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HARNESSING TIKTOK TO ENHANCE GRADE 10 LEARNER ENGAGEMENT IN LIFE SCIENCES CLASSROOMS

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Abstract

The integration of modern technologies in the classroom has become a key strategy to enhance learner engagement, particularly in subjects like Life Sciences. TikTok, a popular social media platform, hold significant potential as an educational tool to enhance engagement among Grade 10 Life Sciences learners in South African township schools. However, existing research indicates that while TikTok is widely recognized for its entertainment value, its application in education remains underexplored, particularly in addressing common teaching challenges such as limited classroom time, learner disengagement, and language barriers. As such, the current study sought to investigate how the integration of TikTok by Grade 10 Life Sciences teachers enhances learner engagement. The research was grounded in Cognitive Load Theory (CLT), which elucidates that since learners' working memory has a limited capacity, effective learning requires minimizing extraneous cognitive load, managing the inherent difficulty of the material, and fostering meaningful knowledge construction enhance comprehension and retention, particularly in complex subjects like Life Sciences. A qualitative case study approach was employed, including semi-structured interviews and classroom observations of five Grade 10 Life Sciences teachers from four Soweto township schools. The findings reveal that TikTok's short, visually engaging videos helped simplify complex scientific concepts, making them more accessible to learners, particularly those who are digital natives. Teachers reported that TikTok's concise, visually appealing content aligned well with learners' learning preferences, especially those accustomed to consuming content on social media. The ability to present content in an engaging and easily digestible format contributed to increased learner focus and participation during the lessons. However, the study also identified challenges, including issues of digital accessibility. Some learners lacked smartphones or reliable internet access, which limited their ability to participate in TikTok-based learning activities. Additionally, some teachers noted the potential for distractions, as learners were tempted to create their own TikTok videos during lessons, which could disrupt the classroom environment and undermine educational objectives. Based on these findings, the study recommends more investments in digital infrastructure to bridge the digital divide, ensuring equal access to technology for all learners. It also calls for professional development for teachers in educational technology to maximize the benefits of TikTok in the classroom. Furthermore, the study suggests incorporating digital media literacy into the curriculum to better equip learners for the digital world.

Keywords: *Engagement, grade 10, harnessing, life sciences, TikTok.*

1. Introduction

In recent years, social media platforms such as TikTok have gained immense popularity among learners, shaping how they consume and engage with content. Martin et al. (2018) posit that learners spend significant time interacting with TikTok, primarily for entertainment. Similarly, de Silva (2016) highlights that the current generation of learners is increasingly inclined toward using smartphones, influencing their preferences for digital and interactive learning tools. Given this shift, this study argues that Life Sciences teachers should leverage TikTok as an educational tool to enhance learner engagement, attention, and interest. Life Sciences, as a subject, encompasses abstract and complex scientific concepts, processes, laws, and theories that many learners find abstract and challenging to grasp (Mkhwebane, 2024). This challenge is particularly pronounced in township schools, where learners from marginalized and Indigenous communities often struggle to relate Life Sciences content to their socio-cultural backgrounds (Mavuru, 2022).

A lack of engagement in Life Sciences has led to reluctance among learners to pursue the subject, often due to fear of failure (Nwokocha & Legg-Jack, 2024). Those who enroll in the subject frequently experience low motivation and disengagement when confronted with complex scientific concepts (Mkhwebane, 2024). This issue is exacerbated by Life Sciences teachers' reliance on traditional teaching methods, which fail to stimulate learners' curiosity, interest, and motivation (Nwokocha & Legg-Jack, 2024). According to de Silva et al. (2016), a key factor behind this pedagogical stagnation is the limited professional development opportunities for teachers to integrate social media into their teaching practices. Without adequate training, many teachers continue using outdated traditional approaches, neglecting more innovative and interactive methods that could make learning more engaging.

In response to these challenges, this study explores the potential of TikTok as a tool for demystifying the teaching and learning of Life Sciences, particularly in township schools. TikTok's short-form videos allow teachers to present content in an engaging, audio-visual format that stimulates both visual and auditory processing (Radin & Light, 2022). This multimodal approach fosters inclusivity by accommodating diverse learning preferences and easing cognitive load—an essential consideration given the cognitively demanding nature of Life Sciences (Mkhwebane, 2024). By presenting information in a structured yet visually appealing manner, TikTok helps learners process and conceptualize scientific concepts more effectively while preventing cognitive overload.

Moreover, TikTok allows learners to revisit content at their own pace, facilitating self-directed learning and revision (Hearth, 2020). Research indicates that poor academic performance in Life Sciences is often linked to learners spending excessive time on social media for non-academic purposes (Yélamos-Guerra et al., 2022). Therefore, by integrating TikTok into teaching, teachers can redirect learners' social media engagement toward academic content, potentially improving their performance in Life Sciences.

Beyond improving comprehension and academic outcomes, TikTok also offers Life Sciences teachers an opportunity to create more dynamic, enjoyable, and engaging learning experiences (Ardiana & Ananda, 2022). Traditional teaching pedagogies, still widely implemented in South African township schools, often fail to captivate learners, leading to continued disengagement and declining performance. If this trend persists, the country risks producing fewer science graduates, exacerbating the shortage of skilled professionals needed to address critical sustainability challenges (Mkhwebane, 2024). Despite the potential of TikTok as an educational tool, its integration into Life Sciences teaching in South African township schools remains underexplored. Thus, this study investigates how the integration of TikTok by Grade 10 Life Sciences teachers enhances learner engagement.

2. Theoretical frameworks

This study was informed by Cognitive Load Theory (CLT), conceptualized by Sweller (2004), which posits that learners' working memory has a limited capacity when processing new information. To facilitate effective learning, teachers must present content in ways that reduce cognitive load, a crucial consideration in Life Sciences, where cognitively demanding content often feels disconnected from the lived experiences of township learners (Mkhwebane, 2024; Mavuru, 2022). CLT differentiates between intrinsic load, which pertains to the complexity of the material itself; extraneous load, which refers to the way content is delivered; and germane load, which involves the mental effort dedicated to constructing and organizing knowledge (Sweller, 2020; Van Merrienboer & Ayres, 2005). In alignment with CLT, this study contends that TikTok's short, visually engaging videos can help mitigate cognitive overload by chunking complex scientific concepts into manageable segments. By leveraging TikTok's multimedia features, teachers can minimize extraneous load through concise, interactive content while promoting germane load by encouraging learners to engage with and make sense of the material actively. The platform's engaging format fosters deeper understanding, making abstract Life Sciences concepts more accessible and relevant to learners.

3. Research Methodology

This study employed a qualitative case study design (Creswell & Creswell, 2018) to provide an in-depth understanding of how TikTok influences learner engagement in Grade 10 Life Sciences classrooms. This approach allowed for the exploration of teachers' nuanced experiences and perspectives regarding integrating TikTok into their teaching practices.

The study purposively selected four Grade 10 Life Sciences teachers from four township schools in Soweto, using predefined selection criteria (Cohen et al., 2017). To be eligible for participation, teachers had to (i) be actively involved in teaching Grade 10 Life Sciences, (ii) have a minimum of two years of teaching experience, and (iii) be willing to integrate TikTok as a pedagogical tool in their classrooms.

Data was collected through semi-structured interviews and lesson observations to gain insights into teachers' perceptions and pedagogical practices related to TikTok integration. Each participant participated in one semi-structured interview, which focused on their perceptions regarding using TikTok to enhance learner engagement. This was followed by one lesson observation per teacher, which investigated how they integrated TikTok into their lessons and how learners engaged with the platform during teaching. The Reformed Teaching Observation Protocol (RTOP) by (Sawada et al., 2002) was used to document and analyze lesson episodes, ensuring a structured assessment of teaching practices.

Following Braun and Clarke's (2006) six-step framework, thematic analysis was employed to analyze the data collected systematically. Teachers' interview responses were transcribed verbatim and subjected to coding, categorization, and theme development to identify patterns and key insights. The emerging themes provided a structured interpretation of how TikTok influenced learner engagement in the Life Sciences classrooms.

4. Research findings

Three themes emerged from the analysis of the findings from the analyzed data: Life Sciences teachers' perception of integrating TikTok when teaching to enhance learner engagement and Possible challenges of using TikTok for teaching and learning and Life Sciences teachers use TikTok to enhance learner engagement.

4.1. Life Sciences teacher's perception of integrating TikTok when teaching to enhance learner engagement

The findings of this study reveal that Life Sciences teachers hold positive perceptions toward integrating TikTok as a pedagogical tool. Teachers strongly endorse TikTok as a valuable platform for increasing learner engagement and improving comprehension of complex scientific concepts. Given that Life Sciences contains abstract and cognitively demanding content, teachers recognize the importance of leveraging digital tools that align with learners' interests and technological habits. Mr. Themba stated, *"I feel like in the 21st century, it is very important to include things such as TikTok in teaching because it can encourage learners to engage and grasp the subject matter."* This response highlights teachers' awareness of the necessity to incorporate modern, technology-driven strategies to enhance student participation and conceptual understanding. Furthermore, teachers acknowledge that learner engagement is intrinsically linked to their interests and digital consumption patterns. In today's digital age, learners spend significant time on social media, making platforms like TikTok an effective tool to capture their attention and sustain engagement. The teacher shared the following sentiments:

Ms. Nosipho: These learners are always on their phones, so you might as well use that to your advantage as a teacher.

Mrs. Lerato: Most learners like to create videos for entertainment, so I think if we use this as teachers, we can make their learning more enjoyable.

These responses demonstrate teachers' recognition of the potential of TikTok to transform passive learning into an interactive, learner-driven experience.

Additionally, the findings indicate that teachers are willing to move away from traditional, lecture-based teaching methods in favor of more dynamic, learner-centered approaches that maximize engagement. This shift is evident in the sentiments shared by Mr. Thabo: *"It is important for us as teachers to take advantage of these trends to ensure that we teach well and keep learners engaged."* Similarly, Mrs. Lerato emphasized, *"As teachers, we need to adapt and innovate our teaching practices to maximize learner engagement."* These perspectives suggest that teachers are becoming more open to integrating digital tools into their instructional strategies to align with evolving learner needs and preferences.

Moreover, teachers recognize that relying solely on traditional teaching methods risks disengagement, cognitive overload, and poor academic performance, particularly in Life Sciences, where learners often struggle to grasp abstract concepts. By integrating TikTok, teachers can bridge the gap between traditional teaching and modern digital engagement, ensuring that lessons are both accessible and stimulating. The integration of short, visually engaging videos allows for the chunking of information, which reduces cognitive overload and supports incremental knowledge acquisition. This aligns with the broader need for adaptive and inclusive teaching strategies that cater to diverse learning styles, particularly in under-resourced township schools where learners often lack access to supplementary learning materials outside the classroom.

4.2. Possible challenges of using TikTok for teaching to enhance learner engagement

Although teachers generally viewed the integration of TikTok as a valuable and innovative teaching strategy, they also raised concerns about the challenges associated with its implementation, particularly in under-resourced township schools. One of the primary concerns was the digital divide, as

not all learners have access to smartphones or affordable internet data to engage with TikTok content outside the classroom. This challenge was emphasized by Mr. Themba, who stated, *"Some learners do not afford to buy smartphones, and this may disadvantage those who cannot afford them, and we have plenty of such learners in our school."* Similarly, Ms. Nosipho highlighted the issue of data accessibility, stating, *"Some learners do not afford to buy internet data to access TikTok videos that we will be uploading for them to engage with."*

These statements underscore the inequities in access to digital resources, which could result in the exclusion of many learners who lack the financial means to participate in TikTok-based learning activities. In township schools without free internet access, reliance on personal mobile data to access educational content further exacerbates existing socio-economic disparities. As a result, integrating TikTok into Life Sciences teaching could unintentionally widen the learning gap, disadvantaging learners unable to access the platform while benefiting those with digital resources.

Another critical challenge raised by teachers was the lack of professional development and training on integrating TikTok into teaching. All participating teachers reported never receiving formal training on using TikTok for educational purposes, either during their preservice teacher education or as in-service teachers. While teachers expressed enthusiasm and willingness to incorporate TikTok into their lessons, the absence of training presents a significant barrier to effective implementation. Despite their willingness to integrate TikTok, teachers recognized that without adequate training, they might struggle with its meaningful and structured use in the classroom.

4.3. Life Sciences teachers' use of TikTok to enhance learner engagement

The challenges related to the lack of training, internet access, and smartphone availability were evident during lesson observations, highlighting the practical barriers teachers faced in integrating TikTok into their teaching. For instance, in Mr. Themba's classroom, when he asked learners to take out their smartphones, log in to TikTok, and view the content he had shared, fewer than 20 out of 65 learners had smartphones, and less than half of those had internet data. This significantly disrupted his lesson plan, as the intended interactive experience was no longer feasible. As a result, Mr. Themba was forced to use the interactive whiteboard (IWB) to display pre-recorded TikTok videos on cellular respiration for the entire class. Similarly, all four participating teachers had to adapt their strategies by using IWBs to display videos for learners rather than allowing individual engagement through personal devices. This shift limited the interactive potential of TikTok-based learning, as learners could not actively participate in the creation or personalized exploration of TikTok content. Instead, they became passive consumers of videos pre-recorded and uploaded before class.

Nevertheless, despite these challenges, using TikTok successfully enhanced learner interest, curiosity, and engagement. In Mrs. Lerato's class, learners were heard expressing enthusiasm, with one remark: "Today learning is going to be fun. I really love TikTok content." This response suggests that merely incorporating TikTok into the lesson created excitement among learners, indicating a positive shift in engagement levels. Similarly, after his lesson, Mr. Thabo jokingly commented, "I should use TikTok because you guys were engaged and attentive today." His remark reflects an acknowledgment of the platform's effectiveness in capturing learners' attention, reinforcing its potential as a valuable educational tool.

Additionally, learner body language and focus during the lesson suggested heightened engagement, as students appeared more attentive and responsive than usual. This observation aligns with the notion that TikTok's familiar, visually stimulating format resonates with digital-native learners, making learning more relatable and enjoyable. While the lack of access to individual devices limited the full interactive potential of TikTok-based learning, the platform still demonstrated its ability to generate enthusiasm and sustain learner engagement in Life Sciences classrooms.

5. Discussion, implications and conclusions

The findings of this study reveal that Life Sciences teachers view TikTok as a valuable tool for engaging the current generation of learners. This perspective aligns with de Silva's (2016) assertion that using technologies and social media platforms in teaching increases learner engagement. Additionally, the findings indicate that TikTok enhances learner engagement, curiosity, motivation, and interest, as also noted by Ardiana and Ananda (2022). This was evident in the lessons, where learners became more enthusiastic and eager to learn upon being informed that TikTok would be used as part of the teaching process.

However, contrary to Radin and Light's (2022) finding that TikTok promotes interactivity in lessons, this study found that passive learning could sometimes occur. This was due to the lack of smartphones and internet bundles among learners, which forced teachers to display videos through

interactive whiteboards (IWBs). The study also identified a lack of teacher training, which mirrors de Silva's (2016) claim that teachers often lack the professional development to integrate smart technologies and social media into their teaching effectively. Furthermore, using TikTok helped prevent cognitive overload by providing short, visually appealing videos that allow learners to process new information in manageable chunks (Sweller, 2020). The recommendations of this study include professional development for teachers on technology and social media integration and partnerships to subsidize digital access for disadvantaged learners. This will ensure inclusive, innovative educational practices in resource-constrained settings.

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