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Practical challenges of integrating technology within Lesotho's secondary geography education: A conceptual analysis

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Abstract

The integration of technology is significant in secondary schools as it has the potential to revolutionize teaching and learning to align with the 21st century demands. However, practical challenges hinder the effective integration of technology in secondary schools. This conceptual study identifies key barriers to technology integration including limited funding for connectivity, inadequate professional development opportunities for educators, inconsistent technology implementation across schools and unclear policies. These challenges impact the effective integration of technology in Geography Education in Lesotho secondary schools. To address these issues, the study adopts Atabek's comprehensive interventionist framework, emphasizing components such as policy development, financial support, and professional development. The recommendations for this study align with Atabek's framework and they include that the Ministry of Education and Training in Lesotho should develop clear policies for technology integration, with a specific focus on Geography Education. Additionally, the ministry should establish strategic planning and budgeting processes to ensure consistent financial support and resource allocation for technology integration initiatives in Lesotho secondary schools.

Keywords: Challenges; Technology; Integration; Geography Education; Secondary schools

1. Introduction

The education sector has undergone significant transformation due to rapid technological advancements. Researchers acknowledge that incorporating technology in secondary schools has the potential to revolutionize teaching and learning. This integration not only promotes digital literacy, engagement, collaboration, and access to information but is also essential in today's world (Shirin, 2023). The necessity of integrating technology in schools arises from the presence of two distinct student groups in classrooms: Generation Z (born between 1995 and 2010) and Generation Alpha (born after 2010), as defined by Annuš et al. (2023). These generations, heavily influenced by technology, feel comfortable with its use in the classroom. Consequently, traditional teaching methods without technology integration may demotivate them.

Despite the widespread benefits of technology integration and efforts by countries like Lesotho to bridge the digital divide and improve personalized learning experiences and educational outcomes, there are significant challenges in integrating technology into Lesotho's secondary Geography Education. These challenges include a lack of financial resources for investing in new technology, insufficient continuous professional development to support effective technology integration, and limited digital knowledge and skills (Makuru & Jita, 2022; Mohlomi, 2022). These obstacles hinder the full potential of leveraging technology in Lesotho's secondary schools.

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The present era is witnessing rapid transformations, particularly in technology, with breakthroughs such as artificial intelligence (AI) and cybersecurity. These changes have prompted nations to explore different approaches to harnessing technology to improve educational experiences (Smiley & Fisher, 2022). The history of technology in education dates back to the 20th century. Early advancements, as outlined by Oleksandra (2023) involved the use of radio, audio-visual tools like filmstrips, and television programs. Despite being designed to revolutionise teaching and learning, the impact of these technologies was limited. However, in the 21st century, technological advancements have led to improvements in educational accessibility, quality, and equity (Raghaviah, 2015).

In essence, technology in education has made significant progress, providing interactive experiences for students to explore virtual environments, conduct virtual experiments, and engage in simulations (Bheda, 2021; Hwang et al., 2020). Lesotho, like many other countries, has embraced technologies such as Virtual Reality (VR), robotics, machine learning, and AI, offering substantial opportunities for the secondary education sector, especially in subjects like geography. However, this integration of technology poses unique challenges.

The integration of technology in education is supported by prominent organizations such as the United Nations (UN). The UN, through its Sustainable Development Goal (SDG) 4, emphasises the importance of providing inclusive and high-quality education for all (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2017). Within SDG 4, there is a specific focus on integrating technology to enhance the quality of education, including at the secondary school level. It is crucial to understand that the UN recognises the potential of technology in facilitating the learning of subject curricula, including geography. The UN also acknowledges the significance of promoting digital skills and literacy through the integration of technology, extending to secondary education, specifically geography education in Lesotho.

As a participant in the United Nations (UN), Lesotho has devised a National Strategic Development Plan II (NSDP) spanning from 2018/19 to 2022/23, aligning with the Sustainable Development Goals (SDGs). This plan is a road map for guiding the education system of Lesotho. One of the emphasis depicted by NSDP, 2018/19-2022/23 is the improvement of ICT in different sectors including the education sector (The Government of Lesotho, 2016). Furthermore, the Lesotho Basic Education Curriculum Policy (LBCEP), 2021 includes Geography Education in the curriculum to play a pivotal role in nurturing environmental skills and fostering a holistic understanding of the world's physical and human landscapes, as well as the interconnectedness of societies (MoET, 2021).

Furthermore, Lesotho's policies underscore the importance of integrating information and communication technology (ICT) into teaching. Notably, the Science and Technology Policy of 2006/11 and the National ICT Policy of 2005 advocate for developing ICT skills, human resource capacity, and educational infrastructure (Gillwald et al., 2017). These policies reflect Lesotho's commitment to transitioning from traditional classroom teaching to a technology-based approach. However, despite these initiatives, Lesotho encounters challenges in effectively incorporating technology into pedagogical practices.

The digital divide, marked by socio-economic disparities, poses a significant obstacle to the equitable integration of technology in schools (Makumane & Mpungose, 2022). Students from economically advantaged backgrounds enjoy better access to technology, creating disparities in the effective teaching of subjects like Geography education. Moreover, the readiness and professional development of teachers are crucial factors influencing the successful implementation of technology in geography classrooms (Ntlobo-Mbele, 2022). Teachers need to establish an environment supportive of diverse learners and possess a profound understanding of their teaching materials (Turungare & Rudhumbu, 2020). Continuous support and training through professional development programs are essential for teachers to enhance their technological pedagogical content knowledge and build confidence in utilizing technology in Geography teaching. These practical challenges in integrating technology within secondary schools demand careful examination to establish a sustainable and inclusive technological framework for teaching various subjects, including Geography.

The United Nations supports the integration of technology in education, as highlighted in Sustainable Development Goal 4 (UNESCO, 2017). Despite a prior emphasis in LBCEP 2021 on prioritizing digital competencies, existing policies aim to strengthen the use of technology in education (MoET, 2021; Ntlobo-Mbele, 2022). However, Lesotho faces numerous practical challenges hindering the effective integration of technology in classrooms (Makumane & Mpungose, 2022; Mohlomi, 2022; Makuru & Jita, 2022). Notably, there is limited knowledge regarding the specific challenges related to integrating technology into Lesotho's secondary Geography Education classrooms. To address this gap, it is crucial to analyse the practical challenges that impede the successful integration of technology in Geography education in Lesotho.

This conceptual paper argues that integrating technology into Lesotho's educational system holds promising prospects for a future saturated with technology. The researchers contend that integrating technology into Geography Education

in Lesotho's secondary schools can enhance the cultivation of relevant skills. Consequently, the paper advocates for a comprehensive analysis of practical challenges that may hinder the integration of technology in Geography Education classrooms. Such an analysis could pave the way for the sustainable integration of technology in Geography, fostering successful skill development through Geography education.

2. Theoretical framework

The study is guided by institutional theory, a sociological perspective (Meyer and Rowan, 2012), which looks at how organizations are shaped by formal and informal rules. This theory has three main parts: coercive isomorphism (organizations do similar things due to external pressures), mimetic isomorphism (organizations copy successful models), and normative isomorphism (organizations follow professional standards). In this study, institutions are the established structures guiding organizations. Robert et al. (2012) say the theory highlights the importance of social norms, rules, and structures in shaping human actions. For our study, institutional theory helps understand external pressures, imitation behaviours, and normative expectations affecting technology adoption. In Lesotho's secondary schools, shaped by policies, norms, and external pressures, institutional theory plays a key role in technology integration success.

The theory also helps identify pressures from external entities, like the government and international organizations, influencing technology adoption in Lesotho. This is crucial for understanding the challenges faced by Lesotho. It also examines how schools in Lesotho imitate successful models or practices, offering insights into technology adoption dynamics. Moreover, it helps understand how norms are connected to technology integration, influencing decisions in Lesotho's secondary Geography Education. Institutional theory checks if schools in Lesotho follow similar practices in technology integration, reflecting a common response to external pressures or societal norms. Lastly, it explores if rules and regulations are unsupportive or if there's no set norm for technology use in education.

2.1. Lesotho's current education system and technology integration

The current education system in Lesotho, like those in other nations, recognises the crucial role of education in achieving developmental goals (UNESCO, 2017). Aligned with Sustainable Development Goal 4 (SDG4), Lesotho is committed to enhancing the well-being of its citizens and unlocking their full potential. This commitment involves equipping students with essential skills to thrive in a competitive global market. Additionally, the African Union Agenda 2063 (AUA) aims to promote unity and harmony across the African continent. Aspiration 2.25 of the AUA envisions a well-developed information and communication technology (ICT) sector integrated into education, ensuring a standardized approach (African Union Commission, 2015).

To operationalize these goals, the Education Sector Policy (ESP) 2016-2026 serves as a comprehensive framework for the development and management of Lesotho's educational system. The ESP prioritizes aspects such as promoting access to education, curriculum development, training, infrastructure improvement, and community engagement. Aligned with SDG4, AUA 2063, and ESP 2016-2026, Lesotho has revised its curriculum, addressing challenges outlined in the Curriculum and Assessment Policy of 2009. The revised Lesotho Basic Education Curriculum Policy (LBCEP) of 2021 places emphasis on integrating technology in education. It encourages the use of multimedia instruction and ICT tools to enhance teaching and learning in schools (MoET, 2021). This pedagogical approach, as advocated by the LBCEP, highlights the importance of incorporating technology to nurture both environmental and digital competencies in subjects such as Geography Education.

2.2. Integrating technology into education in Lesotho

In Lesotho, the integration of technology into education refers to applying scientific knowledge to enhance teaching and learning. This involves using technology tools and practices to improve educational outcomes. However, Lesotho faces challenges in implementing technology in education. Teachers are hindered by limited access to technology resources, and there is a lack of clear guidelines in Lesotho's policies on incorporating technology into teaching (Chere-Masopha, 2018). Some teachers are willing to use technology, but the absence of ICT laboratories in schools limits its integration. Achieving comprehensive technology integration requires effective management of the education system.

2.3. Global adoption of technology in Geography Education classrooms

In Geography classrooms around the world, the use of technology is a hot topic. Coleman (2018) highlights that in Australia, the school curriculum strongly encourages the use of digital technologies, including in geography. Learners use tools like Google Earth to work with spatial data, create maps, and analyse geographical patterns. Additionally, Coleman (2018) notes that the Australian Geography Association provides resources and professional development for

teachers. In the United Kingdom, Fargher (2019) mentions that students explore different global locations through virtual reality experiences, enhancing their understanding of various landscapes. In South Carolina, USA, Osborne et al. (2020) point out that over 85% of Geography educators feel ready to use technology in their teaching, but 95% find it challenging due to limited exposure. Currently, hard-copy maps and Google Earth are the most commonly used geospatial technologies in geography classrooms (Osborne et al., 2020). In summary, despite some challenges, countries worldwide are actively working to integrate technology into geography teaching and learning.

2.4. Geography education and technology integration in Lesotho

Bengel and Peter (2021) explore Geography education and technology integration in Lesotho. They argue that Geography has the power to address evolving human-environment relationships through technology. The Lesotho Basic Education Curriculum Policy (LBCEP) of 2021 emphasises digital literacy skills through technology integration (MoET, 2021). The Geography Education syllabus in Lesotho includes a section focusing on foundational inquiry skills and techniques for Geographic technology. Raselimo and Thamae (2018) highlight that this section aims to cultivate competencies like Geographic Information Systems (GIS), Global Positioning Systems (GPS), and remote sensing in Geography education. However, current syllabus activities do not explicitly use modern technologies, laying the groundwork instead (Ntlobo-Mbele, 2022). Despite this, students can build foundational skills for future Geospatial technological competencies. Some geography topics, like marine processes and plate tectonics, are abstract for Basotho students, requiring simulation videos for instruction (Ntlobo-Mbele, 2022). Given limited technology integration in schools, it is crucial to explore barriers hindering its use in the education system.

2.5. Challenges in integrating technology for Geography Education and implications

The effective use of technology in Geography Education in Lesotho's secondary schools faces significant challenges, as highlighted by Kalanda (2012). A key barrier is limited funding for connectivity, making it difficult to integrate technology. Brandao (2020) emphasises the high costs of purchasing and maintaining technology infrastructure and software licenses, leading teachers to rely on traditional methods (Dotong et al., 2016).

Another obstacle is the limited professional development of teachers. Turugare and Rudhumbu (2020) emphasise that without proper training, educators may struggle to use technology tools. Kalanda (2012) notes that the Ministry of Education rarely provides training, citing limited funds. This lack of training significantly hinders successful technology integration. Even if schools have technology, inadequate teacher training can lead to frustration and compromise effective teaching of Geography.

Another challenge in technology integration is the lack of clear policies. Atabek (2019) emphasizes the absence of guidelines and slow government adaptation. Unclear policies create uncertainties, as noted by scholars like Atabek (2019) and Ruggiero and Mong (2015), making it difficult to plan and implement technology initiatives. Lesotho lacks clear policies guiding teachers on technology integration in subjects like Geography Education. Consequently, Turugare and Rudhumbu (2020) state that technology integration is hindered. Osborne et al. (2020) raise concerns that even existing policies may not keep pace with technological advancements. This lag suggests outdated educational policies hindering successful technology integration. Without technology in teaching, students miss developing essential digital skills, compromising collaborative learning, creativity, and critical thinking (Lisene & Jita, 2018).

Another constraint is the inconsistent implementation of technology across schools, hindering effective Geography Education integration. Ntlobo-Mbele (2022) notes varying technology integration, with some schools having resources, infrastructure, and policies, while others lag due to funding disparities. This inconsistency results in some schools falling behind in technology integration, upholding a discernible education system in Lesotho, where skills development through Geography Education may vary. These inequalities may impede the goal of providing access and quality Geography Education, hindering the achievement of SDG4.

2.6. Intervention for practical challenges in technology integration

The study adopted Atabek's (2020) framework to address challenges associated with technology integration, aiming to provide a sustainable solution for integrating technology into Geography Education classrooms in Lesotho. Atabek's (2020) framework consists of ten components:

2.6.1. Policy development and clarity

This involves establishing clear policies to guide technology integration (Atabek, 2020). In Lesotho, it suggests that the Ministry of Education and Training should develop policies outlining objectives, guidelines, and strategies for

incorporating technology, especially in Geography Education. The lack of clear policies in Lesotho, as noted by Chere-Masopha (2018), may lead to uncertainties among teachers, hindering effective curriculum implementation.

2.6.2. Financial support and resource allocation

Adequate funding is essential to support necessary technological infrastructure, including connectivity, devices, and software licenses (Atabek, 2020). In Lesotho, this component suggests long-term planning, budgeting, and resource allocation to ensure continuity in technology integration. Limited funding in Lesotho impacts the ability to invest in technology (Isaacs, 2007), suggesting the exploration of partnerships and funding opportunities to support implementation.

2.6.3. Professional development for educators

Ongoing training is necessary for educators to effectively integrate technology into their teaching practices (Atabek, 2020). In Lesotho, comprehensive and continuous professional development opportunities for teachers and staff are crucial, emphasizing training on using technological tools and strategies for effective integration, especially in Geography Education.

2.6.4. Curriculum integration and alignment

Integrating technology seamlessly into the geography curriculum ensures alignment with educational objectives (Atabek, 2020). Lesotho needs guidelines for developing technology-enhanced learning materials that align with Geography Education goals, particularly considering the revisions in the LBCEP of 2021.

2.6.5. Technological infrastructure improvement

This refers to investing in improving technological infrastructure for successful integration, including upgrading connectivity, providing access to devices, and ensuring software compatibility (Atabek, 2020). In Lesotho, enhancing technological infrastructure is imperative, aligning with the LBCEP of 2021, which emphasizes the use of technology in pedagogy.

2.6.6. Monitoring and evaluation

Implementation of a mechanism for monitoring and evaluating technology integration initiatives involves assessing the effectiveness of implemented strategies and gathering feedback from teachers, students, and administrators (Atabek, 2020). In Lesotho, monitoring and evaluation can identify areas for improvement in teaching and learning, especially in Geography Education.

2.6.7. Collaboration and partnerships

Collaboration with external entities, such as international organizations and technology companies, is necessary for valuable resources and expertise (Atabek, 2020). In Lesotho, collaboration with electricity supply companies and telecom companies can overcome challenges associated with technology integration in schools, aligning with best practices and decision-making processes.

2.6.8. Community engagement

Engaging parents, guardians, and local communities is vital for building support for technology initiatives (Atabek, 2020; Ruggiero & Mong, 2015). In Lesotho, community engagement is essential to create a conducive environment for technology integration in Geography Education.

2.6.9. Addressing inequalities

A targeted approach is needed to address disparities in technology access among schools, involving policies that ensure all schools have equal opportunities for effective technology integration (Atabek, 2020). In Lesotho, robust addressing of inequalities associated with technology integration is essential for providing quality Geography Education.

2.6.10. Continuous research and adaptation

Ongoing research is necessary to stay informed about emerging trends and best practices in technology integration (Atabek, 2020). Lesotho can benefit from continuous research to adapt interventions based on new findings, ensuring a dynamic and responsive approach to technology challenges in Geography Education.

3. Conclusions and Recommendations

In conclusion, this study aimed to uncover the barriers within the education system that impede the integration of technology in schools. Addressing challenges related to technology integration in schools necessitates a comprehensive approach. The importance of incorporating technology into Geography Education practices cannot be overstated, given the rapid pace of technological advancements. Technologies like GIS and GPS enhance the teaching and learning of geography, facilitating the comprehension of spatial relationships and linear networks. Embedding technology in teaching approaches makes the learning process clearer, more interesting, and more effective.

Despite the benefits of technology integration in Lesotho's secondary Geography Education classrooms, challenges persist. These challenges, such as unclear policies, resource limitations, insufficient professional development, and inadequate monitoring and evaluation, have the potential to hinder effective integration. The implication of such ineffective integration is compromised skills development for students, contradicting the very educational goals that schools are entrusted to support.

The recommendations from this study align with Atabek's (2020) framework and include the following:

- The Ministry of Education and Training should develop clear policies for technology integration, with a specific focus on Geography Education.
- Establish strategic planning and budgeting processes to ensure consistent financial support and resource allocation for technology initiatives in schools.
- Implement comprehensive and ongoing professional development programs tailored to effectively integrate technology into Geography Education.
- Develop guidelines for creating technology-enhanced learning materials aligned with the goals of the revised Lesotho Basic Education Curriculum Policy (LBECP) of 2021.
- Invest in improving technological infrastructure in schools to support the implementation of technology in Geography Education.
- Establish effective mechanisms for monitoring and evaluating technology integration initiatives to measure their impact and identify areas for improvement.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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