Edu-Religia
Jurnal Keagamaan dan Pembelajarannya
Vol. 9, No. 2, September 2026

Digital Continuous Professional Development Engagements: Insights from an Islamic Teacher at a Senior High School in Indonesia

Nurhalimah Siregar[1], Mu'minatus Fitriati Firdaus[2], Miatin Rachmawati[3], Sulhatul Habibah[4]
[1]Universitas Islam Internasional Indonesia
[2]Universitas Gunadarma
[3]Universitas Muhammadiyah Prof. Dr. HAMKA Jakarta
[4]Universitas Islam Darul 'Ulum Lamongan
Email : nurhalimah.siregar@uiii.ac.id[1], muminatus_ff@staff.gunadarma.ac.id[2], miatinrachmawati@uhamka.ac.id[3], sulhatulhabibah@unisda.ac.id[4]

ARTICLE INFO

Article history
Received 07 September 2026
Revised 12 September 2026
Accepted 25 September 2026

Keywords :
Digital Continuous Professional Development, DigComEdu, Female Teachers, Islamic Education, Informal Learning

Abstract

Digital transformation in education requires teachers to learn continuously. However, little is known about how teachers in Indonesian Islamic schools engage in digital continuous professional development (CPD). This qualitative case study explores how teachers in an Islamic girls' senior high school engage in West Java, Indonesia, engage in digital CPD. Drawing on the digital CPD competence within the European Digital Competence Framework for Educators (DigCompEdu). Six female teachers were purposively selected from a school-wide survey based on their willingness to participate and variation in subject, educational backgrounds, and teaching experience. Data were collected from semi-structured interviews, classroom observations, and digital artifacts. The framework method guided the analysis, using deductive codes from DigCompEdu and inductive codes from the data. Three core themes were identified. First, teachers primarily engaged in informal, self-directed micro-learning via YouTube, TikTok, and generative AI tools, driven by immediate classroom needs. Second, learning was peer-supported which a digitally capable colleague who introduced tools to others, and a subject-teacher group (MGMP) shared a paid digital tool. Third, learning was context-bound which a weekly school routine, faith-based expectations for digital materials, and limited time shaped its content and conditions. The findings add contextual evidence to DigCompEdu by showing how school routines, Islamic values, and time pressure frame digital CPD. School can recognize digitally capable peers as informal trainers and protect learning time within the working day.

Introduction

In today's fast technological transformation, every aspect of life has shifted, including the education landscape, which has impacted how we teach students. In response to the demand for digital transformation, teachers are required to keep learning, especially in the use of digital technology for the teaching and learning process (Lockee, 2021). Digital continuous professional development (CPD) is highlighted as one of the crucial elements to empower

teachers' professionalism with technology-enhanced learning environments (Fernández-Batanero et al., 2022; Lay et al., 2020). Within this context, the European framework for the Digital Competence of Educators (DigCompEdu) conceptualizes digital CPD as a foundational competency for educators (Redecker, 2017). However, DigCompEdu is often applied through self-assessment questionnaires (Ghomi & Redecker, 2019), which measure perceived proficiency levels but offer limited insights into how teachers operationalize continuous learning in daily instructional practice.

In the Indonesian context, empirical research on teachers' digital CPD remains few. Existing studies have explored professional learning communities for TPACK among junior high school English teachers (Fadlilah et al., 2025),and broader examinations of teacher agency in formal professional development programs. As a result, little is known about how teachers leverage both digital resources and informal peer networks for self-directed learning in daily practice. This analytical gap is particularly pronounced in faith-based high schools. Islamic schools introduce unique institutional and socio-cultural dimensions, as teachers are expected to go beyond digital pedagogies, including aligning digital content with religious and ethical values.

To address this gap, this study explores teachers' engagement with digital CPD within the context of an Islamic senior high school in Indonesia. Utilizing the digital CPD competence (1.4) of DigCompEdu Area 1 as an analytical guide rather than a quantitative measurement scale. The findings offer meaningful implications for educational leaders and policymakers seeking to design contextually grounded and value-aligned digital support systems for teachers. The study is guided by one research question: How do teachers in an Islamic senior high school engage in digital continuous professional development?

Digital competence is a core part of digital literacy (Redecker, 2017). The European Commission developed the Digital Competence Framework for Educators (DigCompEdu) to describe the digital competence that educators need (Redecker, 2017). It builds on DigComp, a framework for the digital competence of all citizens.

DigCompEdu applies this general base to the work of teachers. The framework consists of 22 competences in six areas: professional engagement, digital resources, teaching and learning, assessment, empowering learners, and facilitating learners' digital competence. Each competence has six proficiency levels: Newcomer (A1), Explorer (A2), Integrator (B1), Expert (B2), Leader (C1), Pioneer (C2). The levels describe growth from first contact with digital technology to innovation and support for peers (Redecker, 2017).

The current study focuses on the first area, which includes (1.1) organizational communication refers to teachers' competences in using digital technologies to improve their communication with learners, parents, and third parties; (1.2) professional collaboration refers to teachers' practices in using digital technologies to share and exchange knowledge and experience with peers to innovate practice together; (1.3) reflective practice includes reflection and critique to develop one's pedagogical practices; and (1.4) digital continuous professional development refers to teachers' practices utilizing digital resources for continuous professional development. The four aspects offer a comprehensive foundation to understand teachers' professional development.

Continuous professional development is lifelong learning to enhance their pedagogical competencies (Caena & Redecker, 2019). Especially in responding to the high demands and challenges of digitalization in education that accelerated after COVID-19 (Lucas et al., 2021). Thus, Continuous Professional Development is vital to support teachers to integrate digital tools and resources into teaching and learning practices.

Digital continuous professional development activities under this competence include identifying online training opportunities, updating subject-specific and pedagogical

knowledge, searching for digital resources, and exchanging ideas in professional communities. The levels of these activities show clear progression. Explorer level refers to teachers use the internet to update their subject-specific and pedagogical knowledge. Expert level refers to teachers using tutorials, courses, and webinars and joining formal and informal exchanges in professional online communities. Leader level refers to teachers choosing online training options according to their development needs, learning style, and time constraints. Pioneer level refers to teachers who advise their peers through digital technologies and serve as role models for younger teachers (Redecker, 2017).

Earlier studies applied DigCompEdu through self-assessment questionnaires (Ghomi & Redecker, 2019). These instruments place teachers on a level. This study uses digital CPD competence differently. It serves as an analytical guide for coding how teachers in this study keep learning in daily practice. The levels serve as reference points for interpretation. However, the framework explores little about school agendas and religious values. Thus, examining these conditions is part of the contribution of this study.

Previous studies have applied the DigCompEdu framework, such as validating DigCompEdu checks in a self-assessment instrument to evaluate educators' digital competencies across diverse geographical and institutional settings (Cabero-Almenara et al., 2023; Caena & Redecker, 2019; Ghomi & Redecker, 2019; Haşlaman et al., 2024; Pham et al., 2024). These studies demonstrate that the framework effectively categorizes teacher proficiency across six progressive levels, from Newcomer (A1) to Pioneer (C2). Most teachers cluster within the intermediate stages, mostly at the Explorer (A2) and Integrator (B1) levels (Cabero-Almenara et al., 2020; Lucas et al., 2021; Tzafilkou et al., 2023). Specifically, regarding area 1, Professional Engagement, quantitative studies reveal that teachers frequently use digital tools for basic administrative communication and informal searching digital resources. However, fewer of them reach the advance leader or pioneer stages characterized by peer mentoring, systematic critiques, and collaborative knowledge construction (Chifla-Villón et al., 2025; Muammar et al., 2023; Tzafilkou et al., 2023). A study highlights that teachers' self-perceived digital competence is significantly shaped by years of technological experience, subject taught, and participation in targeted digital CPD initiatives (Ghomi & Redecker, 2019; Palacios-Rodríguez et al., 2023)

Extensive literature on online teacher professional development highlights the pivotal role of virtual professional learning networks and communities of practice for continuous learning (Duncan-Howell, 2010; Lay et al., 2020; Pawan et al., 2023). Modern digital CPD models increasingly shift away from traditional workshops toward continuous, self-directed, and collaborative learning environments in which educators share pedagogical strategies, exchange resources, and engage in reflective dialogue (Pawan et al., 2023). Participation in these online learning communities has been shown to improve teacher self-efficacy, decrease professional isolation, and enable peer-mediated problem-solving (Duncan-Howell, 2010; Lay et al., 2020). These collaborative engagements promote Area 1 competencies of DidCopmEdu, especially digital CPD, by turning continuous learning into an active (Caena & Redecker, 2019) and sociocultural embedded practice (Yurkofsky et al., 2019).

Researchers show that quantitative measurements often overlook the qualitative assessment of how teachers enact continuous learning in everyday professional routines (Lucas et al., 2021). Existing studies treat DigCompEdu proficiency levels as static evaluative outcomes rather than serving as dynamic analytical frameworks for qualifying ongoing practice (Ghomi & Redecker, 2019). Additionally, few of them examine how ecological aspects such as institutional policy and values shape or constrain teachers' engagement with digital CPD (Palacios-Rodríguez et al., 2023). Therefore, by employing Area 1 progression levels as an analytical framework for qualitative coding instead of as a self-assessment tool,

this study reconciles the gap between standardized competency models and empirical realities by revealing how ongoing digital CPD occurs within culturally and institutionally situated educational settings. In Islamic schools, studies examine how learning communities and religious norms shape teachers' professional learning (Fadlilah et al., 2025).

Method

This study employed a qualitative approach with a case study design (Yin, 2018). The research focused on how teachers engage in digital continuous professional development (CPD). The setting was a private Islamic girls' school located in a developed area of Indonesia. This school shows a strong integration of digital technology with Islamic values cultivation in instructional practices. It provides a relevant context for exploring teachers' experiences with digitalization.

Six female teachers were purposively selected from a school-wide survey based on their willingness to participate, varied in age (29 to 43 years), teaching experience (5–19 years), and subjects taught and educational background. Subject areas include biology, history, English, chemistry, physics, and mathematics. Four held master's degrees while two had bachelor's degrees. Two participants held leadership roles in the school. Pseudonyms based on the subjects they taught were used to maintain confidentiality.

Data were collected through interviews, observations, and physical artefacts. The first researcher interviewed each teacher in person at the school, at a convenient time. The interview was conducted in Bahasa and lasted about 50 to 80 minutes, between March 2025 and May 2025. The first researcher used prepared questions and allowed flexibility for participants to elaborate on their experiences, beliefs, and challenges. The first researcher also observed each teacher teaching her own subject and collected digital artifacts including lesson plans, learning modules, Canva slides, students' worksheets, and students' digital projects. The findings of this study are centered on the interview data, as it provided the clearest and most authentic access to the teachers' voices. Observations and artefacts served to corroborate selected points. The first researcher translated the quotes into English.

The data were analyzed using the Framework Method (Gale et al., 2013). It is a systematic and comparative form of thematic analysis that allows both deductive and inductive coding. Its matrix output offers a clear audit trail from raw data to themes. The analysis was guided by DigCompEdu's digital CPD competence (Redecker, 2017).

The first researcher transcribed the interviews verbatim and read them repeatedly, taking notes on initial impressions. Using a deductive approach, the first researcher developed preliminary codes from the descriptors of the digital CPD competence, such as updating knowledge, learning from online training, exchanging in professional communities, and supporting colleagues. The researcher also developed inductive codes outside the framework, such as school routines, faith-based expectations, and time. Each transcript was analyzed, and the codes were organized into a working analytical framework. Themes were developed from the patterns and variations across the matrix. To strengthen the quality of the analysis, the rest of the researchers reviewed the themes and the draft.

Result and Discussion

Result

The results of this study indicate that the first theme, self-directed learning, describes independent learning of tools and teaching ideas through video tutorials, social media, and AI chatbots. The second theme, peer-supported learning, describes the spread of digital skills through informal exchange with colleagues and subject-teacher groups. The third theme,

context-bound learning, describes how school routines, Islamic values, and limited time and family responsibilities shaped the content and conditions of learning. The themes follow how learning moves from the individual teacher, to colleagues, and then to the school's conditions.

Theme 1: Self-directed learning driven by pedagogical needs

Teachers updated their subject knowledge online as part of lesson preparation. The history teacher followed online portals that publish current material on her subject. The chemistry teacher turned to Gemini before teaching: "I use Gemini, so I search first…before I deliver the material, I must know the details of the content" (Chemistry teacher). The excerpt highlights teacher's readiness standard before the instructional process. Learning came before the lesson and served it directly in both cases. It can be said that teaching preparation was the first purpose for teachers' learning, in which they are eager to know the content before they teach it. This corresponds to the activity of using digital resources like the Internet to update subject-specific competences. This also links the explorer statement in the DigiCompEdu that teachers use the Internet to update pedagogical knowledge (Redecker, 2017). The chemistry teacher's chatbot extends use beyond the sources anticipated in 2017, before generative AI became widely accessible. Observed lessons confirmed this point on their slides teaching. For example, the history teacher's slides showed a timeline of important dates and a road map that make it easier for students to remember historical dates. Additionally, the chemistry teacher showed a YouTube animation on the smart TV teaching abstract concepts like blood sugar in the human body.

New teaching ideas also came from social media and AI. The biology teacher described TikTok as the daily source of educational games: "Most often it's via TikTok…I like to browse there, and eventually I try using them" (Biology teacher). Her account shows that she follows a short cycle of browsing, selecting, and testing in class. The tight timeframe relies on direct classroom implementation to evaluate pedagogical efficacy and validate new ideas. The chemistry teacher took similar step with AI chatbot, asking Gemini how to teach a concept contextually before teaching specific topic. Both sources were general-purpose platforms that teachers turned to for professional learning. Based on the platforms, teachers had to make decision on the teaching content themselves. DigCompEdu's activity on learning new pedagogical methods fits these accounts. Short-video platforms and chatbots extend the sources in the DigiCompEdu framework. In other words, both teachers show that learning activities now take place for general purpose platforms for their own development.

Learning was usually tied to a task and ended when the task was done. The mathematics teacher stated: "We learn according to what we need only; if I want to teach this material, then I just learn up to this point" (Mathematics teacher). In this case, she used YouTube and chose question banks that had already been validated. In this case, checking the source before use shows that learning was selective. The history teacher also described that she learned operational steps from video tutorials. She took one course, specifically on prompting: "The prompt actually determines us, so I joined a prompt class" (History teacher). The course was a structured form of learning. However, she took it to meet her own need to direct AI tools more precisely. In terms of digital literacy, the mathematics teacher's use of validated sources is part of the evaluation process that Nicholas and Ng (2019) refer to as the cognitive dimension, while the history teacher refers to the technical dimension. Both statements correspond to the DigiCompEdu indicators on self-directed learning via video tutorials and online courses. Learning by need also reflects the Leader (C1) descriptor, in which teachers select training options tailored to their specific needs, learning style, and available time. This descriptor serves as an interpretive reference point and does not assess any teacher. In other words, task-bound learning accommodates teachers with heavy workloads, although it may constrain long-term professional development.

A further route to learning was direct work with the tool itself. The physics teacher learned by working with the tool itself and described: "Not busy in making the material, but with exploring Canva itself" (Physics teacher). This statement describes her experience at the start of her use of Canva. Creating her first slides could take a whole day because she kept trying new features, and she now works much faster. In this case, hands-on exploration is interpreted as part of self-directed learning. In other words, digital CPD is embedded in routine material production. Initial technology integration was marked by overt trial and error exploration, which gradually diminished as pedagogical digital competence became more internalized. The observed physics lesson, specifically the integration of digital simulation and Canva slides, demonstrated the tangible outcomes of her professional development trajectory.

This theme highlights that teachers learned independently, in short cycles, and for immediate classroom purposes. Their learning reflects the CPD activities on updating knowledge, learning new pedagogical methods, and using tutorials. The tools used such as social media and AI chatbots, go beyond the framework examples. Teachers shows diverse learning priorities, ranging from subject-matter content and pedagogical strategies to technical operational skills. in other words, professional learning was driven by immediate classroom demands rather than structured institutional development plans.

Theme 2: Peer-supported learning

Colleagues were a main route to new digital tools, and the exchange centered on one teacher. The chemistry teacher recalled that the history teacher was the first to introduce her to using Gemini. As she recalled: "At that time…back then I didn't know about AI" (Chemistry teacher). The mathematics teacher, the same colleague for a different tool which is video editing "This was taught by the history teacher for the first time using CapCut" (Mathematics teacher). The history teacher confirmed this role, including sharing Slide Go for presentations and Gemini for lesson plans with other teachers. Across the three accounts, a colleague gave the first introduction to a tool. Learning moved from one teacher to others. The prompt class that the history teacher took may be one source of the skills she shared. The digital CPD framework on providing training for colleagues and peers addresses this practice, and the framework places it at the pioneer level (C2), where a pioneer is "a role model for younger teachers" (Redecker, 2017). In this school, the model was the teacher with the fewest years of service, and her colleagues included teachers with longer service, one of them in a leadership role. This suggests that digital CPD moved through informal expertise as well as through formal hierarchy. Digital CPD here relied on a capable colleague more than a program.

Subject-group membership widens this exchange beyond the school. The history teacher described how her group handled the cost of a premium tool: "we bought one account, then we all use it" (History teacher). The pooling reduced the expense of a tool that members used for their lessons. The exchange here concerned access to a tool as much as knowledge about it. This case fits the digital CPD framework on exchange in digital professional communities. It also fits the B2 statement that teachers use formal and informal exchanges in professional communities as a source for their development (Redecker, 2017). The history teacher gave the clearest account of this route, while the other teachers' accounts centered on colleagues within the school. Peer support in this sample was therefore mostly local, with the subject group as a supplement.

Learning alongside students formed a smaller pattern tied to supervision work. The biology teacher described working through software with students on a research task: "We searched for tutorials together…we tinkered together" (Biology teacher). In this exchange, students acted as co-learners rather than recipients of instruction. The digital CPD activities

on exchange address colleagues and peers, extending their scope to students. The English teacher described a similar stance in general terms: “Together we learn” (English teacher). Both accounts come from teachers who supervise students’ projects as facilitators. This suggest that this route may depend on teachers’ role with students. In this case, students formed a visible but minor part of how these teachers learned.

Individual exploration continued alongside these exchanges. The physics teacher accounted for centered on her own work with tools during preparation at school. Peer support was one route among several, and its strength varied between teachers. Multiple narratives highlight a sequential learning process that combined peer collaboration with autonomous practice. In this case, initial exposure to digital tools was facilitated by colleagues, following that teachers independently refined their application. Weekly sessions in which teachers present materials and receive feedback from colleagues are discussed in the next theme, in which the school sets its content.

Theme 3: Context-bound learning

The school sets part of the learning agenda through a weekly routine. The English teacher described Thursday sessions in which teachers presented their designs in front of colleagues and received an evaluation: “Every Thursday we have an assessment” (English teacher). The routine gave tool learning a fixed time, an audience, and a standard to meet. In this context, the evaluation was conducted by both peers and institutional leaders. This established practice rendered individual professional development transparent across the school community. Furthermore, this approach contrasts with the self-directed learning observed in Theme 1, as the instructional focus and schedule were institutionally mandated rather than autonomously selected. DigCompEdu describes digital CPD mainly as the teacher’s own use of digital resources (Redecker, 2017). In this context, the school provided the occasion and the audience, so institutional routines belong to an account of how this competence develops. The English teacher gave the fullest description of the routine, and the history teacher referred to similar leadership expectations.

A faith-based standard travelled with digital skill. The English teacher explained that the material “Must still be based on the Qur’an” (English teacher). The history teacher reported that the school leader always asked her to “connect it with the Qur'an” (History teacher). A similar expectation was visible in the classroom observation, which was in an observed lesson. The physics teacher presented a Canva slide that linked a hadith to the concept being taught. This observation matches the interview’s data about school’s expectations. Based on the digital CPD’s activities, learning to design with Canva included learning to carry religious content in the design. Digital skills and religious content were therefore learned together, because the Thursday sessions asked that materials stay based on the Quran. The CPD framework for this competence covers subject knowledge, pedagogy, resources, and exchange with peers. Islamic values formed a further layer in this school. This layer shaped what counted as a good digital product in this specific school.

Home responsibilities shaped the way teachers prepared their teaching materials. The physics teacher preferred to work at school: “At home it’s difficult to do school’s work” (Physics teacher). This highlights that domestic duties and limited time restricted her schoolwork at home. This shows one way that a female teacher’s domestic role sets the conditions for her digital CPD. One reading is that limited time gives more weight to the hours spent at school. It may also help explain why learning in Theme 1 stayed short and tied to tasks. Time constraints emerged across several teachers’ accounts, mostly manifested through heavy workloads. The chemistry teacher identified time availability as the primary barrier to pedagogical innovation, noting that creative instructional design requires dedicated preparation time. Similarly, the biology teacher emphasized that administrative and

instructional responsibilities compound daily routines, thereby severely restricting available time. In addition to institutional demands, the physics teacher highlighted domestic obligations as a competing demand on time.

Taken together, the accounts show that school expectations, faith-based standards, and time pressure, including home responsibilities, each shaped the space for directed learning. Self-directed learning and peer exchange therefore operated within a frame. In other words, teachers engaged in digital CPD with initiative, and the school, their faith, and domestic role shaped the form that initiative took.

Across these themes, a distinct professional development trajectory emerged: learning was initiated by pedagogical demands, diffused through informal peer networks, and mediated by socio-religious school norms and workload constraints. In conclusion, teachers engaged in digital CPD via a contextualized, on demand framework, learning from diverse actors including colleagues, students, and digital resources within the boundaries of institutional standards and time availability.

Discussion

This study investigated how teachers in an Islamic senior high school engage in digital CPD. The empirical findings reveal that teachers' engagement in digital CPD is characterized by three interconnected dimensions. These include self-directed, peer-supported in practice, and bounded by institutional, cultural, and domestic environments. While previous studies applying the DigCompEdu have predominantly relied on quantitative self-assessment instruments to classify teachers' digital proficiency and have frequently found it at intermediate levels (Cabero-Almenara et al., 2020; Ghomi & Redecker, 2019). The qualitative evidence from the current study shows how digital competence is dynamically enacted and sustained in daily school life.

Teachers in this school initiated professional learning in response to classroom needs and leveraged available digital resources such as online video tutorials, social media platforms, and generative AI chatbots. This pattern highlights a broader a shift in teachers' professional development from traditional workshops toward ongoing, self-directed learning and just-in-time learning (Lay et al., 2020). Based on the DigCompEdu framework, teachers' agency to select online training aligned with personal development needs, learning style, and time constraints resembles the Leader (C1) descriptor of competence 1.4 (Redecker, 2017).

The self-directed learning was actively operationalized through informal peer support within the school. Self-directed learning refers to learners taking the initiative to identify their needs, choose resources, and judge their results (Garrison, 1997). Remarkably, this peer exchange was anchored by a junior teacher with fewer years of teaching experience who trained her colleagues, including senior staff and school leaders, in adopting new digital tools such as new generative AI and presentation platforms. Within the DigCompEdu framework, guiding peers and serving as a role model resembles the Pioneer (C2) descriptor (Redecker, 2017). This finding suggests that in this school, digital competency served as the primary determinant for pedagogical leadership rather than tenure. However, this point relies exclusively on the self-reported data of a single teacher. Previous studies relate teachers' digital competence to years of technological experience (Ghomi & Redecker, 2019; Palacios-Rodríguez et al., 2023). Instead, it demonstrates that digital leadership within this school was governed by informal digital proficiency rather than informal seniority, effectively flattening traditional administrative hierarchies through peer-mediated learning (Wang & Zhang, 2023). The finding also aligns with wider research on teacher learning communities, which highlights that peer-mediated reflection and social interaction enhance teacher self-efficacy,

facilitate collaborative problem solving, and turn individual learning into a shared professional practice (Wang & Zhang, 2023).

The third theme adds contextual evidence to the DigCompEdu framework by showing the role of contextual and socio-cultural boundaries. In this context, institutional structures such as weekly evaluation meetings provided a fixed time, audience, and school standard for tool adoption, shifting pedagogical expectations from individual choices to the institutional level. Moreover, faith-based expectations required digital learning materials to be explicitly aligned with Islamic values, such as integrating Quranic verses and Hadith into teaching slides. While DigCompEdu predominantly evaluates individual technical and pedagogical capabilities in isolation (Ghomi & Redecker, 2019; Redecker, 2017), studies on contextualized teacher development emphasize that digital integration is deeply mediated by organizational culture, local governance, and religious or socio-cultural values (Muslih et al., 2024; Yurkofsky et al., 2019). Furthermore, workload and in one account, home duties, are limited when teachers can learn. This finding on structural tensions in teacher professional learning (Chen et al., 2025). Integrating these institutional, faith-based, and domestic dimensions offers a more detailed account of how teachers engage in digital CPD in practice.

Based on empirical findings, this study offers three recommendations for school leaders and educational policymakers seeking to foster teachers' digital CPD. First, schools should formally or informally recognize digitally proficient peers as internal facilitators, leveraging their technical expertise to guide colleagues regardless of seniority. Second, institutional leadership should embed structured evaluation meetings with constructivist feedback into routine school schedules, providing a predictable organizational space for collective tool adoption and pedagogical reflection. Third, schools should dedicate protected hours within the regular working day for self-paced digital learning, since teachers' workload limits their ability to learn. This may also help teachers who find it difficult to learn at home.

Methodologically, this inquiry draws on an in-depth qualitative design involving six teachers within a single Islamic senior high school, situated as part of a broader investigation into digital literacy. While the focused sample size and specific faith-based context preclude statistical generalization to larger populations, the findings offer rich, ecologically valid insights and theoretical transferability to similar educational settings. Future research could examine diverse faith-based institutions or longitudinally track how informal digital leadership evolves over time.

Conclusion

This study examined teachers' engagement in digital CPD within a faith-based educational setting. Their engagement was self-directed in origin, peer-supported in practice and bounded by context. Teachers learned from classroom needs, using video tutorials, social media, and generative AI. A digitally capable colleague introduced tools to other teachers, including senior teachers. A weekly school routine, faith-based expectations, and limited time shaped the way teachers update their knowledge. DigCompEdu's digital CPD competence as an analytical guide, captured many practices and school conditions that add to the context to it. The novelty of this study lies in using DigCompEdu digital CPD competence as a qualitative analytic guide in an Islamic girls' school, which shows how peer trainers, school routines, and faith-based expectations frame teachers' digital learning. In conclusion, by bridging generic digital competence frameworks with the socio-cultural and contextual realities of school life, this study highlights the necessity of designing contextualized, peer-supported, and values-aligned professional development initiatives to sustain meaningful

digital transformation in education. Future studies could include other Islamic school and male teachers.

References

Cabero-Almenara, J., Gutiérrez-Castillo, J.-J., Barroso-Osuna, J., & Rodríguez-Palacios, A. (2023). Digital Teaching Competence According to the DigCompEdu Framework. Comparative Study in Different Latin American Universities. *Journal of New Approaches in Educational Research*, *12*(2), 276–291. https://doi.org/10.7821/naer.2023.7.1452

Cabero-Almenara, J., Gutiérrez-Castillo, J.-J., Palacios-Rodríguez, A., & Barroso-Osuna, J. (2020). Development of the Teacher Digital Competence Validation of DigCompEdu Check-In Questionnaire in the University Context of Andalusia (Spain). *Sustainability*, *12*(15), 6094. https://doi.org/10.3390/su12156094

Caena, F., & Redecker, C. (2019). Aligning teacher competence frameworks to 21st century challenges: The case for the European Digital Competence Framework for Educators (Digcompedu). *European Journal of Education*, *54*(3), 356–369. https://doi.org/https://doi.org/10.1111/ejed.12345

Chen, K.-Z., Tseng, J.-Y., & Oakley, B. (2025). Transforming Online Teacher Training Through Expansive Learning: A Case Study Applying Cultural-Historical Activity Theory and the Change Laboratory Method. *The Asia-Pacific Education Researcher*, *34*(4), 1413–1430. https://doi.org/10.1007/s40299-024-00954-y

Chifla-Villón, M. R., Chifla-Villón, M. P., Suárez-Guartamber, E. M., & Guevara-Viejó, F. (2025). Multidimensional assessment and validation of digital competencies in university teacher education: A confirmatory factor analysis. *Frontiers in Education*, *10*, 1597095. https://doi.org/10.3389/feduc.2025.1597095

Duncan-Howell, J. (2010). Teachers making connections: Online communities as a source of professional learning. *British Journal of Educational Technology*, *41*(2), 324–340. https://doi.org/10.1111/j.1467-8535.2009.00953.x

Fadlilah, S., Yuliasri, I., & Fitriati, S. W. (2025). Understanding English Teachers' Engagement in Professional Learning Communities for TPACK Reconstruction. *Indonesian Journal of EFL and Linguistics*, *10*(2), 319–332. https://doi.org/10.21462/ijefl.v10i2.991

Fernández-Batanero, J. M., Montenegro-Rueda, M., Fernández-Cerero, J., & García-Martínez, I. (2022). Digital competences for teacher professional development. Systematic review. *European Journal of Teacher Education*, *45*(4), 513–531. https://doi.org/10.1080/02619768.2020.1827389

Gale, N. K., Heath, G., Cameron, E., Rashid, S., & Redwood, S. (2013). Using the framework method for the analysis of qualitative data in multi-disciplinary health research. *BMC Medical Research Methodology*, *13*(1), 117. https://doi.org/10.1186/1471-2288-13-117

Garrison, D. R. (1997). Self-Directed Learning: Toward a Comprehensive Model. *Adult Education Quarterly*, *48*(1), 18–33. https://doi.org/10.1177/074171369704800103

Ghomi, M., & Redecker, C. (2019). Digital Competence of Educators (DigCompEdu): Development and Evaluation of a Self-assessment Instrument for Teachers' Digital Competence. *Proceedings of the 11th International Conference on Computer Supported Education*, *1*, 541–548. https://doi.org/10.5220/0007679005410548

Haşlaman, T., Atman Uslu, N., & Mumcu, F. (2024). Development and in-depth investigation of pre-service teachers' digital competencies based on DigCompEdu: A case study. *Quality & Quantity*, *58*(1), 961–986. https://doi.org/10.1007/s11135-023-01674-z

Lay, C. D., Allman, B., Cutri, R. M., & Kimmons, R. (2020). Examining a Decade of Research in Online Teacher Professional Development. *Frontiers in Education*, *5*, 573129. https://doi.org/10.3389/feduc.2020.573129

Lockee, B. B. (2021). Shifting digital, shifting context: (Re)considering teacher professional development for online and blended learning in the COVID-19 era. *Educational Technology Research and Development*, *69*(1), 17–20. https://doi.org/10.1007/s11423-020-09836-8

Lucas, M., Dorotea, N., & Piedade, J. (2021). Developing Teachers' Digital Competence: Results From a Pilot in Portugal. *IEEE Revista Iberoamericana de Tecnologias Del Aprendizaje*, *16*(1), 84–92. https://doi.org/10.1109/RITA.2021.3052654

Muammar, S., Hashim, K. F. B., & Panthakkan, A. (2023). Evaluation of digital competence level among educators in UAE Higher Education Institutions using Digital Competence of Educators (DigComEdu) framework. *Education and Information Technologies*, *28*(3), 2485–2508. https://doi.org/10.1007/s10639-022-11296-x

Muslih, M., Fauyan, M., Kholis, N., & Deporos, S. R. C. (2024). Evaluating The Influence Of Online Learning On The Professionalism Of In-Service Teacher Education At Islamic Higher Education Institutions. *Jurnal Pendidikan Islam*, *10*(2), 175–191. https://doi.org/10.15575/jpi.v0i0.38463

Nicholas, H., & Ng, W. (2019). Mobile Digital Literacy of Australian Adolescent Students: *International Journal of Digital Literacy and Digital Competence*, *10*(3), 32–48. https://doi.org/10.4018/IJDLDC.2019070103

Palacios-Rodríguez, A., Guillén-Gámez, F. D., Cabero, J., & Gutiérrez-Castillo, J. J. (2023). Teacher Digital Competence in the education levels of Compulsory Education according to DigCompEdu: The impact of demographic predictors on its development. *Interaction Design and Architecture(s) Journal*, *57*, 115–132. https://doi.org/10.55612/s-5002-057-007

Pawan, F., Li, S., Nijiati, S., Dopwell, M., Harris, A., & Iruoje, T. (2023). Culturally- and Linguistically-Responsive Online Teacher Learning Professional Development. *Online Learning*, *27*(4). https://doi.org/10.24059/olj.v27i4.4003

Pham, N. S., Nguyen Thi, H. Y., & Vu, T. Q. (2024). Digital Competence of Secondary School Teachers in Hanoi, Vietnam: A Study Based on the DigCompEdu Model. *International Journal of Emerging Technologies in Learning (iJET)*, *19*(05), 20–34. https://doi.org/10.3991/ijet.v19i05.48937

Redecker, C. (2017). *European Framework for the Digital Competence of Educators: DigCompEdu* (Y. Punie, Ed.; EUR 28775 EN). Publications Office of the European Union. https://doi.org/10.2760/159770

Tzafilkou, K., Perifanou, M., & Economides, A. A. (2023). Assessing teachers' digital competence in primary and secondary education: Applying a new instrument to integrate pedagogical and professional elements for digital education. *Education and Information Technologies*, *28*(12), 16017–16040. https://doi.org/10.1007/s10639-023-11848-9

Wang, M., & Zhang, L. J. (2023). Understanding teachers' online professional learning: A "community of inquiry" perspective on the role of Chinese middle school teachers' sense of self-efficacy, and online learning achievement. *Heliyon*, *9*(6), e16932. https://doi.org/10.1016/j.heliyon.2023.e16932

Yin, R. K. (2018). *Case study research and applications: Design and methods* (Sixth edition). SAGE Publications, Inc.

Yurkofsky, M. M., Blum-Smith, S., & Brennan, K. (2019). Expanding outcomes: Exploring varied conceptions of teacher learning in an online professional development experience. *Teaching and Teacher Education*, *82*, 1–13. https://doi.org/10.1016/j.tate.2019.03.002