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Investigating the Experiences of Mathematics Teacher Technology Integration in the Selected Rural Primary Schools in Namibia

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ABSTRACT

This qualitative case study investigated the experiences of 15 purposely selected mathematics teachers' technology integration in Namibia's selected rural primary schools. The study used the TPACK framework while data were collected through semi-structured interviews and lesson observation. The study results indicate that mathematics teachers use various ICT available in primary schools in Namibia. While some ICTs are widely used, others are only utilized occasionally. ICT was deemed beneficial, albeit impeded by several challenges in its incorporation into the mathematics classroom. These challenges pertained to a lack of technology training, a lack of technology integration guidelines, and a change of teacher role in teaching. The study underscores the significance of subject-specific technology training to enable mathematics teachers to adopt transformative uses of technology more frequently. The study recommends further research to examine how rural mathematics teachers effectively use technology to engage and actively meet students' learning needs.

KEYWORDS

Developing Country, ICT, Mathematics Education, Rural School, Technology Integration, TPACK

INTRODUCTION

Over the years, it has been noted that some mathematics teachers use technology to develop students' prior knowledge, abilities, and skills by linking mathematical concepts to materials, addressing common understandings, and introducing more advanced ideas. According to Bakirci and Karisan (2018), technology assists teachers in developing abstract ideas. Information and communication technology (ICT) assists teachers in teaching mathematical facts, skills, knowledge, and concepts more effectively while also improving their own and their students' capabilities (Spangenberg & De Freitas, 2019; Resien et al., 2020). ICT also makes it easier to organize, present, and process

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information, enabling ideas to be shared. The National Council of Teachers of Mathematics (NCTM) acknowledges the importance of technology in teaching and learning mathematics. NCTM (2000) states that "Technology is essential in teaching and learning mathematics; it influences the taught Mathematics and enhances students' learning" (p. 5). Integrating technology into their teaching allows teachers to adapt their pedagogical approach and devise novel teaching methodologies that augment students' comprehension of mathematical concepts, proficiency in mathematical procedures, and strategic competence. As a result, this can lead to enhanced student performance in mathematics.

Aceto et al. (2019) define ICT as an extensive term encompassing various technological tools and resources utilized for communication, information creation, storage, management, and dissemination. The integration of technology has transformed the process of teaching and learning by facilitating the teacher's instruction and enhancing the students' learning experience through innovative ways of gathering, organizing, and evaluating information. Furthermore, NCTM emphasizes the significance of technology in mathematics education and suggests that proficient teachers should utilize technology's potential to improve students' comprehension, engagement, and skills in mathematics (NCTM, 2000).

The integration of ICT in mathematics education in Namibian schools has brought forth numerous advantages and opportunities. By implementing this integration, obstacles to capacity building have been reduced, educational accessibility and equity have improved, and enrollment has expanded across all education levels (Barakabitze et al., 2019). This is mainly because ICT provides opportunities for teachers and students to be trained and educated anytime and anywhere. Furthermore, traditional educational culture has been transformed by the incorporation of ICT, enabling timely and location-independent delivery of educational content. As a result, both students and teachers can learn and teach at their own pace, which promotes independence and accessibility (Kaisara & Bwalya, 2021). The outcome has been increased enrollment, decreased learning costs, and the achievement of educational objectives and goals in a convenient manner (Tshiningayamwe et al., 2020; Shambare & Simuja, 2022).

Mathematics is a compulsory subject at all levels of primary education in Namibia, and the government is dedicated to delivering high-quality mathematics education. Several efforts have been made in the past to improve mathematics achievement in schools. The Namibian Ministry of Education (MoE) recognizes the importance of ICT and has integrated it into the education agenda through the introduction of the ICT policy for education in 2005. The policy guides the government, through the Ministry of Education, to undertake initiatives to equip schools with ICT tools that enable teachers to integrate ICT into their teaching. These initiatives include the provision of ICT equipment and software, such as computers, laptops, GeoGebra, MATLAB, and Internet installations in schools. However, despite the adoption of the ICT policy in education and the provision of necessary ICT equipment and software, many mathematics teachers in Namibia still encounter challenges in integrating ICT into their teaching due to factors such as inadequate electricity, high poverty levels, insufficient infrastructure, and inadequate technical skills among teachers. The implementation of ICT in schools has also addressed crucial issues regarding the utilization of ICT in teaching and learning.

Despite the advancements of information and communication technology in various sectors in Namibia, there is a significant gap in the utilization of technology in mathematics education in schools. This gap is particularly noticeable in rural primary schools due to the inadequate availability of ICT infrastructure for teaching and learning. Incorporating ICT in education is widely recognized as a method of reducing the digital divide (Ye & Yang, 2020; Nepembe & Simuja,2023), enhancing accessibility and efficiency, and promoting quality education, which can ultimately lead to improved workforce development and productivity in the country (Kaisara & Bwalya, 2021). Nonetheless, there exists a paucity of empirical research on the experiences of primary school mathematics teachers who integrate technology into their instructional practices in Namibia. As a result, the purpose of this study is to elucidate the current and initial states of technology integration experienced by successful rural primary school mathematics teachers who incorporate technology.

The research aims to achieve its objective by asking the question: What are the experiences of mathematics teachers' integration of technology in rural primary schools in Namibia? In order

to address the research question, this paper commences with a literature review pertaining to the subject matter. Subsequently, a conceptual framework will be introduced to steer the study. The research approach and data-gathering procedures will then be presented, followed by the exposition and analysis of the research findings. Lastly, the paper concludes by recapitulating the findings and proposing suggestions for future research.

TECHNOLOGY INTEGRATION IN TEACHING MATHEMATICS

Academic researchers and practitioners widely recognize the advantages of incorporating technology in mathematics education (Das, 2019; Dockendorff & Solar, 2018; Sawyerr & Agyei, 2022). Das (2019) demonstrated that the integration of technology in mathematics classrooms helps learners understand complex topics, such as probability and sense numbers. Sawyerr and Agyei (2022) also observed that technology offers opportunities for students to simulate different intricate scenarios, processes, and phenomena, generate visualizations, facilitate explorations, link dynamic notations, connect representations, and help with operational symbols. Furthermore, the National Council of Teachers of Mathematics (2000) advocates that technology, used appropriately and responsibly, can enhance deep learning in mathematics. Therefore, teachers are encouraged to incorporate suitable technology in mathematics classrooms to improve the quality of teaching and learning.

Research highlighted the substantial advantages of incorporating ICT in the teaching of mathematics (Gurer & Akkaya, 2022; Kirkok & Karanja, 2018; Stoilescu, 2015; Chong et al., 2005). Utilization of such technologies has a positive bearing on student achievements and engagement across a range of subject areas, simultaneously boosting their social interaction skills. A direct correlation has been observed between increased student engagement and performance improvement (Sawyerr & Agyei, 2022; Gurer & Akkaya, 2022). Importantly, the implementation of these technologies in mathematics classrooms can streamline the comprehension of subject-specific knowledge, along with the understanding of curriculum required standards (Das, 2019; Eickelmann et al., 2017). A study conducted by Corbalan et al. (2010) found that technology can foster creativity in teaching and learning methods, thus providing multiple approaches to content discovery. Furthermore, the role of virtual teaching for mathematics is found to have numerous advantages, such as improved student motivation, engagement, and comprehension when compared to traditional teaching methods.

Understanding the facets of student motivation involves acknowledging how teachers support these elements through two key factors, according to Sawyerr and Agyei 2022). These factors specifically pertain to instructional methods and the enhancement of skills in students and lead to an environment conducive to improved engagement, facilitation of effective learning, and increased motivation for performance. Schunk and Bursuck (2015) further unpack student motivation as a combination of individual self-perception of capability, the capacity to execute responsibilities, and the internal urge to partake in scholastic activities. In the age of continuous technological growth, we anticipate mounting benefits for learners' motivation and mathematical comprehension.

In today's world, incorporating technology into mathematics classrooms is viewed as positively impacting student outcomes and attitudes toward learning. Many researchers, such as Ottenbreit-Leftwich et al. (2001), Stoilescu (2015), Kirkok and Karanja (2018), and Barakabitze et al. (2019) underscore the advantages of integrating educational technology into teaching methods. They assert that technological incorporation not only increases learners' cognitive capabilities but also inspires them, leading to heightened engagement. Furthermore, educational technology integration allows teachers to quickly provide feedback and fosters dynamic and collaborative learning. Correct technology usage in teaching has consistently yielded positive impacts on student achievement. However, underinvestment in ICT infrastructure, largely due to high costs associated with hardware and software, persists as a challenge in numerous instances.

THEORETICAL FRAMEWORK

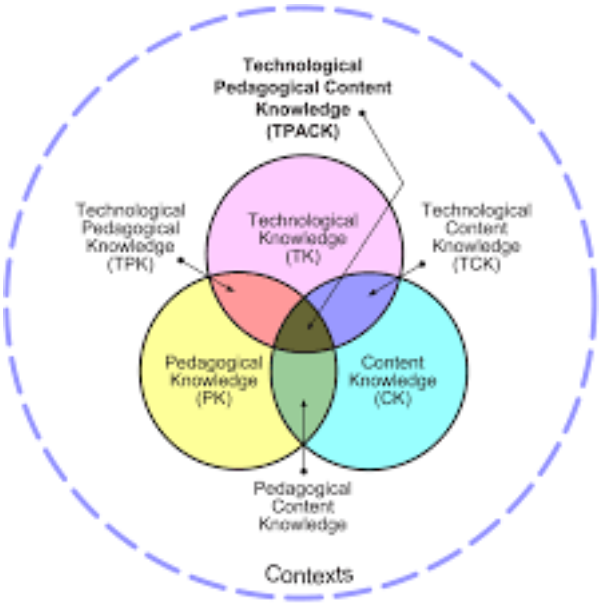
Technological Pedagogical and Content Knowledge (TPACK)

The TPACK theoretical framework (Mishra & Koehler, 2006), which expands on Shulman's (1986) pedagogical content knowledge framework, serves as the foundational theory for this research. TPACK has grown crucial in grasping the expertise, abilities, and knowledge required for teachers to effectively integrate technology into their teaching practices. Koehler and Mishra (2009) suggest that TPACK offers ways technology can bolster effective pedagogy and learning within a specific subject, accommodating the evolutions in content and teaching methodologies produced by technological advances. According to the TPACK framework, for technology to be incorporated effectively, a careful balance of content, pedagogy, and technology must be maintained—these three elements form a complicated and dynamic relationship that shapes teaching methodologies. The theoretical and practical interaction of these knowledge components generates the flexible knowledge needed for successful technology incorporation into teaching. It can be argued that understanding the different components of the TPACK framework (Figure 1) does not automatically lead to the implementation of ICTs in teaching and learning.

The use of technology in education is a multifaceted process. Various factors, including the presence of ICT infrastructure in schools and students' digital abilities, influence the integration of technology in the classroom. Overlooking any factors that impact the adoption and application of ICTs could lead to challenges or even render the implementation of technology in teaching and learning unfeasible.

The TPACK framework includes seven components (shown in Figure 1) and is described as follows: Technology Knowledge (TK): Refers to understanding a range of technologies, from basic tools like pencils and paper to digital technologies, such as the Internet, software programs, interactive whiteboards, and digital video. Content Knowledge (CK): Pertains to the subject matter expertise needed for teaching. Pedagogical Knowledge (PK): Involves knowledge about teaching methods and processes, including classroom management, assessment, lesson planning, and student learning.

Figure 1. TPACK Framework (Reproduced by Permission of the Publisher, © 2012 by tpack.org)



Pedagogical Content Knowledge (PCK): Focuses on knowledge that merges content and pedagogy to improve teaching practices in specific content areas. PCK differs among various content areas. Technological Content Knowledge (TCK): Addresses knowledge of utilizing technology to create new representations for specific content. Technological Pedagogical Knowledge (TPK): Deals with knowledge of how to use different technologies in teaching. Technological Pedagogical Content Knowledge (TPACK): Covers the knowledge necessary for teachers to incorporate technology into their instruction across all content areas. Teachers with TPACK have an inherent grasp of the complex interplay between the three fundamental components of knowledge (CK, PK, TK).

METHODOLOGY

The study was conducted in September 2023 and employed a qualitative case-study research design (Creswell et al., 2007), guided by the interpretive paradigm (Merriam, 2002), to explore deeply rural primary school mathematics teachers' experiences of teaching with technology in Namibia. Phenomenology was chosen as the optimal methodological approach to investigate teachers' experiences integrating technology into instruction. The study is based on the notion that experiences with technologies stem from individual teachers utilizing these technologies in their teaching practices. Moreover, the TPACK framework adopted in this study prominently shapes our methodological approach in this study, guiding us to deeply explore how teachers seamlessly integrate technology with pedagogy and content. It assists with examining how teachers' experiences are shaped by the complex interactions among these three fundamental areas in their technology-infused teaching practices. So, as researchers, we aimed to access teachers' lived experiences by recognizing and setting aside our own preconceptions and attentively listening to the chosen participants' meanings and experiences. The research approach of phenomenology emphasizes the examination of conscious awareness by analyzing the relationship between individuals and technology, making it the most suitable approach for this study (Miller et al., 2018).

In collecting the necessary experiences, the authors perceived teachers as engaged participants who are capable of integrating technology into their teaching settings and reflecting on these practices. They consider teachers to be active players in their occupational and personal domains, adapting to technology and acquiring experiences. This understanding informed the study, which focuses on the experiences of individual teachers. As the study progressed, the focus shifted from individuals to a collective understanding of these experiences. In studying the phenomenon, the authors clearly took account of each teacher's context and individual situation. They also took into consideration the experiences of the participants, either in isolation or in collaboration with others. This well-rounded approach allows a richer understanding of the phenomenon being studied, strengthening it (Simuja, 2018). The study then transitioned from focusing solely on individual experiences to a collective comprehension of shared experiences of the selected teachers' lived aspects. This systematic shift exhibited a significant intuition in this study, highlighting the strength of collective experience over individual ones and further reinforcing the discussion.

Selection of Participants

The study adopted a purposive sampling strategy (Merriam, 2002) and was guided by its capacity to effectively gather data from a specifically chosen group (Creswell & Poth, 2016). In this case, the selected group comprised primary school mathematics teachers, whose critical role in the research was based on their active engagement and informed insights. This research centered on teachers of mathematics who had direct experience and knowledge pertaining to the teaching of mathematics and integration of technology within rural primary schools, specifically in the Okahao Education Circuit, Namibia.

Purposive sampling enabled the selection of teachers with varying experience levels and different levels of technological utilization (Merriam, 2002). This diverse selection ensured the accumulation

of a wide range of perspectives, adding depth and validity to the research data collected. The Okahao Education Circuit, a crucial component of Namibia's education system, is based in the northern part of the country, within the Omusati region. Geographically, it surrounds the town of Okahao, an area characterized by its largely rural population and spread-out settlements. Its position in this rural setting plays a significant role in determining the educational practices and resources available in the schools, which forms an integral background for the present study.

The study's 15 participants were primary school mathematics teachers from six public rural primary schools available in the Okahao Education Circuit in Namibia, with their biographical data displayed in Table 1. Given the relatively small population of Namibia, each education circuit does not feature more than eight primary schools. This is why this study focused on mathematics teachers from six available primary schools within the Okahao Education Circuit. The participants' ages ranged from 26 to 50 years old, with six females and three males included in the sample. All participants were certified teachers registered with the teacher association in Namibia, but their teaching experience levels varied. Five participants had less than 10 years of teaching experience, while ten participants had over 10 years of experience. Each participant had employed technology in their classroom for at least 1 year and worked in a public primary school.

Before carrying out the study, the authors made certain to secure ethical clearance from both the provincial and circuit department of education office and our associated university. Participation in the study was voluntary for the participants, and there was no coercion or deception involved. Participants were free to withdraw from the study at any moment. Throughout the research process, ethical protocols, such as informed consent, confidentiality, anonymity, credibility, and trustworthiness, were adhered to.

Collection of Data and Analysis

All participants in the study signed a consent form voluntarily and received information about the study's purpose before participating. The participants were given the option to choose not to answer

Table 1. The Participants' Characteristics

Participant Code	Gender	Age Range	Years of Teaching Experience	Subject Area
TA	Female	20–30	5	Mathematics
TB	Female	30–40	15	Mathematics
TC	Male	40–50	21	Mathematics
TD	Female	40–50	23	Mathematics
TE	Female	40–50	20	Mathematics
TF	Male	40–50	24	Mathematics
TG	Male	30–40	13	Mathematics
TH	Female	30–40	16	Mathematics
TI	Female	20–30	5	Mathematics
TJ	Female	30–40	4	Mathematics
TK	Female	20–30	3	Mathematics
TL	Male	30–40	8	Mathematics
TM	Male	30-40	7	Mathematics
TN	Female	30–40	9	Mathematics
TO	Female	20–30	5	Mathematics

any of the questions formulated. The authors employed two qualitative methods, semistructured interviews and lesson observations, to execute the methodological processes. While the researchers recognized the perspectives and objectives of these methods for the type of knowledge being pursued, their scope was less straightforward.

The data collection instruments were designed to capture relevant data, and the researchers collected data from 15 mathematics teacher participants. The researchers developed a set of open-ended and semistructured interview questions to address the research question's core themes. The questions were sent to the participants before the face-to-face interviews, which were audio-recorded for transcription purposes. During the interviews, the researchers aimed to mitigate power imbalances, establish rapport and trust, and give the teachers (participants) authority and confidence. The researchers observed all ethical conduct and principles of research.

The researchers arranged observation sessions that were convenient for both the participants and themselves. The nonparticipant observation was used, which involved the researchers being present in the classrooms without interacting with the participants. To capture relevant issues, carefully designed observation guides were used, and observation sessions were scheduled in advance to minimize constraints associated with observations. This method allowed the researchers to understand the participants' feelings about using the virtual learning environment through their speech, gestures, and facial expressions.

This study made use of a thematic analysis method as outlined by Creswell and Tashakkori (2007) to meticulously analyze the data. The process was comprehensive, involving transcription, organization, coding, analysis, and interpretation. This cyclical and thoughtful strategy allowed for the emergence of themes and potential codes throughout the interview process. To manage this process, the second author utilized Microsoft Word for transcribing recorded interviews and NVivo, a credible and adaptable tool, for analyzing the prepared transcriptions and overseeing various qualitative data types.

The authors then sorted the participants' responses into themes or categories, which were subsequently assigned corresponding codes. The data analysis predominantly employed an inductive approach, where emergent themes significantly influenced the foundation of the study's conclusions. This research method, which operates in an iterative and inductive manner, is a common technique applied across numerous studies in the field of educational technology (Creswell & Tashakkori, 2007).

THE STUDY FINDINGS

The gathered data from both semistructured interviews and classroom observation were analyzed multiple times to identify patterns of meaning. This process resulted in the emergence of several themes, which formed the basis of the subsequent data analysis. The study's data revealed the type of ICT used, participants' perceptions (usefulness of technology) regarding the effectiveness of technology in their teaching practices, and the difficulties encountered when integrating technology into the classroom.

The first theme identified in relation to the research question was focused on the types of ICT used by the selected mathematics teachers and available in their schools. It was crucial to determine both the most prevalent and less common ICT used, including those used only on special occasions. Through observation and interviews, all participants reported incorporating some form of ICT in their teaching. The most frequently utilized ICTs were laptops, projectors, WhatsApp, computers, mobile phones, YouTube, interactive whiteboards, radio, and the Internet.

The list of ICTs in Table 2 is not exhaustive, but it does indicate the common technologies used by mathematics teachers in primary schools in the Okahao Education Circuit in Namibia, even if some are only used on special occasions. Specifically, all participants reported using their personal laptops and mobile smartphones. Another commonly used ICT mentioned by participants was the Whatsapp application. The majority of participants reported using Whatsapp frequently, with all reporting that it was used in and outside the classroom. Similarly, participants also listed YouTube

Table 2. List of ICT Used by Selected Participants

Technologies	Commonly Used Technologies	Less Commonly Used Technologies
Laptops	n = 9; 100.0%	
Interactive white board	n = 4; 44.4%	n = 6; 66.6%
Computers	n = 9; 100.0%	
Mobile smartphones	n = 9; 100.0%	
Internet	n = 9; 100.0%	
YouTube	n = 8; 88.8%	
Blackboard collaborate	n = 2; 22.2%	n = 7; 77.7%
Zoom	n = 1; 11.1%	n = 8; 88.8%
WhatsApp	n = 9; 100.0%	
Facebook groups	n = 5; 66.6%	n = 3; 33.3%
SMS	n = 9; 100.0%	
Radio	n = 9; 100.0%	
Telephone		n = 6; 66.6%
Television programs	n = 3; 33.3%	n = 6; 66.6%
Telegram		n = 9; 100.0%
Instagram	n = 2; 22.2%	n = 7; 77.7%
Email	n = 7; 77.7%	n = 2; 22.2%
Skype	n = 2; 22.2%	n = 7; 70.0%
Google Meet		n = 9; 100.0%
MS Team		n = 7; 70.0%
Twitter		n = 6; 85.7%
TikTok		n = 6; 85.7%
WeChat		n = 7; 70.0%
GeoGebra	n = 5; 55.5%	n = 4; 44.4%

content and the Internet as their most commonly used ICT. TC mentioned that: "... I use whatsapp often in my teaching. I use it to communicate with my learners outside of class, answer their questions, and provide them with additional resources…."

Another significant finding of the study was that all participants identified the Internet as one of their most commonly used ICT tools. They expressed the Internet extensively during the interview, recognizing its vital role in modern teaching and its substantial impact on the mathematics teaching and educational sector. Along with the Internet, the researchers in this study also observed various other ICTs in classes, albeit not regularly or frequently. For instance, TB, TO, and TL's classrooms were installed with smart television used to display important information to their learners. TB expressed that:

I have found that using a Smart TV in my classroom has greatly enhanced my teaching. I am able to display and interact with digital content in a way that was not possible with traditional teaching tools…For example, when teaching geometry, I use the TV to display three-dimensional models of geometric shapes and rotate them in real time to demonstrate various properties. I also use the TV

to display digital textbooks, which allow me to zoom in on specific equations and diagrams, making it easier for students to follow along.

Moreover, TA, TM, and TK reported using Ministry of Education software used to record students' records. TE and TI stated that they occasionally use the printer to print tests and exams for students. These findings imply that educational software and printing technology complement conventional mathematics teaching approaches in Namibia primary schools.

Mathematics Teachers' Perception of the Usefulness of Technology in Teaching and Learning

In order to gain a deeper understanding of mathematics teachers' experiences with integrating technology into their classrooms, it was crucial to understand their motivations for using technology and how they perceive its usefulness. Based on the study's findings, participants generally viewed technology as a valuable tool for improving lesson delivery and promoting student learning. However, they also emphasized that technology is still a supplementary tool and cannot replace their role as teachers.

Participants viewed ICT as an aid for delivering lessons by offering multiple modes of representation. TH explicitly stated that technology provides various ways of teaching mathematics concepts, which she considers when planning her lessons. For instance, she discusses making a decision on whether or not to use YouTube videos to teach the concept of three dimensions. TH stated: "…I examine a concept or topic that requires coverage and consider if it is necessary to use technology or rather use other best approach to delivering this information…."

TI sees ICTs as a means to continually change the ways in which mathematics content is presented to learners. She perceived this as having a positive impact on learner understanding, suggesting that technology's versatility and ability to offer multiple modes of representation improve students' comprehension and engagement with the content in her classroom. She emphasizes the potential benefits of incorporating technology into teaching practices and highlights the value of continually exploring new ways to present information to students. TI states that:

I also use educational games to help my students to practice their math skills in a fun and engaging way. For example, there are many online games such as Kahoo! that allow my students to practice their multiplication tables or fractions… These games are designed to be interactive and visually appealing, which helps to keep my students engaged and motivated to learn.

TI believed that when technology is used to present concepts and ideas to students in engaging ways, it becomes more meaningful for both the teacher and the learner. She emphasized the value of using technology to deliver content in multiple ways, which she perceived as enhancing student understanding. By leveraging technologies, such as an educational game's ability to offer different modes of representation, mathematics teachers can create more dynamic and interactive learning experiences that can better engage students and improve their understanding of the material. This highlights the importance of using technology in a thoughtful and deliberate manner in order to enhance mathematics teaching practices and improve student outcomes.

Although the participants in this study consider technology as a supplementary tool in their mathematics teaching practices, the researchers observed that none regard technology as an essential element of their lessons. During one lesson observed, TH used the camera on her mobile phone to capture pictures of a pizza cut into different sizes as a way of illustrating fractions. She utilized the pictures to enhance the timing and provide clear graphics, although she did not suggest that the lesson would have been impossible without the use of the pictures or a digital camera.

Difficulties Encountered During the Integration of Technology in the Classroom

A significant theme identified in the study was the difficulties experienced by the selected mathematics teachers themselves. All participants acknowledged that ICT integration has some difficulties in their teaching and students' learning. The majority of participants expressed concerns regarding the way the ICT was introduced and incorporated into their professional lives. This theme highlights the importance of understanding the varying experiences and perspectives of teachers when it comes to technology integration in mathematics education in primary schools in particular developing countries such as Namibia. While technology can provide valuable benefits to teaching practices and student learning outcomes, it is crucial to recognize and address any concerns or challenges that teachers may face in adapting to and utilizing new technologies in their classrooms.

These participants expressed concerns that despite the widespread integration of ICT in most primary schools in Namibia, most of the workload still falls on the teacher. The choice of viewing technology either as a benefit or a hindrance lies in the person's perspective. The consensus among them was every educator is unique, with different predilections and methodologies for teaching. They should utilize any ICT resources that best enhance their mathematics instruction technique, but only if they deem it fitting. This perspective emphasizes the importance of tailoring technology integration to individual needs and preferences rather than adopting a one-size-fits-all approach. It also underscores the value of acknowledging the importance of teacher agency and autonomy in technology integration in education. TC expresses an example of one of his colleagues:

Despite his dislike for ICTs, he is respected and diligent. He does not utilize the laptop given and requires his students to complete their assessments using traditional methods such as pencil and paper. However, nobody has any negative feedback about him.

TJ and TD expressed apprehension about the impact of ICT on their teaching practices. Their concerns focused on the unexplored impacts associated with the fast-paced integration of technology in primary schools and mathematics classrooms. They argued that the large-scale incorporation of technology into schools is unprecedented, leaving the majority of its aftermath still unknown. TD expressed: "…The ICT are affecting our learners attention and their ability to focus on tasks that involve technology." While TB stated, "Laptops were given to all teachers at our without prior indication of what they could accomplish or what we were expected to do with them…."

TE stated that one day of ICT training offered to teachers is insufficient to cover their needs. TE highlighted that the ratio of qualified trainers to teachers is insufficient to meet the increasing number of teachers in the Okahao Education Circuit. As a result, teachers are often required to use ICT without adequate training. Additionally, TA claimed that the swift incorporation of ICT in the classrooms has created negative consequences, such as the undermining and downgrading of the teacher's role while the spotlight is focused on technology. The two participants worried that there is a lack of comprehensive and ongoing professional development and support for teachers to effectively integrate technology into their teaching practices.

Another concern expressed by all the participants is the need to revise their long-established practices, which have been perfected over time, due to new technologies. They also indicated that they would prefer to retain their current educational practices rather than creating new ones centered on ICT. Additionally, the researchers observed that the optional use of ICT is not entirely optional, as a significant amount of educational content from colleagues and the Ministry of Education is in digital form or related to ICT, creating an obligation to use ICT even if they do not want to or do not see it as necessary.

DISCUSSION OF FINDINGS

In Namibian primary schools and mathematics education, ICT is extensively integrated and used by teachers, although the types of ICT employed may vary. Laptops, projectors, mobile smartphones, and

Whatsapp technologies are widely used, while other ICTs, including learning management systems, are used occasionally or when the situation demands. The reason behind this dissimilarity can be traced to the poor planning for the integration of ICT in schools, which do not dictate which ICT must be present in schools. Findings from the researchers' observations consequently show that the decision on which ICT to invest in falls to the school headmasters in collaboration with teachers and parents, making it a subjective choice. Collaboration and communication among them are crucial aspects to ensure appropriate decisions are made.

Although all participants in this study recognized ICT's effect on their teaching methods, their attitudes toward it varied significantly. Some participants expressed strong support for educational technologies, highlighting their successful integration of ICT into their teaching and practices. Contrarily, others considered ICT merely as a supplementary tool that could not supplant the primary role of the teacher. The view that a teacher remains foremost in the educational process echoes Malik's (2018) findings that observed most teachers in developing countries support traditional teacher-centered teaching methods. Interestingly, Namibia's Ministry of Education also appears to lean toward this viewpoint, with their ICT policy affording teachers the autonomy to decide on ICT usage. However, some educators expressed apprehension about ICT disrupting their current teaching practices, while others questioned its necessity and impact. Therefore, to alleviate these concerns and to promote effective ICT integration, Adarkwah (2021) emphasizes the critical need to offer ample support and training to teachers. As such, their apprehension can be addressed, and they can be empowered with the skills needed to leverage ICT effectively in their teaching practices. The diversity in viewpoints suggests a need for more contextual, flexible ICT integration approaches that respect and harness the professional judgment of teachers. This underscores the importance of a more participatory ICT policy development process, which can incorporate different teachers' perspectives and experiences.

The study findings show some teachers were hesitant about integrating technology in their mathematics classrooms. The insufficiency of technological training for teachers was an issue expressed, as well as the perception of hasty implementation of ICT. They also felt threatened by the minimized role of teachers that may result from ICT use. These sentiments correlate with the views expressed by Shambare and Simuja (2022) and Reisen et al. (2020) regarding teacher training and the potential adverse effects of ICT use. Teachers in this study reported difficulties in adjusting to contemporary technology, holding on to their mathematical educational philosophies and prior teaching experiences. Scholars Gurer and Akkaya (2022) underline the importance of such beliefs and experiences in the context of technology adoption. Resistant attitudes toward change that were reported can form a barrier to the successful integration of ICT in mathematics education, as noted by Adarkwah (2021) and Aceto (2019). Gurer (2022) resonates with these findings and labels these as nonmaterial barriers teachers face when endeavoring to integrate ICT into their teaching approaches.

The study showed that teachers often equate technology integration with a possible loss of control in the classroom. The absence of tailored training sessions to meet their specific needs also contributed to their resistance. Additionally, they felt that the quick pace of technological change left them feeling left behind and struggled with the persistent need to upgrade their skills. The speed of ICT implementation also seemed to overshadow the importance of pedagogy, which they found concerning.

RECOMMENDATION FOR PRACTICE

The findings of this study underline the importance of additional training and resources for educators who hold apprehensions about incorporating ICT into the mathematics classroom. Responding to teachers' reservations and providing them with the necessary skills to effectively integrate technology into their teaching practices is crucial. Furthermore, it is essential for educational policymakers to consider the perspectives of all educators, including those hesitant about using ICT, and ensure that technologies are introduced gradually with enough support. The ultimate objective should be fostering

an effective, purposeful use of ICT in primary education while also addressing any potential issues or obstacles that may come up during the transition.

LIMITATIONS FOR STUDY

This study offered a case perspective on the experiences of rural primary school teachers incorporating technology into mathematics education within the Okahao Educational Circuit in Namibia. While teachers disclosed the ICT employed within their pedagogical practices, they offered scant details regarding their actual efficacy in enhancing student learning. Furthermore, the study's results did not provide an explicit degree concerning the impact of technology integration on students' learning outcomes. As such, it is imperative for subsequent research to explore the methodologies rural mathematics teachers utilize for the effective application of technology to stimulate and adequately address students' learning needs.

The findings of this study echo the need for a well-rounded inquiry into the constituents that may govern the successful integration of ICT into mathematics education in rural Namibian institutions. Future exploration should aspire to comprehend teachers' attitudes toward leveraging ICT within teaching and learning processes, necessitating a comprehensive sample size.

CONFLICTS OF INTEREST

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Clement Simuja's research uses critical social theories and philosophical thinking to examine the ways in which historically underserved groups appropriate information and communication technologies (ICT) to improve their life chances. Areas of study include use of ICT in schools to support economically oppressed communities, the relationship between ICT in the school and the education project, the under-representation of minorities in use of ICT in schools for development, personal identity performance in online spaces, and the use of ICT for political activism and social justice, philosophy of technology(questioning "is technology neutral or is it value-laden?"). Teaching and learning Information and Communication Technologies, Application Development, Learning Technology Development, Research Design, Philosophy of technology, Philosophy of Education.

Hilya Shikesho is a Masters in Education scholar at Rhodes University. With a wealth of experience in teaching with digital technology in secondary schools, Hilya has honed her expertise in leveraging technology to enhance the learning process. Her research focuses on the practices that facilitate or hinder the development of technological pedagogical content knowledge among rural secondary school teachers. By investigating these practices, Hilya aims to gain a deeper understanding of the challenges faced by educators in rural areas when integrating technology into their teaching methods. Through her work, Hilya aspires to identify effective strategies and approaches that can empower rural teachers to harness the potential of technology in their classrooms. She is passionate about narrowing the digital divide and ensuring equitable access to quality education for all students, regardless of their geographical location.