

Social Media as Professional Development for Physical Education Teachers in International Schools in Nairobi, Kenya.

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Abstract

Social media serves as an accessible avenue for teachers' professional development. However, there is limited evidence on how Physical Education teachers in Kenyan international schools use these platforms to support professional development. This study investigated the role of social media in the professional development of Physical Education teachers in selected international schools. The study was conducted in selected international schools in Nairobi City County, Kenya. A descriptive survey design with an embedded qualitative component was adopted. Multistage sampling selected 143 Physical Education teachers and 15 headteachers. Questionnaires and semi-structured interviews were used to collect quantitative and qualitative data, which were analyzed using descriptive statistics and thematic analysis. Instagram (n = 92), LinkedIn (n = 80), and YouTube (n = 75) were the most frequently used platforms. Most respondents (75.5%) collaborated with other Physical Education teachers through social media. Reported benefits included stronger professional networks, increased motivation to adopt new teaching methods, improved teaching practice, and enhanced student engagement. Key challenges included unreliable internet connectivity (52.5%), privacy and data security concerns (50.4%), difficulty assessing information credibility (47.6%), and inadequate digital skills (42.0%). Social media supported the continuing professional development of Physical Education teachers by facilitating collaboration, knowledge sharing, and professional networking. Schools should strengthen digital literacy, improve institutional support, establish clear policies for professional social media use, and improve internet access to maximize these benefits.

Keywords: Social media, professional development, physical education teachers, international schools

1.0 Introduction

The professional development of teachers is vital for enhancing the quality of education through the strengthening of pedagogical knowledge, teaching practices, and the ability of teachers to adapt to new educational requirements. Modern education systems have been advancing rapidly due to technological advancements and curriculum changes (Romay & Alvarez, 2024). Historically, workshops, seminars, conferences, and institutional training programs have been the course of the professional development of educators, but these methods do not always allow people to train effectively due to high costs, inaccessibility, scheduling, and not enough chances of opportunities for collaboration after official training programs (Pavlik, 2014). The shortcomings of the steps mentioned above explain the need for new, flexible methods of professional learning to improve the training of educators.

The rapid growth of digital technologies has transformed professional development by creating new possibilities for teachers to access information from different places, receive education, and communicate with other teachers. Social media has transformed from a communication tool into an important medium for education. Social media allows teachers to exchange information, hold discussions about teaching methods, share their experiences, and build networks (Greenhow et al., 2023; Krismanto et al., 2022; Mercado & Shin, 2024), which is different from traditional professional development, as social media gives educators an opportunity for a self-directed and timely learning process since they can act according to their actual immediate needs. Hence, digital platforms increasingly become complementary to traditional professional education, making it easier to learn (Greenhow et al., 2023; Krismanto et al., 2022; Mercado & Shin, 2024).

These opportunities are particularly relevant to Physical Education (PE), a subject characterised by movement-based pedagogy, practical demonstrations, and the continuous adaptation of instructional strategies to meet learners' physical, cognitive, and social development needs. Social media enables PE teachers to access demonstration videos, lesson ideas, assessment strategies, and subject-specific professional communities that may not be readily available through conventional professional development programmes (Carpenter & Harvey, 2020; Schulz & Gaudreault, 2023; Xu & Yin, 2022). Participation in these online communities has been associated with stronger professional networks, increased instructional confidence, greater willingness to adopt innovative teaching approaches, and reduced professional isolation among Physical Education teachers (Carpenter & Harvey, 2020; Schulz & Gaudreault, 2023; Xu & Yin, 2022). Understanding how social media contributes to the professional development of PE teachers is therefore important for strengthening instructional quality and supporting effective learner outcomes.

The educational capability of social media in the professional development of teachers has gained more attention among scholars. Teachers turn to social media services such as Facebook, WhatsApp, YouTube, LinkedIn, Instagram, or X (formerly Twitter) to look for educational information, share research materials, exchange opinions, and build professional learning networks (Christopherson, 2020; Krismanto et al., 2022; Mercado & Shin, 2024). Despite the choice of

platforms differing based on teachers' professional needs and technological backgrounds, these digital spaces ensure continual learning through collaboration, resource sharing, mentoring, and reflection. Thus, instead of substituting for formal professional development, social media is becoming a supplementary tool for formal professional development by enhancing external professional communication and allowing teachers to implement continual learning principles.

Social media has also gained popularity as a means of achieving collaborative professional learning. Online communities of practice and professional learning networks provide teachers with opportunities for the process of knowledge construction via discussion, peer feedback, group problem-solving, and joint reflection on their classroom practice (Prestridge, 2019; Trust et al., 2016; Van Bommel et al., 2020). The nature of cooperation provides the basis for professional dialogue, exchange of innovative teaching methods, and enhancement of the professional identity of teachers. Continuous participation in the process of being active in professional online communities is also connected with the improvement of self-efficacy, effectiveness of classroom strategies, and willingness to apply new teaching practices (Carpenter & Harvey, 2020; Schulz & Gaudreault, 2023; Xu & Yin, 2022; Lonah, 2023). Physical Education professionals rely on demonstration and practical application, meaning that a collaborative digital space opens the door for learning from others.

There are numerous challenges to social media-based professional development. These include lack of digital competence, internet connectivity issues, insufficient institutional support, safety and privacy concerns, and evaluation of information shared online (Bett & Makewa, 2018; Fox & Bird, 2015; Hizam et al., 2021; Kwaah, 2024; Marín et al., 2022; Sun et al., 2023). The impacts of these challenges may be even more pronounced in developing countries where ineffective technology hampers teachers' ability to take full advantage of the digital environment for their education. Consequently, the effectiveness of social media as a professional development platform depends not only on the availability of digital technologies but also on institutional support, digital literacy, and organisational policies that promote responsible and effective use.

Within Africa, the adoption of social media for teacher professional development has expanded alongside increasing internet penetration and smartphone ownership (Sun et al., 2023). In Kenya, teacher professional development continues to rely predominantly on structured face-to-face training despite growing recognition of the flexibility and accessibility offered by digital professional learning environments (Kariuki et al., 2024; Simiyu et al., 2021). Existing Kenyan studies have demonstrated that social media supports teacher learning, professional networking, and collaborative knowledge sharing (Bett & Makewa, 2018; Simiyu et al., 2021). However, these studies have largely focused on teachers as a general professional group or on public-school contexts. Comparatively little empirical evidence exists regarding how Physical Education teachers working in Kenyan international schools use social media to support their professional development. Furthermore, limited attention has been given to the collaborative processes, perceived professional benefits, and contextual barriers influencing social media use within these specialised educational settings.

Although social media has been widely investigated as a platform for teacher professional learning, little is known about how specialist subject teachers in international school contexts engage with these platforms. By examining the experiences of Physical Education teachers in Kenyan international schools, this study extends current understanding of digital professional learning within a specialist subject and institutional context that has received limited scholarly attention.

This knowledge gap is significant because international schools represent distinctive educational environments characterised by multicultural teaching staff, internationally recognised curricula, and relatively greater access to digital technologies than many public schools. Also, Physical Education differs from many curriculum subjects through its emphasis on practical demonstrations, movement-based learning, and visual pedagogy. Understanding how teachers work within these specialised contexts engage with social media therefore extends current knowledge beyond general teacher populations and contributes new evidence regarding technology-enhanced professional development within international school settings.

This research is supported by Social Learning Theory and Self-Determination Theory, which provide a framework for understanding teachers' engagement with social media for professional purposes. According to Social Learning Theory, teachers gain knowledge through observing, imitating, interacting, and communicating (Bandura, 1977). Self-Determination Theory gives insight into how factors like autonomy, competence, and relatedness impact teachers' motivation for training in the digital context (Deci & Ryan, 1985). Thus, both theories explain the collaborative learning processes and motivational mechanisms responsible for teachers' engagement in social media-based learning.

These objectives guided the study:

- i. Establish the social media platforms used for professional development.
- ii. Examine the forms of collaborative exploration facilitated through social media.
- iii. Assess the contribution of social media to the professional development of Physical Education teachers.
- iv. Identify the challenges influencing the use of social media for professional learning.

By addressing these objectives, the study contributes evidence to inform teacher professional development, educational leadership, technology integration, and policy within international school contexts.

2.0 Methodology

2.1 Study design

This research utilized a descriptive survey design with a qualitative component, as this design facilitates the identification of patterns, trends, and views within a population that align with the aims of this study. The qualitative aspect adds to the quantitative findings by providing additional

information about institutions' views on social media-based professional development and bolstering the study's relevance and accuracy.

2.2 Setting

The study was conducted in four subcounties in Nairobi City County: Roysambu, Dagoretti North, Westlands, and Lang'ata. Schools in these areas are equipped with facilities that guide the learning and professional development of the staff. The study focuses on the four areas with a view to ensuring that it is practical.

2.3 Study population and sampling strategy

The target population comprised Physical Education (PE) teachers and headteachers in selected international schools in Nairobi City County. PE teachers were included because they were the primary users of social media for professional development, while headteachers were included to provide institutional perspectives on the use of digital platforms for teacher learning.

A sample of 150 respondents was selected for this study, which included PE teachers and headteachers. A multistage sampling procedure was employed. Purposive sampling was used at the first stage to select international schools located in the four Nairobi sub-counties: Roysambu, Dagoretti North, Westlands, and Lang'ata, and simple random sampling was used to select Physical Education teachers within the chosen schools. Headteachers were selected purposively because of their leadership roles and knowledge of school policies relating to teacher professional development and technology use.

2.4 Data collection

The researcher utilized two research tools, questionnaires and semi-structured interviews, for the collection of data. The questionnaire was disseminated to PE teachers via Google Forms, while semi-structured interviews were conducted with the head teachers via Google Meet. The questionnaire items were constructed using a five-point Likert Scale (where 1= strongly disagree, and 5= strongly agree) to analyze the attitudes of the respondents.

The questionnaire consisted of themes that were decided after going through the literature and were in accordance with the aim of the research. The contents of the questionnaire were validated by means of expert review by professors and educational research experts. The pilot study conducted helped to make improvements regarding the clarity and relevance of the items in the questionnaire.

2.5 Data analysis

Quantitative data was captured, coded, checked for completeness and consistency, and cleaned before analysis. Descriptive statistics including frequencies, percentages, means, and standard deviations were computed to summarise the core variables and demographic information. Qualitative data were transcribed verbatim and analysed thematically. Interview transcripts were examined and coded using NVivo, and emergent themes were linked to the study objectives.

2.6 Instrument Validity and Reliability

Content validity was established through expert review to ensure the questionnaire aligned with the study objectives. A pilot study was conducted to assess the clarity and suitability of the instrument before the main study. The questionnaire demonstrated acceptable internal consistency, with a Cronbach's alpha of 0.88.

2.7 Ethical considerations

The researcher obtained ethical clearance from the KCA University Scientific and Ethical Review Committee (KCAUSERC) (Approval number: KCAU/SERC/SEASS041). Permission to conduct the study was also obtained from the KCA University Graduate School and the National Commission for Science, Technology and Innovation (NACOSTI) (Research Permit Number: 981853). All participants were provided with information regarding the purpose of the study and gave informed consent before participating. Participation was voluntary, and respondents were assured of confidentiality, anonymity, and their right to withdraw from the study at any stage without penalty. Data was securely stored and accessed only by the researcher to ensure participant privacy and compliance with research ethics.

3. Results

This section presents the findings of the study according to the research objectives. Quantitative findings are presented using descriptive statistics, while qualitative findings are illustrated using representative quotations from the interviews with headteachers.

3.1 Response Rate

PE teachers received 150 surveys. 143 surveys were completed and returned, indicating a 95.3% response rate, which was deemed sufficient for the study (Mugenda & Mugenda, 2019). Out of the targeted 20 headteachers, 15 were interviewed, indicating a 75% return rate.

3.2 Demographic Findings

60 (42%) of the respondents were female, and 83 (58%) were male. This indicates a slight overrepresentation of males in the sample. 38.5% of the respondents were 30–39 years old. Teachers aged 20–29 years accounted for 35.0%, followed by those aged 40–49 (20.3%), and 6.3% were over 50 years old. This suggests that most schools have young staff who are more inclined to use social media platforms due to exposure.

58% of the respondents had a bachelor's degree, while 16.1% had a diploma. 24.5% achieved a master's degree, 0.7% had a certificate, and 0.7% achieved a PhD. 24.5% had 2–4 years of teaching experience, 18.2% had 0–2 years of experience; 17.5% had 4–6 years and 6–8 years of experience, 8.4% had 8–10 years of experience, and 14% had 11 or more years of teaching experience. This shows that most of the teachers were relatively early or mid-career professionals.

3.3 Social Media Platforms Used for Professional Development

The findings of the most used platforms indicate that Instagram had 92 users, followed by LinkedIn (80 users), YouTube (75 users), Facebook (65 users), and lastly Twitter (50 users). Therefore, Physical Education teachers tend to use social media that offer visual or demonstrational content when teaching.

42% of the respondents prefer videos for accessing content, 25.2% chose professional discussions, 16.1% selected webinars, and 14.7% selected articles. Lastly, short reels had 1.4% and infographics had 0.7%.

The information found in Table 1 displays the extent of social media usage for professional development. 68.6% of respondents agreed that they regularly use social media to find new teaching resources and ideas for Physical Education ($M = 3.85$, $SD = 1.05$). Similarly, 67.9% used multiple social media platforms to meet their professional development needs ($M = 3.78$, $SD = 1.03$), while 63.0% indicated that social media content was relevant to their professional development needs ($M = 3.70$, $SD = 1.08$). In addition, 59.5% had the necessary skills to navigate social media platforms for professional development purposes ($M = 3.63$, $SD = 1.12$).

Table 1: Extent of Social Media Usage for Professional Development

Item	SD (%)	D (%)	N (%)	A (%)	SA (%)	Mean	Std. Dev
I regularly use social media to find new teaching resources or ideas for Physical Education	3.5	7.0	21.0	38.5	30.1	3.85	1.05
I possess the necessary skills to navigate social media platforms for professional development purposes.	5.6	10.5	24.5	35.0	24.5	3.63	1.12
I use multiple social media platforms to meet my professional development needs	4.2	8.4	19.6	42.0	25.9	3.78	1.03
I find social media content relevant to my professional development needs in Physical Education	4.9	9.8	22.4	36.4	26.6	3.70	1.08

3.4 Collaborative Exploration Through Social Media

Table 2 presents the findings on collaborative exploration through social media. The mean scores were moderate (3.23 to 3.60). 58.1% of the respondents agreed or strongly agreed that social media allows easy collaboration ($M = 3.60$, $SD = 1.223$). Similarly, 55.3% reported that they participated in online Physical Education communities and forums ($M = 3.40$, $SD = 1.205$), while 51.8% reported actively seeking collaboration opportunities through social media ($M = 3.43$, $SD = 1.178$). The lowest level of agreement was recorded for learning inclusive teaching strategies through social media, with 45.5% agreeing or strongly agreeing ($M = 3.23$, $SD = 1.237$).

Representative qualitative evidence supported these findings. One headteacher stated:

"Social media has enabled our Physical Education teachers to exchange lesson ideas and practical activities with colleagues from other schools, exposing them to a wider range of teaching approaches."

Table 2: Collaborative Exploration through Social Media

Item	SD (%)	D (%)	N (%)	A (%)	SA (%)	Mean	Std. Dev
I seek collaboration opportunities via social media	8.4	11.9	28.0	32.2	19.6	3.43	1.178
I participate in online PE communities/forums	9.8	13.3	21.7	29.8	17.5	3.40	1.205
Social media allows easy collaboration	7.0	12.6	22.4	29.4	28.7	3.60	1.223
I have learned inclusive strategies via social media	11.2	16.8	26.6	28.7	16.8	3.23	1.237

3.5 Contribution of Social Media-Based Professional Development

As seen in Table 3, Physical Education teachers view social media as a positive contributor to their professional development. 54.6% of the respondents agreed that social media strengthens their professional networks ($M = 3.49$, $SD = 1.168$) and increases their motivation to adopt new teaching methods ($M = 3.48$, $SD = 1.137$). Similarly, 53.2% reported that social media had improved their teaching practice ($M = 3.34$, $SD = 1.301$), while 51.8% agreed that it enhanced student engagement ($M = 3.27$, $SD = 1.278$). In contrast, social media received the lowest level of agreement as a complement to formal professional development, with 39.9% of respondents agreeing or strongly agreeing ($M = 3.17$, $SD = 1.218$), and 31.5% remaining neutral.

One headteacher observed:

"Teachers often introduce new practical activities after interacting with colleagues online, and this has improved the variety of learning experiences offered to students."

Table 3: Contribution of Social Media-Based Professional Development

Item	SD (%)	D (%)	N (%)	A (%)	SA (%)	Mean	Median	Mode	Std. Dev
Strengthens professional network	9.1	7.7	28.7	34.3	20.3	3.49	3.00	4	1.168
Improves my teaching practice	11.9	16.1	18.9	32.2	21.0	3.34	3.00	3	1.301
Increases motivation to try new methods	7.0	11.9	26.6	35.7	18.9	3.48	3.00	4	1.137
Improves student engagement	11.2	20.3	16.8	34.3	17.5	3.27	3.00	3	1.278
Complements formal training	10.5	18.2	31.5	23.1	16.8	3.17	3.00	3	1.218

3.6 Challenges of Using Social Media for Professional Development

The findings in Table 4 indicate that Physical Education teachers experience several challenges when using social media for professional development. The most frequently reported challenges were unreliable internet connectivity (52.5%, $M = 3.36$, $SD = 1.297$) and concerns about privacy and data security (50.4%, $M = 3.38$, $SD = 1.294$). Respondents also reported difficulty assessing the credibility of information available on social media (47.6%, $M = 3.34$, $SD = 1.199$) and a lack of institutional guidance or support (46.9%, $M = 3.25$, $SD = 1.292$). Limited digital skills were the least reported challenge, although 42.0% of respondents still agreed that it affected their use of social media for professional development ($M = 3.13$, $SD = 1.217$).

A headteacher highlighted this concern by noting:

"Although teachers are willing to use social media professionally, inconsistent internet connectivity and uncertainty about reliable online information often limit their participation."

Table 4: Challenges Encountered in Using Social Media for Professional Development

Item	SD (%)	D (%)	N (%)	A (%)	SA (%)	Mean	Media n	Mode	Std. Deviation
I am concerned about privacy or data security when using social media for professional purposes.	11.2	14.0	24.5	26.6	23.8	3.38	4.00	4	1.294
I lack sufficient digital skills to utilize social media for my professional development fully.	12.6	16.8	28.7	28.7	13.3	3.13	3.00	3	1.217
Lack of clear guidance or support from my school hinders my use of social media for professional development.	12.6	16.1	24.5	27.3	19.6	3.25	3.00	4	1.292
I find it difficult to assess the credibility of information on social media.	9.1	14.0	29.4	28.7	18.9	3.34	3.00	3	1.199
Unreliable internet connectivity often limits my use of social media for professional development.	11.9	14.7	21.0	30.8	21.7	3.36	4.00	4	1.297

4. Discussion

The findings demonstrate that social media has become an important complement to formal professional development among Physical Education teachers. The high utilisation of Instagram, LinkedIn, and YouTube suggests that teachers value platforms that provide immediate access to professional knowledge, visual demonstrations, and opportunities for networking beyond their schools. These findings are consistent with previous research showing that teachers increasingly use social media to engage in self-directed professional learning through resource sharing, collaboration, and participation in online professional learning communities (Carpenter & Harvey, 2020; Krismanto et al., 2022; Mercado & Shin, 2024). Social media enhances learning opportunities that cannot easily be found through traditional professional development, which is typically limited by time and institutional support.

The popularity of Instagram and YouTube shows the practical side of the subject, as teaching in Physical Education depends a lot on demonstration and physical activity. The two platforms allow teachers to witness new ideas and methods of teaching, share experiences, and look for materials on

a given subject that will enable them to deliver better lessons (Carpenter & Harvey, 2020; Schulz & Gaudreault, 2023; Xu & Yin, 2022). The findings reinforce that the characteristics of individual digital platforms influence their suitability for subject-specific professional learning.

The study further demonstrated that social media promotes collaborative professional learning by extending teachers' professional networks beyond individual schools. Over 50% of the respondents had participated in online professional communities and used social media to collaborate with others. This indicates that digital platforms help share instructional resources, professional experiences, and teaching practices, thereby promoting peer learning and reflective practice. The same results were provided in previous studies regarding professional learning networks and online communities of practice, indicating that collaboration, knowledge sharing, and support in professional activities offered by social media are its major benefits as far as the professional development of teachers is concerned (Prestridge, 2019; Trust et al., 2016; Van Bommel et al., 2020). Qualitative findings reinforced these results, with the heads of schools stating that online communication opens up new opportunities for teachers to apply various types of instruction in their practice and improve the way they interact with their colleagues from other educational institutions.

Respondents also perceived that social media greatly complements teachers' professional growth by strengthening professional networks, increasing motivation to adopt innovative teaching approaches, improving teaching practice, and enhancing student engagement. Thus, it is possible to conclude that educators perceive social media as something more than a means of communication, but rather as an environment for continuous professional training. Other studies also support this position, indicating that participation in online communities boosts teachers' confidence, professional self-perception, creativity in teaching, and introduces them to the application of new teaching methods (Lonah, 2023; Schulz & Gaudreault, 2023). Nevertheless, respondents regarded social media as a complementary tool instead of a replacement for formal education.

Despite the advantages of using social media for professional development purposes, there are still some obstacles that prevent teachers from becoming engaged in this process. Unstable internet connection, concerns about the privacy and security of personal data, lack of institutional support, problems in evaluating the credibility of information found online, and different levels of digital literacy are the main obstacles to accessing social media-based professional development. The results corroborate with previous studies that explain the impact of a range of factors such as technological infrastructure, digital competencies, organisational support, and concerns about the quality of information on teachers' participation in online professional development communities (Bett & Makewa, 2018; Fox & Bird, 2015; Hizam et al., 2021; Marín et al., 2022). Although respondents generally demonstrated positive attitudes towards social media, the findings indicate that the effectiveness of digital professional learning depends upon supportive institutional policies, adequate technological infrastructure, and teachers' capacity to evaluate and utilise online resources effectively.

The findings may also be interpreted through the theoretical framework underpinning this study. Social Learning Theory contributes to understanding how teachers generate professional knowledge through observing, communicating, and modelling their peers in virtual professional communities (Bandura, 1977). The use of visual platforms such as Instagram and YouTube indicates how teachers learn through visual demonstrations, exchanging teaching ideas, and applying observed instructional practices. In addition, Self-Determination Theory helps to explain why teachers engage in ongoing professional learning. Social media allows teachers to identify learning opportunities that meet their professional needs while creating relationships with professional colleagues. Yet, issues such as unstable internet connection, lack of institutional support, and low levels of digital literacy can prevent teachers from participating effectively in online learning activities (Deci & Ryan, 1985).

5. Implications and Recommendations

The research findings hold significant implications for educational policies and practices. The studied institutions need to create policies promoting the responsible professional use of digital social networks. Moreover, proper recommendations regarding professionalism, privacy, and data safety should be presented to the school teachers. The schools should include digital literacy training in their teacher training programme in order to enhance their critical evaluation of the information found online and the use of digital social networks for educational purposes. Improving internet infrastructure within schools would further facilitate equitable access to online professional learning opportunities.

The study also demonstrates the value of strengthening professional learning communities through digital platforms, particularly for specialist subject teachers such as those in Physical Education. School leaders should therefore encourage structured online collaboration by facilitating participation in professional networks and recognising informal digital learning as a valuable component of continuing professional development.

Future research should extend this work by comparing the use of social media across public and international schools, examining differences between subject disciplines, and conducting longitudinal studies to evaluate how sustained participation in online professional learning communities' influences teaching practice and learner outcomes over time.

6. Study Limitations

Several limitations should be considered when interpreting the findings. First, the study was limited to selected international schools in Nairobi City County, and the findings may therefore not be generalisable to public schools or other educational contexts within Kenya. Second, the reliance on self-reported data may have introduced response bias, as participants' perceptions may not fully reflect their actual use of social media. Finally, the cross-sectional nature of the study limited the ability to establish causal relationships between social media use and professional development outcomes.

7. Conclusion

This study demonstrated that social media plays a valuable role in the professional development of Physical Education teachers in selected international schools in Nairobi. The findings showed that teachers primarily used social media to access professional resources, collaborate with colleagues, and strengthen professional networks. Social media also supported improved teaching practice, increased motivation to adopt innovative teaching approaches, and enhanced student engagement. However, its effective use was constrained by unreliable internet connectivity, privacy concerns, limited institutional support, challenges in evaluating online information, and varying levels of digital literacy. These findings highlight the need for schools to strengthen institutional support, digital literacy, and technological infrastructure. Overall, social media has the potential to complement formal professional development and contribute to continuous teacher learning.

Declaration of Interest

The authors declare that they do not have any known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Competing interests

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Data availability

The data that support the findings of this study are available from the corresponding author, Lorence Kiunga, upon request.

Disclaimer

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