

Teachers' Readiness to Online Learning: A Pedagogical Perspective

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Abstract

The Covid-19 pandemic has induced a shift in the education system from face-to-face interaction to remote learning. Teachers are obliged to master the philosophy of distance learning and required to have sufficient knowledge of online learning pedagogy. This study aims to explore teachers' views regarding their readiness to incorporate online learning. An online survey was conducted to collect responses from Indonesian teachers (N=126). Participants answered an online questionnaire that included questions about their teaching preparation, online learning activities, and student online learning assessment. The valuable evidence gained from the teachers' perceptions on their readiness to incorporate online learning could be considered a recommendation to improve their professional development, including in online learning pedagogy skills. In addition, these results may provide insight into online learning dynamics and provide the cornerstone for future studies to examine teacher roles across diverse educational frameworks.

Keywords: *Covid-19 Pandemic, Online Learning, Pedagogy, Teacher's Professional Development, Teacher's Readiness*

Introduction

The abrupt Covid-19 pandemic has transformed all facets of human life, including education which, mediated by technology, has shifted from face-to-face to online learning. Guan et al. (2020) claimed that such a pandemic triggered a nerve-racking scenario that has forced people to adjust to new circumstances and pursue adequate actions to deal with them. Moreover, Bozkurt (2020) argued that surviving a pandemic requires creating support communities for exchanging tools and expertise, and listening to different voices. It included shifting the paradigm of pedagogy from offline to online learning,

including the roles of teachers and students, and the learning environment. Online learning should rely on a learner-centred, constructivist learning model, focusing on collaborative learning, contextual learning techniques, less or adaptive teacher scaffolding, and peer-to-peer learning (McLoughlin & Oliver, 1999). The goal is to develop a learning culture in which engagement, cooperation, and knowledge building are fostered amongst peers through teacher support as it responds to the learners' needs.

The pandemic has affected the thorough emergence of online learning in various educational domains and contributed to effective teaching and learning transitions. Teachers have crucial roles in applying online learning processes. The way teachers use their knowledge and learning beliefs to teach and the values they bring to their professional experience may serve as barriers or supports to learning, shape their practice, and serve as heuristics for teachers immersed in ever-changing classroom settings (Admiraal et al., 2017). Other concerns are related to non-technical teaching problems, as well as insufficient infrastructure and information, communication and technology (ICT) facilities to enable immediate online learning activities (Sahu, 2020). Practising online learning is challenging: as Indonesian teachers are newcomers to the digital age, ICT expectations sometimes clash with the pedagogical concern in classrooms (Febriani & Hafifah, 2019; Hafifah & Sulisty, 2020). Furthermore, Whitehouse et al. (2010) have reported the changing focus of online teacher professional development design, primarily through the lens of online pedagogy. It has caused changes in the teaching profession due to various external pressures and the growing role of new media and digital literature in teaching and learning. This requirement mandated that 21st-century teachers be lifelong learners and reflective professionals who can adapt to rapidly changing demands. Besides, the Internet has evolved from a primary source of knowledge to a communicative and innovative platform.

The pandemic has created shockwaves across the globe including in developing countries such as Indonesia, where it resulted in the government's decision to instruct heads of schools and universities to implement work-from-home and learn-from-home arrangements since early March 2020. One of the points of the policy is implementing distance learning in accordance with the conditions of their respective universities and advising students to engage in online learning from home, both synchronously and asynchronously through various platforms. Consequently, the burden of schoolwork has transferred on to various online platforms, which has probably helped students to better manage their disturbed academic lives. Thus, e-learning has significantly grown as an educational tool, similar to other technologies that have been developed (Lautenbach & Randell, 2020). Providing effective and meaningful online learning experiences for students has been another challenge for teachers, especially those in remote areas. The goal of this current study is therefore to explore the views of teachers on their readiness to adopt online learning during this pandemic.

Research Objectives

Online learning is no longer an innovation but a necessity in this current pandemic. Because it has been in demand, teachers should be ready to apply online learning. Several studies on the use of online learning during the pandemic have been conducted (Farhana et al., 2020; Yun & Zhang, 2020; Manimaran & Kasirajan, 2020; Mohalik & Sahoo, 2020; Assalahi, 2020), but teachers' views on their readiness to incorporate online learning has not been fully explored. This study is therefore essential, as the learning concept should be adapted based on the principles of online learning pedagogy. Thus, this study aimed to explore teachers' views related to their willingness to integrate online learning by focusing on (1) their preparation for online learning lesson plan, (2) online learning activities during the pandemic, and (3) student assessment during online learning.

Literature Review

Online learning technologies have become ubiquitous, new technologies have continued to evolve, and new possibilities are developed while pedagogical strategies and systems are transformed. Dabbagh & Bannan-Ritland (2005) listed core components of online learning that included pedagogical models, education strategies, and learning technologies. These three components form an iterative relationship in which pedagogical models or social learning frameworks guide the design of online learning environments, leading to the specification of educational and learning strategies that have been subsequently enabled by learning technologies.

Philosophically, online learning is the embodiment of a student-centred learning paradigm that strongly supports teachers promoting active learning, collaboration, mastery of the material, and learning processes that are controlled by students themselves (Simonson et al., 2014). This further strengthens the characteristics of students in an online learning environment, which demands autonomous learners who can manage their own learning process and be more objective and confident in their stand, make critical reflections, make their own decisions, and take action independently (Phi, 2017). In other words, teachers need to provide effective online learning activities in which students can carry out the learning process independently and manage their own learning time as well as determine learning material according to their own needs. Based on the discussion above, teachers' readiness has been a major requirement to enable digital learners' performance that covers the following factors. First, it applies the principles of student-centred flexibility in which all students have their way of learning that works for them. Second, students can attend classes and courses anywhere as long as they have a computer and access to the Internet. Third, it has given students a better opportunity to choose from various schools and courses. Fourth, in terms of accessibility, online course materials can be accessed 24 hours a day, every day. Fifth, online learning offers a lot of savings because there are no additional costs for transportation and accommodation. Sixth, students are exposed to knowledge and experiences shared by instructors from around the globe, which is something that cannot be learnt in books. Seventh, students may not have to sit for long periods of time, as lessons can be paused when needed, and notes read at will (Visually, 2021).

Smaldino et al. (2015) outlined the basic guidelines for digital teachers, beginning with their knowledge of subjects, teaching and learning, and technology to facilitate student learning, creativity, and innovation in face-to-face and virtual environments. Lister (2014) stated there are common components that need to be considered in developing online learning, i.e., course structure, material presentation, collaboration and interaction, and timely feedback. Teachers, therefore, are expected to design, develop, and evaluate authentic learning experiences and assess the incorporation of contemporary tools and resources to optimise content learning in contexts. Besides, teachers should exhibit expertise, skills, and job processes that indicate a creative professional in a global and digital society. Teachers should also consider local and global social concerns and obligations in the evolving digital world and illustrate legal and ethical conduct in their professional practices. Ultimately, teachers must continue to develop their professional practice, model lifelong learning and demonstrate leadership by encouraging and demonstrating the efficient use of digital tools and resources.

Research Method

Based on a research survey design, the goal of this study is to present teachers' views on their readiness to incorporate online learning. It is meant to reflect and conceptualise a phenomenon. Survey studies identify data patterns rather than include a rigorous description

by which investigators conduct a survey to a sample or to the entire population of individuals to convey perceptions, beliefs, habits, or characteristics (Creswell, 2012). A successful representation would include a thorough explanation of the phenomenon, i.e. statements that recreate a situation and as much of its meaning as possible (Gall et al., 2007). This research design was chosen because the study identified and centred on the phenomenon of teacher readiness to implement online learning.

This study used an online survey, which included administering questionnaires as an act of questioning and gathering information on the teacher's understanding of their readiness to integrate online learning. Data collection surveys gathered information from Indonesian teachers about several key issues, which are their thinking, attitudes, or understanding of online teaching preparation, pandemic online learning activities, and student assessment during online learning. Gall et al. (2007) argued that the survey is a method of data collection using questionnaires or interviews to collect data from a sample selected to represent a population to which the data collection results could be generalised. The online questionnaire was developed by adopting the concepts of teachers' readiness for online learning taken from Dabbagh & Bannan-Ritland (2005) and McLoughlin & Oliver (1999). The questionnaire consists of two main parts: 1) the teachers' socio-demographic background, and 2) the teachers' perceptions on their readiness in online learning activities during the pandemic.

Participants

A total of 126 responses were received from teachers across Indonesia at the end of 2020. Their ages ranged from 23 to 57 years, while their teaching experience ranged from 2 to 24 years. The sample consists of 35 males and 91 females. 73.88% of the participants came from urban areas, and the remaining were from rural areas. Researchers also found that the participants' place of work comprised state-owned institutions (54.01%) and the remainder are private institutions. Additionally, 28.68% of participants suggested that their places of work had been conducting online learning before the pandemic, while the others (71.32%) claimed otherwise. 82.22% of participants reported that they applied online learning during the pandemic, while the remainder did not so in turn. Only 63.36% of participants had online training experience, while the remainder did not.

Data Analysis

A significant component of the data analysis used pattern-matching to identify variances between teaching preparation, online learning activities, and student assessment of online learning (Dabbagh et al., 2005; McLoughlin & Oliver, 1999). This process enabled the identification of transparent ties between teacher readiness in online learning and practices as represented within the study's theoretical and conceptual context (Miles et al., 2014). The analysis includes noting the response rate, testing for response bias, performing descriptive analysis of all objects, and answering descriptive questions (Creswell, 2012).

Findings

Based on the findings, there is valuable evidence to be gained from the teachers' points of view on their readiness to incorporate online learning. The survey results are divided into three key issues: teaching preparation, pandemic online learning activities and student assessment for online learning.

Teaching Preparation

The teachers were asked to report their views on their online learning lesson plan during the pandemic to examine teaching preparation in this context. Their responses were scored on a scale that ranged from “Strongly Disagree” to “Strongly Agree”.

Table 1

Teaching Preparation for Online Learning during the Pandemic

No	Statements	Strongly Agree	Agree	Disagree	Strongly Disagree
1	I created a lesson plan based on students' learning outcomes to be achieved.	48.53%	49.26%	2.21%	0.00%
2	I adjusted a lesson plan based on an online learning situation during a pandemic.	58.82%	40.44%	0.74%	0.00%
3	I considered students' characteristics and their needs in designing an online learning lesson plan during the pandemic.	51.11%	48.89%	0.00%	0.00%
4	I integrated students' online learning activities with appropriate digital competence.	45.52%	53.73%	0.75%	0.00%
5	I integrated students' online learning activities with a hidden curriculum in transmission norms, values and beliefs conveyed in the social environment.	48.51%	51.49%	0.00%	0.00%

Table 1 lists the teachers' views, in which 58.82% strongly agreed to adjust a lesson plan based on an online learning situation during a pandemic, and 51.11% considered students' characteristics and needs in designing an online learning lesson plan during the pandemic. Meanwhile, only 49.26% agreed to create a lesson plan based on students' learning outcomes to be achieved. Amidst the teachers 53.73% agreed to integrate students' online learning activities with appropriate digital competence, while 51.49% agreed to integrate students' online learning activities with a hidden curriculum in transmission norms, values and beliefs conveyed in the social environment. The findings demonstrated that around half of the participants recognised the need to alter the lesson plan by addressing learning goals, students' needs, and the effects of a rapidly developing pandemic on online learning.

Online Learning Activities during the Pandemic

The study of online learning activities during the pandemic described how the teachers' teaching practice covered the roles of teacher and student, the materials, and the learning activities.

Table 2

Pandemic Online Learning Activities

No	Statements	Strongly Agree	Agree	Disagree	Strongly Disagree
1	I played the role of resource instructor, co-participant, scaffolder, co-learner, moderator, facilitator, mentor, monitor, and advisor in the online learning process.	43.28%	53.73%	2.99%	0.00%
2	I created learning experiences to develop students into problem solvers, explorers, researchers, collaborators, goal-setters, moderators, facilitators, scaffolders, and participants.	36.76%	61.76%	1.47%	0.00%

No	Statements	Strongly Agree	Agree	Disagree	Strongly Disagree
3	I practised a learning activity that forces students to actively construct or make their knowledge, and their experiences determine that reality.	27.94%	60.29%	11.76%	0.00%
4	I rendered my students as active agents by empowering them to bring their knowledge, past experiences, education, and ideas; this influence show they absorb new information and learn.	30.88%	66.91%	2.21%	0.00%
5	I emphasised collaborative learning in the context of online learning.	28.36%	66.42%	5.22%	0.00%
6	I carried out an activity initiated by a student during online learning to make sense of the content by summarising, mapping, drawing, imagining, self-testing, self-explanation, teaching, and enacting.	25.93%	55.56%	17.04%	1.48%
7	I mediated between offering support and promoting student self-regulation while learning (e.g., planning, setting learning goals, and monitoring their emerging understanding).	17.04%	61.48%	20.74%	0,74%
8	I figured students would learn better in communities and, very naturally, when looking to others as a source of learning, so I used peer-to-peer activities.	17.78%	68.15%	14.07%	0.00%
9	I developed teaching materials by considering the learning objective, students' characteristics and needs.	41.35%	58.65%	0.00%	0.00%
10	I created a learning strategy that encourages students to actively engage cognitively, behaviourally, and emotionally.	39.26%	60.00%	0.74%	0.00%
11	I considered integrated technology, digital pedagogy, and required material based on the learning objective and students' needs.	37.04%	61.48%	1.48%	0.00%
12	I applied online learning process that has had positive effects on students' active engagement.	36.30%	62.96%	0.74%	0.00%

A variety of statements examined the online learning practices related to how teachers implemented online learning during the pandemic. Table 2 shows that 53.73% of the participants agreed to play a role as a resource instructor, co-participant, scaffolder, co-learner, moderator, facilitator, mentor, monitor, and advisor in the online learning process. In addition, more than 60% agreed to create learning experiences to develop students into problem solvers, explorers, researchers, collaborators, goal-setters, moderators, facilitators, scaffolder, and participants.

Furthermore, 60.29% of participants agreed to practise a learning activity that forced students to actively construct or make their knowledge, with their experiences determining that reality. Also, 66.91% agreed to render their students as active agents by empowering them to bring their knowledge, past experiences, education, and ideas. This influenced how they absorbed new information and learned. This research also found that 66.42% agreed to emphasise collaborative learning in the context of online learning, while 55.56% agreed to carry out an activity initiated by a student during online learning to make sense of the content by summarising, mapping, drawing, imagining, self-testing, self-explanation, teaching, and enacting. Also, 61.48% agreed to mediate between offering support and promoting student self-regulation while learning in the form of planning, setting learning goals, and monitoring their emerging understanding. Many teachers (68.15%) agreed that students would learn better in communities and, very naturally, when looking to others as a source of learning, so they used peer-to-peer activities.

It was found that 58.65% agreed to develop teaching materials by considering the learning objective, as well as students' characteristics and needs. Also, 60.00% of

participants agreed to create a learning strategy to actively engage students in cognitive, behavioural, and emotional learning, while 61.48% agreed to consider integrated technology, digital pedagogy, and required material based on the learning objective and students' needs. Finally, 62.96% agreed to apply an online learning process that has had positive effects on students' active engagement.

These findings described that the majority of participants considered applying the learning activities by switching their learning paradigm from face-to-face to online learning. Aspects of online learning practices in the form of teacher and student roles, learning techniques, and learning media, were adapted to the online learning pedagogy.

Student Assessment for Online Learning

The survey findings described the participants' views on how they implemented student assessment for online learning during the pandemic. It explained how they dealt with the practice of assessment and how they provided feedback to students.

Table 3

Student Assessment during Online Learning

No	Statements	Strongly Agree	Agree	Disagree	Strongly Disagree
1	During online learning, I evaluated students' cognitive, affective, and psychomotor skills.	28.68%	63.24%	8.09%	0.00%
2	I designed an online summative and formative evaluation focused on the learning goal, taking into account students' contexts and characteristics.	31.11%	66.67%	2.22%	0.00%
3	Affective assessment is based on my evaluation of student behaviour during online learning.	28.15%	68.15%	3.70%	0.00%
4	I regularly assess the online learning process by involving students, parents, and institutions.	27.01%	64.23%	8.03%	0.73%
5	I used a digital assessment platform to test student's achievement.	23.13%	66.42%	10.45%	0.00%
6	I applied peer-assessment during online learning.	12.69%	73.88%	12.69%	0.75%
7	I provided personal feedback on student's achievement.	34.81%	63.70%	1.48%	0.00%

Table 3 shows that the concept and requirements of student assessment did not change significantly for online learning during the pandemic. 63.24% agreed to assess students' cognitive, affective, and psychomotor skills during online learning. The findings showed that 66.67% agreed to design an online summative and formative evaluation focused on the learning goal, taking into account students' contexts and characteristics. Among the participants, 68.15% agreed that applying affective assessment was based on their evaluation of student behaviour during online learning. It was promising to find that 64.23% agreed to regularly assess the online learning process by involving students, parents, and institutions. It was also found that 66.42% agreed to use a digital assessment platform to test student achievement, 73.88% agreed to apply peer-assessment during online learning, and 63.70% agreed to provide personal feedback on student achievement.

Assessment is a necessary process for assessing the students' skills and accomplishments against learning objectives. Participants were found to be committed to applying the evaluation to their students' cognitive, affective, and psychomotor dimensions for online learning during the pandemic.

Discussion

The results depicted that majority of the teachers (>75%) have demonstrated their readiness in three aspects described in the findings, i.e. the teachers' lesson plan, online learning activities, and student assessment for online learning. Teachers consequently adjusted their course design based on the online learning environments focusing on pedagogical perspectives. It is universally understood that technology evolves very rapidly and influences all aspects of life. Hence, online learning is no longer a novelty; however, the sudden introduction of online learning during the pandemic, which uses a technology-based learning mechanism, has remained a challenge in terms of its implementation. The pandemic has revealed the skills and competencies needed during a global crisis like Covid-19. Students' digital literacies have become very important, and even parents and teachers have taken an important role to support students in practicing distance learning using online platforms. Beyond digital literacy, critical digital literacy needs to be referred to with the expertise to critically analyse information and its authenticity. The development of digital literacy is in line with the general interest in using the Internet for gathering information and communicating. For example, the digital trend in Indonesia shows that more than 60% of the population are familiar with the use of the Internet and social media. The latter has also taken their interest because social media channels are fast, varied, and offers different forms of information (Kemp, 2020). The trend has supported teachers, students, and even parents to cope with some barriers in online learning during the pandemic. Based on the survey results, more than 90% teachers stated that they adjusted a lesson plan for online learning by considering the context of the pandemic and appropriate digital competence. This is in line with a previous study that found it is important to simplify the development of basic online materials and make possible the creation of virtual content, particularly to support the virtual learning process (Coates et al., 2005).

Findings related to teachers' readiness for online learning demonstrated that the majority of respondents grasped the principle of online learning pedagogy based on the concept of online teaching roles in managing social interaction, instructional design, technological guidance, learning assessment, and learning support (Badia et al., 2017). As designers, the teachers relied on their use of material resources and power structures in a particular context to better convey their meaning (Kress & Selander, 2012). As instructional designers, the teachers need to judge how best the learner could attain their learning outcomes and how the teachers used instruments, technologies, and resources to be mindful of what the students could and could not do (Lim, 2021). Moreover, practising empathy also allowed teachers to posit themselves as students to better understand the latter's positions and privileges, whether in terms of wealth, gender, society, or any combination of them all (Adams & Rodriguez, 2020). The teachers are required to create an atmosphere of confidence and promote a social compromise learning approach by taking on the role of participant, correspondent, and facilitator. The goal is to develop a learning culture in which engagement, interaction, and knowledge-building are fostered amongst peers. The teachers' role is reciprocal, compassionate, and communicative as they respond to the learner's needs.

Online learning ecosystems during the pandemic enable teachers to adapt the idea of pedagogy from face-to-face to online learning with mediation by technology. Online learning is not about digitising materials (Holland, 2017). Teachers are expected to apply effective strategies and practices that provided room for students' active learning through online learning (Stewart et al., 2012; Zucker & Fisch, 2019). An online learning scaffolding is required to turn the community phase into a meaningful learning experience (Orlando, 2013). Further, an open pedagogy involving students as information creators rather than just consumers should be developed. This is a form of experiential learning in which students can demonstrate understanding through the act of development so that open pedagogy

subjects can be created and freely licensed to students to be applied outside the classroom in a way that can affect the wider community (Bates, 2019). The instructor's organisational role is to build meaningful learning experiences and play a constructive role in helping students participate in these experiences as a learning group. As the learning environment shifts towards a collaborative and student-centred approach, the roles of teacher and student could be seen as increasingly mutual.

The National Educational Technology Standards for Students or NETS-S (Smaldino et al., 2015) outlined six essential competencies that students need to excel in for school and future careers. These competencies are consistent with 21st century expertise and skills on the concepts of technology operations concepts, beginning with creativity and innovation, which describe students' demonstration in thinking creatively, constructing knowledge, and developing innovative products and processes using technology. Next is communication and collaboration skills, which explain how students use new technologies and environments to interact and function collaboratively. Additionally, study and information fluency reveal how students use digital resources to collect, analyse, and use information. Further, critical thinking, problem-solving, and decision-making describe how students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources. Next is digital citizenship, which includes students' understanding of individual, cultural and social problems related to technology and legal practice, including ethical behaviour. Technology operations and principles explain how students show a sound understanding of technological concepts, processes, and operations. Ultimately, it is a must for the teacher to mould the student as an online learner in line with the 21st century student profile through an effective online learning design by altering the approach from face-to-face learning experiences and focusing on the students' characteristics and needs.

It is important for teachers to be familiar with the NETS-S and build technological skills to match their students' expectations. Huang (2018) listed three prominent roles of teachers in online learning, including cognitive, managerial, and affective roles. However, these functions do not seem to have the same effect in online learning. In particular, online teachers' managerial role is considered to be the most crucial role for students. From the students' perspective, teachers play a smaller role in cognitive aspects and have the least impact on the affective aspects of online learning. This is in line with findings from a previous study conducted by Salinas et al. (2016), which showed that the integration of ICT into education generates a set of transformations that modify all its elements, i.e., organisation, curriculum, students, and teachers. Consequently, students are inevitably shaped to be self-directed learners. The findings show that more than 90% of teachers who apply online learning have had positive effects on students' active engagement. Therefore, the characteristics of students' self-directed learning in online learning need to be optimally facilitated. Teachers act as facilitators who are responsible for providing "web-supported or web-enhanced instructions" (Dabbagh & Bannan-Ritland, 2005). The use of the term "self-directed learners" is also described in greater detail by Warring (2012) as learners who are able/willing to learn by themselves and feel confident in making their own decisions. Bates (2019) argued that the need for new technology and learners in the digital era demands a rethinking of conventional school-based teaching, especially where it has been predominantly based on the transmission of knowledge. It is pertinent to re-assess the teaching method and decide how teachers would like to teach in the digital age. This requires creativity and vision rather than technological knowledge. Therefore, it is essential to decide the most suitable mode of delivery based on teaching philosophy, the needs of students, the demands of discipline, and the resources available.

Assessment offers real knowledge to respond to particular situations, promote many skills, and deliver long-term benefits that are strongly linked to student learning. The aim of assessment must be clear, as a single assessment framework could not satisfy all the needs

of assessment. A technology enhanced learning environment, including online learning, has four characteristics: using technology to motivate people, using technology to enrich learning resources, using technology to implement learning and instructional strategies, and finally, using technology to assess and evaluate learning goals (Wang & Kinuthia, 2004). The concept of online learning has introduced new opportunities to conduct an assessment using the digital platform and adapt the constructivist approach through social interaction, discussion, collaboration, peer feedback, and more. Online learning pedagogy can motivate students to engage more actively. McCarthy (2017) stated that useful feedback from teachers creates the foundations for learning autonomy and a high achievement framework, which can improve learning. Quality feedback relies on specific terminology and precise evaluation requirements. However, providing feedback could be a tiresome, repetitive and is often time-consuming, particularly with large class sizes, making delivering of timely feedback a demanding task.

The development of teachers' online learning pedagogical competencies could be considered for further study. An evaluative research on teachers' professional development programmes to judge the merit, value, or worth of online learning programmes is also recommended. Lastly, this study describes exploring teachers' views regarding their readiness to incorporate online learning. It is therefore suitable for further studies to expand the research topic to explore technology mediated learning processes that focus on the students' needs.

Conclusion

Through the introduction of technology, online learning is crucial in that it has added a great deal to pedagogical aspects, especially where the application of technology could lead to effective learning. This study explored Indonesian teachers' views regarding their readiness to incorporate online learning through a survey research design. The valuable findings on the teachers' perspectives and opinions on their readiness to incorporate online learning could be considered in the recommendations for their professional development which would include online learning pedagogy skills. The advancement of teachers' digital pedagogy skills, including the integration of technology, pedagogy, and content knowledge, is a matter of urgency. The 21st century requires a teacher's role to also include that of an instructional designer, takes into account students' characteristics and needs in various circumstances, and integrates technology to achieve the best quality pedagogy.

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