Exploring the challenges of integrating TPACK in Lesotho`s universities

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Abstract

The integration of Technological Pedagogical Content Knowledge (TPACK) into teaching practices within Lesotho's universities faces significant challenges. This qualitative study investigates the barriers that hinder the effective implementation of TPACK in the higher education context in Lesotho. Through in depth interviews with university teachers, the study identifies several key challenges. Including limited time, lack of institutional support, and insufficient resources. These barriers undermine teaching efficacy and student learning outcomes, as they prevent teachers from seamlessly integrating technology into their pedagogy. The study underscores the urgent need for enhanced support, resources and continuous professional development to empower teachers and enable them to overcome these challenges. The findings contribute to the understanding of the complexities involved in the integration of TPACK in the unique context of Lesotho's higher education system , and provide insights that can inform policy and practice to improve the effective use of technology in teaching and learning.

KEYWORDS; TPACK, Integration, Teachers,Lesotho, challenges

1. INTRODUCTION

The integration of Technological Pedagogical Content Knowledge (TPACK) within higher education institutions in Lesotho presents a multifaceted challenge for educators. TPACK, as articulated by Mishra and Koehler, emphasizes the intersection of three critical knowledge

domains : technology, pedagogy and content knowledge which are essential for effective teaching in the digital age Mishra and Koehler (2006).

In the context of Lesotho's universities, where educational resources and technological infrastructure may be limited,the application of the TPACK framework becomes increasingly complex. This is compounded by the rapid evolution of technology and the necessity for educators to adapt their teaching methodologies accordingly (Yopi,2024; Raphael,2024). one of the challenges faced by teachers in Lesotho is the lack of adequate technological resources and training. Many educators struggle to effectively integrate technology into their teaching practices due to insufficient access to digital tools and platforms (Turugare & Rudhumbu, 2020; Makuru & Jita, 2022). This limitation not only hinders their ability to deliver content effectively but also affectes ther confidene in utilizing technology as a pedagogical tool (Muslimin et al.,2022).

Furthermore, the disparity in technological proficiency among educators can led to inconsistent implementation of TPACK principles, ultimately impacting student learning outcomes (Taopan, 2020; Voogt et al; 2012) Additionally, the pedagogical aspect of TPACK poses challenges for teachers in Lesotho. The integration of technology into pedagogy requires a deep understanding of both the content being taught and the most effective methods for delivering that content (Fahrurozi et al., 2019).

However, many educators may not have received adequate training in pedagogical strategies that leverage technology, resulting in a gap between their technological capabilities and their pedagogical practices (Padmavathi, 2017; Dewi, 2024). this disconnect can lead to a reliance on traditional teaching methods which may not engage students effectively in a technology driven learning environment (Taopan, 2020; Raphael, 2024) moreover the cultural and contextual factors unique to Lesotho further complicate the integration of TPACK. Teachers must navigate a landscape shaped by socio- economic challenges, including poverty and limited educational infrastructure which can impede their ability to implement innovative teaching practices (Lekhetho, 2013; Lebata & Mudau, 2014). the necessity for continuous professional development and professional development and support for educators is paramount to overcoming these challenges and fostering an environment conducive to effective technology integration (Raphael, 2024; Turugare & Rudhumbu 2020).

2. TPACK FRAMEWORK THEORY

Technological Pedagogical Content Knowledge (TPACK) is a comprehensive framework that describes the essential knowledge teachers need to integrate technology effectively into their teaching practices. Developed by Mishra and Koehler, TPACK extends Shulman's earlier work on pedagogical content knowledge (PCK) by incorporating technology as a critical component of effective teaching (Voogt et al., 2012; Taopan, 2020). The framework posits that successful technology integration requires a harmonious blend of three primary forms of knowledge: content knowledge (CK), pedagogical knowledge (PK), and technological knowledge (TK). This integration is crucial for teachers to design, implement, and evaluate educational experiences that leverage technology to enhance student learning (Niess, 2011; Yeh et al., 2013). The TPACK framework emphasizes that teachers must not only understand their subject matter but also how to teach it effectively using technology. This involves recognizing the unique affordances and constraints of various technologies and how they can be employed to facilitate learning in specific content areas (Heitink et al., 2017; Graham et al., 2012). For instance, a teacher must know how to use digital tools to teach mathematics effectively, which requires an understanding of both the mathematical concepts and the pedagogical strategies that best support student engagement and comprehension (Li, 2023; Mourlam et al., 2021).

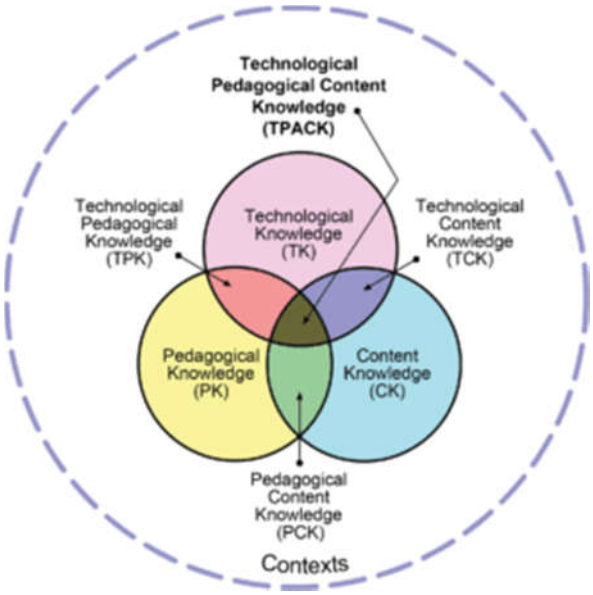
Research has shown that the development of TPACK among teachers is influenced by various factors, including professional development programs, collaborative learning experiences, and the design of technology-rich instructional activities (DeSantis, 2016; Koh & Divaharan, 2011). Effective professional development that targets TPACK can lead to significant improvements in teachers' confidence and competence in using technology in their classrooms (Huang et al., 2020; Bulut & Güveli, 2023). Moreover, studies indicate that preservice teachers who engage in technology-integrated learning experiences are more likely to develop robust TPACK, which in turn enhances their instructional practices (Cengiz, 2014; Baran et al., 2017).

Furthermore, the TPACK framework is not static; it evolves as teachers gain more experience and as technology continues to advance. This dynamic nature of TPACK highlights the importance of ongoing professional development and reflective practice for educators (Han &

Patterson, 2020; Mejia & Sargent, 2023). As teachers navigate the complexities of integrating technology into their teaching, they must continually adapt their knowledge and skills to meet the changing needs of their students and the educational landscape (Bond & Dirkin, 2020; WU, 2023). TPACK serves as a vital framework for understanding the intersection of technology, pedagogy, and content knowledge in education. By fostering a deep integration of these elements, educators can enhance their teaching effectiveness and improve student learning outcomes in an increasingly digital world.

The framework is most easily recognized by figure 1 given below

figure 1



Here is a breakdown of each component:

1. **Technological Knowledge (TK):** refers to the understanding of various technologies and their capabilities. This includes familiarity with hardware, software and digital tools that can enhance teaching and learning processes. Teachers must be adept at using these technologies to facilitate instruction and engage students effectively.(Nasir et al., 2023; Willermark, 2017).

2. **Content Knowledge (CK)**: Encompasses the subject matter that teachers are expected to teach. This knowledge includes the facts concepts, theories, and principles related to the specific

discipline. A strong grasp of content knowledge allows teachers to convey information accurately and to design appropriate learning experiences.(Nasir et al.,2023; Duan et al., 2022).

3. Pedagogical Knowledge (PK): Involves the method and strategies of teaching. This includes understanding how students learn, the different instructional strategies that can be employed and the assessment techniques that can be utilized to evaluate student learning.(Nasir et al., 2023; Willermark, 2017).

4.Technological Pedagogical Knowledge (TPK): is the the understanding of how technology can be used to support pedagogical practices. This component emphasizes the interplay between technology and pedagogical, highlighting how specific technologies can enhance teaching methods and improve student engagement .(Saubern et al., 2020; Nasir et al. 2023; Willermark, 2017).

5. **Technological Content Knowledge (TCK**): refers to the understanding of how technology can be used to represents and teach specific content. This involves knowing which technologies are best suited for particular subject matter and how they can be employed to facilitate deeper understanding of content. (Saubern et al.,2020; Nasir et al., 2023; willermark, 2017).

6. Pedagogical Content Knowledge (PCK): combines pedagogical and content knowledge, focusing on how to effectively teach specific content. This component emphasizes the importance of understanding how to present content in ways that are accessible and engaging for students talking into account their prior knowledge and learning needs.(Nasir et al .,2023; Willermark, 2017).

7. **Technological Pedagogical Content Knowledge(TPACK**): represents the integration of all the aforementioned components. It is the holistic understanding that enables teachers to effectively combine technology, pedagogy, and content in their teaching practices. This comprehensive knowledge is essential for creating meaningful learning experiences that leverage technology to enhance student learning outcomes (Saubern et al., 2020; Nasir et al.,2023; Willermark,2017).

3. Challenges Integrating TPACK in Lesotho

In today's rapidly evolving educational landscape, technology integration has become vital for optimizing teaching and learning outcomes. The Technological Pedagogical Content Knowledge (TPACK) framework offers educators a comprehensive model to seamlessly blend technology, pedagogy and content expertise in their instructional practices. However, implementing TPACK poses significant challenges, primarily stemming from systemic issues such as:

1) limited access to technological resources
2) Inadequate teacher training and professional development
3) Insufficient institutional support and infrastructure

Lesotho's universities play a vital role in shaping the country's future professionals. To remain relevant and competitive these institutions must effectively integrate technology into their teaching practices. This requires educators to seamlessly blend technological skills, pedagogical expertise and subject matter knowledge also known as Technological Pedagogical Content Knowledge (TPACK).

However, teachers in Lesotho universities encounter numerous challenges when implementing TPACK in their daily lessons. These obstacles hinder the successful fusion of technology affecting teaching efficacy and student learning outcomes.recognizing and addressing these challenges is crucial for developing targeted interventions. Such solutions will enhance technology integration, fortify higher education and empower future professionals.

This study investigates the unique challenges Lesotho university teachers encounter integrating Technological Pedagogical Content Knowledge (TPACK) into teaching practices. Through educator's experiences and perspectives, it identifies barriers hindering effective TPACK adoption and informs strategies for enhanced teacher support,resource allocation and student learning outcomes.

3.1 Limited Access to Technological Resources

Teachers in Lesotho universities face significant challenges integrating technology into their teaching. One major obstacle is the limited availability of technological resources. Many

universities lack reliable internet, modern computers and up to date software. The TPACK framework highlights technology's crucial role in enhancing educational outcomes. However many universities lack essential infrastructure,hindering seamless technology integration. Teachers consistently report inadequate access to

- Computer for instructional preparation and delivery
- Reliable internet connectivity for online resources
- Up to date software for efficient instructional design

In rural areas this problem worsens due to restricted digital access. Teachers struggle to engage students through technology, resorting to traditional methods instead. Insufficient resources hinder effective teaching and learning

3.2 Insufficient Professional Development and Training

Effective integration of TPACK requires not only access to technology but also the skills and knowledge to use it effectively within the context of pedagogy and content delivery. However, many teachers in Lesotho's universities report that they receive insufficient training in how to incorporate technology meaningfully into their teaching. Although some professional development initiatives are available, they often focus on basic digital literacy rather than on the specific pedagogical approaches emphasized in TPACK.

Teachers are therefore left feeling underprepared to use technology in ways that align with their teaching objectives. This lack of training creates a gap between the theoretical knowledge of TPACK and its practical application in the classroom.

3.3 Technical Difficulties and Infrastructure Challenges

Even when technology is available, technical difficulties often disrupt the learning process. Teachers in Lesotho frequently face issues such as power outages, unreliable internet, and malfunctioning devices, which can derail lessons and create frustration for both educators and students. In many cases, universities do not have sufficient technical support staff to address these issues quickly, leaving teachers to troubleshoot on their own.

This unreliability in technology use discourages teachers from incorporating digital tools into their lessons regularly. As a result, even when there is a desire to integrate TPACK, technical issues create barriers that make its use impractical.

3.4 Balancing Technology with Pedagogical and Content Goals

One of the fundamental elements of the TPACK framework is the seamless integration of technology, pedagogy, and content knowledge. However, achieving this balance can be a significant challenge for teachers. Many educators find it difficult to integrate technology in ways that enhance rather than overshadow the core content. This is especially true for subjects that are traditionally taught using non-digital methods, such as humanities or social sciences, where teachers may feel that technology does not align with the subject matter.

Additionally, there is often a fear among teachers that the overuse of technology could detract from the depth of content or lead to superficial learning. Striking the right balance between content delivery and technological integration remains a challenge for many educators.

3.5 Institutional and Policy Constraints

Institutional policies and support structures play a crucial role in enabling or hindering the integration of TPACK. In Lesotho, many universities lack clear guidelines or incentives for teachers to incorporate technology into their teaching. Additionally, budget constraints limit investments in necessary technology infrastructure and professional development programs. Without institutional backing, teachers are often left to manage the demands of technology integration on their own, with limited resources and support.

The lack of a supportive institutional framework can make it difficult for teachers to implement long-term, sustainable changes in their teaching practices. As a result, even when teachers are willing to integrate TPACK, institutional constraints make it challenging to do so effectively.

Conclusion

The integration of TPACK in Lesotho's universities faces significant challenges, including limited resources, inadequate training, technical issues, and systemic constraints. These barriers prevent educators from fully leveraging technology to enhance their teaching practices and improve student learning outcomes.

To address these challenges, universities must prioritize:

- Investing in technological infrastructure and resources.
- Offering targeted professional development programs that focus on TPACK principles.
- Establishing institutional policies and support systems to encourage and sustain technology integration.

By overcoming these obstacles, Lesotho's higher education institutions can foster an environment where technology, pedagogy, and content knowledge intersect, empowering educators and enriching the learning experience for students.

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