminars and workshops for both teacher educators and students on technology integration.
4. Train the teacher educators on contextualized pedagogy as this instructional approach is seen to match the aims and objectives of Social Studies Education.
5. Benchmarking activities may be done so that the College may learn from the best practices of other TEIs.

5.3.3. Implications for Further Study

This study is an initial attempt to develop a TPACK instrument for Social Studies by modifying the Survey of Preservice Teachers' Knowledge of Teaching and Technology developed by Schmidt et al. (2009) and the Technological Pedagogical Content Knowledge for Twenty-first Century Skills questionnaire developed by Valtonen et al. (2017). Future research may focus on subjecting the instrument to reliability testing. Second, explore the use of performance assessment measures to complement the self-report measure to address the limitations of using self-report measures and to better assess the TPACK of preservice teachers. Finally, the instrument can be used also to evaluate the TPACK level of in-service Social Studies teachers who are in the higher career stages in the PPST. Future research may

explore how the content knowledge, pedagogical knowledge, and technological knowledge that is required at higher career stages of a teacher's professional development can be included in the TPACK instrument.

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APPENDICES

APPENDIX A

Comparison of the SPTKTT, TPACK-21, and the Research Instrument for Use in the Study

Schmidt et al. (2009) **54-item SPTKTT Instrument**	**Valtonen et al. (2017)** **34-item TPACK Instrument**	**Adapted version for this study:** **54-item TPACK Instrument** (*in italics are new items*)
TK (Technology Knowledge)		
1. I know how to solve my own technical problems	TK1: I can solve ICT related problems	TK1. I know how to solve ICT-related problems in my Social Studies class teaching.
2. I can learn technology easily.		
3. I keep up with important new technologies.	TK2: I am familiar with new technologies and their features	TK2. I am familiar with the new technologies and their features as applied to the Social Studies classroom.
4. I frequently play around the technology.		
5. I know about a lot of different technologies.	TK3: I know several websites about new technology	TK3. I know several websites about new technologies related to Social Studies.
6. I have the technical skills I need to use technology.	TK 4: I can use new technologies	TK4. I have the technical skills I need to use ICTs in my Social Studies class.
CK (Content Knowledge)		
Mathematics		
7. I have sufficient knowledge about mathematics.		
8. I can use a mathematical way of thinking.		
9. I have various ways and strategies of developing my understanding of mathematics.		
Social Studies		

10. I have sufficient knowledge about Social Studies.		
11. I can use a historical way of thinking.		CK1. I can use a historical way of thinking.
12. I have various ways and strategies of developing my understanding of Social Studies.		CK2. I know how to integrate knowledge from the other disciplines of Social Sciences into my lessons. CK3. I know how to connect my lesson with the current events and issues
Science		
13. I have sufficient knowledge about science.	CK1: I have sufficient knowledge in developing contents in natural sciences	
	CK2: I know the basic theories and concepts of natural sciences	CK4. I know the philosophical and theoretical perspectives in Social Studies. CK5. I know the concepts, facts, and tools in: • History • Economics • Geography • Politics and Governance CK6. I know and understand the following themes which organize the content of the Social Studies curriculum • People, Society, and the environment • Time, continuity, and change • Culture • Rights, Duties, and Citizenship • Power, Authority, and Governance • Production, Distribution, and Consumption • Regional and Global connections
	CK3: I know the history and development of important theories in natural sciences	CK7. I know the history of Social Studies.

	CK4: I am familiar with recent research in natural sciences	
		CK8. I know how to choose materials and resources that will deepen my students' understanding of the Social Studies lessons.
14. I can use a scientific way of thinking.		
15. I have various ways and strategies of developing my understanding of science.		
Literacy		
16. I have sufficient knowledge about literacy		
17. I can use a literary way of thinking.		
18. I have various ways and strategies of developing my understanding of literacy.		
PK (Pedagogical Knowledge)		
19. I know how to assess student performance in a classroom.		PK1. I know how to assess student performance in my Social Studies classroom.
20. I can adapt my teaching based-upon what students currently understand or do not understand.		PK2. I can adapt my teaching based-upon what students currently understand or do not understand.
21. I can adapt my teaching style to different learners.		PK3. I can adapt my Social Studies teaching strategies to different learners.
22. I can assess student learning in multiple ways.		PK4. I can assess my students' learning in multiple ways.
23. I can use a wide range of teaching approaches in a classroom setting.		
24. I am familiar with common student understandings and misconceptions.		PK5. I am familiar with common student understandings and misconceptions about the Social Studies concepts to be discussed.

25. I know how to organize and maintain classroom management.		
	PK1: Guiding students' discussions during group work (2-5 students)	PK6. I can guide students' discussion during group work
	PK2: Supporting students' critical thinking	PK7. I can use a wide range of teaching strategies to develop my students' critical thinking in Social Studies.
	PK3: Guiding students in planning their own learning	
	PK4: Supporting students' reflective thinking	PK8. I can use a wide range of teaching strategies to develop my students' reflective thinking in Social Studies.
	PK5: Guiding students to make use of each other's thoughts and ideas during group work (2-5 students)	
	PK6: Supporting students' problem-solving skills	PK9. I can use a wide range of teaching strategies to develop my students' problem-solving skills in Social Studies.
	PK7: Supporting students' creative thinking	PK10. I can use a wide range of teaching strategies to develop my students' creative thinking in Social Studies.
		PK11. I can link the past, the present, and the future in my Social Studies lessons
		PK12. I can develop and use a variety of traditional and innovative instructional materials in Social Studies.
PCK (Pedagogical Content Knowledge)		
26. I can select effective teaching approaches to guide student thinking and learning in mathematics.		
27. I can select effective teaching approaches to guide student thinking and learning in literacy.		

28. I can select effective teaching approaches to guide student thinking and learning in science	PCK1: In natural sciences, I know how to guide students' content-related problem solving in groups (2-5 students)	
	PCK2: In natural sciences, I know how to guide students' critical thinking	
	PCK3: In natural sciences, I know how to guide students to make use of each other's thoughts and ideas in group work (2-5 students)	
	PCK4: In natural sciences, I know how to guide students' reflective thinking	
	PCK5: In natural sciences, I know how to guide students in planning their own learning	
	PCK6: In natural sciences, I know how to guide students' creative thinking	
29. I can select effective teaching approaches to guide student thinking and learning in Social Studies.		PCK1. I can to select the appropriate teaching strategy to facilitate thinking and learning of a specific concept in Social Studies
		PCK2. I can select assist my students to see the connections between Social Studies and the other subject areas.
		PCK3. I can integrate the five themes of the Social Studies curriculum in my teaching.
TCK (Technological Content Knowledge)		

30. I know about technologies that I can use for understanding and doing mathematics.		
31. I know about technologies that I can use for understanding and doing literacy.		
32. I know about technologies that I can use for understanding and doing science.	TCK1: I know websites with online materials for studying natural sciences	TCK1. I know websites with online materials for teaching and learning Social Studies
	TCK2: I know ICT-applications which are used by professionals in natural sciences	TCK2. I know ICT-applications which are used by professionals in natural sciences
	TCK3: I know ICT-applications which I can use to better understand the contents of natural sciences	TCK3. I know ICT applications which I can use to better understand the contents of Social Studies
	TCK4: I know technologies which I can use to illustrate difficult contents in natural sciences	TCK4. I know technologies which I can use to illustrate difficult content topics in Social Studies.
33. I know about technologies that I can use for understanding and doing Social Studies.		
		TCK5. I know how to determine whether online sources of information are reliable or trustworthy.
TPK (Technological Pedagogical Knowledge)		
34. I can choose technologies that enhance the teaching approaches for a lesson.		TPK1. I can choose technologies that enhance the teaching approaches for a lesson.

35. I can choose technologies that enhance students' learning for a lesson.		TPK2. I can choose technologies that enhance students' learning for a lesson.
36. My teacher education program has caused me to think more deeply about how technology could influence the teaching approaches I use in my classroom.		
37. I am thinking critically about how to use technology in my classroom.		
38. I can adapt the use of the technologies that I am learning about to different teaching activities.		TPK3. I can adapt the use of the technologies that I am learning about to different teaching activities.
39. I can select technologies to use in my classroom that enhance what I teach, how I teach and what students learn.		TPK4. I can select technologies to use in my classroom that enhance what I teach, how I teach and what students learn
	TPK1: I know how to use ICT in teaching as a tool for students' reflective thinking	TPK5. I know how to use ICT as a tool for students' reflective thinking
	TPK2: I know how to use ICT in teaching as a tool for students to plan their own learning	
	TPK3: I know how to use ICT in teaching as a tool for sharing ideas and thinking together	TPK6. I know how to use ICT in teaching as a tool for sharing ideas and thinking together
	TPK4: I know how to use ICT in teaching as a tool for students' creative thinking	TPK7. I know how to use ICT as a tool for students' creative thinking
	TPK5: I know how to use ICT in teaching as a tool for students' problem solving in groups (2-5 students)	TPK8. I know how to use ICT as a tool for students' problem-solving

	TPK6: I know how to use ICT in teaching as a tool for students' critical thinking	TPK9. I know how to use ICT as a tool for students' critical thinking
40. I can use strategies that combine content, technologies and teaching approaches that I learned about in my coursework in my classroom.		
41. I can provide leadership in helping others to coordinate the use of content, technologies and teaching approaches at my school and/or district.		
42. I can choose technologies that enhance the content for a lesson.		TPK10. I can choose technologies that enhance the content of my Social Studies lessons.
		TPK11. I can implement different methods of online instruction in my Social Studies class.
		TPK12. I know how to moderate online interaction with my students
		TPK13. I know how to encourage online interactivity among students.
TPACK (Technology Pedagogy and Content Knowledge)		
43. I can teach lessons that appropriately combine mathematics, technologies and teaching approaches.		
44. I can teach lessons that appropriately combine literacy, technologies and teaching approaches.		
45. I can teach lessons that appropriately combine science, technologies and teaching approaches.		

46. I can teach lessons that appropriately combine Social Studies, technologies and teaching approaches.		TPACK1. I can teach lessons that appropriately combine Social Studies, technologies and teaching approaches.
	TPACK1: In teaching natural sciences, I know how to use ICT as a tool for sharing ideas and thinking together	
	TPACK2: In teaching natural sciences, I know how to use ICT as a tool for students' reflective thinking	
	TPACK3: In teaching natural sciences, I know how to use ICT as a tool for students to plan their own learning	
	TPACK4: In teaching natural sciences, I know how to use ICT as a tool for students' problem solving in groups (2-5 students)	
	TPACK5: In teaching natural sciences, I know how to use ICT as a tool for students' creative thinking	
	TPACK6: In teaching natural sciences, I know how to use ICT as a tool in group work (2-5 students)	
	TPACK7: In teaching natural sciences, I know how to use ICT in teaching as a tool for students' critical thinking	

		TPACK2. I can use technology to create effective representations of content in my Social Studies teaching.
		TPACK3. I can use online tools to assess student learning in my Social Studies class.
		TPACK4. I can create a Social Studies ICT-integrated lesson plan
Models of TPACK (Faculty, PreK-6 teachers)		
47. My mathematics education professors appropriately model combining content, technologies and teaching approaches in their teaching.		
48. My literacy education professors appropriately model combining content, technologies and teaching approaches in their teaching.		
49. My science education professors appropriately model combining content, technologies and teaching approaches in their teaching		
50. My Social Studies education professors appropriately model combining content, technologies and teaching approaches in their teaching.		TPACK5. My Social Studies education professors appropriately model combining content, technologies and teaching approaches in their teaching.
51. My instructional technology professors appropriately model combining content, technologies and teaching approaches in their teaching.		TPACK6. My teachers in Technology for Teaching and Learning appropriately model combining content, technologies and teaching approaches in their teaching.
52. My educational foundation professors appropriately model combining content, technologies and teaching approaches in their teaching		TPACK7. My teachers in the professional education subjects appropriately model combining content, technologies and teaching approaches in their teaching

53. My professors outside of education appropriately model combining content, technologies and teaching approaches in their teaching.		TPACK8. My teachers in the general education subjects appropriately model combining content, technologies and teaching approaches in their teaching
54. My PreK-6 cooperating teachers appropriately model combining content, technologies and teaching approaches in their teaching.		TPACK9. My cooperating teachers appropriately model combining content, technologies, and teaching approaches in their teaching.

APPENDIX B

The Modified TPACK Instrument for this Study

Survey of Preservice Social Studies Teachers
Technological Pedagogical and Content Knowledge – Part I

Thank you for taking time to complete this questionnaire. Please answer each question to the best of your knowledge. Your thoughtfulness and candid responses will be greatly appreciated. Your name or identification number will not at any time be associated with your responses. Your responses will be kept completely ***confidential****.*

DEMOGRAPHIC INFORMATION

1. Name: _____
2. Email address: _____
3. How many times per week do you read newspapers?
   - [ ] Everyday
   - [ ] Four or more times per week
   - [ ] One to three times per week
   - [ ] Never
4. How many times per week do you watch the television for news?
   - [ ] Everyday
   - [ ] Four or more times per week
   - [ ] One to three times per week
   - [ ] Never
5. How many times per week do you listen to the radio for news?
   - [ ] Everyday
   - [ ] Four or more times per week
   - [ ] One to three times per week
   - [ ] Never
6. Aside from newspapers, television and radio, what are your other sources of news?
   _____
7. Check the gadgets you own:
   - [ ] Cellular phone
   - [ ] Desktop computer
   - [ ] Laptop
   - [ ] Tablet
   - [ ] Printer/scanner
   - [ ] Others, please specify _____
8. Mode of accessing the internet (check those applicable)
   - [ ] Post-paid internet service
   - [ ] Pre-paid internet service
   - [ ] WiFi network of the school
   - [ ] Others, please specify _____.

PART I. SELF-REPORT MEASURE

	1 Needs a lot of knowledge	2 Some knowledge	3 Good knowledge	4 Strong knowledge
CK (Content Knowledge)				
CK1. I have sufficient knowledge about Social Studies.				
CK2. I can use a historical way of thinking.				
CK3. I have various ways and strategies of developing my understanding of Social Studies.				
CK4. I know the philosophical and theoretical perspectives in Social Studies. CK4.1. Social Constructivism CK4.2. Ecological Systems Theory				
CK5. I know the basic theories and concepts in				
CK5.1. History.				
CK5.2. Society and Culture.				
CK5.3. Geography.				
CK5.4. Economics.				
CK5.5. Politics and Governance.				
CK6. I know and understand the following themes in the Social Studies curriculum:				
CK6.1. People, Society, and Environment.				
CK6.2. Time, Continuity, and Change.				
CK6.3. Culture, Identity, and Nationhood.				
CK6.4. Rights, Responsibility, and citizenship.				
CK6.5. Power, Authority, and Governance.				
CK6.6. Production, Distribution, and Consumption.				
CK6.7. Regional and International Relations.				
PK (Pedagogical Knowledge)				
Below are some definitions that will help you answer the items in this section: • **Reflective thinking** is the ability to consciously think about one's studying, learning, and skills.				

• **Problem solving** is the ability to solve previously unknown tasks and problems by deduction and by combining previous information and experiences in a new way. • **Creative thinking** is the ability to make use of one's skills and to combine various sources of information to create something new. • **Critical thinking** is the ability to process large amounts of information, to evaluate the reliability of information, and to compare various sources of information.				
PK1. I know how to assess student performance in my class.				
	1 Needs a lot of knowledge	2 Some knowledge	3 Good knowledge	4 Strong knowledge
PK (Pedagogical Knowledge)				
PK2. I can adapt my teaching based on what students currently understand or do not understand.				
PK3. I can adapt my teaching strategies to different learners.				
PK4. I can assess students' learning in multiple ways.				
PK5. I am familiar with common student understandings and misconceptions about Social Studies concepts.				
PK6. I know how to organize and maintain classroom management.				
PK7. I can guide students' discussion during group work.				
PK8. I can use a wide range of teaching strategies to develop my students' critical thinking.				
PK9. I can use a wide range of teaching strategies to develop my students' reflective thinking.				
PK10. I can use a wide range of teaching strategies to develop my students' problem-solving skills.				
PK11. I can use a wide range of teaching strategies to develop my students' creative thinking.				
TK (Technology Knowledge)				
Information and communications technology (ICT) refers to a wide arrange of different devices, such as computers, tablets, smart phones, etc., as well as web-based applications and software, social media services (e.g., blogs, Facebook, YouTube, WhatsApp, Instagram) and online learning environments (e.g., Moodle, Office365)				
TK1. I know how to solve my own ICT-related problems.				

TK2. I have the technical skills to use ICTs in my Social Studies class.				
TK3. I am familiar with the new technologies and their features as applied to the Social Studies classroom.				
TK4. I know several websites about new technologies that are related to Social Studies.				
PCK (Pedagogical Content Knowledge)				
PCK1. I can select effective teaching strategy to guide student thinking and learning in Social Studies.				
PCK2. I can select materials and evaluate resources that will deepen my student's understanding of the lesson in Social Studies.				
	1 Needs a lot of knowledge	2 Some knowledge	3 Good knowledge	4 Strong knowledge
PCK (Pedagogical Content Knowledge)				
PCK3. I can use the thematic approach to help students see the connections between Social Studies and the other learning areas.				
PCK4. I can integrate and apply the seven themes in the Social Studies curriculum in my lesson planning. PCK4.1. People, Society, and Environment. PCK4.2. Time, Continuity, and Change. PCK4.3. Culture, Identity, and Nationhood PCK4.4. Rights, Responsibility, and Citizenship. PCK4.5. Power, Authority, and Governance. PCK4.6. Production, Distribution, and Consumption. PCK4.7. Regional and International Relations.				

PCK5. I can relate the past to current issues and events, and possible outcomes in the future in my Social Studies lessons.				
PCK6. I can develop and use a variety of traditional instructional materials in Social Studies.				
PCK7. I can develop and use a variety of ICT-based instructional materials in Social Studies				
TCK (Technological Content Knowledge)				
TCK1. I know websites with online materials for teaching and learning Social Studies.				
TCK2. I know ICT applications that are used by professionals in the Social Sciences.				
TCK3. I know technologies that I can use to better understand the contents of Social Studies.				
TCK4. I know how to use technologies to illustrate difficult contents in Social Studies.				
TCK5. I know how to evaluate whether sources of information online are valid and reliable.				

	1 Needs a lot of knowledge	2 Some knowledge	3 Good knowledge	4 Strong knowledge
TPK (Technological Pedagogical Knowledge)				
TPK1. I can choose technologies that enhance the teaching strategies for my lesson in Social Studies.				
TPK2. I can choose technologies that enhance students' learning for my lesson in Social Studies.				
TPK3. I can adapt the technologies that I know to different teaching activities in Social Studies.				
TPK4. I can choose technologies that enhance the content for a lesson.				

TPK5. I know how to use ICT as a tool for students' reflective thinking.					
TPK6. I know how to use ICT in teaching as a tool for sharing ideas and thinking together.					
TPK7. I know how to use ICT as a tool for students' creative thinking.					
TPK8. I know how to use ICT as a tool for students' problem-solving.					
TPK9. I know how to use ICT as a tool for students' critical thinking.					
TPK10. I can implement the following methods of online instruction: TPK10.1: Synchronous Instruction TPK10.2: Asynchronous Instruction					
TPK11. I can facilitate online interaction with my students.					
TPACK (Technological Pedagogical Content Knowledge)					
TPACK1. I can teach lessons that appropriately combine Social Studies, technologies, and teaching strategies.					
TPACK2. I can use technology to create effective representations of content in Social Studies.					
TPACK3. I can use online tools to assess student learning.					
TPACK4. I can write an ICT-integrated lesson plan in Social Studies.					

	1 Strongly disagree	2 Disagree	3 Neither agree nor disagree	4 Agree	5 Strongly agree
MODELS OF TPACK					

6. My Social Studies education instructors/professors appropriately model combining content, technologies, and teaching strategies in their teaching.					
7. My teachers in Technology for Teaching and Learning appropriately model combining content, technologies, and teaching strategies in their teaching.					
8. My teachers in the Professional Education subjects appropriately model combining content, technologies, and teaching strategies in their teaching.					
9. My teachers in the General Education subjects appropriately model combining content, technologies, and teaching strategies in their teaching.					
10. My cooperating teachers appropriately model combining content, technologies, and teaching strategies in their teaching.					

Part II. Open-ended Questions

1. What teaching strategies have you used to develop the following skills among your students':
    a. critical thinking

    b. creative thinking

    c. reflective thinking

    d. problem-solving skill

2. Give examples of assessment tools you have used in your class.

3. List some of the websites that you used in teaching Social Studies.

4. List some of the websites that you usually visit to learn about new technologies.

5. List some of the ICT applications that you use to better understand the contents of Social Studies.

6. List some apps and software that you used to make your other tasks in school easier (e.g., checking papers, record-keeping, computing students' grades etc).

7. List some of the ICT applications used by professionals in the Social Sciences that you know.

8. What ICT-related problems did you encounter and how did you solve it?

9. List some of the apps and software that you know that would make it easier for your students to understand the lesson? Were you able to use these apps and software during your teaching internship? If not, why?

10. How do you determine whether sources of information online are reliable?

11. What are the traditional instructional materials that you developed and used during your teaching internship?

12. What are the ICT-based instructional materials that you developed and used during your teaching internship?

13. What online tools did you use to assess your students' learning?

APPENDIX C

Authorization to Use the SPTKTT from Dr. Denise Schmidt

UNIVERSITY OF THE PHILIPPINES

Nineveth Emlano <neemlano@up.edu.ph>

Request permission to use the Survey of Preservice Teachers' Knowledge of Teaching and Technology

Nineveth Emlano <neemlano@up.edu.ph> Sun, Nov 5, 2023 at 11:29 PM
To: "dschmidt@iastate.edu" <dschmidt@iastate.edu>

Dear Dr. Schmidt:

I am Nineveth Emlano, a Master of Arts in Social Studies Education student at the UP Open University. I am currently writing my thesis with the title "Examining the technological, pedagogical and content knowledge of pre-service Social Studies teachers. The study intends to examine the preparedness of pre-service Social Studies teachers to assume the role of a beginning teacher at the secondary level through the use of the Technological Pedagogical and Content Knowledge (TPACK) framework. The study also seeks to determine the enabling factors and barriers to the development of TPACK among pre-service teachers.

In this connection, I would like to request permission to use the Survey of Preservice Teachers' Knowledge of Teaching and Technology. The instrument will be modified to incorporate the content, pedagogical, and technological knowledge expected from a beginning Social Studies teacher at the secondary level. Some items from TPACK-21 developed by Valtonen et al. will also be added to measure the readiness of the respondents for teaching the 21st-century skills needed by the students.

I hope for your kind consideration of my request.

Respectfully,
Nineveth E. Emlano

UNIVERSITY OF THE PHILIPPINES

Nineveth Emlano <neemlano@up.edu.ph>

Request permission to use the Survey of Preservice Teachers' Knowledge of Teaching and Technology

Crawford, Denise A [SOE] <dschmidt@iastate.edu> Mon, Nov 6, 2023 at 10:04 PM
To: Nineveth Emlano <neemlano@up.edu.ph>

Dear Nineveth,

Thank you for your interest in using our TPACK survey. You have our permission to use the survey for your study. Good luck!

Best,

Denise Crawford

Denise A. Schmidt-Crawford

Professor

Director, Center for Technology in Learning and Teaching

School of Education

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Past - President, Iowa Association of Colleges for Teacher Education (IACTE)

Past - President, Society for Information Technology and Teacher Education (SITE)

Apple Distinguished Educator (2003)

[Quoted text hidden]