

TEACHER PROFESSIONAL LEARNING IN THE PERSPECTIVE OF EDUCATIONAL TECHNOLOGY

Teacher Professional Learning Dalam Perspektif Teknologi Pendidikan

Wawan Krismanto

Universitas Negeri Makassar

Jl. Andi Pangerang Pettarani, Kota Makassar, Sulawesi Selatan, 90222

ABSTRACT:

Teachers' increasingly massive and diverse use of gadgets allows their facility to be directed at teacher learning activities to improve their competence and professionalism. This research explores the professional learning of technology-based teachers from the perspective of learning technology. Apart from the fact that publication on this topic is still limited, this study is also essential as a foundation, framework, or conceptual framework for technology-based teacher professional development research. To achieve the objectives of this research, a qualitative approach through the method of literature study or library research is a research method that is considered relevant. Literature data is collected through books, literature, notes, and relevant previous research reports. The research procedure is reading, taking notes, or recording, then inventorying and processing it into research data. The research results concluded that teacher professional development shifted into professional learning. The process is conditioned and built actively, self-regulated, sustainable, and based on social and contextual processes according to the teacher's problems and needs. The learning technology perspective views that professional teacher learning not only focuses on the results of learning activities but also on processes and resources that are created, managed, and utilized optimally to facilitate various teacher learning activities through different modes or technological devices. Technology provides an opportunity to make teachers' professional learning more inclusive and sustainable. This opens up broad opportunities for future studies on technology-based teacher professional learning in the area or domain of educational technology or instructional technology.

Keywords:

*educational technology;
professional learning; teacher
learning*

Kata kunci:

*pembelajaran profesional;
teknologi pendidikan;
pembelajaran guru*

ABSTRAK:

Penggunaan gadget yang semakin masif dan beragam oleh guru memungkinkan fasilitasnya diarahkan untuk kegiatan pembelajaran guru dalam meningkatkan kompetensi dan profesionalismenya. Penelitian ini bertujuan mengeksplorasi pembelajaran profesional guru berbasis teknologi dari perspektif teknologi pembelajaran. Selain karena publikasi tentang topik ini masih terbatas, penelitian ini juga penting sebagai landasan, kerangka, atau kerangka konseptual untuk penelitian pengembangan keprofesian guru berbasis teknologi. Untuk mencapai tujuan penelitian ini, pendekatan kualitatif melalui metode studi literatur atau studi kepustakaan merupakan metode penelitian yang dianggap relevan. Data pustaka dikumpulkan melalui buku, literatur, catatan, dan laporan penelitian sebelumnya yang relevan. Prosedur penelitiannya adalah membaca, mencatat, atau mencatat, kemudian menginventarisasi dan mengolahnya menjadi data penelitian. Hasil penelitian menyimpulkan bahwa pengembangan keprofesian guru bergeser menjadi pembelajaran profesional. Proses tersebut dikondisikan dan dibangun secara aktif, mandiri, berkesinambungan, dan berdasarkan proses sosial dan kontekstual sesuai dengan permasalahan dan kebutuhan guru. Perspektif teknologi pembelajaran memandang bahwa pembelajaran guru profesional tidak hanya terfokus pada hasil kegiatan pembelajaran tetapi juga pada proses dan sumber daya yang diciptakan, dikelola, dan dimanfaatkan secara optimal untuk memfasilitasi berbagai kegiatan belajar guru melalui berbagai moda atau perangkat teknologi. Teknologi memberikan kesempatan untuk menjadikan pembelajaran profesional guru lebih inklusif dan berkelanjutan. Ini membuka peluang luas untuk studi masa depan tentang pembelajaran profesional guru berbasis teknologi pada bidang atau domain teknologi pendidikan atau teknologi instruksional.

INTRODUCTION

Teacher professional development (TPD) is an issue that is considered

essential and strategic as an effort by various countries to improve the quality of their education, especially to

create high-quality teaching and learning for every citizen (OECD, 2019; UNESCO, 2016, 2020). Effective teacher professional development is believed to have the potential to boost teaching quality, achievement of learning objectives, improvement of student learning processes and outcomes, progress and effectiveness of schools and education reform (Hennessey et al., 2021; OECD, 2019; Thacker, 2017; UNESCO, 2016). If continuous professional development is inadequate, support for teachers and national standards for teacher professional development are low, then these three things contribute to the low quality of learning outcomes (Brooks & Gibson, 2012; Gibson & Brooks, 2013). So ideally, every country has a system, model, method, and strategy that effectively facilitates professional development for teachers at all levels of education. In the Indonesian context, for several decades until 2020, there has not been a system, model, method, or strategy that effectively facilitates professional development for teachers at all levels of education. This is because it is still hampered by various problems, as explained in the next paragraph.

Support from various parties is needed to realize the learning and professional development of teachers to improve their competence, provide

space and sufficient time for them to collaborate, reflect, feedback cycles and build networks to enhance the quality of their learning (De Smet et al., 2008; Jan, 2017). Moreover, in the context of TPD, which is carried out conventionally, various problems still need to be solved to implement an effective and efficient TPD. For example, Indonesia implemented the TPD program conventionally for several decades until 2020. The results of studies on the programs that were implemented at that time showed various problems. These problems include. *First*, the limitations of the TPD program are due to regional coverage and geographical location, the reach of more than 3.4 million teachers, and the disproportionate budget. This causes equity and disparities in teacher quality to be slow to resolve because teachers' opportunities to participate in the TPD program are limited. *Second*, regarding teacher organizations, independence, relevance, and support for the TPD scheme in formal communities still needs to be higher. For example, this occurred in the KKG/MGMP/MKKS forums (Inovasi, 2019; republik.com, 2018; solopos.com, 2019). *Third*, TPD tends to be top-down in the form of policies and programs from the central government to the regions and then up to the teachers. This scheme is not

optimal because the program's relevance is low, activities are incidental & not sustainable (Chang, Shaeffer, Al-Samarrai, Ragatz, Ree, et al., 2014; Cirocki & Farrell, 2019; Harjanto et al., 2018). *Fourth*, teachers have not internalized TPD as a responsibility and a need. Hard efforts are needed so that the independence and significance of the output of the TPD program increases and meets expectations. Including the teacher certification program, which aims to improve the competence, qualifications, and professionalism of teachers whose outcomes are relatively low (Chang, Shaeffer, Al-Samarrai, Ragatz, de Ree, et al., 2014; Kusumawardhani, 2017; Widodo & Riandi, 2013). From 2021 to 2023, the Government of Indonesia has started implementing the TPD program, which is moving towards change through the Program Merdeka Mengajar, which has the characteristics of providing opportunities for teachers to develop technology-based competencies through the Platform Merdeka Mengajar (PMM) application. It contains various features that encourage community-based self-learning teachers, such as Self-Development and Community (Kemendikbudristek, 2023).

For this reason, TPD carried out conventionally, must be equipped with models, methods, and strategies that effectively bridge the various problems. Apart from increasing the quality and quantity of programs and getting more substantial budget support, another thing that needs to be realized is a technology-based teacher professional development program. The ease of access to gadgets, the presence of various learning applications, and the increasing use of social media among teachers must be utilized for the program. The emergence of Web 2.0 and social media platforms has allowed users to assume new attitudes and roles when accessing the internet. It is not only to search for information but also to interact, collaborate, produce, and publish content and facilitate learning opportunities anytime and anywhere (Coutinho & Lisbôa, 2013; Trust et al., 2016). In addition, the ease of use of web tools and communication applications, and the growth of social media, have prompted a movement for teachers to start independently with the opportunity to develop their professional learning online (Vu et al., 2014). This can be exemplified in the Program Merdeka Mengajar, embodied in a Platform Merdeka Mengajar (PMM) application. This application provides an opportunity

for all teachers in Indonesia to develop themselves and master a variety of competencies. Starting from updating the curriculum, implementing best practices, and learning many things from the community members of the application. Teachers can freely use the application to study anytime and anywhere without being limited by time and geographical location. Teachers are also allowed to share good practices, share learning resources and work on developing their best learning tools (Kemendikbudristek, 2023).

In addition, online practice communities take advantage of the growing social networking technology among teachers; providing new opportunities to initiate learning networks to improve teaching practices; where individuals worldwide can engage in collegial collaborations (Scott, 2010). That can increase the passion for change and improve the quality—of their teaching practice. Based on the literature review, the technology-based teacher professional development program opens new doors to enhance the quality of education and learning. Not only that, but it also opens opportunities for teachers to develop independently because web-based technology allows prospects to learn

anytime, alone, and according to the needs of teachers (Prestridge, 2018).

Technology-based teacher professional development also allows researchers to study more broadly and diversely through the latest research methods. Especially researchers with a background in the field of learning technology. These researches will undoubtedly intersect with educational technology or learning technology; about the study and practice of ethics to facilitate learning and improve performance by creating, using, and managing appropriate technological processes and resources, including learning in the professional development framework of teachers who utilize technology. Meanwhile, publications that examine technology-based teacher professional development from the educational or learning technology perspective still need to be completed. Based on previous literature reviews that have been described in previous sections, such as Scott (2010), Coutinho & Lisbôa (2013), Vu et al. (2014), Trust et al. (2016), and Prestridge (2018), have not reviewed technology-based teacher professional development from an educational or learning technology perspective. Their study has only reached the use of technology in teacher professional development, which provides a variety of potentials

and advantages for teacher professional development. Even though examine technology-based teacher professional development from the educational or learning technology perspective is important as a basis, framework, or conceptual framework in technology-based teacher professional development research.

For this reason, this article was written as an effort to complete the necessary literature as a foundation, framework, or conceptual framework in technology-based teacher professional development research. The hope is that it will open up further thought and investigation to practically explore technology-based teacher professional development in more depth or prove its effectiveness through qualitative and quantitative approaches. These researches will contribute more to solving the problems of conventional teacher professional development and have the potential to provide teacher professional learning programs that are more inclusive and sustainable.

METHOD

This research attempts to answer the research question; 1) How does professional learning become a new paradigm in teacher professional

development? 2) What is the perspective of learning technology in looking at teachers' professional learning? 3) What is the role of technology in professional learning among teachers today? And 4) How to build participation in professional learning among teachers? For this reason, a qualitative approach through literature study or library research is considered appropriate. This literature study is considered appropriate because to answer research questions, the primary data needed is literature data. The research questions can be answered based on the conclusions from relevant, interrelated, and comprehensive literature data. These answers provide a comprehensive picture of understanding professional learning from the perspective of educational or learning technology. Literature study or library research is a series of activities related to collecting library data in the form of books, literature, notes, and reports relating to the problem to be solved, then reading, recording or recording, then inventorying and processing it into research data (Nasir, 2005; Zed, 2008).

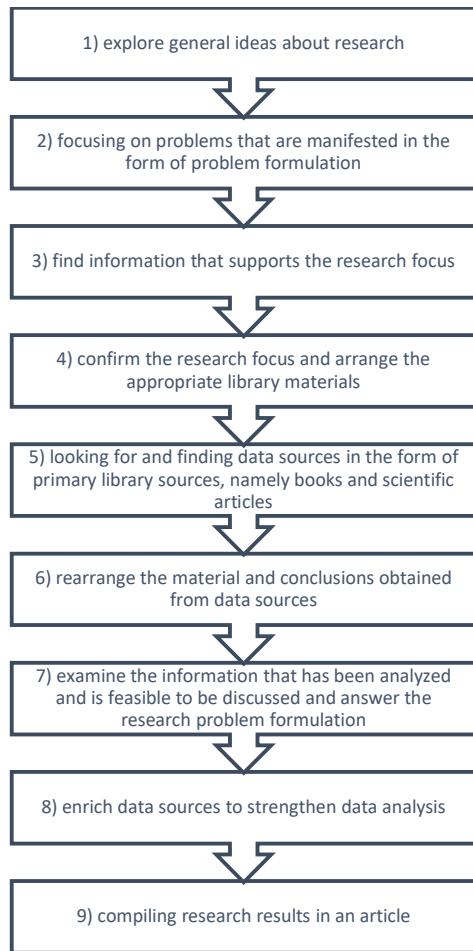


Figure 1: Research Procedure

Following its benefits, this literature study can be a preliminary study to understand the research focus of the new phenomenon (Zed, 2008). In the context of this research, literature studies are intended as a foundation, framework, or conceptual framework in technology-based teacher professional development research that will open up ideas and practical follow-up research in exploring technology-based teacher professional development. The research procedures adopted by the

researcher can be described in the Figur 1.

RESULTS AND DISCUSSION

Professional Learning as a New Paradigm in Teacher Professional Development

Various literature and expert thoughts on professional development have indicated a paradigm shift from professional development to professional learning. The process is conditioned and built actively, self-regulated, and sustainable, based on social and contextual methods according to the problems and needs in carrying out their daily profession (Clarke & Hollingsworth, 2002; Easton, 2008; Endedijk & Cuyvers, 2022; Grimmett, 2014; Hunzicker, 2011; Milligan et al., 2014; Oddone, 2022). This paradigm shift certainly applies also in the context of teacher professional development. For this reason, the concept of teacher professional development has also changed from just a self-development process and program in terms of teacher professionalism to a teacher learning process and program, known as professional learning. Helen Grimmet (2014) emphasized that there needs to be a paradigm shift in teacher professional development. Namely, a change in the focus of professional development, from something done

for teachers by experts (usually from outside) to professional learning, namely something done by the teacher himself as a reaction to their pedagogical needs and reflections (Grimmett, 2014). The teachers explored the problems through pedagogical reflection, then discussed them, and tried to find solutions through professional learning activities. In the Indonesian context, this paradigm shift encourages a change in the role of those who are usually resource persons or experts (such as Widyaprada, Widyaiswara, or Lecturers) to become facilitators who guide teachers' learning either individually or through teacher communities. They are guided to reflect together, find problems, explore solutions and direct them to try to implement and jointly reflect on the results. Thus there is a continuous process of professional learning. The Indonesian government has started doing this since 2021 through the Program Guru Penggerak (PGP) and Program Sekolah Penggerak (PSP).

Professional learning as a new paradigm of professional development is defined as "the formal and informal learning experiences undertaken by teachers and school leaders that improve their professional practice and the school's collective effectiveness as measured by

improved student engagement and learning outcomes" (Cole, 2012, p. 4). This definition positions professional learning as something that is not only related to individual teacher learning but the consistent application of effective teaching practices that will lead to changes in institutions or schools. In the end, the main goal of professional learning is to improve student learning outcomes. In line with the assertion that every professional development activity carried out by teachers should be based on a conception that does not only study "if and how professional development makes them make various changes"; but to a stage that ensures that the changes that occur to them have significance for process improvement, and the learning outcomes of their students (Desimone, 2023). Each teacher can act as an agent of change, and professional learning teachers have great potential as solid catalysts to carry out or realize educational reforms and innovations to ensure that learning in schools can truly benefit students (Papp & Cottrell, 2021).

Today's teachers face challenges and problems that are increasingly complex amidst the various changes that have occurred. To overcome the difficulties of teaching every day and anticipate the

changes around them that affect themselves, their students, and their learning, every teacher needs to study again. In this case, Lois Brown Easton (2008) emphasized that every educator needs to learn today, which is why professional learning has replaced professional development. Just developing is not enough; every educator must be knowledgeable and wise; that is, they must realize that they need to continue to make various changes to get different results and become learners who continue to develop themselves (Easton, 2008).

Professional learning is attached to the teaching profession because teaching is a complex profession with changing demands and curriculum standards and requires continuous development of each teacher; this is where teachers need to continue learning throughout their careers (Louws et al., 2017). Another concept asserts that every individual who can work effectively in a changing environment needs to fulfill their own self-regulated learning needs so that each teacher needs self-awareness to set learning goals, monitor, or evaluate self during learning, and self-reflection after learning (Milligan et al., 2014). In other words, teachers need the initiative to want to learn again, which comes from within themselves. The learning

process that starts from oneself is another form of independent learning that is owned by those who have specific learning goals so that they actively seek relevant learning experiences (Tour, 2017). Thus teachers also need to shift from the paradigm that teacher professional learning is something that is given/done for teachers, to something that is done with or by themselves, in other words with their active participation. As teachers move from "renting" to "owning" their professional learning, teachers become more deeply involved and more willing to see themselves not only as teachers but also as learners and learning leaders (Murray & Zoul, 2015).

In the Indonesian context, teachers are currently encouraged to actively learn independently through communities and individuals to develop their competence and professionalism through Platform Merdeka Mengajar (PMM) application, Program Guru Penggerak (PGP), and Program Sekolah Penggerak (PSP). PMM was built to support the Implementation of the Kurikulum Merdeka and provided to be a driving partner for teachers and principals in teaching, learning, and creating (Kemendikbudristek, 2023). PSP focuses on developing student

learning outcomes in a holistic manner which includes competence (literacy and numeracy) and character, starting with improving the quality of superior human resources (principals and teachers) (Kemendikbudristek, 2021b). PGP is a leadership education program for teachers to become learning leaders, including online training, workshops, conferences, and mentoring for six months (Kemendikbudristek, 2021a).

Professional Learning in the Perspective of Educational Technology

The industrial era, supported by the development of digital technology, has encouraged various changes in the world of education. These changes include strengthening educational goals so that their outcomes follow the demands of life in the current era. Michael Spector (2016) revealed that current educational objectives could be grouped as follows: 1) developing productive workers/professionals (emphasized in the industrial era and now reemphasized in the competitive global economic era); 2) developing effective problem solvers (emphasized in many disciplines and increasingly important in the digital age); 3) develop analytical and critical thinkers (has long been emphasized in engineering and management

programs and is increasingly essential in the information age); 4) developing responsible citizens; and 5) developing lifelong learners (Spector, 2016).

The educational goals Michael Spector (2016) put forward can be adopted to describe the direction of change or professional learning orientation among teachers today. Professional learning needs to be emphasized not only in transferring knowledge and skills from experts or between fellow teachers to increase professionalism. However, professional learning activities emphasize: 1) improving teacher performance so that it is productive and has an impact on students, 2) being an essential part of solving various practical problems of teaching teachers, 3) encouraging a culture of reflective, analytical, and critical thinking in dealing with various new problems and challenges, 4) encouraging all individual teachers to be responsible and involved in improving their self-quality and performance, 5) fostering the initiative of each teacher to want and be able to learn for life for the sake of improving self-quality and performance.

In addition, as stated in the previous section, along with current technological developments, the professional development of teachers through various forms of professional

learning is also affected. New technologies have the potential to transform teaching, and technology also has the potential to transform teacher professional development. The National Academies Teacher Advisory Council explained that the professional development of electronic technology-based teachers is increasingly focused on web-based, interactive technologies, presenting information by combining text, video, and sound (National Academies Teacher Advisory Council, 2007). It does not require participants to be involved in the experience simultaneously.

Efforts to realize orientation changes and accommodate changes in the facilitation process in electronic technology-based professional learning programs align with the concept of learning technology or educational technology. "Educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources" (Januszewski&Molenda, 2008, p. 1). Thus the definition of educational technology is the study and practice of ethics to facilitate learning and improve performance by creating, using, and managing appropriate technological processes and resources.

The critical elements in this definition can be seen in the following figure.

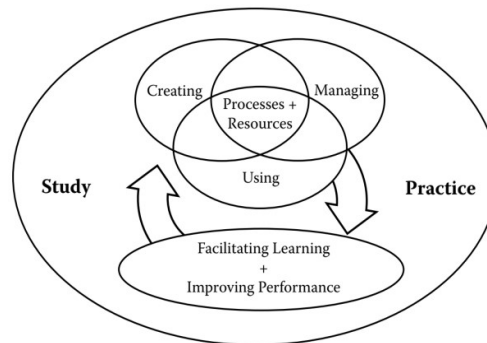


Figure 2: A Visual Summary of Key Elements of Definition AECT 2008

(source: (Januszewski&Molenda, 2008, p. 5))

Examining professional learning among teachers from the perspective of learning technology can be seen from two sides: facilitating learning activities and improving performance. The efforts of a professional learning program in creating, managing, and using various processes and resources are to enable teacher learning activities and improve teacher performance. The learning technology perspective views professional learning as not only focusing on the results of learning activities but focusing on processes and resources that are created, managed and utilized optimally to facilitate various teacher learning activities and through multiple modes or technological devices. The results of creating, managing, and using different sources can ultimately improve teacher performance,

impacting the quality of student learning. To improve performance driven by learning technology, Michael Spector (2016) provides a framework for developing the competencies of those who, in their daily work processes, are supported or require advanced learning technology (ALT), in this case, the teaching profession, as one example. There are five domains of ALT competency, according to Michael Spector (2016), as seen in the following table.

Table 1: Five Domains of ALT Competence

Knowledge competence	E.g., learning theory, pedagogy, experimental design, societal concerns, etc.
Process competence	E.g., operational skills in using ICT for education and training
Application competence	E.g., skills in applying ALT skills (e.g. instructional design) in education and training
Personal/social competence	E.g., self regulation skills, communication skills, collaboration skills, etc.
Innovative/creative competence	E.g., using new technologies in innovative ways to solve education and training problems.

(Source: (Spector, 2016, p. 151))

From the perspective of learning technology, professional learning programs for teachers need to implement, integrate and even develop the theory and practice of educational technology. Education managers must have reliable academic and professional skills to create or

apply educational technology so that education delivery becomes more qualified, effective, efficient, and relevant to the needs and demands of the times (Warsita, 2013). In these discussion and the Indonesian context, education managers are Kepala Sekolah in the school area, in the regional management and supervisor area, namely Kepala Dinas Pendidikan, and in the national area teachers management and supervisor is Direktorat Jenderal Guru & Tenaga Kependidikan. There are at least three of the five areas of educational technology in AECT 1994. These can be an entry point for implementing the theory and practice of educational technology in professional learning programs for teachers, namely 1) design and 2) utilization and 3) management. Design is conditioning the learning process to create the expected strategy and product (Seels & Richey, 2000). In this case, learning systems, messages, learning strategies and the characteristics of participants in professional learning programs need to be designed to achieve the objectives of facilitating teacher learning and improving teacher performance. Utilization is an activity that utilizes a series of processes and various sources for learning activities (Seels & Richey, 2000). In this case, strategies or methods, instructional

models and media tools need to be designed and implemented to support teacher learning facilitation and improve teacher competencies and performance. Management is the process to controls technology and resources through planning, organizing, coordinating and supervising (Seels& Richey, 2000). In this case, a series of activities utilizing technological processes, various learning resources, and great information along with delivery systems in professional learning activities need to be managed so that they can facilitate teacher learning to improve teacher performance.

Technology in Teacher Professional Learning

Along with current technological developments, the professional development of teachers through various forms of professional learning is also affected. New technologies have the potential to transform teaching, and technology also has the potential to transform teacher professional development. The National Academies Teacher Advisory Council explained that the professional development of electronic technology-based teachers is increasingly focused on web-based, interactive technologies, presenting information by combining text, video,

and sound (National Academies Teacher Advisory Council, 2007, p. 4). It does not require participants to be involved in the experience simultaneously. This means that teacher professional development activities by utilizing technology do not require teachers to simultaneously participate in all kinds of learning activities. However, teachers have choices according to their learning preferences and conditions. For example, some teachers have free time and continue participating in live or web-based LMS or application-based learning activities. Some teachers have limited time, so they only learn through YouTube recordings. Some teachers prefer only to follow the progress of the teacher's learning activities through posts on their social media.

In addition, in the last few years, teachers have begun to use various online forums, such as websites, personal blogs, Twitter or Facebook, as resources for networking, sharing knowledge, giving and receiving suggestions, sharing and discussing—curriculum materials, etc. (Liljekvist et al., 2017). In addition, web-based technology allows opportunities for learning anytime, independently, and according to the needs of teachers (Prestridge, 2018). The ease of use of web tools and

communication applications and the growth of social media has encouraged the emergence of movements for teachers to start independently who have the opportunity to develop their professional learning online (Vu et al., 2014). Shelleyann Scott (2010) also explained that online technology presents innovative ways to overcome obstacles for effective teacher professional development. Online practice communities that utilize social networking technology provide new opportunities to initiate learning networks to improve teaching practices, where individuals worldwide can engage in collegial collaborations that can enhance teaching enthusiasm (Scott, 2010).

Some of the advantages of professional development that utilize technology or often termed online professional development, include (National Academies Teacher Advisory Council, 2007):

1. Flexible and versatile (flexibility and versatility). Teachers with diverse backgrounds will have varied and different needs. If programmed and structured correctly, professional development programs utilizing technology can be adapted to meet this diversity. In addition, the design of a flexible and versatile

online system can be used widely and is almost unlimited.

2. Has the potential to build community among teachers and across groups (possibility to build community among teachers and across groups). (Online) technology in general and certain types of online professional teacher development programs, in particular, can help build a community often lost from teachers' daily lives due to their busy activities. Using technology, teachers can interact with each other to exchange information and experiences.
3. Increasing teacher retention and enabling teachers to be actively involved directly in their professional development as individuals who work as teachers.

In line with the description above, a study conducted by Jorryt Van Bommel & Yvonne Liljekvist concluded that when teachers commonly use digital gadgets, there are no clear boundaries between teacher interactions with their colleagues at local schools and their interactions with other colleagues outside schools; namely through social media and social networking sites (Bommel&Liljekvist, 2016).

In his book *New Digital Technology in Education*:

Conceptualizing Professional Learning for Educators, Wan Ng (2015) explains that several identified factors can drive effective professional development programs for professional learning, and these can be applied to teaching and learning in professional learning that integrates technology inside (Ng, 2015). These factors are a) A focus on educators' practice that is linked to students' learning outcomes, namely a focus on learning practices that are directly related to improving student learning outcomes; b) Addressing individual educators or institutional' s needs, namely addressing the needs of individual educators and institutions, in this case, schools; c) The PD program immerses educators in the learning, namely professional development encourages each teacher to be willing and able to learn again; d) The PD program builds a professional learning community, namely a professional development program that can encourage creating a learning community in the teacher professional development framework.; e) Duration of PD Programs, namely the duration of time enabling each teacher who attends it to have the opportunity to apply knowledge and good practices obtained through the professional development program that he participated in.

Building Teacher Participation in Professional Learning

Researchers have studied technology that can encourage professional learning (Littlejohn & Pammer-Schindler, 2022; Oddone, 2022) and can facilitate the participation of each member in various forms of learning activities in the community (Green & Hurley, 2006). In the context of learning activities in an online-based community, there are at least four technological supports to build, manage and develop a community (C. Hoadley, 2012), namely: 1) as a liaison for fellow community members who have learning needs and problems in similar practices, 2) as a provider of shared information sources, 3) as a tool for scaffolding discussions among community members which supports interaction and communication in learning, and 4) as a means of building awareness for every member of the community to learn and obtain information through various sources.

Hoadley & Kilner emphasized that when there is interaction with learning content that fits the context of the individuals involved, knowledge will be disseminated by members of the learning community, and through technological facilitation, the dissemination process becomes easier to do (C. M. Hoadley & Kilner, 2005).

This framework is known as the C4P framework for communities based on the affordability of technology and strategies for using technology. The framework consists of five elements that mutually complement and reinforce each other to build a community and increase the knowledge of its members effectively, namely: 1) content, 2) conversation, 3) connection, 4) information context and 5) purpose (C. M. Hoadley & Kilner, 2005). The five elements are described and explained in the following figure and table.

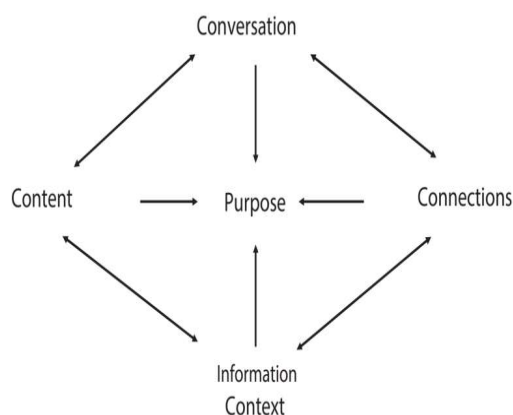


Figure 3: Framework C4P Hoadley & Kilner
(Source: (C. M. Hoadley & Kilner, 2005, p. 34))

Table 2: The Explanation of The C4P Framework by Hoadley & Kilner

Elemen	The Explanation
<i>Content</i>	efers to static and explicit knowledge objects, such as documents or video clips, which are helpful and essential to all community members in building knowledge.
<i>Conversation</i>	It is a form of interaction to effectively exchange knowledge, which can be realized in online discussions.

<i>Connection</i>	It is a relationship and trust between community members, which allows members to work together and collaborate with the same goal of increasing knowledge.
<i>Information Context</i>	Refers to empowering community members to assess whether and how the information being discussed or discussed is relevant to them and can be applied in the context of their situations, conditions and problems.
<i>Purposes</i>	Refers to the reason members come together in a community, which is a determining factor in collaboration.

Specifically associated with using mobile social media, Xue et al. put forward a framework for building a knowledge-building community among teachers that consists of five elements: Content, Conversation, Connection, Context and Purpose (Xue et al., 2019). He describes it in figure 4.

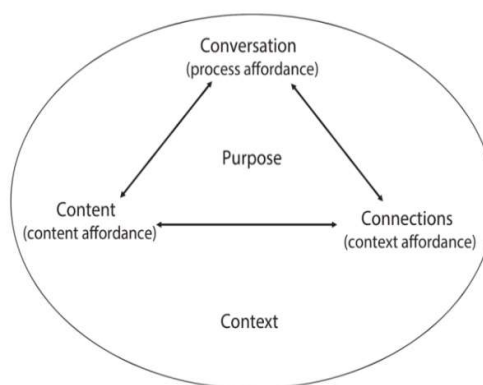


Figure 4: Framework For Using Mobile Social Media In Building A Knowledge-Building Community
(source: (Xue et al., 2019, p. 21))

When using this framework, Xue et al. describe that several factors

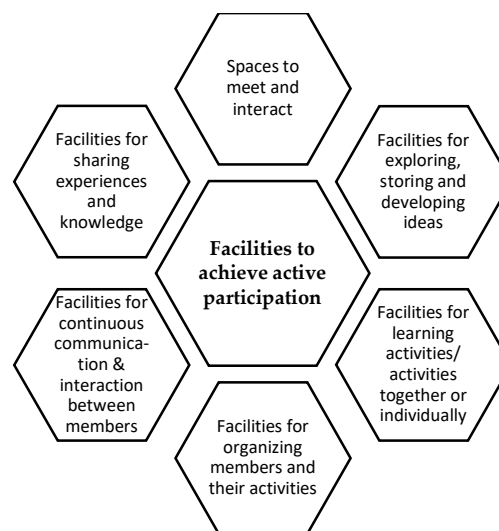
need attention (Xue et al., 2019), as explained in the following table.

Table 3: Factors Need Attention For Building A Knowledge-Building Community

Elemen	Factors need attention
<i>Content</i>	Quality content is one of the most challenging issues and requires good interaction among community members. To produce quality content is to package forms and series of conversations within the community about specific topics into discussions and learning activities.
<i>Conversation</i>	To produce meaningful knowledge, conversations or other than everyday chats need to be directed to be relevant to community goals. Understanding and a sense of having a common goal will foster a productive conversation culture, where everyone is involved and realizes that the purpose of each conversation is to achieve a common goal
<i>Connection</i>	Connections cannot occur spontaneously but are designed and facilitated by technology within the framework of achieving common goals, supported by quality and contextual content and conversations.
<i>Information Context</i>	Understanding the context will help community members who are not physically together in placing knowledge according to the context of their thoughts, ideas and problems. Each member is connected through an interaction relationship, understands the context of thoughts, ideas and issues with one another, and discusses the application of knowledge generated from the community according to the actual situations and conditions among them.
<i>Purposes</i>	Shared goals must be the focus of all elements and will be

	embedded in all content, conversations, connections, and contexts.
--	--

Cameron added that each member certainly wants the learning they follow to be related to what they do in their daily practice (Cameron, 2011). Individual awareness of who participates in the community must be increased to encourage them to be actively involved. Every individual involved must know deeply about the society they belong to and its relevance and benefit to their professional practice. For this reason, every community that facilitates learning activities to improve professional practice skills requires at least six main facilities to be able to achieve the active participation of its members (Coakes& Clarke, 2005). In simple terms, it can be illustrated through the following figure.



Figur 5:. Facilitation To Achieve Active Participation

(Source: Adaptation from (Coakes& Clarke, 2005))

The conclusions of other studies also show that participation in the context of online learning is strongly influenced by the technology platform used and its feature characteristics, the content and learning experience in it, the roles and tasks of the learner, and the availability of abundant information in it (Vonderwell& Zachariah, 2005). Technology that is easily accessible, features that are easy to use and easy to follow in the daily activities of teachers will increase teacher participation in learning activities to improve their competence and professionalism. Learning activities that provide a variety of alternative content and learning experiences will also tend to increase their participation in learning. For example, teachers will tend to increase their participation if learning activities are supported by YouTube recordings, social media posts, WhatsApp or Telegram groups. rather than requiring them to access the LMS continuously and requiring them to follow a lot of material structure and a lot of features in it.

Other studies add that communities that facilitate online learning strongly desire to increase member

participation and share knowledge more optimally; it is necessary to encourage the development of norms and access that support the use of information technology for their learning participants (Green & Hurley, 2006). He further explained that supporting models and access to information technology will contribute to the comfort of learning participants (community or organizational members) in technology-mediated interactions. The convenience built and the continuous program will further encourage higher learning participation in the online community.

CONCLUSION

This research attempts to answer the research question; 1) How does professional learning become a new paradigm in teacher professional development? 2) What is the perspective of learning technology in looking at teachers' professional learning? 3) What is the role of technology in professional learning among teachers today? And 4) How to build participation in professional learning among teachers? Referring to the four research questions and the results of the literature study that has been carried out, this study concludes four essential points as follows.

First, the concept of teacher professional development has shifted from a paradigm that only focuses on self-development processes and programs regarding teacher professionalism to a teacher learning process and program known as professional learning. In this context, the professional development carried out by teachers becomes a learning process (professional learning) that is conditioned and built actively, self-regulated, sustainable, and based on social and contextual processes according to the problems and needs in carrying out their daily profession as a teacher. For that, teachers need to have the initiative to want to learn again. The willingness to learn again comes from within themselves and actively seek relevant learning experiences. Technological developments greatly accommodate this paradigm shift.

Second, the learning technology perspective views professional learning as focusing on the results of learning activities and on processes and resources that are created, managed and utilized optimally to facilitate various teacher learning activities and through multiple modes or technological devices.

Third, electronic technology that is increasingly interactive can facilitate teachers sharing of knowledge,

learning resources and reflective experiences and teaching practice experiences. Current technology also allows them to flexibly build and develop technology-based teacher learning communities, for example, through social media and social networking sites. They can organize learning activities from, by and for their communities at any time and about anything according to their needs. Thus, technology provides an opportunity to make teachers' professional learning more inclusive and sustainable.

Fourth, Grow, and building awareness about learning participation in a teacher's professional learning requires the attention and support of many factors. Among other things, the availability of spaces and activities for mutual interaction, sharing and discussion; the purpose, benefits and relevance of positive learning activities; technology platforms and their flexible characteristics: intensive, diverse and sustainable learning activities; abundant availability of information and learning resources; model support and access to good information technology.

The implication is that the technology-based teacher professional learning program opens opportunities for teachers to develop independently

because the current use of technology allows prospects to learn anything, anytime, from anywhere alone and relevantly according to the needs of teachers. Thus, technology-based teacher professional learning is an alternative to overcome the various problems of conventional teacher professional development.

Another implication is that researchers have more opportunities to study more specifically and variously through the latest research methods on technology-based teacher professional learning, especially for researchers with a background in educational technology or instructional technology. Teacher professional development research has not only shifted towards professional learning among teachers. Still, it has also moved from conventional systems, models, methods and strategies to more creative directions through various technology platforms. So it opens up future research opportunities, especially from the perspective of educational technology or learning technology. For example, studies on a platform and feature development, instructional design and models, implementation studies, evaluation studies and program effectiveness. Or many other studies that fall into the area or domain of educational

technology or instructional technology.

REFERENCES

- Bommel, J. Van, & Liljekvist, Y. (2016). Teachers' informal professional development on social media and social network sites: When and what do they discuss? *ERME-Topic Conference: Mathematics Teaching, Resources and Teacher Professional Development, Humboldt-Universität, Berlin*.
- Brooks, C., & Gibson, S. (2012). Professional Learning in a Digital Era. *Canadian Journal of Learning and Technology / La Revue Canadienne de l'apprentissage et de La Technologie*, 38(2), 1–17.
- Cameron, S. E. (2011). *TEACHERS AS LEARNERS: PROFESSIONAL LEARNING IN THE* Submitted by Doctor of Education (Issue March). Australian Catholic University.
- Chang, M. C., Shaeffer, S., Al-Samarrai, S., Ragatz, A. B., de Ree, J., & Stevenson, R. (2014). *Teacher Reform in Indonesia: The Role of Politics and Evidence in Policy Making*. The World Bank.
- Chang, M. C., Shaeffer, S., Al-Samarrai, S., Ragatz, A. B., Ree, J. de, & Stevenson, R. (2014). *Teacher Reform in Indonesia*. The World Bank. <https://doi.org/10.1596/978-0-8213-9829-6>
- Cirocki, A., & Farrell, T. S. C. (2019). Professional development of secondary school EFL teachers: Voices from Indonesia. *System*, 85, 102111. <https://doi.org/10.1016/j.system.2019.102111>
- Clarke, D., & Hollingsworth, H. (2002). Elaborating a model of teacher professional growth. *Teaching and Teacher Education*, 18(8), 947–967. [https://doi.org/10.1016/S0742-051X\(02\)00053-7](https://doi.org/10.1016/S0742-051X(02)00053-7)
- Coakes, E., & Clarke, S. (2005). Encyclopedia of communities of practice in information and knowledge management. In *Encyclopedia of Communities of Practice in Information and Knowledge Management*. <https://doi.org/10.4018/978-1-59140-556-6>
- Cole, P. (2012). Linking effective professional learning with effective teaching practice. In *Education Services Australia*. Education Services Australia.
- Coutinho, C. P., & Lisbôa, E. S. (2013). Social networks as spaces for informal teacher professional development: Challenges and opportunities. *International Journal of Web Based Communities*, 9(2), 199–211. <https://doi.org/10.1504/IJWBC.2013.053244>
- De Smet, V., Gaeremynck, V., Wouters, R., Sleurs, W., Aase Rojkova, M., Baeklund, B., Sperber, B., Vinding, S., Norcliffe, D., Espinet, M., Pujol, R. M., Junyent, M., Ochoa, L., Geli de Ciurana, A. M., Steiner, R., Rauch, F., Palencsar, F.,

- Tischler, K., Radits, F., ...
 Bäumler, E. (2008). *Competencies for ESD (Education for Sustainable Development) teachers* (W. Sleurs, Ed.). Katholieke Hogeschool Leuven.
- Desimone, L. M. (2023). Rethinking teacher PD: A focus on how to improve student learning. *Professional Development in Education*, 49(1), 1–3. <https://doi.org/10.1080/19415257.2023.2162746>
- Easton, L. B. (2008). Teaching: A Developing Profession. *Phi Delta Kappa*, 89(10), 755–761. <https://doi.org/10.1177%2F003172170808901014>
- Endedijk, M. D., & Cuyvers, K. (2022). Self-Regulation of Professional Learning: Towards a New Era of Research. In *Research Approaches on Workplace Learning* (Vol. 31, pp. 219–237). Springer.
- Gibson, S., & Brooks, C. (2013). Rethinking 21st Century Professional Development. *Literacy Information and Computer Education Journal*, 4(2), 1064–1073. <https://doi.org/10.20533/licej.2040.2589.2013.0141>
- Green, C. W., & Hurley, T. A. (2006). Promoting Participation in Communities of Practice. In E. Coakes & S. Clarke (Eds.), *Encyclopedia of communities of practice in information and knowledge management* (pp. 408–418). Ide Group Reference.
- Grimmett, H. (2014). The Practice of Teachers' Professional Development: A Cultural-Historical Approach. In *Sense Publisher*. Sense Publisher. <https://doi.org/10.1007/978-94-6209-610-3>
- Harjanto, I., Lie, A., Wihardini, D., Pryor, L., & Wilson, M. (2018). Community-based teacher professional development in remote areas in Indonesia. *Journal of Education for Teaching*, 44(2), 212–231. <https://doi.org/10.1080/02607476.2017.1415515>
- Hennessey, S., D'Angelo, S., McIntyre, N., Koomar, S., Kreimeia, A., Cao, L., Brugha, M., & Zubairi, A. (2021). *Technology, Teacher Professional Development and Low- and Middle-Income Countries: Technical report on systematic mapping review*. EdTech Hub. <https://docs.edtechhub.org/lib/VTQDT65R>
- Hoadley, C. (2012). What is a Community of Practice and How Can We Support It? In S. Land & D. Jonassen (Eds.), *Theoretical foundations of learning environments* (pp. 287–300). Routledge.
- Hoadley, C. M., & Kilner, P. G. (2005). Using technology to transform communities of practice into knowledge-building communities. *ACM SIGGROUP*

- Bulletin*, 25(1), 31–40.
<https://doi.org/10.1145/1067699.1067705>
- Hunzicker, J. (2011). Effective professional development for teachers: A checklist. *Professional Development in Education*, 37(2), 177–179.
<https://doi.org/10.1080/19415257.2010.523955>
- Inovasi, I. for I. S. C. (2019). *KKG/KKM/KKKS/KKPS Sebagai Wadah Jejaring Pendukung Pengembangan Keprofesian Berkelanjutan (PKB)* (Issue Juni).
- Jan, H. (2017). Teacher of 21st Century: Characteristics and Development. *Research on Humanities and Social Sciences*, 7(9), 50–54.
- Januszewski, A., & Molenda, M. (2008). Educational Technology: A Definition with Commentary. In *Routledge Taylor & Francis Group*. Routledge Taylor & Francis Group.
- Kemendikbudristek. (2021a). *Cari Tahu tentang Pendidikan Guru Penggerak*. Pendidikan Guru Penggerak.
<https://sekolah.penggerak.kemdikbud.go.id/gurupenggerak/detil-program/>
- Kemendikbudristek. (2021b). *Program Sekolah Penggerak*. Program Sekolah Penggerak. <https://psp-web.pauddikdasmen.kemdikbud.go.id/#/home>
- Kemendikbudristek. (2023, March 30). *Apa Itu Platform Merdeka Mengajar?* Merdeka Mengajar. <https://pusatinformasi.guru.kemdikbud.go.id/hc/en-us/articles/6090880411673-Apa-Itu-Platform-Merdeka-Mengajar->
- Kusumawardhani, P. N. (2017). Does teacher certification program lead to better quality teachers? Evidence from Indonesia. *Education Economics*, 25(6), 590–618.
<https://doi.org/10.1080/09645292.2017.1329405>
- Liljekvist, Y., Bommel, J. van, & Olin-Scheller, C. (2017). Professional Learning Communities in a Web 2.0 World: Rethinking the Conditions for Professional Development. In I. H. Amzat & N. P. Valdez (Eds.), *Teacher Empowerment Toward Professional Development and Practices* (pp. 269–280). Springer Nature Singapore Pte Ltd.
https://doi.org/DOI10.1007/978-981-10-4151-8_18
- Littlejohn, A., & Pammer-Schindler, V. (2022). Technologies for Professional Learning. In *Research Approaches on Workplace Learning: Professional and Practice-based Learning* (Vol. 31). Springer.
- Louws, M. L., van Veen, K., Meirink, J. A., & van Driel, J. H. (2017). Teachers' professional learning goals in relation to teaching experience*. *European Journal of Teacher Education*, 40(4), 487–504.

- <https://doi.org/10.1080/02619768.2017.1342241>
- Milligan, C., Littlejohn, A., & Margaryan, A. (2014). Workplace Learning in Informal Networks. *Journal of Interactive Media in Education*, 1. <https://doi.org/10.5334/2014-06>
- Murray, T. C., & Zoul, J. (2015). A New Vision for Professional Learning. In *Leading Professional Learning: Tools to Connect and Empower Teachers*. Corwin A Sage Company. <http://dx.doi.org/10.4135/9781483393346.n2>
- Nasir, M. (2005). *Metode Penelitian*. Ghalia Indonesia.
- National Academies Teacher Advisory Council, (NATAC). (2007). Enhancing professional development for teachers: Potential uses of information technology: Report of a workshop. In *The National Academies Press*. <https://doi.org/10.17226/11995>
- Ng, W. (2015). New Digital Technology in Education: Conceptualizing Professional Learning for Educators. In *Springer*. Springer. <https://doi.org/DOI10.1007/978-3-319-05822-1>
- Odone, K. (2022). The nature of teachers' professional learning through a personal learning network: Individual, social and digitally connected. *Teaching and Teacher Education: Leadership and Professional Development*, 1, 100001. <https://doi.org/10.1016/j.tatelp.2022.100001>
- OECD. (2019). *TALIS 2018 Results: Vol. I*. OECD Publishing. <https://doi.org/10.1787/1d0bc92a-en>
- Papp, T. A., & Cottrell, M. (2021). Teacher Professional Learning, Culturally Responsive/Sustaining Practices, and Indigenous Students' Success: A Comparative Case-Study of New Zealand and Saskatchewan, Canada. *Alberta Journal of Educational Research*, 67(2 (Summer)), 105–128.
- Prestridge, S. (2018). Categorising teachers' use of social media for their professional learning: A self-generating professional learning paradigm. *Computers & Education*, 129, 143–158. <https://doi.org/10.1016/j.compedu.2018.11.003>
- republika.com. (2018). *Ini Faktor MGMP tidak Berjalan Efektif | Republika Online*.
- Scott, S. (2010). The Theory and Practice Divide in Relation to Teacher Professional Development. In J. O. Lindberg & A. D. Olofsson (Eds.), *Online Learning Communities and Teacher Professional Development: Methods for Improved Education Delivery* (p. 20). IGI Global. <https://doi.org/10.4018/978-1-60566-780-5.ch002>

- Seels, B. B., & Richey, R. C. (2000). *Instructional technology, The definition and domains of the field* (Terjemahan Dewi S Prawiradilaga, R. Rahardjo, Yusuf Hadi Miarso). Penerbit IPTPI & LPTK.
- solopos.com. (2019, October 9). *KKG dan MGMP PAI Belum Maksimal, Ini Penyebabnya—Solopos.com | Nasional—Solopos.com*.
<https://www.solopos.com/kkg-dan-mgmp-pai-belum-maksimal-ini-penyebabnya-985695>
- Spector, J. M. (2016). Foundations of Educational Technology. In J. M. Spector (Ed.), *Routledge Taylor & Francis Group* (2nd ed.). Routledge Taylor & Francis Group.
- Thacker, E. S. (2017). “PD is where teachers are learning!” high school social studies teachers’ formal and informal professional learning. *The Journal of Social Studies Research*, 41(1), 37–52.
<https://doi.org/10.1016/j.jssr.2015.10.001>
- Tour, E. (2017). Teachers’ self-initiated professional learning through Personal Learning Networks. *Technology, Pedagogy and Education*, 26(2), 179–192.
<https://doi.org/10.1080/1475939X.2016.1196236>
- Trust, T., Krutka, D. G., & Carpenter, J. P. (2016). “Together we are better”: Professional learning networks for teachers. *Computers and Education*, 102, 15–34.
<http://dx.doi.org/10.1016/j.compedu.2016.06.007>
- UNESCO. (2016). Education 2030: Incheon Declaration and Framework for Action for the Implementation of Sustainable Development Goal 4. In *Http://uis.unesco.org/sites/default/files/documents/education-2030-incheon-framework-for-action-implementation-of-sdg4-2016-en_2.pdf*. UNESCO.
<https://doi.org/10.2307/25094797>
- UNESCO. (2020). *Global Coalition for Education Data Concept Note*.
- Vonderwell, S., & Zachariah, S. (2005). Factors that influence participation in online learning. *Journal of Research on Technology in Education*, 38(2), 213–230.
<https://doi.org/10.1080/15391523.2005.10782457>
- Vu, P., Cao, V., Vu, L., & Cepero, J. (2014). Factors driving learner success in online professional development. *The International Review of Research in Open and Distributed Learning*, 15(3).
<https://doi.org/10.19173/irrodl.v15i3.1714>
- Warsita, B. (2013). Perkembangan Definisi Dan Kawasan Teknologi Pembelajaran Serta Perannya Dalam Pemecahan Masalah Pembelajaran. *Jurnal Kwangsan*, 1(2), 72.

<https://doi.org/10.31800/jurnalkwangsan.v1i2.6>

- Widodo, A., & Riandi. (2013). Dual-mode teacher professional development: Challenges and re-visioning future TPD in Indonesia. *Teacher Development*, 17(3), 380–392. <https://doi.org/10.1080/13664530.2013.813757>
- Xue, S., Hu, X., Chi, X., & Zhang, J. (2019). Building an online community of practice through WeChat for teacher professional learning. *Professional Development in Education*, 00(00), 1–25. <https://doi.org/10.1080/19415257.2019.1647273>
- Zed, M. (2008). *Metode Peneletian Kepustakaan* (2nd ed.). Yayasan Obor Indonesia.