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Challenges for teachers in integrating ICT into geography teaching and promoting map reading skills in secondary schools in Namibia

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Abstract: The study examines how teachers face challenges in integrating ICT into geography classes and promoting map reading skills in secondary schools in Namibia. A qualitative approach with semi-structured interviews was used to survey 15 geography teachers in Outjo, Kunene Region, Namibia, and the data was analysed using NVivo software. The results showed that geography teachers need ICT-based classrooms, effective learning management systems and computer training programs. The results also highlighted barriers such as lack of resources, technological infrastructure and teacher training, including pedagogical skills to apply ICT in geography teaching. Research suggests that Namibia's Ministry of Education needs to improve technology integration in classrooms by offering professional development workshops, updating policies and providing sufficient ICT resources to bridge the digital divide.

Keywords: challenges; geography; ICT; map reading; digital skills; Namibia.

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1 Introduction

The Kunene Region is located in the mountainous northwestern part of Namibia, and the Ojo circuit is one of the three major educational circuits in the region. In the Outjo region four secondary schools that offer lower-level subjects received SMART boards. Each school received one SMART board, with the exception of one lucky school that received an extra. Although these four schools have received SMART boards, there are only two schools in the Outjo circuit that offer AS Level (a qualification obtained by studying a subject for one year). The researcher of the present study concludes that the SMART boards at two secondary schools offering AS Level are not sufficient to support the efficiency of ICT integration. In addition to the idea of integrating personal devices into teaching, integrating ICT into teaching in the age of digital technologies is still a challenge. Teachers in the Outjo district received training on integrating ICT into education. However, the region performs poorly and is ranked last among Namibia's 14 regions. Geography is a discipline that involves many subjects, including population, land, oceans, mountains, deserts, Geographical Information Systems (GIS) and many more. Nowadays, GIS is an advanced and dynamic subject in terms of high-tech involvement; however, the ability to simply read a map is profoundly meaningful for high school teachers and students. When discussing map reading, some researchers assert that map reading skills are the ability to interpret or understand geographic information depicted on a map (Dempsey et al., 2016). Map reading skills can cultivate readers' ability to understand an actual territorial location through symbolic information. In the process of reading a map, readers need to extract basic information such as different continents, distances, directions, natural and artificial features and topographical features. Teaching maps and reading skills require technological tools to ensure learners' understanding and acquisition of the skills. Without adequate support and the integration of technologies such as Information and Communication Technology (ICT), it is impossible to improve tutoring and learning and to achieve various academic goals (Pondiwa, 2022). The integration of ICT into schooling involves the use of computer and network technology in daily classroom activities. This practice leads to productive acquisition of knowledge. In the modern world, with the advent of ICTs, teachers have been able to blend technology into their teaching methods to enhance their students' learning experience. Although some skills are becoming obsolete due to the integration of ICT in education (Islam, 2016; Islam et al., 2019, 2020; Bin et al., 2020; Xu et al., 2023a; Zheng et al., 2023) map reading skills remain vital for improving students' knowledge of geography and their performance on exams. Map reading skills include determining direction, calculating bearings, finding grid coordinates, measuring distances, calculating slopes, determining topographic elevations, interpreting photos and calculating areas. Generally speaking, teaching map reading skills must involve the presentation of symbols, maps, photographs and contours, which requires the use of ICT facilities. ICT plays a huge role in promoting education and its outcomes, making our lives comfortable and meaningful in many aspects (Islam, 2014; Islam et al., 2018; Jiajun et al., 2019; Chen et al., 2020; Islam and Sheikh, 2020; Li et al., 2021; Jiang et al., 2021; Li et al., 2022 , 2023; Jiang et al., 2022; Du et al., 2022; Xu et al., 2023b; Jiang et al., 2024; Du et al., 2024) 2024). Many organisations, apart from educational institutions, Carroll and Borycz (2024) started investing heavily in technology deployment and modernising organisations to work faster and achieve their long-term goals. Using electronic instruments in the classroom provides many advantages to educators and

learners. Internet technology continues to evolve and influence pedagogy in schools. Over time, the world is moving more and more towards a paperless society. However, the integration of ICT into the academic context presents several challenges, particularly for those who are lagging behind in the application of these opportunities. Rafi et al. (2020) said challenges faced by teachers in integrating ICT include partial availability and network connectivity, lack of technical support in managing training, paucity of resources and qualified teachers. Several studies have undertaken the integration of ICT into education systems; however, most efforts focus only on the challenges learners encounter in integrating ICT into education (Najmaldeen and Rafi, 2023). This research, taking into account the situation of secondary schools in Namibia, focuses on the difficulties encountered by educators in integrating ICT into the teaching of map reading skills in geography. This research aimed to identify the nature of challenges affecting limited access to ICT resources, teacher training, technical support, curriculum and content integration in geography teaching in secondary schools in Outjo Circuit, Kunene Region in Namibia. In addition, cultural and linguistic barriers, teachers' assessment of ICT integration and acquisition of map reading skills and related necessary adaptations were discussed. In conclusion, the study also explores the role of teachers in promoting geography learning in the classroom to improve students' learning experience and faculty teaching methods with the help of computer technology.

2 Literature review

The utilisation of technology in the 21st century, remains an indispensable part of various organisations for smooth functioning and faster achievement of organisational goals. Before discussing the latest technologies such as AI and ICT, it is imperative to know whether readers/students have sufficient digital literacy, as developing countries in particular face this problem (Carroll and Borycz, 2024). Embedding ICT into education is regarded as one of the essential elements in moulding the education system for future expansion. Integrating ICT into teaching and learning is a much-needed part of the Namibian education system, which demands resources and teachers' training to integrate ICT into teaching and learning to improve the quality of education (Simataa, 2022; Kays and Gamundani, 2020). The Namibian Ministry of Education highlights the usefulness of technology-based academic instruction in the national school syllabus in its latest Education Blueprint (2013–2025). In addition to revolutionising the teaching and learning sector, technology-based academic instruction offers learners the opportunity to work better in a globalised digital world, bringing many benefits despite the simultaneous challenges. Some of the main challenges of integrating ICT into education include policy, planning, infrastructure, content and language of learning, capacity building and financing. With the advancement of the latest technologies and their numerous features, ICT has posed many challenges to established organisations, such as cyber security, the right to privacy, data protection, and many more. It has been observed that lack of technical skills among teachers to use certain software, insufficient funding for ICT and professional development, and lack of collaboration between academic staff and management pose serious challenges. Timotheou et al. (2022) discovered that schools currently face several challenges such as subpar results despite investments in technology, growing gaps in technology usage, lack of digital capacity and experience, low professionalism and lack of coordination from administration. Despite these

challenges, many researchers admit that the induction of network technology in education has the capability to increase the learners' engagement while faculty deliver lectures, which has a positive impact on their performance and achievement of goals. The use of technology in education, more importantly in geography, is an excellent way to learn, as reading maps helps teachers and students to gain in-depth information about a particular country and its geostrategic and geopolitical situation among the countries of the world. Maps are intricate graphical illustrations that encode spatial information. Symbols are used with numbers and words and are an important tool for communicating spatial information. With the evolution of technology and increasing technological ubiquity, traditional teaching methods have been replaced by technology-based pedagogies that are more interesting and attractive to younger generations. In particular, the computers and videos present in the courses help students to master the content of the subject taught, thus improving the learning tools necessary for effective teaching. Ohei et al. (2023) concluded that ICT integration was the most important tool for improving classroom teaching and learning performance in seven South African township schools. An appropriate mechanism must be determined as to how teachers need to use ICT to achieve the set curriculum objectives, as improper planned use of ICT can cause grave issues in geography classes. These technology tools help teachers better manage their classrooms and meet the needs of their students while teaching and answering questions. Ndlovu and Moll (2016) emphasised the need for compliance with the school's technology budget and current policies on the use of technology to promote academic activities. As long as the program continues to treat ICT as a separate entity within the teaching and learning ensemble, teachers will continue to be unable to take full advantage of these technologies to promote knowledge transfer. It is clearly in geography instructors' best interest to use ICT in their teaching, but in classrooms like those in Namibia, one can still ask the question: What challenges do teachers face when integrating ICT into geography lessons? Kaur (2023) highlighted the challenges faced in ICT integration, including partial availability and network connectivity, schools with insignificant assistance and training, time constraints and lack of competent teachers and ICT integration in teaching Map Works. In addition to challenges, Fu (2013) explained that barriers to effective technology integration from teachers' perspectives include low teacher prediction and a lack of clear objectives for the use of ICT in schools. There are several strategies to address these challenges, such as technology training to update teachers' skills and knowledge, integrating ICT into teaching and providing teachers with workshops on how to integrate technology into education. However, the strategies listed include the integration of ICT into education but not specifically into map reading skills in geography. Many challenges related to embedding ICT in various disciplines have been discovered, but only a few challenges related to embedding ICT in geography teaching have been identified in the literature. Even though teachers face difficulties in teaching geography, the specific challenges of teaching map reading skills are yet to be known. It is in the best interest of the research to conduct an in-depth study on the challenges of integrating ICT into lessons and class activities on map reading skills.

3 Research objectives

This study explores the issues in embedding ICT into map instruction and geography reading skills in Namibian secondary schools. Specifically, the study:

1) Examines the current status of ICT infrastructure and resources in Namibian secondary schools for the teaching of map reading skills.
2) Examines teachers' perceptions regarding the use of ICT in teaching map reading skills.
3) Identifies the pedagogical strategies and practices teachers use to integrate ICT into Map Works teaching.
4) Examines the barriers and challenges educators encounter in embedding ICT into Map Works teaching.
5) Proposes recommendations and suggestions for improving the integration of ICT into the teaching of map work in Namibia.

3.1 Research methodology

The research methodology of this study was selected in light of Greener's (2008) suggestion that the methods used in data collection should be determined by the sustainability of the research question, the objectives and the type of information to be collected. This section focuses on the research design, research instruments, validity and reliability of the instruments, study population, sampling procedures, data collection procedures (including data analysis) and ethical considerations for this study. Therefore, the research instruments were developed considering validity and reliability and ethical domain before submitting them for data collection. In addition, the research instruments were reviewed by experts and the Research Committee of East China Normal University to ensure that the terms used in the questionnaire were securely defined and correctly understood. However, it is important to ensure that reliability is not affected by random errors. In addition, the research questionnaire was thoroughly analysed and shared with experts to find errors and make it simpler for readers to understand the meaning and purpose of the questions. To improve the instruments, the researchers turned to geography scholars at East China Normal University, and their expert suggestions were incorporated into the instruments before they were completed and data collection began.

3.2 Instrument development

Given the general situation of literacy in the country as well as the qualifications and expertise of teachers in teaching geography, a semi-structured questionnaire was compiled to carry out the survey. In addition, a thorough literature review also helped the authors to develop high-quality research instruments that prompted the interviewee to share information during the interview; Kothari, 2019). During the instrument development phase, literature specifically focused on teacher engagement in ICT in the classroom was taken into account. Before the research instruments were distributed to teachers in Outjo, Kunene Region, Namibia the authors sought expert opinions from the Faculty School of Education of East China Normal University. In addition, demographic data were collected from respondents regarding ICT infrastructure and integration, classroom learning, assessment of teachers' skills and their role in teaching geography students. Based on the sampling, the results were generalised, as it was difficult to collect data from thousands of respondents. The random sampling technique carried out by many researchers in the past was conducted to collect the desired data (Saunders et al., 2019).

Compared to the quantitative research method, qualitative research is more useful and flexible in terms of data collection in an academic environment through face-to-face interviews. In face-to-face interviews, respondents share information, suggestions, or ideas that cannot be collected in a quantitative study because its fixed questions leave no space to elicit in-depth details from respondents. In addition, open-ended questions accompanied the questionnaire for an in-depth study of the challenges educators face in teaching geography map reading skills in Outjo Circuit, Kunene, Namibia.

3.3 Data collection procedure

Since there is only one senior official in charge of geography in the region, he was included in the interview. In addition, the six secondary schools in the district with 14 teachers offered geography subjects at the secondary school level, with map reading being one of the subjects. A regional administrator and 14 teachers involved in teaching geography subjects were involved in information gathering; thus, the population for this survey consisted of 15 participants. We collected firsthand or primary data through structured and unstructured questions asked in face-to-face interviews. Primary data is the process of collecting data through a research questionnaire or face-to-face interview, while secondary data comes from sources such as websites, journals, archival materials or published reports (Bartholomew, 2022).

3.4 Data analysis

After the data collection was completed, the interviews were transcribed accurately, validated once more, and then imported into NVivo. NVivo is a software that helps researchers analyse qualitative data such as interviews, surveys and focus groups. The software is designed to help researchers organise, manage and analyse unstructured or semi-structured data by coding the transcripts and identifying themes and patterns in the data. In addition, NVivo software is also helpful in visualising the data and generating reports.

3.5 Result analysis

In the data collection process, as shown in Table 1, a total of 15 interviewees participated in the data collection, among whom was an administrative officer responsible for monitoring education in the entire region of Outjo. Additionally, all 15 participants were teachers who teach geography and help readers read maps in the district of Outjo, Namibia. As the region has six secondary schools in which only 14 teachers teach geography along with a senior management officer, it was decided to collect data from them, taking into account their teaching experience in geography and the challenges they face in this region. Among the participants, seven were aged 30 through 39, followed by five aged 40 through 49, and the remaining three were between the ages of 20 and 29. There were nine male and six female participants, and they had varying levels of teaching experience, with most having taught for five to ten years. In terms of experience, four teachers had > 10 years long-term experience, while three had < 5 years of experience, particularly in geography.

Table 1 Demographic profile of participants

Characteristics		*Gender*		*Teaching*	
Age	*Values*	*Male*	*9*	*Experience*	*Values*
40–49 years	5			Above 10 years	4
30–39 years	7	Female	6	Between 5 years and 10 years	8
20–29 years	3	Total	15	Below 5 years	3
Total	15			Total	15

4 Result

(I) *Available technology in schools*: When candidates were asked about the available technology in their schools, they listed different types of technology, some with more ICT infrastructure than others. Every school has at least some ICT resources to improve teaching and learning. At the time of the study, school (A) had a total of 24 computers, including two teachers' laptops, five in the library and 18 computers with internet access during the study. School records were available on CDs and cassettes in the form of audio and video, and there were digital cameras, most of which were on geography. School (B) had 20 computers, of which 18 are operational and two were out of order, including a laptop, two photocopiers, a television, an overhead projector and access to the internet during study periods. An educational app from School (C) called Cloud Paging contained content for all subjects, including games, tests and quizzes. Most teachers had this application installed on their laptops. School (C's) computer lab had ten desktop computers, a projector, a smart board, a television, a radio and a school-owned laptop.

School (D) had limited technology resources and had recently received donations of five laptops and ten computers, a printer and a newly installed internet facility. In addition, school (E) had 22 computers and two laptops and had access to the internet during studies, albeit with a poor network connection. Furthermore, school (F) had 26 computers: 22 in the computer room, four in the library and one laptop for teachers. The school recorded audio and video on CDs and cassettes, had a digital camera and had operational internet.

(II) *Provision of training in using computers*: Participants were asked the following question: 'Have you ever received training in using computers?'

All participants reported that they had received training in the use of computers as preparation for teaching students. The teachers explained how important computer training is to them and gave several reasons.

> *'The computer training I received gave me the skills to integrate technology into teaching methods, making classes more engaging and interactive'.*
>
> *'I can use a computer more efficiently to manage administrative tasks such as grading, attendance and lesson planning'.*
>
> *'Through computer training, WE (teachers) can access a wide range of educational resources, including online libraries, educational websites and multimedia tools, thereby enriching our teaching materials. Computer literacy*

> *is critical, and by receiving training, teachers can prepare themselves and their students for a technology-driven future'.*

The above excerpt shows that teachers are computer literate, and computer training enables them to integrate technology into teaching methods, effectively manage administrative tasks, access teaching resources and improve teaching materials. It helps teachers prepare for a technology-driven future and increases student engagement in academic activities. Ng et al. (2023) indicated that computer training allows teachers to improve their teaching methods, streamline administrative tasks, access educational resources, prepare for the future and improve communication and collaboration.

(III) *Map reading skills*: The researcher asked participants to share their understanding of map reading skills used in teaching geography. All participants agreed that map reading skills are essential in geography to enable individuals to interpret and understand spatial information. One of the participants was quoted talking about what map reading skills entail:

> *'These skills involve the cognitive functions and analyse different types of maps, including topographical maps, thematic maps and political maps. Key map reading skills include understanding scale, interpreting symbols and legends, identifying directions and recognising different types of boundaries and landforms. Another interviewee revealed 'that technology-based skills promote advanced information retrieval in different databases, modernisation of urban and environmental planning and effective use of GIS and other aspects of geography'.*

(IV) *Integrating ICT into teaching geography*: Some participants also expressed that technology apart from ICT integration advances readers' research skills and introduces innovation in education and research, especially in those subjects where technology is highly involved. Three candidates shared their view that:

> *'In the past geography was taught as a subject and was confined to charts during the classroom lecture, and the young generations are lucky enough to have the assistive technology that paves the way in bringing innovation in teaching and learning the subject'.*

Shedding light on the multifaceted advantages of ICT such as exploring real-world maps through satellite images, geospatial data helps in effective urban planning and managing environmental planning and disasters. One of the interviewees said:

> *'The application of ICT will assist geography students in better preparing them for higher levels of study and research and open ways to join the world's top universities and find good jobs'.*

In favour of the above statement, one of the teachers shared his viewpoint as explained that:

> *'The Integration of ICT in GIS assists in information management, making better decisions, viewing digital maps, visualising data and remote sensing, etc., that promotes students' skills in understanding how to manage environmental disasters and develop effective planning'.*

(V) *Visual representation*: One of the teachers added that ICT integration in geography can improve students' visual skills in reading maps and understanding geospatial relationships, patterns and new trends on maps. Another teacher said students can interact and manipulate geographic data to create visual representations using digital

maps, GIS and other ICT tools. This can lead to an in-depth understanding of topography, spatial relationships and various geographic concepts. ICT also allows users to access interactive visualisations, satellite images and real-time data, thereby improving learning outcomes.

(VI) *Access to updated information*: Research participants disclosed that through ICT, students keep themselves updated by accessing database resources and reading the latest publications on new trends and innovations in geography. Further, the integration of ICT into geography will help to explore innovations in the field of GIS and their implications in urban planning, keeping vigilant eyes on environmental changes and possible disasters in the future. Given the importance of updated information in this field, a participant explained:

> *'This can facilitate students' access to online resources in various databases related to GIS, interactive maps and satellite images which contain high-quality information followed by complicated data analysis and software used to present the real situation to readers based on research'.*

Additionally, another participant mentioned that:

> *'In addition to the geographic phenomenon, the inclusion of ICT in geography helps in accessing various data, environmental changes, mountains, oceans, population geography and environmental changes make the subject easier for readers to understand'.*

Furthermore, one of the teachers said that ICT helps students in collaborative projects and discussions with peers and experts from around the world and allows them to gain insight into the latest geographical developments. The above story demonstrates that by leveraging ICT tools and resources, educators can enable learners to access, analyse and interpret up-to-date geographic information, thereby improving their map reading skills and their understanding of the dynamic nature of the world.

Bull et al. (2020) found that technology helps students access current maps, geospatial information and real-time data on weather conditions, population demographics and environmental changes, thereby promoting collaborative projects and discussions. It is obvious that by integrating ICT, educators can improve the effectiveness of teaching map reading skills in geography, thereby preparing students for a technologically advanced and geographically interconnected world. Highlighting the importance of ICT, one participant said:

> *'Students learn to navigate and interpret digital maps, thereby improving their ability to understand and analyse spatial data. 'The second said that exposure to ICT tools prepares students to effectively use technology for research, analysis and communication' However, the third added that 'ICT facilitates interactive and engaging learning experiences, making map reading more dynamic and immersive'*
>
> *Similarly, the fourth participant said that 'students develop skills relevant to the digital age, preparing them for future careers and daily life in a technology-driven world'.*

By integrating ICT into the teaching of map reading skills, educators can enable students to become competent digital citizens and build a solid foundation of geographic knowledge and technology skills.

(VII) *Challenges for teachers in integrating ICT into teaching map reading skills in geography*: Participants stated that not all schools have sufficient and necessary technological infrastructure to support ICT integration, including limited resources, infrastructure constraints, teacher training, digital divide as well as maintenance and support, as explained below:

> *'Many schools may not have sufficient funds to invest in the latest technologies, such as interactive whiteboards or GIS software, which are essential for effectively teaching map reading skills'.*

Supporting the previous participant, another participant spoke about the limitations of ICT infrastructure and how it is difficult to maintain and support ICT in schools.

> *'In some schools, internet connectivity may be inadequate or the electricity supply unreliable, making it difficult for teachers to consistently use technology in their geography lessons. The internet in our school is always on and off, which affects teachers and learners'.*

> *'Even if schools have access to technology, there can be difficulties maintaining and troubleshooting the devices, leading to disruptions in the teaching process'.*

Two of the teachers indicated that limited pedagogical training regarding accessing technology poses a challenge. One participant stated:

> *'Teachers may lack the necessary training to effectively integrate technology into geography lessons. Without proper training, they may have difficulty teaching map reading skills using existing technology'.*

> *'Many educators may lack the necessary training to effectively integrate ICT into the teaching of map reading skills, resulting in underutilisation of existing technology'.*

Additionally, two participants spoke about the digital divide and the barriers that disadvantaged students may face in taking technology-enriched geography courses due to the lack of technology in the country. This is demonstrated in the following statements:

> *'Students from disadvantaged backgrounds may not have access to technology at home, leading to inequality in their ability to engage in technology-enabled geography lessons'.*

> *'Socioeconomic disparities can lead to unequal access to technology among students, impacting the effectiveness of ICT integration in teaching map reading skills'.*

The above extracts show that schools are struggling to integrate ICT in teaching geography map reading skills due to limited resources, infrastructure, teacher training, digital divide and maintenance. Insufficient funds, unreliable internet connection, maintenance and limited teacher training hinder the consistent use of technology. Sharma (2021) understood that technology poses significant challenges to teachers when integrating ICT into the teaching of geographical map reading skills, impacting their ability to deliver effective and engaging lessons.

(VIII) *Insufficient resource availability*: Participants indicated that the limited availability of resources poses several challenges for teachers when integrating ICT into teaching map reading skills in geography. Three of the participants indicated that there is limited access to computers, the internet, software and tools, and

mentioned the effects of having a limited number of computers in the school compared to the learner ratio.

> *'Limited access to ICT devices hinders the effective integration of technology into geography lessons. There are few computers compared to the number of learners who use them during the same course. This may limit teachers' ability to provide hands-on experience with digital maps and GIS tools'.*

> *'Inadequate or unreliable internet connectivity can hinder the use of online mapping resources, geospatial data, and interactive mapping tools, thereby limiting the scope of learning activities'.*

One of the respondents disclosed that the software required and the related digital devices for teaching the subject of geography are limited in these schools:

> *'The availability of appropriate software and tools to teach map reading skills is crucial. However, budgetary constraints may limit the acquisition of GIS software, mapping applications and other digital resources necessary for effective teaching'.*

> *'Some teachers may face challenges in integrating ICT if they lack the training and support needed to use digital mapping tools and resources effectively. Professional development opportunities may be limited, impacting their ability to use technology to teach map reading skills'.*

The above narratives demonstrate that the integration of ICT into teaching geography map reading skills faces challenges due to limited access to computers, internet, software and tools, budget constraints and lack of training and support. Ghavifekr and Rosdy (2015) advocated for strategic planning, investment in technology infrastructure, continuing professional development and collaboration with stakeholders to ensure teacher support to effectively integrate ICT into teaching map reading skills. Rafi et al. (2019) pointed out that despite these challenges, the utilisation of technology in academia will increase student engagement in learning and performance.

(IX) *Lack of technical support and limited time*: Three teachers expressed concern about the lack of a computer technician to repair devices when they are damaged or broken. One teacher pointed out a staff room full of non-functional computers due to a lack of technicians to repair them.

> *'Just like how our computer science teacher tried to help me when my laptop froze during a class, but unfortunately, he couldn't fix it'.*

> *'Technical glitches and connectivity issues can disrupt the seamless integration of ICT in the teaching of map reading skills, impacting the learning process'.*

The above finding reveals that teachers were concerned over the absence of a computer technician to repair damaged or broken devices, leading to non-functional computers and delays in class.

Additionally, six of the participants chose not to integrate technology into their lessons due to time constraints, as shown below:

> *'We have limited time, so I don't integrate technology into my lessons because it takes too much time. In the limited amount of time you have to go get a projector from the other classroom, set it up, get everything done and teach in 40 minutes, you won't be done'.*

> *'Teachers don't want to spend their allotted 40 minutes of teaching time setting up computers and projectors or searching the school for a single projector that they might not even find'.*

> *'Finding a balance between ICT integration and traditional teaching methods within limited class time poses a significant challenge for teachers'.*

The above narrative indicates that participants are hesitant to integrate technology into their lessons due to time constraints. Two participants mentioned that setting up computers and projectors takes time and that they may have difficulty finding a projector within the 40 minutes allotted. It is crucial to note that these challenges may differ when specifically integrating ICT into mapping work. Only geography teachers can accurately identify the challenges associated with integrating ICT into the teaching of map reading skills.

(X) *Difficulties when integrating ICT into the teaching of reading maps in geography*: Integrating ICT into teaching map reading skills in geography presents several challenges, including limited access to technology, insufficient teacher training, time constraints and difficulties with pedagogical integration. One participant said:

> *'Integrating ICT in a way that enhances rather than distracts from the learning process requires careful pedagogical planning, which can be difficult for teachers who are unfamiliar with the learning process'.*

Three of the teachers indicated that lack of training and professional development is the main cause of the difficulties teachers face when embedding ICT into teaching and attempting to use ICT tools to teach map reading skills. This can lead to a lack of confidence and skills in using technology in the classroom. Participants had different understandings of how a lack of training was behind the difficulties teachers faced when integrating ICT into teaching map reading skills in geography, as mentioned below:

> *'Without adequate training, teachers may struggle to effectively use ICT tools and resources to teach map reading skills'.*

> *'Teachers may struggle to seamlessly integrate ICT into their geography lessons, leading to disjointed or ineffective use of technology'.*

> *'Without training, teachers may struggle to identify and select appropriate ICT resources to teach map reading skills, leading to suboptimal learning experiences for students'.*

> *'Teachers may lack the confidence to experiment with new ICT tools and methods, leading to reluctance to fully embrace technology in their teaching'.*

> *'Without training, teachers may not know the best teaching strategies for integrating ICT into geography lessons, leading to less effective teaching methods'.*

The results indicate that teachers identified a lack of training as the main challenge in integrating ICT into teaching map reading. A lack of training leads to ineffective use of technology, sub-optimal learning experiences and reluctance to fully embrace technology, as well as insufficient knowledge of instructional strategies.

4 Discussion

The study examined the ICT infrastructure of six secondary schools, each with a different level of technology. These technologies included computers, laptops, photocopiers, televisions and projectors. One of the schools had an educational app called Cloud Paging, while other schools had limited resources and operational internet access. The literature review suggests that the integration of ICT throughout the workplace appears to be a necessity to promote 21st century educational skills (Balaban et al., 2023). The results show that geography teachers envision ideal classrooms equipped with smart whiteboards, projectors, learning management systems, computers and email accounts to enable efficient connectivity, rapid project localisation and accessible learning. The findings indicated that computer training is critical for teachers to integrate technology into teaching methods, manage administrative tasks and access resources and enhancement materials to prepare for a technology-driven future. Geography helps students become purposeful thinkers, and the vast majority of researchers agree that geography combined with advanced technologies such as GIS and satellites can help overcome complexity and prepare us to face the future (Bendl et al., 2024). This study highlights the benefits of integrating ICT into geography education for teaching map reading skills. Technological tools such as interactive maps and geographic information systems make map reading engaging and effective. They help students explore real-world maps, satellite images and geospatial data, improving their understanding of topography and spatial relationships. As a result, the integration of ICT improves the effectiveness of teaching map reading skills in geography. Learning and teaching geography is different from other subjects as it requires subject content knowledge. The literature shows that GIS and RS have modernised geography teaching methods in universities and schools. In addition, ICT-based computer games are becoming increasingly popular in geography education, especially in schools (Dai and Liu, 2024). We examined the difficulties of access to technology that present several challenges to teachers integrating ICT into map reading skills, including limited resources, infrastructure, teacher training, the digital divide, its maintenance and support. The results also suggest that there are barriers to incorporating (ICT) in teaching geographical map reading skills. These include inadequate access to computers, the internet, software and tools, budget constraints, inadequate teacher training and support and time constraints. It is a great challenge for teachers to find a balance between ICT and traditional teaching methods within a limited teaching time. Evidence suggests that the challenges teachers face in integrating ICT into map reading lessons include limited access, lack of training, time constraints, and difficulties in integrating ICT into the classroom. In these schools, students face connectivity issues, limited technical support, irregular power supply, lack of ICT infrastructure, poor internet connectivity, lack of management support and lack of effective training, in addition to inadequate ICT resources (Toll et al., 2024). These issues hinder teachers' ability to use technology effectively, resulting in poor learning experiences and a reluctance to fully embrace technology (Rafi et al., 2022). With this in mind, this research examines how (ICT) can be used to learn geographic map reading skills. It emphasises the importance of teacher preparation, availability of technology, curriculum integration, interactive educational aids, multimedia materials and group learning. It shows that collaborative learning can overcome these difficulties by promoting teamwork between students on tasks and projects using ICT tools.

5 Conclusion

The study carefully explains the main issues and examines the key elements of the research area through a detailed literature review in preparation for a deeper investigation. It also provides a broad perspective on the current state of knowledge and theoretical models. Moreover, it highlights the methods used in the study, explaining how the research was carefully planned and systematically conducted to maintain the integrity and reliability of the study. In addition, content analysis techniques are used to accurately reveal and scrutinise the data collected, converting the results into valuable findings by presenting the raw data in text format, making the results understandable. The main aim of the report is to make a substantive contribution to the academic community with a particular focus on improving the teaching methods of geography teachers in secondary schools in the Outjo region of Namibia. It described the types of technology available in schools as part of the study, the ideal classroom for teachers and whether training in using computers and understanding map reading skills was provided. The study examined the lack of technological infrastructure for integrating ICT into teaching, improving map reading skills of students in geography, and the difficulties instructors face in embedding ICT into classroom management. Furthermore, the study concluded that insufficient availability of resources in these schools hinders access to up-to-date information and administration of training of teaching staff on ICT integration and improvement of their teaching skills. We also conclude that the absence of a modernised geography curriculum taught in these schools constitutes a pressing barrier to the integration of ICT into geography teaching, an obstacle that, in the future, will need to be taken into account by policymakers, designers of programs, school administrators and teachers.

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