

Role of Technology in Enhancing Continuous Professional Development for Teachers: Basis for a Plan of Action

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Abstract— This study investigates the role of technology in enhancing Continuous Professional Development (CPD) for teachers, focusing on social, cognitive, and teaching presence. Using a descriptive comparative research design, the study aimed to provide insights for developing a comprehensive plan of action to optimize technology integration in CPD initiatives. Findings reveal that technology significantly enhances CPD in all dimensions. In terms of social presence, teachers reported a very high sense of connectedness to their professional community, with an average mean score of 4.243, highlighting the effectiveness of online platforms in fostering collaboration. For cognitive presence, technology facilitated resource accessibility and problem-solving, achieving an average mean score of 4.209, with teachers valuing the ease of accessing materials to enhance their professional skills. In teaching presence, facilitators utilized technology to design interactive programs, with an average mean score of 4.280, emphasizing engaging online learning experiences as a key benefit. The overall findings, with an aggregate mean score of 4.244, underscore the pivotal role of technology in supporting teachers' professional growth. While high levels of engagement were noted, areas for improvement include fostering a deeper sense of belonging within professional communities. The study concludes that technology is essential for effective CPD, enabling collaboration, intellectual development, and teaching innovation. Tailored strategies that leverage technology can address the evolving needs of educators, fostering leadership and intellectual growth in a resource-rich, collaborative professional learning environment.

Keywords— Professional Development, Technology Integration, Social Presence, Cognitive Presence, Teaching Presence.

INTRODUCTION

Background of the Study

Technology has had a tremendous impact on the way teachers approach Continuous Professional Development (CPD). It is thought that embedding technology into CPD will augment teachers' social, cognitive, and teaching presence, which are vital for effective professional development. Social presence is the capacity of individuals to articulate themselves within the community of learners, giving rise to construction and interaction. Cognitive presence is the degree to which the members create and validate meaning through engagement and periods of thought. Teaching presence involves combining instructional and social processes to achieve specified learning outcomes. Using such corresponding presences can be improved with the help of technology, which allows teachers to cope with the changing needs of the

education system and improve their professional skills.

A growing body of research indicates that the use of technology in the context of CPD offers considerable advantages while also stressing the complementary benefits to the teaching of other subjects. As Mostafa (2021) noted, educators use social media to collaborate and engage meaningfully and such online platforms have become an important location for professional development. This collaborative setting provides opportunities for teachers to share knowledge and form communities which are important in terms of the educators' development. Villanueva (2021) expanded on this by demonstrating that blended learning approaches which mesh in-person activities with the use of digital tools strengthen the teaching presence and are able to be responsive to the heterogeneity of learners. Such hybrid forms allow teachers to take

advantage of the benefits of online learning while not losing the interactivity and personal contact inherent in face-to-face teaching. Fletcher (2023) further elaborated the involvement of virtual learning environments in the reflective practice which is a critical skill for career development and transition. These discomfoting environments encourage participation and self-evaluation and therefore assist the teachers in recognizing the deficits in their performance and coming up with new ways of teaching (Gaad, 2022). Also, Akgun and Greenhow (2023) demonstrated how AI based tools can help customize CPD to provide learning experiences to individual educators' needs and promoting continuous improvement. This personalized approach ensures that professional development is efficient and aligned with each educator's strengths and goals. Collectively, these findings emphasize that integrating technology into CPD enriches learning experiences and empowers educators, enhancing their ability to meet the evolving needs of their students and improving outcomes for all.

While existing literature highlights the benefits of technology in CPD, several gaps and lapses still need to be addressed. Despite evidence of technology's benefits in CPD, there needs to be more understanding of the specific mechanisms through which different tools enhance social, cognitive, and teaching presences. Current research often examines isolated aspects of technology use without considering their collective impact on professional growth. This study aims to bridge this gap by exploring how technology can be strategically integrated into CPD and proposing an action plan for effective implementation.

This research investigates how components of technology can enhance CPD's status and showing what has to be done in order that such technology is used effectively. This research provides a framework as regards how technology in the form of tools and strategies can enhance social, cognitive and teaching presences in CPD programmes, which will make it easier for teachers to keep up with the demands of modern education. Furthermore, the research seeks to bring out the essential ways in which technological factors affect professional growth and enhancement of the processes of teaching. It is also meant to determine

the best means of applying technology appropriate for CPD. Finally, what the research attempts to do is to come up with a strategic plan that is feasible in terms of outcomes so that teachers who are engaged in CPD that is technology focused can find it useful.

Theoretical Framework

This study is anchored in the Community of Inquiry (CoI) Framework by Garrison, Anderson, and Archer (2000), a foundational constructivist approach to learning emphasizing the importance of collaborative and interactive environments. The CoI Framework comprises three interconnected dimensions: social presence, cognitive presence, and teaching presence, each contributing uniquely to fostering meaningful learning experiences. When applied to continuous professional development (CPD) for teachers, primarily through technology, the CoI Framework provides a comprehensive structure to enhance professional growth and engagement.

Social presence is the first dimension of the CoI Framework and refers to the ability of participants to project their identity, form relationships, and engage in authentic communication. In the context of CPD, social presence is crucial for creating a sense of community among teachers. Online platforms enable teachers to interact, share their experiences, seek feedback, and build professional networks, which fosters a supportive and collaborative learning environment. This environment encourages active participation and the sharing of diverse perspectives, making learning more relevant and inclusive (Annand, 2011).

The second dimension, cognitive presence, is how learners construct and confirm meaning through reflection and critical thinking. In technology-supported CPD, cognitive presence is facilitated through online discussions, webinars, and e-learning modules that promote active learning and reflective practice. This dimension encourages teachers to analyze, question, and synthesize new information, which deepens their understanding and supports the integration of innovative strategies into their teaching practices. By engaging in reflective thought and discourse, teachers develop critical thinking skills

essential for adapting to new educational challenges and enhancing student learning outcomes (Ozogul et al., 2021).

Teaching presence, the third dimension, involves designing, facilitating, and directing learning experiences that lead to meaningful outcomes. Effective teaching presence in technology-enhanced CPD programs ensures the content is relevant, engaging, and structured to achieve specific learning goals. Instructional design plays a pivotal role by presenting content in a way that is clear and aligned with the learning objectives, while facilitators guide and support the participants through their learning journey. This guidance includes prompting discussions, addressing questions, and maintaining an interactive, goal-oriented atmosphere. Therefore, teaching presence underpins the learning experience's effectiveness by ensuring that teachers remain focused, motivated, and able to apply what they learn to their professional contexts (Priesman, 2014).

Together, these three dimensions of the CoI Framework—social presence, cognitive presence, and teaching presence—create an environment that promotes meaningful and sustained learning. By leveraging technology, CPD programs can harness these dimensions to build vibrant learning communities where teachers engage, reflect, and grow. This approach not only enhances the quality of professional development but also equips teachers with the skills necessary to foster dynamic and effective learning environments for their students.

The Community of Inquiry (CoI) Framework has been widely applied in various studies to explore the role of technology in enhancing continuous professional development (CPD) for teachers. For instance, Shehzad and Charles (2023) focused on teacher engagement in online PD courses, emphasizing the importance of social presence in fostering a community where teachers felt connected and comfortable sharing their experiences. Specifically, their study found that a strong social presence increased engagement and satisfaction, while cognitive and teaching presence was essential for maintaining motivation and supporting meaningful

dialogue. Consequently, this research underscored that the CoI Framework can enhance online PD by promoting interaction and reflective practice, which are vital for teacher development.

Building on this, Rovai (2002) analyzed how social and teaching presence impacted learning outcomes in online teacher education courses. His study demonstrated that a strong teaching presence, characterized by prompt feedback and structured interaction, significantly influenced teacher satisfaction and success. Moreover, Rovai's work highlighted that balancing teaching presence with a positive social presence created an engaging and supportive learning atmosphere, encouraging deeper cognitive processing and the application of knowledge. Thus, this research further reinforced the relevance of the CoI Framework in assessing the effectiveness of technology-mediated learning experiences for teachers.

Similarly, Pool et al. (2017) explored the application of the CoI Framework in developing collaborative online learning spaces for teacher PD. Their findings showed that integrating social and teaching presence into course design fostered deeper cognitive engagement and increased peer interaction. As a result, teachers were more motivated to share insights, reflect on their practices, and engage in critical thinking, contributing to their professional development. Therefore, the study emphasized that creating a strong community and providing structured learning opportunities are essential for supporting teacher growth through online programs.

In addition, Swan, Garrison, and Richardson (2009) conducted a case study on an online PD program aimed at integrating technology into teaching practices. They examined how the CoI Framework's three dimensions contributed to teacher learning and satisfaction. Notably, the study found that teachers reported higher satisfaction and a stronger inclination to apply new strategies in their classrooms when social, cognitive, and teaching presence were effectively incorporated into the program design. Consequently, this research reinforced the idea that the CoI Framework can enhance teacher engagement and

the application of new knowledge in technology-supported PD programs.

Furthermore, Lacaste et al. (2022) examined the CoI Framework's role in online PD focused on collaborative learning and teaching practice sharing. Their research highlighted that interactive components like discussion forums and peer reviews promoted cognitive presence and encouraged teachers to analyze and share ideas critically. Moreover, the study emphasized that teaching presence, through structured guidance and facilitation, was crucial for maintaining participation and meeting learning goals. Therefore, this work demonstrated that integrating the CoI Framework's dimensions supports the creation of vibrant learning communities that encourage ongoing teacher development and knowledge application.

Taken together, these studies underscore the CoI Framework's pivotal role in providing a comprehensive foundation for understanding how technology enhances continuous professional development (CPD) for teachers. By promoting engagement, encouraging reflective practice, and facilitating the application of new knowledge, the framework serves as an analytical tool and a strategic guide for designing impactful and sustainable professional development programs. Technology's role in CPD is inherently multifaceted, with immense potential to strengthen the social, cognitive, and teaching presences essential for effective learning. This theoretical analysis demonstrates how the CoI Framework can be leveraged to harness technology strategically, enabling the creation of adaptive, personalized, and transformative CPD programs that meet the evolving needs of educators

RESEARCH METHODOLOGY

This study employed a descriptive-comparative research design to determine the role of technology in enhancing the continuous professional development (CPD) of teachers and to examine differences in perceptions based on respondents' demographic characteristics. The study was conducted among 122 licensed teachers from various schools in the Magsaysay District, Lanao del Norte, who were actively teaching, had participated in at least one CPD activity within the past three years, and had experience using technology for instruction or professional development. Data were gathered using a researcher-made questionnaire consisting of two parts: the first collected respondents' demographic profile (age, educational attainment, and length of service), while the second measured the extent to which technology supports CPD in terms of social, cognitive, and teaching presence using a 5-point Likert scale. The instrument, adapted from the Community of Inquiry (CoI) Framework, underwent expert content validation and pilot testing, yielding a Cronbach's alpha of 0.87, indicating high reliability. Prior to data collection, permission was secured from the concerned authorities, and questionnaires were administered through both printed and online formats. Ethical principles, including informed consent, confidentiality, voluntary participation, and institutional ethical approval, were strictly observed throughout the conduct of the study. Data were analyzed using frequency count and percentage to describe the respondents' profile, arithmetic mean to determine the extent of technology's role in CPD, and the Kruskal-Wallis Test to determine significant differences in respondents' perceptions when grouped according to their demographic characteristics.

III. PRESENTATION, ANALYSIS, AND INTERPRETATION OF DATA

Table 1. Demographic Profile of the Respondents

Profile	Frequency	Percentage
Age		
below 25 years old	0	0.00
25 – 34 years old	12	9.83
35 – 44 years old	71	58.19
45 – 54 years old	37	30.32
55 years old and above	2	1.63

Educational Attainment		
Bachelor's Degree	85	69.67
Master's Degree	32	26.22
Doctorate Degree	3	2.45
Others	2	1.63
Length of Service		
less than 1 year	8	6.55
1 – 5 years	10	8.19
6 – 10 years	43	35.24
11 – 15 years	43	35.24
16 – 20 years	15	12.29
more than 20 years	3	2.45

The demographic profile of the respondents highlights that the majority are mid-career educators, with 58.19% aged 35–44 years and 30.32% aged 45–54 years, suggesting an experienced and actively engaged workforce. Foundational qualifications dominate, as 69.67% hold a Bachelor's Degree, with a notable portion (26.22%) pursuing further education through a Master's Degree. Regarding service length, the most prominent groups (35.24% each) have 6–10 and 11–15 years of experience, reflecting a well-established teaching force, while newer and veteran teachers are less represented. These insights emphasize the need for technology-driven Continuous Professional Development (CPD) programs to enhance skills, leadership, and career progression across all experience and education levels.

Studies highlight that mid-career educators, particularly those with 11–15 years of experience, engage more deeply in professional development activities focused on autonomy and transformative skills rather than routine training (Koellner & Jacobs, 2019; Tan, 2021).

These teachers are motivated by the need for leadership opportunities and intellectual growth, which align with their career maturity (Guglielmi et al., 2020). To optimize their professional development, CPD programs should be tailored to meet their evolving needs, offering leadership training, collaborative opportunities, and reflective practices (Koellner & Jacobs, 2019; Tan, 2021).

Table 2. Extent of Technology Support for Professional Development in terms of Social Presence

Indicators	sd	Mean
Technology helps me feel connected to my professional community.	0.64	4.51
Online platforms allow me to interact with my colleagues effectively.	0.62	4.34
Virtual professional development sessions foster meaningful collaboration for me.	0.64	4.20
Technology helps me establish and maintain my professional relationships.	0.61	4.26
Online communication tools (e.g., chat, forums) enhance my engagement with my peers.	0.70	4.44
I feel part of a larger professional network through my participation in online communications.	0.63	4.13
Social media platforms enable me to share and discuss my professional ideas.	0.68	4.16
Technology provides a supportive environment for me to engage in open professional discussions.	0.63	4.25
Virtual environments allow me to express my ideas effectively.	0.72	4.06
Technology helps me overcome feelings of isolation in my professional practice.	0.71	4.08
Average Mean	4.243	(Very High)

Scale: 1.0 – 1.80 “Very Low”, 1.81 – 2.60 “Low”, 2.61 – 3.40 “Average”, 3.41 – 4.20 “High” 4.21 – 5.0 “Very High”

The data from Table 2 indicates that technology plays a significant role in enhancing social presence for teachers' professional development, with an average mean score of 4.243, rating the level of technology support as "Very High." This highlights its strong impact on fostering social connections within the professional community. Teachers reported that technology is highly effective in helping them feel connected to their professional networks, with the highest mean score of 4.51 for the statement, "Technology helps me feel connected to my professional community." This suggests that technology facilitates meaningful interactions, mainly through online platforms and communication tools, which help teachers engage with colleagues and enhance collaboration, as evidenced by mean scores of 4.44 and 4.34.

Virtual professional development sessions and online communication tools further foster collaboration and help maintain professional relationships, with mean scores of 4.20 and 4.26, respectively. While the sense of belonging to a more extensive professional network

through online participation scored a mean of 4.13, and the feeling of inclusion in virtual environments was slightly lower at 4.06, both results still reflect a positive sense of engagement. Additionally, technology helps mitigate feelings of isolation in professional practice, as shown by a mean score of 4.08.

The data suggests that technology significantly supports social presence, creating a strong sense of community and engagement among teachers. However, aspects such as belonging could still be further enhanced.

The data emphasizes that technology fosters social presence in teachers' professional development. Teachers reported high levels of connection with their professional community through online platforms, with technology also supporting collaboration and reducing feelings of isolation. Although some areas, such as a sense of belonging, could be further enhanced, the overall positive impact of technology is clear (World Bank, 2023; Montero-Mesa et al., 2023).

Table 3. Extent of Technology Support for Professional Development in terms of Cognitive Presence

Indicators	sd	Mean
Technology enables me to reflect on my teaching practices critically.	0.77	4.10
Online professional development programs provide me with resources to deepen my knowledge.	0.50	4.21
I use technology to explore solutions to the challenges I face in my field.	0.64	4.26
Technology supports my ability to construct meaningful professional insights.	0.58	4.20
Virtual resources help me stay updated with the latest teaching strategies.	0.76	4.25
Technology-based platforms encourage me to engage in problem-solving and critical thinking.	0.74	4.16
Online courses enhance my ability to understand complex teaching concepts.	0.71	4.12
I can easily access learning materials to improve my professional skills.	0.60	4.31
Technology fosters my curiosity and inquiry in professional growth.	0.51	4.27
Digital tools help me verify and confirm the knowledge I acquire.	0.63	4.20
Average Mean	4.209 (Very High)	

Scale: 1.0 – 1.80 "Very Low", 1.81 – 2.60 "Low", 2.61 – 3.40 "Average", 3.41 – 4.20 "High" 4.21 – 5.0 "Very High"

The data from Table 3 reveals that the extent of technology support for professional development in terms of cognitive presence is perceived as very high

by the respondents, with an average mean score of 4.209, which falls within the "Very High" category.

Among the indicators, the statement "I can easily access learning materials to improve my professional skills" received the highest mean score of 4.31. This suggests that teachers find technology particularly effective in providing easy access to resources that enhance their professional skills. Additionally, the indicator "Technology fosters my curiosity and inquiry in professional growth" scored 4.27, reflecting that technology plays a significant role in encouraging teachers to explore and inquire about new opportunities for professional growth.

Other indicators, such as "Online professional development programs provide me with resources to deepen my knowledge" (mean = 4.21) and "I use technology to explore solutions to the challenges I face in my field" (mean = 4.26), further highlight the positive impact of technology in offering resources and solutions to professional challenges.

The lowest mean score, 4.10, was recorded for the statement "Technology enables me to reflect on my teaching practices critically."

While this still falls within the "Very High" category, it indicates that while technology aids in critical reflection, this aspect may not be as pronounced as other areas.

Overall, the data underscores that technology significantly supports cognitive engagement in teachers' professional development, enabling them to access valuable resources, engage in problem-solving, stay updated on teaching strategies, and foster a continuous process of learning and inquiry.

This positive perception could serve as a strong basis for developing a plan of action to further integrate technology in teachers' professional growth.

Table 4. Extent of Technology Support for Professional Development in terms of Teaching Presence

Indicators	sd	Mean
Technology supports me in organizing effective professional development activities.	0.53	4.32
Facilitators use technology to design engaging online learning experiences that benefit me.	0.60	4.40
Online training programs are structured to meet my professional needs.	0.65	4.34
Technology enhances feedback mechanisms that support my learning during professional development.	0.69	4.20
Digital tools support the delivery of clear and focused training sessions for me.	0.70	4.11
Technology makes my professional development sessions more interactive and engaging.	0.64	4.25
Facilitators effectively use technology to guide discussions that involve me in professional settings.	0.61	4.26
Technology enables instructors to adapt training sessions to meet my diverse learning needs.	0.66	4.34
The use of technology in my professional development ensures a well-defined learning process.	0.60	4.28
Facilitators use technology to evaluate the effectiveness of the training sessions I attend.	0.64	4.31
Average Mean	4.280	(Very High)

Scale: 1.0 – 1.80 "Very Low", 1.81 – 2.60 "Low", 2.61 – 3.40 "Average", 3.41 – 4.20 "High" 4.21 – 5.0 "Very High"

The data in Table 4 reflects how much technology supports professional development regarding teaching presence. The results demonstrate a generally high level of technology support across all indicators, with an average mean of 4.28, falling within the "Very High" category.

Specifically, facilitators are highly effective in using technology to enhance professional development activities. The highest-rated indicator, with a mean of 4.40, is the use of technology to design engaging online learning experiences that benefit the participants. Closely following this, indicators related

to the use of technology to organize effective professional development (mean = 4.32) and to structure online training programs to meet professional needs (mean = 4.34) also received very high ratings.

Additionally, technology's role in enhancing feedback mechanisms (mean = 4.20) and making professional development sessions more interactive (mean = 4.25) were also rated positively, indicating that technology contributes significantly to creating engaging and interactive learning environments. Moreover, the use

of digital tools to support transparent and focused training sessions (mean = 4.11) and technology's ability to adapt training to diverse learning needs (mean = 4.34) highlight the flexibility and inclusivity of technology in professional development.

Overall, the high mean scores across all indicators suggest that technology is critical in enhancing the quality and effectiveness of teacher professional development, particularly in organizing, engaging, and evaluating the training process.

Table 5. Extent of Technology Support for Professional Development

Indicators	Mean	Interpretation
Social Presence	4.243	Very High
Cognitive Presence	4.209	Very High
Teaching Presence	4.280	Very High
Average Mean	4.244	Very High

Scale: 1.0 – 1.80 “Very Low”, 1.81 – 2.60 “Low”, 2.61 – 3.40 “Average”, 3.41 – 4.20 “High” 4.21 – 5.0 “Very High”

The data presented in Table 5 reflects the extent of technology support for professional development in terms of three key indicators: Social Presence, Cognitive Presence, and Teaching Presence. The mean scores for these indicators are as follows: Social Presence (4.243), Cognitive Presence (4.209), and Teaching Presence (4.280), all of which fall within the “Very High” range on the scale provided. The overall

average mean score of 4.244 further reinforces this interpretation, indicating that technology support for professional development is perceived as being very high. This suggests that technology effectively facilitates various aspects of professional development, particularly in fostering engagement, cognitive involvement, and teaching presence among teachers.

Table 6. Test of Significant Differences on How Technology Supports Professional Development as to Age

Variables	N	df	p-value	Decision
Professional Development:				
below 25 years old	0			
25 – 34 years old	12			
35 – 44 years old	71	3	0.076	Retain the Ho
45 – 54 years old	37			
55 years old above	2			

Note: $p < 0.05$: The difference is statistically significant

The data presented in Table 6 examines the test of significant differences on how technology supports professional development across various age groups. The analysis includes five age categories: below 25 years old, 25-34 years old, 35-44 years old, 45-54 years old, and 55 years and above. The p-value for this test is 0.076, which is greater than the significance level of 0.05. As a result, the null hypothesis (H_0) is

retained, indicating that there is no statistically significant difference in how technology supports professional development among the different age groups. This suggests that age does not have a significant impact on the use or effectiveness of technology for professional development in the sample population.

Table 7. Test of Significant Differences on How Technology Supports Professional Developments as to Educational Attainment

Variables	N	df	p-value	Decision
Professional Development:				
Bachelor's Degree	85	3	0.004	Reject the Ho
Master's Degree	32			
Doctorate Degree	2			
Others	2			

Note: $p < 0.05$: The difference is statistically significant

The data presented in Table 7 shows the results of a test of significant differences on how technology supports professional development based on the educational attainment of teachers. The sample includes teachers with different educational backgrounds, such as a Bachelor's degree, Master's degree, Doctorate degree, and others, with a total sample size of 85 for the Bachelor's degree, 32 for the Master's degree, and 2 for the Doctorate degree and

others. The p-value obtained is 0.004, which is less than the significance level of 0.05. This indicates that there is a statistically significant difference in how technology supports professional development among teachers with varying levels of educational attainment. Consequently, the null hypothesis (H_0) is rejected, implying that educational attainment plays a role in the perceived effectiveness of technology in supporting professional development for teachers.

Table 8. Test of Significant Differences on How Technology Supports Professional Developments as to Length of Service

Variables	N	df	p-value	Decision
Professional Development:				
less than 1 year	8	5	0.247	Retain the Ho
1 – 5 years	10			
6 – 10 years	43			
11 – 15 years	43			
16 – 20 years	15			
more than 20 years	3			

Note: $p < 0.05$: The difference is statistically significant

The data presented in Table 8 shows the results of a test of significant differences on how technology supports professional development in relation to the length of service of teachers. The table reports the number of respondents (N) for each category of length of service, which ranges from less than 1 year to more than 20 years. The p-value obtained is 0.247, which is greater than the significance level of 0.05. This indicates that there is no statistically significant difference in how technology supports professional development across different lengths of service among the teachers. As a result, the null hypothesis (H_0) is retained, meaning that the length of service does not significantly affect teachers' perception of how technology supports their professional development.

IV. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The findings of the study conclude that technology plays a vital role in enhancing teachers' continuous professional development (CPD) by strengthening social, cognitive, and teaching presence. The consistently high ratings across these dimensions indicate that technology fosters collaboration, reflective learning, knowledge sharing, and meaningful engagement in professional development activities. Moreover, the findings suggest that technology-supported CPD should be responsive to teachers' varying professional needs, particularly those at different career stages, by providing personalized

and interactive learning opportunities. Overall, the study affirms that integrating technology into CPD programs is essential for promoting teachers' continuous professional growth and improving the quality and effectiveness of professional learning experiences.

Recommendations

In light of the findings, it is recommended that teachers actively integrate technology into their continuous professional development to enhance their instructional practices and engage in collaborative learning opportunities. School administrators should strengthen technology-supported CPD by providing adequate resources, training, and tailored professional learning programs. Educational policymakers are encouraged to develop policies and allocate resources that promote the sustainable integration of technology in teacher development. Likewise, educational institutions should enhance their CPD offerings through technology-driven training aligned with teachers' evolving needs, while educational technology providers should continue developing accessible, user-friendly, and context-responsive digital learning platforms. Although students are indirect beneficiaries, they are expected to experience improved learning outcomes as teachers enhance their competencies through technology. Finally, future researchers are encouraged to further investigate the long-term effects of technology-enhanced professional development, including its influence on teaching effectiveness, student achievement, and emerging educational technologies.

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