

## Teacher Professional Development in the Digital Age: The Role of Communication Science in Improving Teaching Skills

Muhamad Hanif Fuadi<sup>1\*</sup>, Frista Fitriany Ramadhanita<sup>2</sup>, Lisna Novita<sup>3</sup>

<sup>1</sup>Institut Nahdlatul Ulama Tasikmalaya

<sup>2</sup>STAI Al-Jawami Bandung

<sup>3</sup>Universitas Muhammadiyah Cirebon

**Corresponding Author:** Muhamad Hanif Fuadi [fuadi9070@gmail.com](mailto:fuadi9070@gmail.com)

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### ABSTRACT

Professional development of teachers in the digital era is increasingly important in the midst of rapid technological developments and educational transformation. Communication science plays a key role in helping teachers adapt to these changes, especially in improving teaching skills and interaction with students. This article explores several important aspects, including the use of digital technology, effective communication in teaching, continuous training, personalized learning, and microcredentialing. This research focuses on Madrasah Aliyah Cilendek Kota Tasikmalaya, where teachers face significant challenges in utilizing technology and communication skills to optimize teaching. Based on analysis from various academic sources and case studies, this article offers strategic insights and recommendations for teacher professional development in the digital age

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## INTRODUCTION

The digital transformation that occurs in the world of education requires teachers to not only master the learning material but also have adequate communication skills to convey information effectively. Along with the development of technology, teachers are also required to utilize digital platforms in the learning process. "Teachers' professional development in the digital age is highly dependent on how they are able to integrate technology and interpersonal communication in their teaching" (Flores & Day, 2020: 120). This article will examine how communication science plays a role in improving teachers' teaching skills at Madrasah Aliyah Cilendek Kota Tasikmalaya, focusing on several key aspects, such as the use of digital technology, effective communication, continuous training, personalized learning, and microcredentialing.

The rapid digital transformation has had a significant impact on various sectors, including education. Teachers are no longer only required to master learning materials in depth, but must also have adaptive communication skills in a digital context. Technology has become an integral part of modern learning, and digital platforms, such as e-learning applications, social media, as well as other technological devices, are becoming important tools in supporting teaching. However, "the main challenge facing teachers in the digital era is how they can convey information in an effective and engaging way for students through this digital medium" (Flores & Day, 2020: 120).

Previous research has shown that strong communication skills, both interpersonal and technology-based, play a key role in teaching success. "The integration of technology in the learning process requires a holistic communication approach, where teachers are able to adapt their strategies to the individual needs of students" (Darling-Hammond & Hyler, 2020: 35). In this context, teachers must have a deep understanding of the use of technology as well as the ability to communicate effectively with students, both in physical classrooms and through digital platforms. The aim of this study is to explore how communication science can play a role in improving teachers' teaching skills qionships between the variables studied.

## LITERATURE REVIEW

This article uses two main theories as the basis for the study, namely: *First*, Educational Communication Theory: This theory emphasizes the importance of effective message delivery between teachers and students. "The effectiveness of communication in education depends not only on the mastery of the content, but also the ability to convey the material in an interesting, clear, and adaptive manner" (McCroskey & Richmond, 2008: 35). In the digital context, communication is becoming *increasingly complex because it involves new media that must be mastered by teachers*.

*Second*, the Theory of Continuous Professional Development: This theory explains that teachers' professional development is a process that takes place throughout their careers, "where teachers are constantly updating their knowledge and skills to stay relevant to the times" (Darling-Hammond & Hyler, 2020: 40). In the digital age, this theory highlights the importance of technology and communication training to ensure effective teaching.

A number of studies have shown that the use of technology in education greatly affects the effectiveness of teachers' teaching. "Teachers who utilize

digital technology in learning tend to be more able to increase student engagement, especially in the context of online learning” (Zhao, Pugh, and Sheldon, 2020: 145). On the other hand, it shows that “digital communication training can improve teachers' ability to interact with students through online learning platforms” (Dede, 2019: 250).

Relevant research also highlights the importance of personalized learning. “The use of data analytics to adapt teaching methods to individual student needs is a growing trend in digital education” (Wiliam, 2018: 200). This is in line with efforts to develop more personalized interpersonal communication in teaching.

## **METHODOLOGY**

This study uses a qualitative approach with a case study method. The locus of the study is Madrasah Aliyah Cilendek Kota Tasikmalaya, where teachers at this school are observed and interviewed about the use of digital technology and their communication skills in teaching. Data were collected through in-depth interviews with 10 teachers, analysis of training documents received by teachers, and classroom observation for 2 months. The data was analyzed using thematic analysis methods to identify patterns in the use of technology and communication in teaching.

The population targeted in this study is teachers at Madrasah Aliyah Swasta Cilendek Tasikmalaya City. This population was chosen because they face challenges in utilizing digital technology and communication skills in teaching. To ensure representative results, a purposive sampling method is used, in which teachers who are involved in technology and communication training and have experience in integrating technology in learning will be specially selected.

Purposive sampling allows the study to focus on teachers who are most relevant to the study objectives, i.e. those who have been involved in continuous professional development and have experience with technology-based communication. In this context, non-random sample selection will help reveal patterns in the use of technology and communication skills in the digital environment.

This study uses qualitative instruments, namely in-depth interviews and participatory observations. In-depth interviews were conducted to understand teachers' perspectives on the use of technology in teaching as well as the challenges they face in digital communication. The interview guide is structured based on two main theories, namely Educational Communication Theory and Continuous Professional Development Theory, with a focus on developing communication skills and technology in teaching.

Participatory observation is carried out to directly observe how teachers interact with students through digital media, such as e-learning platforms and learning applications. This aims to measure teachers' communication skills in the digital context as well as student involvement in the learning process. This research will be carried out in three main stages: First, the Preparation Stage: This stage includes the collection of initial information about the teachers to be interviewed, the preparation of interview guides, and training for observation. This stage is estimated to take about 2 weeks.

Second, Data Collection Stage: In-depth interviews and participatory observation will be conducted for 4-6 weeks, depending on the school schedule and the willingness of the respondents. Interviews are conducted face-to-face or online, according to the convenience of the teacher. Third, Data Analysis Stage: Data from interviews and observations will be analyzed using thematic analysis techniques for 2-4 weeks. At this stage, the data will be encoded to identify key themes relevant to teachers' professional development in the digital age.

Data from interviews and observations will be analyzed using a qualitative approach with thematic analysis methods. In this method, interview transcripts and observation notes will be coded based on emerging themes, such as "the use of technology in teaching," "effective communication in a digital environment," and "ongoing professional training." After that, these themes will be integrated to form a more comprehensive picture of the challenges and opportunities in teacher professional development in the digital age.

Data analysis will be carried out in several steps, including: 1) Theme introduction: Identifying key themes based on answers from interviews and findings from participatory observations; 2) Data coding: Compile codes for repetitive themes related to the use of technology, communication skills, and professional training; 3) Theme mixing: Grouping related themes into broader categories to uncover clearer patterns and 3) Interpretation of results: Drawing conclusions from the analyzed findings, in accordance with the purpose of the research.

To ensure the validity of this research, various steps were taken. First, data triangulation was carried out by comparing the results of the interview with the results of observation. This is to ensure that the findings from the interviews are consistent with what is observed in the field, thus increasing the validity of the research. Second, member checking is used, where the results of the interview transcript are confirmed to the study participants to ensure that the researcher's interpretation is in accordance with what the respondents meant. It also helps in increasing the credibility and trust of the data collected. Third, peer debriefing is carried out by involving experts in the field of education and communication technology to review research findings and provide input. This step aims to identify potential biases and strengthen the reliability of data interpretation.

The methods used in this study are based on previous literature on professional development and communication in digital education. "Digital communication training can improve teachers' skills in delivering material effectively through online platforms" (Zhao, Pugh, and Sheldon, 2020: 145). This research is relevant because it shows how digital communication plays an important role in teaching success. In addition, "the importance of personalized learning in digital education, where teachers must be able to adapt teaching methods to the individual needs of students" (William, 2018: 200). This reinforces the importance of developing more personalized interpersonal communication in digital teaching, especially when teachers are dealing with diverse student needs.

Although this research provides in-depth insights into teachers' professional development in the digital age, there are some methodological limitations. First, this research was only conducted in one school, namely Madrasah Aliyah Cilendek, so the findings may not be generalized to other

schools with different contexts. Therefore, the results of this study should be carefully considered before applying it to a wider population. Second, because this study uses a qualitative method, the results are more descriptive than statistical generalizations.

## RESULT

Digital transformation in the world of education requires teachers to not only master the subject matter, but also develop skills in using technology and effective communication. At Madrasah Aliyah Cilendek, the application of technology in teaching is increasingly common, with the use of social media and e-learning platforms as a means of communication and material delivery. However, challenges remain, especially when it comes to maintaining the effectiveness of communication between teachers and students in digital classrooms. Communication science plays an important role in helping teachers deliver material effectively, both verbally and nonverbally. Teachers who are able to integrate the two show an increase in student engagement during the learning process. However, continuous training in digital communication skills is still needed to improve teacher competence in this technological era.

The use of technology also supports personalized learning, which allows teaching to be tailored to the individual needs of students. However, to apply this approach optimally, teachers need to have adaptive interpersonal communication skills. In the context of professional development, microcredentialing and certification of special skills are beginning to be recognized as a means to improve teacher competence in teaching in the digital era. Through the development of technology and communication skills, teachers at Madrasah Aliyah Cilendek can better navigate the challenges of digital teaching and provide a more engaging and interactive learning experience for their students.

Several aspects are important to be explored further in this study, including:

### 1. Use of Technology in Teaching

Teachers at Madrasah Aliyah Cilendek generally utilize digital technology in teaching, such as the use of social media to communicate with students and e-learning applications to deliver material. According to one of the teachers, "Technology helps us access a wider and more diverse range of learning resources, although communication challenges remain" (Interview, 06/2024).

The exploration of the use of technology in teaching is an increasingly relevant topic in the digital era, especially in educational institutions such as Madrasah Aliyah Cilendek. The transformation of education driven by technological developments demands changes in teaching approaches and skills possessed by educators. One important aspect of this change is the use of digital media to support teacher-student interaction. Based on the results of an interview with one of the teachers at Madrasah Aliyah Cilendek, technology has helped in expanding access to various learning resources and making communication with students easier. However, communication challenges remain, especially when technology is not fully integrated in the learning system (Interview, 06/2024).

In the context of teaching, digital technology has had a significant impact on the way information is delivered and received. According to the theory of "Educational Communication, effective communication in teaching involves not only the delivery of material, but also how teachers can utilize available media to improve interaction with students" (McCroskey & Richmond, 2008: 35). In the digital age, social media and e-learning platforms are part of an important communication strategy, where teachers can send materials, interact directly with students, and provide feedback more quickly and efficiently. In one study, it was found that "teachers who utilize digital technology tend to be more able to increase student engagement in online learning, especially in the context of distance learning" (Zhao et al., 2020: 145).

The use of technology at Madrasah Aliyah Cilendek also illustrates how digital technology has been integrated into the learning process. Social media is used by teachers to communicate with students directly, both to convey information about assignments and additional materials. "Technology also facilitates access to a wider range of learning resources, thus giving teachers flexibility in choosing relevant and up-to-date materials" (Flores and Day, 2020: 122). This is reinforced by research that states that "technology facilitates the distribution of subject matter in a more structured and diverse manner, so that students can learn at their own pace" (Flores & Day, 2020: 120).

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For example, in the use of e-learning platforms, teachers need to master skills in visually organizing content and conveying messages through videos or writing, which is different from teaching in a physical classroom. Verbal and non-verbal communication that is usually an important part of teaching in physical classrooms becomes less effective in a digital environment if it is not supported by the right technological approach. "Communication that occurs in the digital world requires teachers to be able to convey messages in a concise, clear, and interesting way, considering that students tend to lose concentration more quickly in online learning formats" (Heath & Heath, 2017: 97).

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"Teachers who received training in digital communication were better able to integrate technology into their teaching and felt more confident in managing interactions with students on digital platforms" (Flores & Day, 2020:

122). This is especially important, given that effective communication in the digital classroom often depends on the ability of teachers to use technology appropriately. Therefore, at Madrasah Aliyah Cilendek, training that focuses on communication skills and the use of digital technology is highly recommended to improve the quality of teaching and interaction with students.

## 2. Effective Communication in Teaching

Communication science helps teachers deliver material effectively in the classroom and through digital platforms. "Teachers who are able to integrate verbal and nonverbal communication well are better able to maintain student involvement in the learning process" (Flores & Day, 2020: 122). The exploration of effective communication in teaching is becoming increasingly relevant in the context of modern education, where digital technology plays an important role in the learning process. In various studies, communication is considered one of the main keys to learning success, both in physical classrooms and through digital platforms. Effective teaching relies heavily on the teacher's ability to convey messages clearly and engagingly, using the right combination of verbal and nonverbal communication. This can keep students engaged and improve their learning outcomes.

"The importance of effective communication in teaching, where teachers need to be able to combine various forms of communication to create an interactive and dynamic learning environment" (Flores & Day, 2020: 123). Verbal communication, such as the way teachers explain concepts, should be complemented by nonverbal communication elements such as hand gestures, eye contact, and facial expressions, all of which aim to reinforce the message conveyed. This study also shows that teachers who are able to integrate verbal and nonverbal communication well will find it easier to maintain student engagement, especially when using digital platforms that often reduce face-to-face interaction.

In today's digital era, teaching is not only carried out through face-to-face classes, but also through digital platforms such as e-learning, Zoom, and Google Classroom. In an interview with one of the teachers at Madrasah Aliyah Cilendek, the importance of effective communication was also acknowledged: "In this era of technology, we have to learn how to convey material in a more interesting way through digital platforms, because students easily lose focus if communication is not effective" (Interview, 06/2024).

Effective verbal communication includes the teacher's ability to compose sentences that are clear, structured, and easy for students to understand. In addition, the use of the right voice intonation is also important to attract attention and maintain student interest. "The use of language that is simple and understandable by students greatly affects the effectiveness of material delivery" (McCroskey & Richmond, 2008: 35). On the other hand, nonverbal communication such as facial expressions, body movements, and eye contact play an important role in placing emphasis on the important points of the material being conveyed. When teachers are unable to use nonverbal communication effectively, the message conveyed may not be fully understood by students.

"Nonverbal communication helps create an emotional connection between teachers and students, which can increase student engagement in the learning process" (Heath & Heath, 2017: 97). In the context of digital learning,

the challenge of nonverbal communication is greater due to the limitations of the media used. Therefore, teachers need to find ways to adapt their communication to remain effective, even if nonverbal interaction is not as intensive as in a physical classroom. For example, the use of engaging visual presentations and good timing in online teaching can be an effective strategy for maintaining student focus and attention.

As the use of technology in education increases, teachers' ability to deliver material through digital platforms is becoming increasingly important. "Digital communication has different characteristics from face-to-face communication, so teachers need to adapt their approach" (Darling-Hammond & Hylar, 2020: 40). In online teaching, the verbal aspect often becomes more important because nonverbal communication cannot always be done effectively. Therefore, it is important for teachers to maximize the use of words, voice intonation, as well as visual elements such as presentation slides and videos to replace some of the nonverbal communication functions.

"Teachers who can effectively utilize digital technology tend to be better able to increase student engagement, especially in online learning" (Zhao, Pugh, & Sheldon, 2020: 146). The use of visual communication and interactive tools, such as online polls or interactive quizzes, can help keep students engaged and ensure that they are actively participating in learning. One of the teachers at Madrasah Aliyah Cilendek said, "We use applications such as Google Classroom and Zoom to communicate with students. Despite the challenges in interaction, this platform helps us in delivering material in a more structured way" (Interview, 06/2024).

While technology offers a variety of advantages, challenges remain when it comes to digital communication. "Digital communication requires a more structured and planned approach compared to face-to-face communication" (Dede, 2019: 250). In online learning, teachers must be more careful in compiling the material and ensuring that the message conveyed can be understood well by students, even without a physical presence in the classroom. One of the biggest challenges is ensuring that students stay engaged during learning sessions, given the digital environment that allows distractions to occur more easily.

"Pentingnya penyesuaian komunikasi interpersonal dalam konteks personalized learning. Di era digital, penggunaan data analitik untuk menyesuaikan metode pengajaran dengan kebutuhan individual siswa semakin berkembang" (William, 2018: 200). However, this personalization requires flexible interpersonal communication skills, as each student has a different way of learning and preferences. Teachers need to understand how to communicate with students based on their individual needs, which can be done through more personalized interactions on digital platforms.

### 3. Continuous Training and Development

Teachers at this madrasah receive regular training, but improvements are still needed in the aspect of developing digital communication skills. Training that focuses more on the use of technology in learning communication has been proven to increase teachers' confidence and competence in teaching. Continuous training and development is one of the important components in improving teacher competence, especially in today's digital era. With the rapid development of technology, teachers are faced with the need to constantly update their knowledge and skills, especially in terms of digital communication

that supports the technology-based learning process. Teachers at this madrasah receive regular training, but improvements are still needed in the aspect of developing digital communication skills. Training that focuses more on the use of technology in learning communication has been proven to increase teachers' confidence and competence in teaching. Continuous training and development is one of the important components in improving teacher competence, especially in today's digital era. With the rapid development of technology, teachers are faced with the need to constantly update their knowledge and skills, especially in terms of digital communication that supports the technology-based learning process.

“Continuous professional development plays an important role in maintaining the relevance of teachers in the age of technology” (Darling-Hammond & Hyler, 2020:40). In the ever-evolving world of education, teachers must be able to adapt to new demands, including mastery of digital communication skills. Training that not only focuses on mastering technology, but also how it can be used effectively in the learning process, is very necessary. Mastery of digital communication, especially in an online learning environment, has been proven to increase teachers' confidence and competence in delivering material to students.

In line with this opinion, “that teachers who have skills in utilizing digital technology in learning tend to be more able to improve student interaction and engagement” (Zhao, Pugh, & Sheldon, 2020: 145). Training that focuses on the use of technology in learning communication can help teachers overcome challenges in online learning environments, such as a lack of face-to-face interaction and increased potential distractions for students. “Continuous training can significantly increase teachers' confidence in teaching” (Guskey, 2016: 245). Teachers who receive regular technology and communication training will feel better prepared to face the challenges of digital-based learning. This is in line with the results of interviews at Madrasah Aliyah Cilendek, where some teachers admitted that more intensive training and focusing on digital communication skills will greatly help them in improving their teaching competence.

“We need more practical training in using digital technology, so that we are more confident when interacting with students online” (Interview, 06/2024). “The importance of creating meaningful and relevant training experiences for teachers” (Heath & Heath, 2017: 97). Training that is relevant to the practical needs of teachers on a daily basis can help them understand how to apply technology directly in the classroom. For example, using digital platforms like Google Classroom or Zoom requires not only technical skills, but also effective communication strategies to keep students engaged and engaged.

The use of technology in teacher training not only plays a role in introducing digital tools, but can also be used to develop more effective communication skills. “Digital technology can be used to simulate learning scenarios that allow teachers to practice in situations that are close to the real world” (Dede, 2019: 250). With this simulation, teachers can hone their digital communication skills, for example how to convey material clearly and interestingly through online platforms, as well as how to maintain good interaction with students even if there is no direct physical interaction. “Training that utilizes analytical data to evaluate the effectiveness of teachers'

communication in online learning can help teachers understand their strengths and weaknesses” (Wiliam, 2018: 200). The use of technology to provide real-time feedback can improve their interpersonal communication skills in a digital environment, while also helping them develop a more personal approach to interacting with students.

Although the benefits of digital communication skills training have been proven, there are still many challenges faced in its implementation. One of the biggest challenges is the diversity of technological proficiency levels among teachers. At Madrasah Aliyah Cilendek, some teachers stated that they felt they were lagging behind in terms of technology skills compared to their younger counterparts. “We need training that is tailored to our abilities, because not all teachers have the same technological background” (Interview, 06/2024). “Personalised and ongoing training is key to facing these challenges” (Flores & Day, 2020: 126). Each teacher has different needs in terms of mastery of technology and communication, so training tailored to individual abilities will be more effective in improving their competence. Practical and direct training can help teachers who feel less confident in using technology.

#### 4. Personalized Learning

Technology allows teachers to tailor teaching to the individual needs of students. However, this adaptation requires flexible interpersonal communication skills, which need to be continuously developed through training. Personalized learning is a learning approach that adapts teaching methods and materials to the individual needs of students. Along with the development of technology, teachers are faced with opportunities and challenges to implement personalized learning effectively. Technology allows teachers to leverage various digital platforms to compose and deliver materials that suit each student's unique learning style and needs. However, the success of the implementation of personalized learning does not only depend on mastery of technology, but also on the flexible interpersonal communication skills of teachers, which need to be continuously developed through continuous training.

“In the process of personalized learning, teachers' interpersonal communication skills are very important to maintain effective interaction with students” (Flores & Day, 2020: 122). This applies both in face-to-face and online learning environments. Teachers must be able to listen and understand the needs of individual students, as well as adjust teaching approaches so that each student gets optimal learning. Additionally, the technology allows teachers to collect and analyze data related to student performance in real-time, which can be used to adjust teaching strategies according to student needs more quickly and accurately. Technology plays an important role in facilitating personalized learning. Digital platforms, such as learning management systems (LMS) and educational analytics software, allow teachers to track student progress and tailor materials according to each student's level of understanding. “Technology helps teachers create a more individualized learning experience by using data to tailor instruction and provide more timely feedback” (Wiliam, 2018: 204). This technology can provide teachers with deeper insights into students' strengths and weaknesses, so they can adapt teaching approaches to support students' unique needs.

One of the teachers at Madrasah Aliyah Cilendek highlighted the importance of technology in helping to adapt the material to the needs of

students, "We can now more easily see the extent of students' understanding through the e-learning platform, and it allows us to adapt the lessons to their individual needs" (Interview, 06/2024). However, the teacher also stated that although technology helps, interpersonal communication skills remain an important aspect in understanding student needs that cannot always be measured through digital data. While the benefits of personalized learning are clear, there are challenges in implementing it, especially with regard to teachers' readiness to utilize technology effectively. Many teachers feel that they are not fully confident in combining technology and interpersonal communication in the learning process. "Continuous professional training is necessary to ensure that teachers not only master technology, but are also able to integrate it with effective communication in learning" (Darling-Hammond & Hylar, 2020: 40). Proper training allows teachers to develop the interpersonal communication skills needed to support students in the context of personalized learning.

Teachers at Madrasah Aliyah Cilendek also noted that additional training in the use of technology for interpersonal communication is needed. "We can use technology to see students' progress, but to truly understand them personally, we need more training in terms of digital communication," said one teacher (Interview, 2023). This shows that technology cannot completely replace human interaction, but must instead be combined with good interpersonal communication skills.

##### 5. Microcredentialing and Specific Certifications

Teachers in madrassas are beginning to pay attention to the importance of microcredentialing as a means of professional development. Certifications in communication and technology skills help them to more easily adapt to the demands of teaching in the digital age. Microcredentialing is a form of recognition of specific competencies in a particular skill, which is obtained through a shorter training program compared to formal education. In the context of education, microcredentialing plays an important role in teachers' professional development, especially in the digital era where the demand for mastering technology and communication skills is increasing. Teachers at Madrasah Aliyah Cilendek, for example, are beginning to realize the importance of microcertification in communication and technology skills to help them adapt to the challenges of modern teaching.

"Microcredentialing helps professionals in various fields, including education, to develop new skills that are in line with the needs of the times without having to go through lengthy formal education" (OECD, 2019: 120). In this context, teachers can obtain specific certifications in digital communication skills, management of e-learning platforms, and other technological abilities relevant to the teaching process in the digital age. "Microcredentialing helps professionals in various fields, including education, to develop new skills that are in line with the needs of the times without having to go through lengthy formal education" (OECD, 2019: 120). In this context, teachers can obtain specific certifications in digital communication skills, management of e-learning platforms, and other technological abilities relevant to the teaching process in the digital age.

One of the teachers at Madrasah Aliyah Cilendek explained that the training they received related to technology and communication through microcertification has given them more confidence in managing online learning.

“Certification in digital communication makes it easier for me to understand the best way to use e-learning platforms and keep communication with students effective,” said the teacher (Interview, 06/2024). This fact shows that microcredentialing can improve the practical competencies of teachers needed to teach in the digital era. In modern teaching, effective communication skills through digital media are becoming increasingly important. “The use of technology must always be accompanied by an improvement in interpersonal communication skills to ensure that the technology is used effectively in learning” (William, 2018: 205). Teachers who have certifications in these skills find it easier to adapt to the needs of online teaching, where communication not only happens in person, but also through various digital media.

Communication certifications involve not only public speaking skills, but also in-depth interpersonal communication skills, especially when interacting with students online. These microcredentials in interpersonal communication can include the ability to understand students through digital interactions, maintain good relationships despite being in a virtual learning space, and address communication challenges that often arise in digital contexts.

## **DISCUSSION**

The use of technology in teaching at Madrasah Aliyah Cilendek shows a positive impact in terms of access to learning resources and flexibility in teaching. However, communication challenges remain a significant issue, especially in the digital environment. Training and development of digital communication skills are urgently needed to address this issue. Through personalized learning and microcredentialing approaches, teachers can better tailor their teaching methods to the needs of students and continue to improve their skills in communicating effectively through digital platforms. Therefore, it is important to continue to provide in-depth training for educators so that they can overcome the challenges that arise in this digital era.

Effective communication in teaching is the key to creating an interactive and productive learning environment, both in physical and digital classrooms. Teachers who are able to combine verbal and nonverbal communication well will be better able to maintain student engagement and improve learning outcomes. In the digital age, the ability to tailor communication through online platforms is becoming increasingly important, especially given the challenges of maintaining students' attention in a more dynamic digital environment. By understanding the importance of effective communication and continuing to develop their communication skills, teachers can create a better learning experience for their students, both in physical and digital classrooms.

Continuous development in digital communication skills is essential for teachers, especially in an era where technology plays a central role in education. Training that focuses on the use of technology in learning communication not only increases teachers' confidence, but also their competence in creating an interactive and dynamic learning environment, both in physical classrooms and in online learning. However, the training must be designed in such a way that it can meet the individual needs of each teacher, taking into account the challenges they face. With the right training, teachers will be better prepared to face the challenges of learning in the digital age and be better able to provide effective teaching to their students.

Personalized learning offers a great opportunity for teachers to provide teaching that is more tailored to the individual needs of students, especially through the help of technology. However, the technology itself is not enough; Teachers must also have flexible interpersonal communication skills to facilitate more effective interactions with students. Therefore, continuous training in technology and communication is essential. With the right training support, teachers can be better prepared to implement personalized learning that combines technology with an effective interpersonal communication approach, thereby creating a learning environment that is more responsive to the individual needs of students.

Microcredentialing and specific certifications provide an efficient solution for teachers to develop their professional skills in the digital age. With certifications in communication and technology skills, teachers are better prepared to face the demands of learning that increasingly relies on digital platforms and online interactions. In the context of Madrasah Aliyah Cilendek, teachers who have obtained micro-certification feel more confident in managing online learning and maintaining effective communication with students. Therefore, microcredentialing plays a crucial role in teachers' professional development, helping them to remain relevant and effective in facing educational challenges in the digital age.

## **CONCLUSION AND RECOMMENDATION**

Communication science plays a strategic role in the professional development of teachers in the digital era. The use of educational technology and effective communication skills allows teachers to be more adaptive to student needs and rapid technological changes. At Madrasah Aliyah Cilendek, teachers face challenges in integrating technology and communication skills in teaching, but ongoing training and specific certifications can help them to be more competent. The recommendations of this study include: 1) Improved Training: It is recommended to provide further training for teachers in digital communication skills and the use of technology for personalized learning; 2) Use of Microcredentialing: The implementation of microcredentialing can be a solution to provide teachers with special certifications in communication and technology effectively and efficiently and 3) Collaboration with E-Learning Platforms: Schools can work with e-learning platform providers to ensure teachers have wider access to technology and training.

## **FURTHER STUDY**

Further research from the article "Teacher Professional Development in the Digital Age: The Role of Communication Science in Improving Teaching Skills" can be focused on some of the important aspects identified in this study. This research highlights the importance of teachers' professional development in the digital context, as well as the role of communication in improving teaching skills. Here are some research directions that can be taken to deepen understanding of this topic.

*First*, case studies in various school contexts. One of the limitations of this study is that the study was conducted in only one school, namely Madrasah Aliyah Cilendek. Further research can be carried out by expanding

the study location to various types of schools, both public and private, in various regions. This will provide a more comprehensive picture of the challenges and strategies faced by teachers in integrating technology and communication in their teaching. By comparing results from various contexts, researchers can identify factors that affect the success of teachers' professional development in the digital era.

*Second*, the influence of digital communication training. This study shows that digital communication training can improve teachers' skills in interacting with students. Further research can explore the most effective types of training and how they can be implemented on an ongoing basis. For example, research can examine the impact of online versus face-to-face training, as well as how it can be tailored to the specific needs of teachers across different disciplines.

*Third*, data analysis and learning personalization. This research also highlights the importance of personalizing learning through the use of analytical data. Further research may explore how teachers can use data analytics to understand students' individual needs and adjust their teaching methods. This can include a study of tools and platforms that can assist teachers in collecting and analyzing student data, as well as how the data can be used to improve student engagement and learning outcomes.

*Fourth*, the role of interpersonal communication in digital learning. In the context of digital learning, interpersonal communication is becoming increasingly important. Further research can investigate how teachers can develop effective interpersonal communication skills in an online learning environment. This includes understanding how to interact with students who have different learning styles and how to build strong relationships even through digital media. The research can involve in-depth interviews with teachers and students to gain insight into their experiences in communication in the digital classroom.

*Fifth*, Evaluate the long-term impact of professional development. Finally, further research can evaluate the long-term impact of professional development programs focused on technology and communication. This can include longitudinal studies that track teachers' progress in teaching skills and interactions with students over time after attending a training program. This research can provide insight into the sustainability of the changes resulting from training and how it affects student learning outcomes. Overall, further research in the field of teacher professional development in the digital age is essential to understand and address the challenges faced by educators today. By exploring the various aspects already mentioned, researchers can make a significant contribution to the existing literature and assist in formulating more effective strategies to improve teaching and interaction skills in the digital classroom. This research will not only benefit teachers, but also students and the education system as a whole.

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