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Descriptive Survey of Preservice Mathematics Teachers' Perceived Knowledge and Use of Teaching and Learning Materials

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ABSTRACT

This study explores how pre-service mathematics teachers use teaching and learning materials (TLMs) in lessons. It highlights the importance of utilising TLMs effectively to create an engaging math learning environment. Barriers and benefits of integrating TLMs are also examined due to limited pre-service teacher readiness literature. A survey involving 272 pre-service mathematics teachers used a quantitative approach to assess their knowledge, perceived barriers, and benefits of Teaching and Learning Materials (TLMs). Results showed that teachers have moderate TLM knowledge, with Trundle wheels being the most recognised and Abacus the least. The main barriers included time constraints, lack of computer skills, and limited TLM resources. However, teachers acknowledged the benefits of TLMs in boosting student engagement and comprehension of math concepts. The study reveals that pre-service teachers have a moderate level of knowledge about different Teaching and Learning Materials (TLMs), but there is variability in their familiarity with various materials. Barriers to using TLMs include a lack of resources in schools, time constraints, limited computer skills, and difficulties in teaching specific mathematical concepts. The research emphasises the importance of training programs for teachers to incorporate TLMs into their lessons effectively. Addressing these challenges is crucial for enhancing math education and providing students with interactive learning experiences. The findings offer valuable insights for policymakers and educators seeking to improve teacher preparation in TLM use.

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1. INTRODUCTION

Education has several advantages, including a successful career, a high social standing, and self-assurance. Education teaches us to view challenges as opportunities to try new things without fear. Education is the primary cause of prosperous people and developed nations. Thus, education is believed to be the foundation for all future achievements [1], [2]. One of the main concerns for Ghanaian citizens has been the educational system's effectiveness and how it affects children's learning outcomes. The Ministry of Education (MoE) seeks to enhance by applying suitable policy measures. The educational landscape is constantly changing due to the demands and difficulties posed by a society undergoing perpetual change. At the core of this development is the understanding that raising the standard of education requires the efficient integration of teaching and learning resources.

The term "teaching and learning materials (TLMs)" refers to all tangible and nontangible resources that a teacher can employ to carry out a lesson plan and aid learners in meeting learning goals [3]. Materials of any kind used to help teachers carry out activities for teaching and learning in the classroom are referred to as TLMs. The term tangible, as applied in the above definition, refers to the material through which the curriculum's objectives are experienced as provided by the TLMs [4]. TLMs might help a learner bring an experience to life to make learning more engaging, dynamic, and thrilling. Teaching and learning materials come in various formats, including images, realia, items, specimens, computers, workbooks, and textual resources such as textbooks that can affect students' engagement and comprehension in the learning process [5]. Other supplies include whiteboards, flannel or felt boards, felt markers, eyeglasses, portable magnifiers, braille machines, hand frames, styli, braille sheets, bulletin boards, photographs, charts, graphs, maps, big print books, globes, posters, and diagrams, as well as reading stands.

TLMs are indispensable tools in mathematics education, transforming abstract concepts into tangible, accessible student experiences. Mathematical principles often pose challenges due to their inherently abstract nature, making it essential to employ materials that bridge theoretical content and practical understanding [6]. Visual aids and manipulative and interactive technologies create a multisensory learning environment, allowing students to explore mathematical ideas hands-on and visually [7], [8]. These materials offer a concrete representation of abstract concepts, making them more understandable and relatable. For instance, geometric shapes, number lines, or algebraic manipulation enable students to manipulate and visualise mathematical relationships physically, fostering a deeper conceptual understanding. By engaging multiple senses and learning modalities, teaching and learning materials demystify complex mathematical concepts and cater to diverse learning styles, promoting inclusivity and ensuring students can grasp and internalise mathematical principles with greater clarity and confidence. In essence, these materials serve as powerful conduits for transforming the often-daunting world of abstract mathematics into a more accessible and enriching educational experience [9].

Despite the acknowledged significance of teaching and learning materials in enhancing mathematics education, there is a noticeable gap in the literature—a shortage of comprehensive research addressing the preparedness of preservice teachers to effectively utilise these invaluable resources [10]. While the transformative potential of these materials in making abstract mathematical concepts tangible has been highlighted, understanding the extent to which future educators are equipped with the knowledge and skills to leverage them in their teaching practices remains a critical and underexplored aspect [11].

This research gap is particularly pronounced in the background of teacher preparation programs for preservice teachers, where the pivotal transition from theoretical pedagogical knowledge to practical application in the classroom occurs. By delving into this uncharted territory, the study seeks to uncover insights that can inform targeted interventions and improvements in teacher education, ensuring that preservice teachers are adequately equipped to harness the full pedagogical potential of teaching and learning materials in the teaching of mathematics [12].

Preservice teachers find themselves at a pivotal stage in their developmental journey, standing at the crossroads where theoretical knowledge gained through teacher education programs converges with the practical demands of the classroom. This juncture represents a crucial transition, requiring aspiring educators to seamlessly bridge the gap between pedagogical theories acquired in academic settings and the dynamic realities they will encounter in actual teaching environments. During this phase, the conceptual foundations laid in teacher education programs are tested as preservice teachers embark on the challenging task of translating abstract educational principles into effective, hands-on instructional strategies [13].

This transitional period holds particular significance for integrating teaching and learning materials in teaching mathematics, as it necessitates a nuanced understanding of how to adapt theoretical knowledge to student's diverse needs and learning styles. As these educators-in-training stand on the brink of their professional careers, the extent to which they are prepared to navigate this intersection between theory and practice, especially in utilising teaching and learning materials, becomes a focal point in ensuring the effectiveness and innovation of future mathematics education. Understanding the depth of their knowledge regarding teaching and learning materials in the specific domain of mathematics is essential for ensuring the efficacy of their future teaching practices. Previous studies have often provided a broad overview of preservice teacher preparation. Still, there is a noticeable gap in research explicitly dedicated to the nuanced understanding of teaching and learning materials within mathematics education [14].

This research utilised a quantitative descriptive survey to comprehensively examine preservice mathematics teachers' perceptions and practices concerning integrating teaching and learning materials in mathematics classrooms. The study's outcomes are anticipated to offer valuable insights beneficial to teacher education programs, curriculum developers, and policymakers. The identified gaps in preservice teachers' knowledge are intended to serve as a basis for targeted interventions to enhance their readiness to effectively utilise teaching and learning materials. The research aspires to enhance foundational mathematics

education by addressing these gaps, potentially positively impacting students' learning outcomes. The timeliness and urgency of this study lie in its potential to ensure the competence of future educators and increase the overall quality of mathematics education in schools [15]. While the theoretical benefits of TLMs are widely acknowledged, a practical gap exists in translating this knowledge into effective teaching strategies. The study aims to examine the real-world difficulties that preservice teachers face in incorporating TLMs into their mathematics instruction and propose practical solutions for bridging this gap.

Problem statement

While the theoretical benefits of TLMs are widely acknowledged, a practical gap exists in translating this knowledge into effective teaching strategies. The study aims to look at the real-world difficulties that pre-service instructors face in incorporating TLMs into their mathematics instruction and propose practical solutions for bridging this gap.

Research Objectives

This study analyses pre-service mathematics teachers' knowledge of using teaching and learning materials, perceived barriers, and benefits of integrating teaching and learning materials in mathematics lessons.

The specific objectives of the study include; To find out

1. preservice mathematics teachers' knowledge of TLMs for teaching mathematics.
2. perceived barriers Pre-service mathematics teachers face using TLMs in teaching mathematics

Concept of Teaching and Learning Materials for Teaching Mathematics

All the tools educators employ to offer education are collectively called teaching materials. A collection of human and nonhuman resources that a teacher can utilise in teaching and learning scenarios to support the achievement of targeted learning objectives is known as TLMs [16]. These resources can include both animate and inanimate items. Despite their diverse forms and dimensions, instructional resources all share the ability to support student learning. However, there are many types of teacher resources available. The term "teaching materials" is most frequently used to describe tangible examples, such as worksheets or manipulatives (learning aids or games that students can use to practice new skills, such as counting blocks). Atepor et al. [17] assert that mastery of a subject is not enough to teach it. Therefore, researchers now consider pedagogical content knowledge (PCK) as significant as subject-matter expertise. PCK depends on a teacher's subject matter expertise and how this expertise is transformed into different formats so that students in various settings can comprehend the material. According to Van Driel [18], PCK is defined as teachers' knowledge and beliefs about the goals of teaching subjects to students at different levels, their knowledge of students' prior knowledge and potential misconceptions, their knowledge of the curriculum, which includes relationships between subjects, and their knowledge of various instructional strategies and representations. PCK consists of four major dimensions: subject matter knowledge determined by teaching goals,

students' knowledge of the subject matter, knowledge of instruments to be used in subject matter teaching, and knowledge of instructional processes [19].

Mathematics teaching aids include 3D models, math puzzles, charts, tables, videos, and similar materials [20]. Since mathematics is commonly perceived as challenging, using various instructional techniques in the classroom is essential to ensure students fully grasp the material. Utilising instructional resources such as textbooks, manipulatives, technology tools, and (physical or digital) models facilitates the teaching and learning of mathematics. It makes the subject more engaging, easier to understand, and directly tied to real-world applications. To make it easier for teachers to teach mathematics, educators, teachers, and policymakers must work deliberately to make teaching and learning resources available. Numerous mathematics topics in primary, junior, and senior high schools are connected to the environment. How the teaching and learning resources are arranged for those classes is good. Teachers can communicate clearly, compellingly, and successfully using instructional materials. Teaching resources simplify and enhance the learning experience of mathematical ideas.

Teaching learning materials (TLMs) make mathematical concepts simple and enjoyable. They also make the teacher's presentation more engaging and captivating while simplifying the subjects. For example, students learn more efficiently. An innovative classroom, such as a smart classroom, allows teachers to assemble many teaching-learning resources online [21]. Textbooks, worksheets, multimedia resources, and hands-on materials are examples of TLMs that may be used in primary, junior, and senior high schools [22].

Textbooks are large books that cover a specific subject or curriculum area in depth. Textbooks can be used to provide background information to students as well as structure the learning process. Worksheets are pieces of paper with questions or activities for students to complete. Worksheets can help to reinforce concepts and skills learned in class. Videos, interactive games, and online resources are examples of multimedia resources that can supplement classroom instruction. Multimedia resources can be a powerful tool for engaging students and assisting them in visualising complex concepts. In addition to manipulatives such as puzzles or blocks, hands-on materials can also contain experiments that allow students to practically apply what they have learned. Using hands-on materials can be an effective strategy to support students in understanding abstract ideas.

Ready-made Teaching Learning Materials

Teachers in many schools have access to a variety of premade TLMs. Most schools have science and math kits available. These instruments and equipment are highly beneficial to both teachers and students. These ready-made TLMs include abacuses, Dane's blocks, Unifix cubes, rulers, compasses, geometry boxes, number line models, tangrams, and other tools.

Appropriate Use of Teaching and Learning Materials in Teaching Mathematics

Mathematics is one of the most important subjects taught in schools. The available literature attests to the significance of mathematics in human activities, scientific and

technological jobs, and a range of other occupations in addition to national development [23]. Students, however, struggle to understand mathematics due to its abstract nature. As a result, it is critical to find ways to make mathematics more concrete for students so that they can grasp it more easily. Teaching and learning materials like those listed above are essential for accomplishing this task. The goal and importance of instructional materials are to facilitate learning, make lessons more engaging, and enable teachers to communicate ideas more clearly. Regardless of the significance of instructional materials in mathematics teaching and learning, many scholars worry about the lack of TLMs in schools and, most importantly, how appropriately they are used.

According to a study by Asano et al. [24] on TLM use in upper primary schools, private and public schools possessed a sizable amount of TLM in science but misused it. The high cost of some TLMs and the lack of funding for government schools to buy them are further reasons the study revealed that private schools have more TLMs than public schools. In addition, inexperienced teachers damaged some of the TLMs whenever they used them.

The fact that teaching and learning materials (TLMs) make courses more applicable and practical when used properly is a major justification for why educators must incorporate TLMs into their curricula [25]. They do not learn abstract concepts but engage with the materials. Teachers also save time by explaining topics with fewer words. For example, a picture conveys anger more effectively than words alone. One benefit of using teaching and learning resources is that they help pupils retain what they have learned for longer. The instructional materials enable students to engage with the lesson, as stated by Karakış et al. [26]. Interaction between the teacher and students occurs during the presentation of materials; questions are welcomed from both parties. Students can actively engage in class through conversations regarding the teaching materials utilised.

When properly employed, these resources can reinforce content presented in other media, connect students with their environment and culture and that of different cultures, and perhaps engage students who may not always respond well to textual materials. Students become more engaged and attentive while learning with items and pictures since they can feel and interact with their studies immediately. Ramadlani and Wibisono [27] found that children taught using objects also have greater levels of visual literacy.

Student-teachers can deliver their lessons creatively and successfully using teaching and learning materials. The media can assist students in developing the right attitude towards instructional information when appropriately selected and integrated. Additionally, there is potential for improvement in the trainee teachers' classroom interactions with students. Using media can improve trainee teachers' proficiency in handling, producing, and designing media. Using media, aspiring educators can affect students' attitudes, promote self-motivation, illustrate related elements and concepts, draw attention to specific subjects and ideas, promote relevance and legitimacy, and enhance comprehension. Educators can impart greater intensity when accessing teaching and learning resources. According to Kaku and Arthur [28], Vigor indicates brevity with exactness, claiming that delicate and profound thoughts "can be communicated with the faintest shades of meaning shown through media." Teaching and learning resources are

unquestionably crucial to modern scholarly efforts. This is particularly true in the initial years of learning when using audio-visual aids, which helps students acquire more than just facts [29]. Despite its significance, how teachers execute it see it affects how media is used in the classroom. Learning experiences involving the student physically and offering tangible examples are generally retained longer than abstract experiences such as attending a lecture. Images or complex computer simulations in a presentation are examples of how teaching and learning resources can aid in adding elements of reality.

Backfisch et al. [30] stated that the efficient use of teaching-learning resources, such as wall charts, diagrams, photographs, and pictures, can improve the quality and efficacy of teaching. This is in accordance with Ghana's new structure and content of education. Across all pretertiary levels, the use of instructional resources is essential. Good communication between the teacher and the students is necessary for effective teaching. Despite being the most straightforward method of delivering education, spoken instruction is inherently abstract. According to Westwood [31], trainee teachers need instructional media to support them in communicating with students of different skills and potential levels so that students' needs can be met according to their abilities.

It is evident from the discussion that teaching and learning materials (TLMs) allow students to grow in understanding and knowledge by offering a range of practical, developmentally appropriate skills and helping students acquire symbolic knowledge by putting their experiences into representation. Prospective teachers must master the creation of fundamental TLMs and the usage of teaching and learning resources to guarantee the regular use of TLMs in their lesson plans.

Preservice Mathematics Teachers' Knowledge of the Use of TLMs in Teaching Mathematics

Integrating many different kinds of specialised knowledge is necessary for complex teaching practices. Since educators must apply intricate knowledge structures in various situations and circumstances, teaching might be considered an ill-structured discipline [32]. Teachers work in highly dynamic and complicated educational environments, requiring them to continuously adapt and evolve their understanding. Therefore, it is essential to have expertise from various fields, including subject matter knowledge, knowledge of student thinking and learning, and knowledge of using instructional technology. Teaching and learning materials are widely defined as items that have been didactically modified so that the teacher can utilise them to help the students understand the material. These are all technology resources that have been carefully created and are meant to be used during the teaching and learning process. They comprise non-electronic materials (printed and non-printed objects) and electronic materials (computers, digital media, or the internet). In addition to teachers' direct instruction and other learning activities, electronic and non-electronic materials are vital to the teaching process since they provide students with an additional source of knowledge.

The role of the teacher is pivotal in effectively integrating TLMs (technology) into classroom instruction, as they directly influence the selection of optimal instructional strategies for students. As teachers serve as the primary influencers of instruction within

the classroom, it is imperative to support them in acquiring technological proficiency to enhance the educational experience of diverse students [33], [34], [35]. Numerous researchers concur that leveraging teaching and learning materials for instructional purposes can enhance student learning outcomes and equip educators with a powerful means of delivering content [36].

Perceptions Preservice Mathematics Teachers Have about the Benefits of Integrating TLMs into a Mathematics Lesson

There are several inherent benefits to using teaching and learning materials by student-teachers during teaching practice. First, encouraging and assisting student learning requires the effective use of TLMs. Second, employing TLMs allows topic matter to be chosen and arranged with more excellent care. Consequently, preservice teachers can teach subject matter in a more structured, consistent, targeted, and well-defined manner, increasing the quality of education they provide. Third, because learners of different capacities can receive the same training and their unique variances can be accommodated through TLMs, the delivery of instruction by preservice teachers can become much more standardised. Additionally, practice teaching with the use of teaching and learning resources can significantly enhance the interest and pleasure of the learning process. Among other things, utilising special effects and altering the pictures might assist students in staying engaged.

Interactions in the classroom can also be interactive. If instructional design incorporates concepts such as stimulus variation, feedback, reinforcement, and learner participation, teaching and learning materials can also promote interaction among students, between students and teachers, and from teachers to students [36], [37].

Preservice teachers believe that instructional resources reduce teaching time since they only require a brief amount of time to provide substantial knowledge, according to Lapitan Jr et al. [38]. They might be employed to determine requirements and prompt inquiries from pupils. To develop students' creative potential, it is possible to arouse, retain, and pique their attention. Preservice teachers believe that instructional materials guarantee the employment of classroom-focused communication strategies overall. Therefore, it is essential to support, motivate, and encourage learners to continue learning and begin learning [39].

2. METHOD

The research approach for this study was quantitative. The researchers used the survey method for data gathering and analysis. Considering the study's goals and the researcher's overall research objectives, the choice to employ this method was made. The significance of this approach lies in its ability to gather copious volumes of data, which can subsequently be statistically examined to discern patterns and trends. This method is beneficial for testing hypotheses and making predictions based on statistical models. Additionally, quantitative research can provide more objective and reliable results than qualitative research methods that rely on subjective interpretation. Specifically, the researchers employed a descriptive survey design. This kind of data analysis yields

extensive findings. According to Zou and Xu [40] and Stalmeijer et al. [41], a study's goal is to comprehend the subject thoroughly, its context, and the intricacy and significance of the issue. This research design provides a comprehensive understanding of complex phenomena. The actual population of preservice teachers was 512. Out of this population, 272 preservice mathematics-related teachers were purposively sampled for the study. This sampling technique was chosen because the preservice teacher trainees in their final year have undergone teacher education training and are familiar with teaching and learning resources. The researchers used a 23-item questionnaire to solicit information regarding preservice teachers' knowledge of using teaching and learning materials. The data collected was analysed using descriptive statistics.

3. RESULTS AND DISCUSSION

3.1. Results

The research questions were analysed using SPSS, which utilised percentages, means, and standard deviations.

Research question one:

What is the pre-service mathematics teachers' knowledge of TLMs?

Preservice mathematics teachers' knowledge of TLMs.

Research question one aimed to examine some instructional resources used in mathematics instruction. To that end, questionnaires, including some instructional material names, were distributed to preservice mathematics teachers, asking them to indicate whether they were familiar with them.

Table 1. Knowing the following TLMs in teaching mathematics

Items	Mean	SD
Diene's blocks	1.51	0.636
Attribute blocks	2.49	0.636
Abacus	1.42	.697
Geoboard/GeoDot	2.52	.716
Trundle wheel	2.59	.594
Dominoes	2.53	.701
Pattern blocks	2.09	.775
Cuisenaire rods	1.65	.836
Rekenreks counting frames	2.27	.746
Place value blocks or base ten blocks	2.20	.802
Unifix cubes	1.83	.746
Dice	2.09	.775
Geometric Solids	1.72	.713
Algebraic Tiles	2.57	.649
Tangrams	1.47	.685
Total	2.06	0.714

The results in Table 1 show how the preservice mathematics teacher knew the following TLMs in teaching mathematics, with a mean of 2.06 and a standard deviation of 0.714. The study revealed that Diane's blocks had a mean of 1.51 and a standard deviation of 0.636. A mean of 2.49 and a standard deviation of 0.636 were also noted for the attribute blocks. With a mean and standard deviation of 1.42 and 0.697, respectively, the researcher moved to Abacus. When the researcher moved to Geoboard/GeoDot, he recorded a mean of 2.52 and 0.716, respectively, as the standard deviation. Trundle wheel

and Dominoes had means of 2.59 and 2.53 and standard deviations frames of 0.594 and 0.701, respectively, while Pattern blocks, Cuisenaire rods, Rekenreks counting, and Place value blocks or base ten blocks had means of 2.09, 1.65, 2.27 and 2.20 and standard deviations of 0.775, 0.836, 0.746 and 0.802 respectively. In addition, Unifix cubes, Dice, Geometric solids, Algebraic Tiles, and Tangrams each had means of 1.83, 2.09, 1.72, 2.57, and 1.47, respectively, while their standard deviations were 0.746, 0.775, 0.713, 0.649 and 0.685, respectively.

The results indicate that the Trundle wheel had a mean score of 2.59, and the Abacus Wheel had the lowest mean score of 1.42. This indicated that the preservice mathematics teachers could not identify some TLMs effectively. Preservice mathematics teachers ' lack of awareness of TLMs in teaching mathematics was cited as a critical barrier to their knowledge as an instructional tool. This indicates that the preservice mathematics teachers had no prior knowledge of the TLMs. They had never seen some TLMs or observed other teachers using them in a mathematics lesson. Therefore, the results in Table 1, which show a total mean of 2.06, indicate that the preservice mathematics teacher has a moderate knowledge of TLMs, as stated by Ofori and Dampson (2012), who used a four-point Likert-type scale where 1.00-1.99 denotes low, 2.00-2.99 moderate response and 3.00-3.99 represents high response.

Research Question Two:

This research question concerns the perceived barriers pre-service mathematics teachers face using TLMs in teaching mathematics.

Some Perceived Barriers Preservice Mathematics Teachers Face Using TLMs in Teaching Mathematics.

The purpose of research question 2 was to determine what barrier preservice mathematics teachers would have while attempting to teach mathematics using TLMs. As indicated by the preservice mathematics teachers, the distribution of potential TLMs' usage barriers is shown in Table 2.

Table 2. Preservice perceived barriers to using TLMs in teaching (N=272)

Possible Barriers	Number of respondents	Percentages
Time constraints	228	83.82
Lack of computer literacy skills	214	78.68
Frequent power outage	59	21.69
Lack of TLMs	262	96.32
Lack of in-service training on TLMs	103	37.87
Irregular internet accessibility	156	57.35
Teacher negative attitude	78	28.68
Difficulty in using TLMs to teach some topics in mathematics	259	95.22

The findings demonstrate that preservice mathematics teachers' perceptions are a significant barrier impeding their use of TLMs in lesson delivery. There were 228 time constraints, representing 83.82% of the respondents. Regarding the lack of computer literacy skills, 214 agreed, representing 78.68% of the sample. Concerning frequent power outages and a lack of TLMs, only 59 and 262, accounting for 21.69% and 96.32% of respondents, accepted them as challenges in using some TLMs in teaching and learning mathematics. For irregular internet accessibility, 156, representing 57.35% of the respondents, indicated that it was a barrier, while 78, representing 28.68%, believed that teachers' negative attitudes towards TLMs were also a barrier. Furthermore, 259 respondents, representing 95.22%, expressed that it was challenging to use TLMs to teach some topics in mathematics.

The results suggested that a lack of TLMs in schools was the most significant barrier to preservice in using TLMs in teaching and learning mathematics in mathematics classrooms, with 262 respondents representing 96.32% of the sample. 259 (95.22%) respondents viewed difficulty using TLMs as a barrier. This explains why most mathematics teachers are reluctant to use TLMs when teaching. The least common barrier was frequent power outages, followed by teachers' negative attitudes toward using TLMs, representing 21.69% and 28.68% of respondents' views.

3.3. Discussion

Despite the use of TLMs in lesson delivery and the importance attached to their usage at all levels of education in Ghana, preservice mathematics teachers do not seem to know most of the TLMs and have not used them in their lesson delivery during their off-campus teachings. Thus, the study made a finding on the knowledge of pre-service mathematics teachers, having moderate expertise on some of the TLMs in teaching and learning mathematics with a total mean of 2.06 and a standard deviation of 0.714, depicting moderate knowledge of TLMs. This was made clear by the study's findings, which showed that the preservice mathematics teachers were unaware of the TLMs beforehand and had neither used nor seen several of the TLMs in mathematics lessons before. Again, regarding their usage of TLMs, Pre-Service Mathematics Teachers possess a fair knowledge with a total mean of 2.78 and a standard deviation of 1.1. The outcome of this research aligns with the conclusions of Mwingirwa's investigation [42]. Mwingirwa conducted a study titled "Preparedness of mathematics teachers in transforming the teaching and learning of secondary school mathematics, a Case of Tigania East District, Kenya." This finding validates the findings of Şimşek and Yazici [43]. Şimşek and Yazici conducted a study titled Examining the Digital Learning Material Preparation Competencies of Pre-Service Mathematics Teachers. The findings also showed that preservice teachers' abilities to construct digital learning materials were deficient.

4. CONCLUSION AND RECOMMENDATIONS

Conclusion

This study's main objective was to ascertain the level of knowledge pre-service mathematics instructors had regarding the knowledge and usage of instructional resources. This led the researcher to learn about the pre-service mathematics teacher's knowledge and usage of TLMs and the obstacles to and advantages of TLMs usage in the classroom. The results of this study allow us to conclude that, although teachers are not all that good at

using TLMs, it is crucial for efficient lesson delivery when teaching and learning mathematics.

Recommendations

The Ministry of Education recommends making various TLMs available to teachers based on the study's findings. This will allow teachers to know and learn how to use them if they do not know their usage. The researchers also recommended that teachers and preservice teachers be given in-service training in the Ghana Education Service about how to use TLMs in teaching mathematics and, for that matter, other subjects since the benefits of using them are enormous. This will motivate teachers to use the TLMs because they will know how to use them appropriately and efficiently. This will significantly facilitate enhancing student performance and simplifying teachers' jobs.

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