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Research Article

Pre-service Geography Teachers' Technological Pedagogical Content Knowledge (TPACK) Proficiency: A Student Perspective

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ABSTRACT

Students should be the primary beneficiaries of teachers' TPACK proficiency. This study aimed to investigate the proficiency of pre-service geography teachers in Technological Pedagogical Content Knowledge (TPACK) through the lens of student perceptions. TPACK, a framework that integrates technological, pedagogical, and content knowledge, is crucial for effective teaching in the digital age. By understanding students' perceptions, this research sought to identify areas where pre-service teachers excel and where they might need further development. The respondents of this research were public high school (Sekolah Menengah Atas Negeri/SMAN) students from Langsa City, Aceh Province. The number of respondents involved was 184 students. They came from SMAN 2 Langsa, SMAN 4 Langsa, and SMAN 5 Langsa where the pre-service teacher was placed during their teaching practice. The research method used is quantitative descriptive based on a questionnaire which aims to measure TPACK proficiency in pre-service geography teachers according to student perception. The results of the study showed that pre-service teachers' TPACK proficiency was very good based on the respondents' perspectives, especially in the aspects of pedagogy and geography content knowledge. However, technological knowledge has results at the good level, which is lower than the other two aspects. Based on these results, the recommendation offered is that the technological capabilities of pre-service geography teachers should to be improved to provide a better learning experience for students.

Keywords: TPACK; pre-service teacher; geography education; students' perceptions.

INTRODUCTION

TPACK encompasses the intersection of technological, pedagogical, and content knowledge, enabling educators to skillfully employ technology to support meaningful learning [1]. By developing strong TPACK skills, teachers can create engaging and interactive learning experiences that cater to the diverse needs and learning styles of their students. Through the combination use of pedagogy, content, and technology knowledge, teachers can differentiate instruction, provide timely feedback, and foster collaborative learning opportunities. Moreover, TPACK empowers teachers to model effective digital citizenship practices and critical thinking skills, preparing students to thrive in an increasingly technology-driven world. Student assessments are a valid indicator for measuring teacher performance. Students have more time to observe teacher performance than administrators or principals [2]. Therefore, the primary beneficiaries of a teacher's TPACK skills are the students

themselves [3] [4]. When teachers effectively leverage technology to support instruction, students are more likely to develop a deeper understanding of the subject matter, enhance their problem-solving abilities, and become more motivated and engaged learners. Therefore, it is imperative that teacher education programs prioritize the development of TPACK, ensuring that future educators are equipped with the necessary skills to harness the power of technology for the benefit of their students.

A pre-service teacher program for geography subject in school encompasses a comprehensive training regimen designed to equip aspiring educators with the requisite knowledge and skills to effectively teach geography in the class [5] [6]. This program entails a multifaceted approach, including academic coursework, practical experience, and assessments. TPACK proficiency can be trained in pre-service geography teachers through various courses at universities [7]. Especially courses that are practical and technological. However, the implementation of this will be seen from the teacher's skills in optimizing classroom resources for student learning achievement [8]. Academic coursework covers a spectrum of subjects, spanning geography content, educational theory, pedagogy, and specialized teaching methods tailored to the subject. Field experience is a pivotal component, mandating supervised hours in actual classrooms where pre-service teachers observe, assist, and eventually take on teaching responsibilities under the guidance of a mentor educator [9].

Furthermore, emphasis is placed on curriculum development, empowering pre-service teachers to craft engaging lesson plans and instructional materials aligned with geography standards. They also learn to employ diverse assessment methods to gauge student learning and progress. With the integration of technology becoming increasingly crucial, pre-service programs provide training on leveraging digital resources like Geographic Information Systems (GIS) and interactive maps in geography education [10]. Sensitivity to cultural and environmental issues is fostered, cultivating global awareness and a commitment to sustainability. Towards the program's culmination, pre-service geography teachers undertake a student teaching placement, assuming the role of lead instructor under the mentorship of an experienced geography teacher. Successful completion of the program often culminates in certification or licensure, enabling individuals to teach geography in their respective region or country. Continuous professional development remains imperative for educators to stay abreast of evolving practices and stay attuned to the dynamic landscape of geography education.

The main problem about pre-service geography teacher program is lack of relevancy. The lack of relevance between prospective geography teachers and outdated teaching materials in secondary schools can be addressed through case-method lectures in universities. [11] [12]. Case-method lectures for pre-service geography teachers can provide relevant and actual experiences related to learning problems that occur in schools today. This step can directly improve TPACK proficiency which also has an impact on their teaching skills [13]. When pre-service geography teachers are equipped with modern, updated teaching methods and content, but are provided with outdated materials in high schools, it hinders their ability to deliver effective instruction [14]. This misalignment can lead to difficulties in engaging students and meeting educational objectives. Additionally, it may impede the integration of new technologies and current information, which are crucial for preparing students for the challenges of the modern world. To address this issue, it is essential for educational institutions to ensure that pre-service teachers have access to relevant, up-to-date teaching materials and resources in order to maximize their impact in the classroom.

The relevancy issue between pre-service teachers and obsolete teaching materials can have significant consequences, for instance in the context of GIS (Geographic Information Systems) and remote sensing, which have rapid change in usage or the technology (Singh et al., 2012). If pre-service geography teachers are trained using the latest advancements and software applications in GIS and remote sensing technology, but are provided with outdated or incompatible software in their high school classrooms, it creates a significant barrier. Moreover, the field of GIS and remote sensing is dynamic, with new technologies, techniques, and software updates emerging regularly. If pre-service teachers are not exposed to the most current tools and methodologies, they may be less-prepared to

educate students on the latest advancements and industry practices. This can lead to a skills gap and hinder students' ability to compete in a technology-driven job market.

Nonetheless, the pre-service geography teaching curriculum still does not cover the need for in-depth study of GIS and remote sensing materials. However, in-depth study of GIS and remote sensing is still needed so that pre-service geography teachers can increase students' interest in geospatial technology that is needed by the world of work and industry today [15]. The use of advanced GIS technology can bring real-world experiences into geography classes and encourage student participation in learning. This will have an impact on increasing student understanding of geographic concepts and issues through meaningful learning activities so that students and teachers can learn new content collaboratively [16]. In addition to proficiency in Geographic Information Systems (GIS) and remote sensing, pre-service geography teachers must also possess a strong foundation in pedagogical theory. This theoretical knowledge empowers them to effectively design, implement, and evaluate geography instruction. By understanding the principles of learning, motivation, and assessment, pre-service teachers can create engaging and meaningful learning experiences for their students.

Furthermore, a solid grasp of pedagogical theory enables them to adapt their teaching strategies to diverse learners and to integrate technology seamlessly into their classrooms [17] [18]. Ultimately, a well-rounded pre-service geography teacher, equipped with both technological skills and pedagogical expertise, is better prepared to inspire future generations of geographers. Similarly, a comprehensive understanding of geography science is essential for effective geography teaching. Geography teachers must possess a deep knowledge of both theoretical and applied aspects of the discipline [19]. This includes a thorough grasp of the fundamental concepts and theories related to the geosphere, atmosphere, hydrosphere, and biosphere. Additionally, teachers must be well-versed in the application of geographic knowledge to real-world problems, such as environmental issues, urban planning, and natural resource management. By mastering the breadth and depth of geography science, teachers can provide students with a solid foundation in geographic literacy and critical thinking skills [20].

This matter aligns with the TPACK (Technological Pedagogical Content Knowledge) framework. TPACK emphasizes the intersection of technological knowledge, pedagogical knowledge, and content knowledge [21] [22]. Pre-service geography teachers may possess strong content and technology knowledge. And also, they should have the ability to create High Order Thinking Skills (HOTS) questions to support 21st century learning (Suhendro et al., 2021). For instance, in the context of teaching land use and land cover dynamics in geography subject, a geography teacher exhibiting a powerful Technological Pedagogical Content Knowledge (TPACK) framework demonstrates an amalgamation of proficient content knowledge (CK), pedagogical knowledge (PK), and technological knowledge (TK). This proficient integration empowers the educator to leverage technology effectively in the dissemination of information pertaining to land use and land cover dynamics.

The essential goal of any educational endeavor is to facilitate student learning [24] [25] [26]. Therefore, the effectiveness of a teacher's TPACK skills should be evaluated based on its impact on student outcomes. Students should be the primary beneficiaries of teachers' TPACK proficiency [27]. In this context, student assessment emerges as a crucial indicator for evaluating the performance of pre-service geography teachers. By prioritizing student perspectives, teacher education programs can gain valuable insights into the effectiveness of their instruction [28]. Students, as active participants and consumers within the educational landscape, possess unique and valuable insights into the quality of teaching and learning experiences. Incorporating student feedback can provide valuable data on the impact of pre-service teachers' TPACK on student learning outcomes [29]. This student-centered approach not only enhances the quality of teacher education but also empowers students to become active stakeholders in their own learning journeys. By valuing student perspectives, pre-service teacher education programs can cultivate a more responsive and student-centered approach to preparing future generations of educators.

Besides, by collecting data on students' perceptions of their teacher's use of learning technology, pedagogical strategies, and content knowledge, researchers can gain valuable insights into the extent to which pre-service geography teachers are able to integrate technology effectively into their instruction [30]. In this research, student perceptions will be measured through surveys to collect data about TPACK proficiency of pre-service geography teacher. By analyzing this data, researchers can identify areas of strength and weakness in pre-service geography teachers' TPACK, and can provide targeted recommendations for professional development. Based on these arguments, this study aims to analyze the level of TPACK proficiency in pre-service geography teachers at the high school level.

METHODS

This study aimed to investigate and analyze the proficiency of pre-service geography teachers in Technological Pedagogical Content Knowledge (TPACK) through the lens of student perceptions. The research method used is quantitative descriptive based on a questionnaire which aims to measure TPACK proficiency in pre-service geography teachers according to student perception. Student perception is very critical to measure TPACK proficiency in pre-service geography teachers. TPACK proficiency affects the learning experience obtained by students. In this research, a combination of survey and descriptive methods was employed to investigate the phenomenon under scrutiny. The survey method involved the distribution of structured questionnaires to a targeted sample of participants, allowing for the collection of quantitative data pertaining to specific variables of interest. Students' perceptions of teacher TPACK have an influence on the students' learning success. Therefore, these questionnaires were carefully designed to elicit responses that would provide insights into the perceptions of the participants regarding the proficiency of pre-service geography teacher in TPACK [2] [31]**.** The survey instrument was pre-tested to ensure the validity and reliability of the research questionnaire. Complementing the survey method, a descriptive approach was adopted to provide a comprehensive overview and contextualization of the collected data. The research data is calculated as a percentage for each answer given by the respondents. Each questionnaire item is given five choices, i.e. strongly agree (SA), agree (A), neutral (N), disagree (D), and strongly disagree (SD). These choices are given based on students' perceptions of the teaching quality that given by pre-service geography teacher. The research framework can be seen in figure 1.

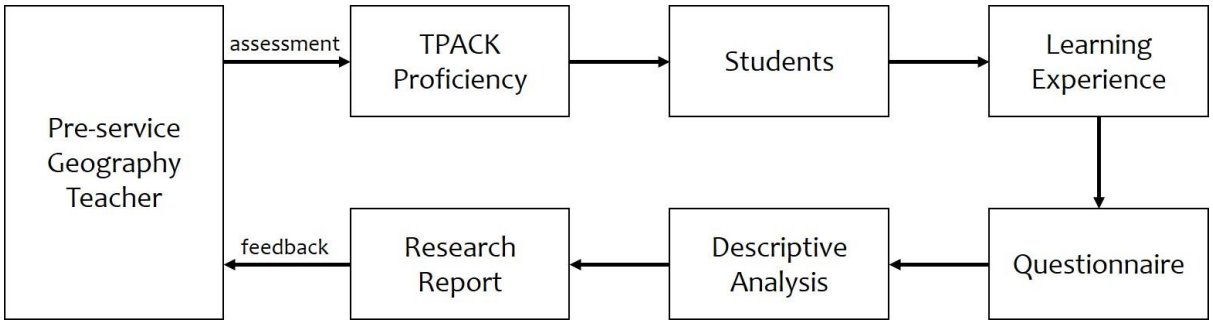


Figure 1. Research Framework

The research sample consisted of 184 students enrolled at Langsa City public high school (Sekolah Menengah Atas Negeri/SMAN). The research sample was students from three schools in Langsa, i.e. SMAN 2 Langsa, SMAN 4 Langsa, and SMAN 5 Langsa. The sample determination was carried out using a random sampling technique representing classes X (15-16 years old), XI (16-17 years old) and XII (17-18 years old). The details of the samples or

respondents in this study can be seen in table 1. This specific group was selected to participate in the study due to its relevance to the research objectives. The choice of Langsa City public high school as the source of the sample was likely influenced by factors such as accessibility, availability of participants, and the school's alignment with the research topic or area of interest. It is important to note that the sample size of 184 students provides a manageable yet statistically significant cohort for data collection and analysis, allowing for meaningful insights to be drawn from the study. The questionnaire utilized in this research comprised a set of 25 structured statement designed to gather specific information from the respondent's perception in geography pre-service TPACK proficiency. The questionnaire consists of three parts, i.e. content knowledge (8 items), pedagogical knowledge (9 items), and technology knowledge (8 items). These questions were carefully crafted to address key aspects relevant to the research objectives and shown in table 2.

Table 1. Research Respondents

Class	SMAN 2 Langsa	SMAN 4 Langsa	SMAN 5 Langsa	TOTAL
X	20	22	21	63
XI	22	18	19	59
XII	19	21	22	62
TOTAL	61	61	62	184

Table 2. Research Questionnaire

NO	CODE	CATEGORY	STATEMENT
1	C1	Content	I understand the geography material very well after listening to the pre-service teacher's explanation.
2	C2	Content	Pre-service teachers can answer questions well during classroom learning activities.
3	C3	Content	I feel that the pre-service teacher can explain the material very well.
4	C4	Content	I gained a good understanding of the correlation of geography with daily life as an Indonesian citizen.
5	C5	Content	I feel that the geography taught by pre-service teachers is very useful for my future career development.
6	C6	Content	I feel that pre-service teachers have broad insight about geography and its application in a real day life.
7	C7	Content	I took the initiative to dig deeper into geography knowledge when the pre-service teacher taught in front of the class.
8	C8	Content	Pre-service teachers always explain the answers well to the geography questions or quizzes given.
9	P1	Pedagogy	I feel the class atmosphere is more intimate if the pre-service teacher teaches in front of the class.
10	P2	Pedagogy	I participate actively in class when the pre-service teacher gives me the opportunity to ask questions or have an opinion.
11	P3	Pedagogy	I do the assignments given by the pre-service teacher seriously and on time.
12	P4	Pedagogy	I feel that pre-service teachers have very good abilities in teaching.
13	P5	Pedagogy	I never feel bored if the pre-service teacher teaches in the class.
14	P6	Pedagogy	I am willing to obey the class rules set by the pre-service teacher (turning off the phone, not chatting, etc.).

NO	CODE	CATEGORY	STATEMENT
15	P7	Pedagogy	It is easier for me to work together in class when the pre-service teacher gives group assignments.
16	P8	Pedagogy	I pay close attention to the explanation of the material presented by the pre-service teacher.
17	P9	Pedagogy	I do not want to miss the in-class meeting when the pre-service teacher is scheduled to teach.
18	T1	Technology	I was impressed with the use of learning media used by pre-service teachers, e.g. Assemblr Edu.
19	T2	Technology	I have a good understanding of the remote sensing materials delivered through the Google Earth by the pre-service teacher.
20	T3	Technology	I am highly satisfied with the pedagogical approach employed by the pre-service teacher, which incorporates the use of learning media such as Google Maps.
21	T4	Technology	The power point or slideshow utilized by the pre-service teacher facilitates my comprehension of geospatial technology concepts.
22	T5	Technology	I enjoy using the website application that my Geography pre-service teacher uses for tests and quizzes, such as Quizziz or Kahoot.
23	T9	Technology	I appreciate my Geography teacher's ability to use different technology to teach, e.g. animated video or learning application in Android.
24	T7	Technology	Pre-service teachers are proficient in using mapping applications such as ArcGIS or Quantum GIS to teach geography content in the classroom.
25	T8	Technology	Pre-service teachers are proficient in using Android-based geospatial applications such as Avenza Maps or SW Maps.

Note: Each statement is responded to by selecting one of five options, i.e. SA (Strongly Agree), A (Agree), N (Neutral), D (Disagree), or SD (Strongly Disagree). All items are favorable statements with high scores for positive responses, and low scores for negative responses.

RESULTS

The research yielded a noteworthy finding, indicating that most students expressed satisfaction with the performance of the pre-service teachers. This positive feedback suggests that the aspiring educators, who were in the process of completing their teacher training program, demonstrated a level of competence and effectiveness in their instructional roles. The specific factors contributing to this satisfaction may include the pre-service teachers' pedagogical approach, communication skills, and their ability to create an engaging and conducive learning environment. Additionally, it is plausible that the pre-service teachers successfully applied relevant content knowledge and teaching methodologies, aligning with the students' learning needs and preferences.

The favorable evaluation of the pre-service teachers' performance is indicative of a successful integration of pedagogical and content knowledge, as well as an effective utilization of teaching strategies [32]. This outcome is encouraging as it reflects positively on the quality of the pre-service teacher program and its impact on the students' learning experiences. Furthermore, the students' satisfaction with the pre-service teachers may also have implications for their own academic and personal development. Students' positive perspectives on the quality of learning provided by teachers have a major impact on students' tendency to pursue a career as a teacher as well [33]. Figure 2 shows students' perceptions

of TPACK proficiency in pre-service geography teachers which have been presented in graphical form.

From Figure 2, the average TPACK proficiency according to students' perceptions is in the good category. This is indicated by most respondents who gave the response "agree" on the geography content knowledge questionnaire items (C1 - C8) and pedagogy knowledge items (P1 - P9). Meanwhile, for the technology knowledge items (T1 - T8), the responses were mostly "neutral". This shows that students' perceptions of pre-service geography teacher TPACK proficiency are in the good category for geography content knowledge and pedagogy knowledge. Meanwhile, for technology knowledge, students considered that pre-service geography teachers were still at the moderate stage.

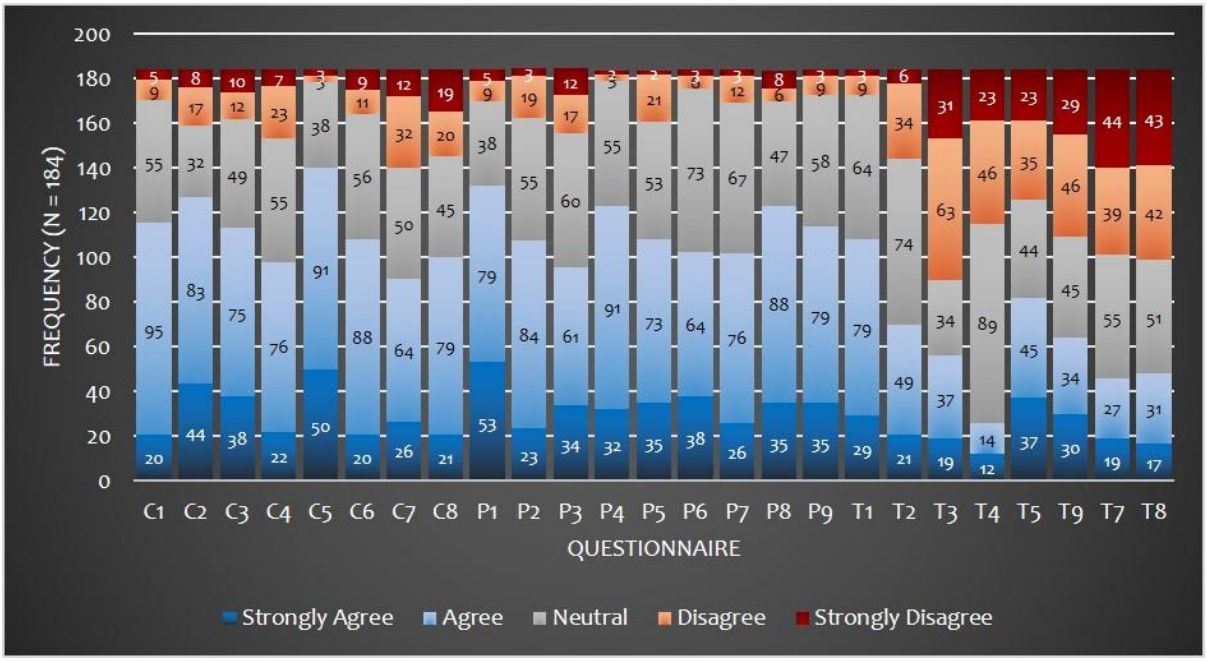
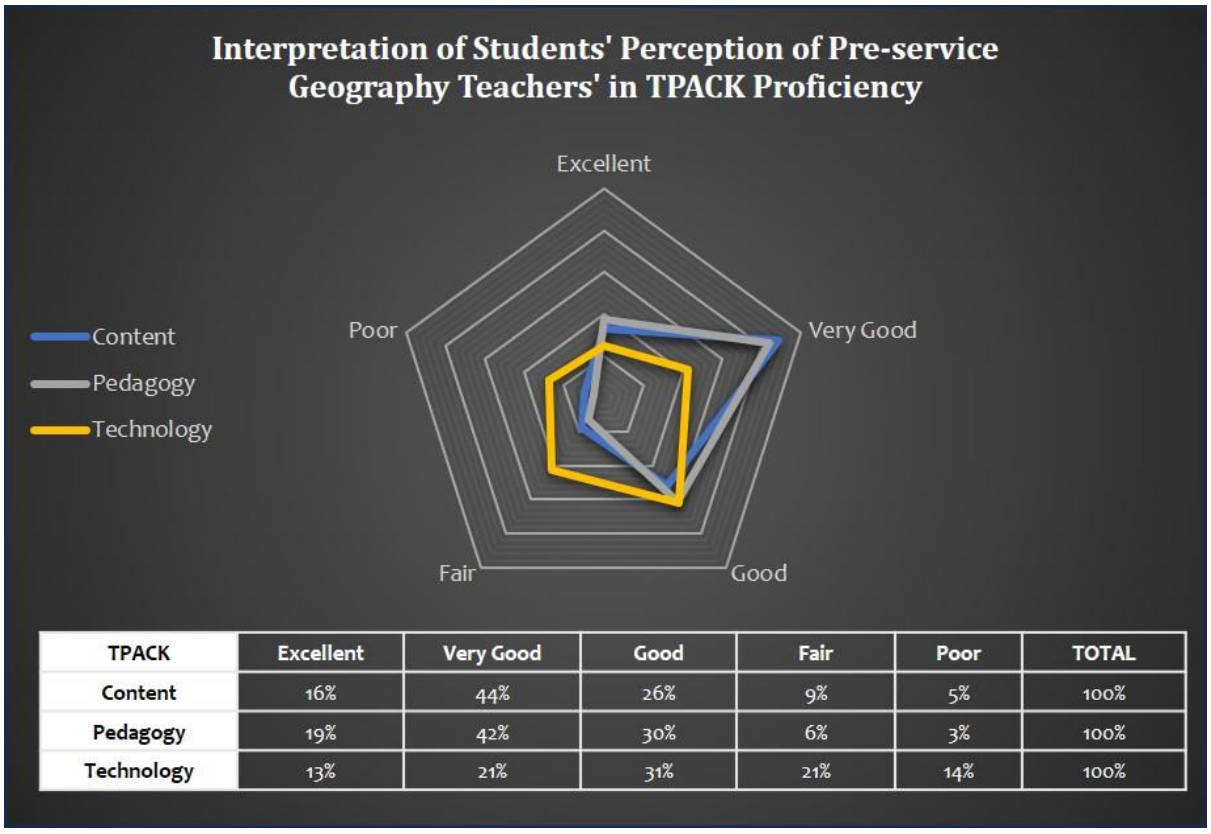


Figure 2. Respondents' perceptions of pre-service geography teacher proficiency in TPACK.

Based the data on the figure 2, to enhance pre-service teacher performance based on the research findings indicating most of the students' satisfaction, several strategic approaches can be considered. Firstly, targeted professional development programs for pre-service geography teachers should be implemented, especially in mastering learning technology. These programs should focus on honing cutting-edge learning technologies such as animated videos, augmented reality, or virtual tour for filed study substitution. Evenmore, applications such as ArcGIS, Quantum GIS, ENVI, and Google Earth Engine need to be trained to pre-service geography teachers so that they can adapt to the latest advances in geospatial technology. Moreover, integrating modern teaching technologies and methodologies into the pre-service teacher curriculum is essential. As evidenced by the research findings, staying updated with current educational trends and technology is critical for effective teaching. Providing access to latest learning technology, such as interactive software and digital resources, can empower pre-service geography teachers to create dynamic and engaging learning environments. Mentorship programs should also be established, connecting pre-service geography teachers with experienced educators who can provide guidance, constructive feedback, and share best practices.

DISCUSSION

The data in figure 2 can be simplified by summing each student's response in the form of a percentage. The questionnaire used is a favorable item. Each item answered with a "strongly agree" response has the meaning "excellent". And each item with a "strongly disagree" response has the meaning "poor". While the "agree" response means "very good", the "neutral" response means "good", and the "disagree" response means "fair". The results of the summation of student responses can be seen in figure 3. Based on figure 3, geography content knowledge in pre-service geography teachers is at a very good level with 44% of respondents answering. Pedagogy knowledge is at a "very good" level with 42% of respondents answering. However, technology knowledge is at a good level with 31% of respondents answering. This information was obtained by observing most of the respondents who gave answers. Therefore, mastery of technology in learning is critical for pre-service geography teachers. Students provide assessments according to teacher performance during classroom learning. This means that this information is closely related to the quality of learning provided by pre-service geography teachers at SMAN 2 Langsa, SMAN 4 Langsa, and SMAN 5 Langsa. Technology is a fast-moving and dynamic aspect of life. Often teachers are late in adopting technology so that they do not want to use it in classroom learning. Therefore, case-method learning is very important to be included in the pre-service teacher in the university curriculum.



TPACK	Excellent	Very Good	Good	Fair	Poor	TOTAL
Content	16%	44%	26%	9%	5%	100%
Pedagogy	19%	42%	30%	6%	3%	100%
Technology	13%	21%	31%	21%	14%	100%

Figure 3. Interpretation of students' perceptions of pre-service geography teachers' TPACK proficiency (N = 184 respondents).

The efficacy of case method learning within pre-service geography teacher education programs can be significantly enhanced through the strategic integration of Outcome-Based Education (OBE) principles. This approach not only elevates the quality of the learning experience for prospective educators but also profoundly impacts their career trajectories and contributes to the overall sustainability of the education sector within a nation [8] [33]. The teaching profession inherently carries a significant social responsibility, extending beyond the confines of the classroom to encompass the broader societal landscape. Consequently, pre-service teacher education programs

must adapt and evolve to equip aspiring educators with the knowledge, skills, and dispositions necessary to excel in a dynamic and demanding educational environment [34]. By embracing an OBE framework, these programs can prioritize the development of specific, measurable, achievable, relevant, and time-bound learning outcomes that align with the evolving needs of the profession and the society they serve. Furthermore, by integrating real-world case method into the university curriculum, pre-service geography teachers can develop a nuanced understanding of the complexities and challenges faced by educators in diverse contexts. Through analyzing real-world scenarios, they can learn to apply theoretical knowledge to practical situations, develop effective pedagogical strategies, and cultivate the essential skills of collaboration, communication, and critical reflection. Outcome-Based Education (OBE) has demonstrably enhanced geography learning by focusing on clear learning outcomes and aligning assessment with these objectives. Implementing OBE in geography learning in the class necessitates a shift from content-focused instruction to a student-centered approach. OBE curriculum implementation in geography directly relates to applying geographical concepts and skills to real-world scenarios by emphasizing learning outcomes that require students to demonstrate their abilities in practical contexts. Instead of solely focusing on theoretical knowledge, OBE-aligned assessments, such as case studies, field projects, and simulations, challenge students to analyze real-world geographical issues, interpret spatial data, and propose solutions. This approach fosters a deeper understanding of geographical concepts by connecting them to tangible situations, enhancing students' problem-solving and critical-thinking skills, and preparing them to address complex challenges in their communities and beyond.

The proposed strategy can be operationalized through a multifaceted approach, one key component of which is the facilitation of independent learning. This can be achieved by leveraging the vast array of online learning resources available, such as Massive Open Online Courses (MOOCs) [35], micro-credential programs [36], and training initiatives organized by local education authorities [37]. These digital platforms offer flexible and accessible learning opportunities that enable educators to acquire new knowledge and skills at their own pace. Also, it can significantly enhance geography teachers' TPAC) proficiency. These platforms offer flexible access to updated geographical content, innovative pedagogical strategies, and emerging technologies relevant to the field. MOOCs can broaden teachers' understanding of advanced geospatial techniques and contemporary geographical issues. Micro-credentials provide targeted professional development in specific technology applications, such as GIS software or remote sensing analysis, validating acquired skills. Furthermore, training initiatives can foster collaborative learning communities where teachers share best practices for integrating technology effectively into their geography instruction, thus strengthening the interconnectedness of content, pedagogy, and technology within their TPACK framework. This combined approach empowers geography educators to create engaging and technologically enriched learning experiences for their students [14]. By participating in MOOCs, for instance, teachers can engage with a global community of learners and experts, fostering a collaborative learning environment. Micro-credential programs provide more targeted and focused learning experiences, allowing educators to develop specific competencies aligned with their professional goals. Furthermore, training initiatives organized by local education authorities can offer tailored support and guidance, ensuring that educators have access to the resources and expertise necessary to implement innovative teaching practices in their classrooms.

This effort was made as a follow-up to the students' perspective on the quality of learning provided by the teacher. Students' perspectives are crucial indicators of teaching quality as they offer direct insights into the learning environment and the effectiveness of instructional practices. Students experience the curriculum and pedagogy firsthand, making their feedback invaluable for understanding what resonates with them and where improvements are needed. Their perceptions can illuminate aspects of teaching that might be overlooked by other evaluation methods, such as the clarity of explanations, the level of engagement, and the perceived relevance of the material. Gathering student perspectives through surveys, focus groups, or classroom discussions provides data on the impact of teaching on student learning, motivation, and overall classroom climate. This

feedback loop allows educators to reflect on their practice, identify areas for growth, and ultimately enhance the quality of instruction to better meet the needs of their learners.

CONCLUSION

Based on the research results, most of the respondent's expressed satisfaction with their instructional abilities from pre-service geography teacher. Pre-service geography teachers have TPACK proficiency at the "very good" level for geography content knowledge and pedagogy knowledge. However, they have lower technology knowledge, which is at the "good" level based on the perception of the students they teach. This indicates that pre-service geography teachers need strengthening in the technology knowledge aspect. This strengthening effort can be done through case-method learning that integrates Outcome-based Education concept with technological developments that are increasing globally. Pre-service geography teachers need training programs to be able to utilize cutting-edge technology for learning, such as animated videos, augmented reality, or virtual tours for filed study substitution. Even more, they need to be influenced to utilize ArcGIS, Quantum GIS, or Google Earth Engine as learning media to improve the quality of geography learning in the classroom. This strategy can be implemented through many efforts, one of which is independent learning through MOOCs, micro-credential programs, or training organized by local education authorities.

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DECLARATIONS

Conflict of Interest

The authors declare no conflict of interest with any financial, personal, or other relationships with other people or organizations related to the material discussed in the article.

Ethical Approval

On behalf of all authors, the corresponding author states that the paper satisfies Ethical Standards conditions, no human participants, or animals are involved in the research.

Informed Consent

On behalf of all authors, the corresponding author states that no human participants are involved in the research and, therefore, informed consent is not required by them.

DATA AVAILABILITY

Data used to support the findings of this study are available from the corresponding author upon request.

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