Teacher Digital Literacy and the COVID-19 Pandemic in Indonesia: Forced, Used to It, Return to Before?

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Abstrak

Education 4.0, which combines digital technology with a face-to-face learning system, is seen as a solution for developing digital literacy in schools. This system is believed to be the foundation of success. The COVID-19 pandemic in Indonesia in early 2020 has become one of the forcing factors for accelerating digital literacy mastery by teachers and students. During the nearly two years of the pandemic, despite facing many obstacles, a digital culture began to take shape among teachers and students. The question is whether, after the pandemic, the use of digital media continues to become a culture and support for implementing Education 4.0 in schools or is it back to its original condition. This research aims to determine the level of teachers' digital literacy and its implementation in schools during and after the COVID-19 pandemic. The research was conducted by involving teachers who are not teachers of Information and Communication Technology from junior high schools in Purwokerto, Central Java. Preliminary data was collected using a google form survey, followed by forum group discussion and interviews. Triangulation techniques are used for data validity. The data was analyzed using descriptive data analysis. The results showed that teachers' digital literacy generally shows sufficient competence where teachers already have the technical ability to access and produce content online to support learning activities. When the COVID-19 pandemic was over, the intensity of digital media use returned to its original dependence on the digital culture that developed in each school. After the COVID-19 pandemic ended, teachers with adequate digital Literacy continued to develop a digital culture in the learning

process. In contrast, teachers who, before the pandemic, had limited digital literacy tended to no longer use digital media in the learning process.

Keywords: Education 4.0, Digital Literacy, Teachers, COVID-19 Pandemic

Introduction

Long before the COVID-19 pandemic hit the world, the push to immediately make inroads in the education system was already a concern for various parties. Globalization and the industrial revolution 4.0, which has brought significant changes in various aspects of life, have given rise to debates and the need for an education system that can produce graduates who are suitable for the needs and demands of industry and the world of work. The world of education is facing the challenge of preparing graduates who are ready to be involved in a world of work that changes very quickly and is full of uncertainty. Schools and colleges are challenged to produce graduates who fit into fields of work, professions, and technologies that have never even existed and been imagined before. The education system then not only adequately prepares graduates who are qualified for the needs of the world of work but also must equip students with the skills they need to become active, responsible, and contribute as citizens (OEDC, 2018). The world of education must not only adjust but must also transform its learning system.

One figure who has a vital role in transforming the learning system is the teacher. Teachers can no longer teach students about the material. However, they must make students lifelong learners so they can continuously adapt and keep up with the changes that will continue to occur. To make students become lifelong learners, the main requirement is that even the teacher must be a figure who never stops learning. In such a situation, everyone should be viewed as a learner, not only students but also teachers, school administrators, families, and even the environment in which students are located (OEDC, 2018).

Various parties have put forward various efforts and designs of learning systems. Student-centered learning models are seen as an ideal learning model, as well as collaborative learning, such as case study methods and project-based learning. These learning models encourage students to explore conceptual learning materials more independently outside of the classroom, while in the classroom, they are more encouraged to gain experience through discussion, problem-solving, and even producing joint work. One of the education systems that is considered relevant is education 4.0, where the vision of learning is no longer an effort to provide skills and knowledge to students but also provides the ability for students to recognize and find for themselves learning resources for them to acquire these skills and knowledge (Anaelka, 2018).

There are at least nine characteristics of education 4.0, namely that learning can be done anywhere and anytime, learning can be tailored to the individual needs of each student, and students can choose their own way of learning. Students will also be encouraged to produce their own projects, be involved in situations in the field to run internships, mentorship, and work on various projects. Students must also be more encouraged to master technology and be able to interpret data by applying theories and concepts that they know. The assessment process for each student can be carried out differently with the assessment framework, which is also adapted to the learning process carried out by students. Students can even provide input in preparing and updating the learning curriculum. Going beyond all these characteristics,

students will become independent learners, and the teacher only acts as a facilitator, no longer as the only source of knowledge (Anaelka, 2018).

One of the main foundations needed to develop Education 4.0 is mastery of digital literacy. Therefore, since 2017 the Indonesian government, through the Ministry of Education and Culture, has launched the National Digital Literacy Movement, which stipulates that mastering digital literacy competencies is as essential as mastering reading, writing, numeracy, and other competencies (Setiansah, Novianti, & Sutikna, 2021). Literacy culture is seen as a prerequisite for 21st-century life skills that must be mastered through integrated education starting from family, school, and community—especially considering the increasing level of internet penetration in Indonesia. Based on the Report of the Indonesian Internet Service Providers Association, the internet penetration rate in Indonesia in 2021-2022 reaches 77.02%, or it can be said that the number of Indonesians connected to the internet reaches 210,026,769 people from 272,682,600 total Indonesian population (APJII, 2022). In such a situation, the family as the first environment that comes into contact with the child is expected to be the frontline in building digital literacy in children. However, based on the results of a study entitled "Development of a Model for Protecting Minors against Online Risks through Family-Based Media Literacy Education" in 2019 (Setiansah et al., 2020), it is known that most parents turn out to have a lower level of digital literacy than children. Children prefer friends - generally, schoolmates- or older siblings as sources of information or sharing partners when facing difficulties in accessing internet-based media. In addition to asking friends, children also ask teachers more often than parents (Setiansah, Novianti, Rahmawati, et al., 2021).

Departing from the results of previous research, it can be concluded that schools play a strategic role in developing digital literacy culture, and teachers certainly play a crucial role in building digital culture in schools. The problem is, although all parties have realized the urgency of teachers in mastering digital literacy, the implementation is more challenging than expected. Even a study conducted in Medan in 2015 entitled " Internet Media Literacy among Vocational High School Teachers in Medan City" (Siyamitri, 2015) revealed the fact that several teachers who were research informants claimed to have never heard of the term media literacy and did not know the definition of media literacy. The informants' knowledge about the internet-based media industry still needs to be improved. They do not even know about various internet regulations except for the ITE law and the press, which also they cannot explain the whole content. Other studies also reveal teachers' limited level of digital literacy (Kholid, 2020; Rosmalah, Sidrah Apriani Rahman, 2021; Setiansah, Novianti, & Sutikna, 2021).

When the COVID-19 pandemic hit the world and became one of the megadisruptions that brought massive changes to various sectors of people's lives, the world of education became one of the sectors that were affected quite a lot. The acceleration of mastery of digital technology is something that cannot be denied. Students and teachers are forced to learn from home and rely on digital media to carry out online learning. Various problems rooted in the limitations of digital literacy of teachers and students also came to the fore. Numerous studies have revealed that limited access to and mastery of digital technology by most parents, teachers, and students in many schools, has become the biggest obstacle to implementing online learning in schools. Primary and secondary school teachers are the group that faces the most challenges in carrying out online learning during the pandemic. Elementary and junior high school students generally still have limited access to digital media. Not infrequently, they have to share using a *smartphone* with their parents or older siblings. Even if children of junior high school age are then bought *smartphones* for online learning purposes, most of them still do not have

adequate digital literacy in terms of skills, ethics, security, and digital culture (Jamila et al., 2021; Malik, 2022; Nurohmah et al., 2020; Purnawanto, 2021; Wiyoko et al., 2022).

Based on the background of the problems outlined above, it becomes interesting and important to know how the digital literacy rate of junior high school teachers is in the situation post-pandemic COVID-19. Has the acceleration of digital literacy mastery that occurred due to the COVID-19 pandemic an opportunity for increasing teachers' digital literacy to support the implementation of Education 4.0 or has it been abandoned again?

Literature Review

Along with the development of media, information, and communication technology, the concept of media literacy has also changed. The development of technology, culture, and media history requires a particular definition of literacy (Livingstone, 2004). In another study entitled Internet Literacy: Young People's Negotiation of New Online Opportunities, Livingstone reiterated the importance of sharpening the concept of internet literacy to distinguish it from the previously existing concept of print or media literacy (Livingstone, 2011). The need to distinguish the concept of literacy is used as a reference in this study because many teachers have yet to be able to explain the difference between media literacy in question and school literacy which refers more to mastering numeracy, reading, and writing literacy competencies.

In the era of the internet and digital media technology, of course, the concepts of internet literacy and digital literacy are essential concepts to master. However, just like other concepts in the social sciences that are never singular, the concept of digital literacy also has diverse definitions and uses. A systematic literature study revealed that the concepts of media literacy, digital literacy, and digital media literacy are concepts that are widely used by media literacy and digital literacy researchers today (Limilia & Aristi, 2019). Referring to the results of the study, the definition of digital literacy that many researchers refer to is the definition from Gilster, which states that digital literacy is the ability to understand and use information in the digital age (Limilia & Aristi, 2019). The Ministry of Information and Communication has established four pillars of digital literacy: digital skills, digital ethics, digital safety, and digital culture (KOMINFO, 2021). Digital literacy is closely related to digital competence. Digital competencies are understood in broad concepts as a set of knowledge, skills, and attitudes needed to use digital technologies to optimize daily life effectively (Zhao et al., 2021).

There are several ways to measure the level of media literacy, one of the most widely used ways is the individual competency framework (ICF) (Limilia et al., 2020). Individual Competency is defined as the ability of an individual to exercise several media skills. These skills include cognitive processes, analysis, communication, capabilities to build awareness and critical thinking skills, and the ability to produce and communicate messages. In general, ICF divides this individual competence into two categories: personal competence, which is a person's ability to use media and analyze media content. As well as social competence which is a person's ability to communicate and build social relations through media and produce media content (European Commission Directorate General Information Society and Media, 2009). In addition to the ICF, digital competence can be measured using a digital competency indicator based on the European Commission's formulation called DigComp 2.0. DigComp 2.0 compiles 21 digital competencies grouped into five areas: data literacy, data information;

communication and collaboration; digital content creation, security, and problem-solving (Zhao et al., 2021).

In line with the opinion that the surrounding social, cultural, and technological environment will determine the conditions of digital literacy faced, this study uses the Educator's Digital Competence Framework (EDC) to determine the level of digital literacy of teachers who are respondents in this study. The EDC compiles 20 digital competencies that teachers must master. These competencies are grouped into four areas of competence: knowledge development, knowledge application, knowledge sharing, and knowledge communication (UNICEF (Regional Office for Europe and Central Asia), 2022). The first area focuses on teachers' digital competencies related to the digital teaching and learning process and their relationship to national policies, digital teaching, and learning and assessment approaches. The second competency area focuses on teacher competence in facilitating students' digital skills to learn effectively by using ICT responsibly, solving problems, and developing, sharing, and creating various new knowledge.   The third area of competence focuses on using community by teachers to enhance the competencies needed to engage in practice and professionally develop a culture of collaboration. Finally, the fourth competency area focuses on utilizing digital technology to support organizational communication by improving teacher competence in communicating with students and stakeholders and using digital resources safely and responsibly (UNICEF (Regional Office for Europe and Central Asia), 2022).

Research Method

This research was carried out using a descriptive method involving 22 (twenty-two) junior high school teachers in Purwokerto City. The junior high school level was chosen because the middle school or adolescent age is often categorized as a transitional age, where children like to explore new things, including digital media. Based on data from previous research, during the COVID-19 pandemic, 90% of junior high school-age students already have their own internet access devices, both in the form of smartphones and laptops (Setiansah, Novianti, Rahmawati et al., 2021). So the presence of teachers who have adequate digital literacy becomes very strategic. The teachers who were respondents in this study were determined by considering the number and condition of schools in Purwokerto. Researchers collaborated with the Banyumas District Education Office, especially in junior high school development, to obtain the necessary number of respondents. The researcher invited 30 (thirty) teachers to participate in the FGD. However, because the implementation of the FGD was still in the condition of PPKM (Enforcement of Community Activity Restrictions) level 1, not all participants were invited to attend. In these PPKM conditions, data is collected online and offline. The online ones were conducted through surveys using google forms and online interviews. The offline ones were conducted through focus group discussions. This research used triangulation by comparing various data collection techniques or methods. Triangulation is needed to increase data trustworthiness/ validity/authenticity. Triangulation is also carried out to increase researchers' understanding of what has been found through the research they conduct (Sugiyono, 2018). The data analysis technique used is a descriptive data analysis technique. Grouping data carry out descriptive data analysis into two. Qualitative data is grouped into words or sentences, analyzed, and presented by grouping and compiling categorizations according to the problems studied. While quantitative data is in the form of numbers carried out by non-inferential calculations (divided, number, times) and presented in the form of tables or diagrams/graphs (Arikunto, 1993).

Figures 1 and 2. *Implementation of FGD research data collection*

Results

COVID-19 Pandemic and Teacher Digitalization

Based on the data collected in this study, it is known that the COVID-19 pandemic has become one of the coercive factors for teachers to master digital technology / IT more quickly. The informants who were deliberately selected instead of information and communication technology (ICT) teachers admitted that they were previously unfamiliar with digital technology. Some even admitted that they were surprised that they were invited as participants in the *Digital Literacy Focus Group Discussion* (FGD). Even though he was not an ICT teacher, as stated by Mr. Zaimul Umam from Diponegoro Purwokerto Junior High School below:

Usually, those who go are ICT teachers. *How come* this is a guidance and counseling teacher?

In my school, I just use power points. I still need to be a digital literacy teacher because I am not an ICT teacher. The new teacher is given directions by the supervisor on how to make a learning video. (Zaimul Umam, FGD, 24 June 2021)

The statement that teachers must immediately learn and adjust was also expressed by one of the FGD participants from SMPN 2 Purwokerto below:

We want to do something, but the students already know first. Students are more literate than me, so they can discuss with the child. However, at the beginning of the learning year, teachers were given training by the IT team regarding the rapid development of IT so that we could adjust faster when faced with situations like this. (Semi Dwi Lestari, FGD, 24 June 2021)

Not all teachers, however, said they stuttered and were forced to use digital media due to the pandemic. Some teachers said they had gotten used to using digital devices long before the pandemic happened. This statement was expressed by Mrs. Rachel from Purwokerto Christian Junior High School. She said that although she is not an ICT teacher, she has often been asked to deal with learning media and work issues related to information and communication technology. Mrs. Nur Amalina, from SMPIT Al Irsyad Purwokerto, also expressed a similar statement. She revealed that the conditions in her school were somewhat different from other schools that had to adapt quickly during the COVID-19 pandemic. Most of the teachers and students at SMPIT Al Irsyad are said to be used to using digital media.

The statement revealed by the FGD participants, which was carried out approximately one year after the COVID-19 pandemic hit Indonesia, showed results that were in line with the results of the survey through the G-Form. Based on the survey, it is known that there are no teachers who cannot operate computers/laptops/gadgets and access the internet at all. This condition can be seen in the graphic in figure 3, which shows the composition where there are 18.2% say they master the use of computers/gadgets/laptops quite well, 27.3% can use well, and 54.5% can use computers very well. Meanwhile, figure 4 shows that the percentage of teachers who can access the internet very well is even higher, reaching 63.6%. 18.2% of teachers stated that they could access the internet well and quite well, with the same percentage of 18.2%.
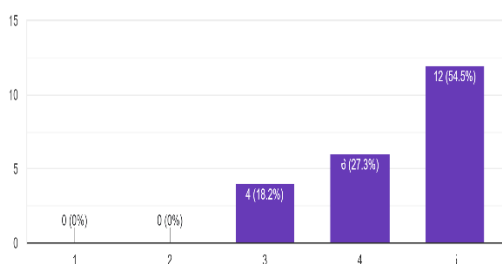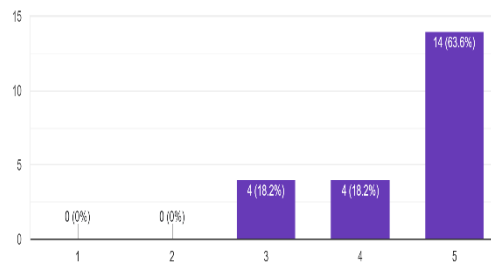

Figure 3. *Ability to use a computer*

Figure 4. *Ability to access the internet*

The pandemic condition and the ability of teachers to use and access the internet have also encouraged teachers to use computers and the internet to carry out various needs and activities related to their professional duties. During the pandemic, the use of digital media has become part of the work culture of teachers. Many teachers also say they already know and can use all the features on their computers/ laptops, as shown in figure 5.
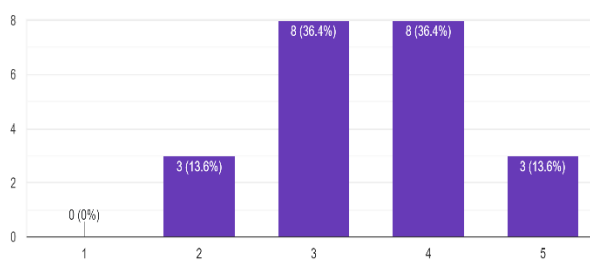

Figure 5. *Respondents who use all the features on the computer/laptop*

In addition to using digital media to fulfill tasks and activities related to learning needs, teachers also use digital media to interact and socialize. All teachers stated that they had joined groups facilitated by conversational applications, one of which is WhatsApp, albeit with varying intensities. They also often reconfirm information obtained through social media or other digital media with other people, be their friends or colleagues. However, only a few teachers actively use the internet for more complex needs, such as using fact-checking applications, reporting news or hoax information, etc. This is at least seen in the graph of figure 6.
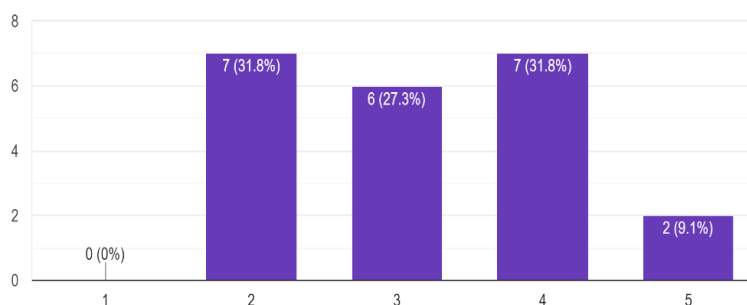
Figure 6. *Use of hoax information/news reporting features*

Based on figure 6, it is known that only 2% of informants can use features to report hoax news actively. When this was confirmed by their knowledge of the regulations related to the use of digital media, most teachers (54.5%) claimed to be quite familiar with the regulations related to it. Likewise, knowledge about how to report hoax news is also only well-known by 13.6% of respondents. The data obtained through the *google form* was also confirmed through the statements of teacher respondents from SMPN 1 Purwokerto disclosed in the FGD, as follows:

My experience so far is that digital literacy has been entirely new to learning media. As far as I know, it is only to convey the ITE Law and the rules for using social media. Because we also have not fully understood it, students have not been detailed about digital literacy either. (Santi Nur, FGD, June 24, 2021)

However, even though some teachers are still not familiar with digital media regulations, some admitted that they still remind students about the risks and dangers of online. Such as hoax news as revealed by teacher respondents from SMP Maarif NU Purwokerto, who said that he and other teachers in the school also informed students about hoax news. and how to deal with it, one of which is by reducing access to mass media.

COVID-19 Pandemic Subsides, Teachers' Digital Literacy Levels Return to Their Original Levels?

Approximately a year after the restrictions on community activities were imposed, and various activities, including learning, were carried out from home, starting in September 2021, the face-to-face learning system began to be implemented on a limited basis. Gradually, starting from half-day face-to-face schooling, alternating until it is again entirely face-to-face in schools at the beginning of the new school year 2022. All parties, including teachers and students, welcomed the return to the face-to-face learning process. The use of digital media and online learning, which had become a culture, seems to have begun to change again.

When several respondents were contacted and interviewed again in early 2023, 100% of respondents stated that the learning process had been fully implemented face-to-face in schools. 57.1% of teachers said they still use digital media for learning (Figure 7). The most widely used medium is youtube. As many as 85.7% of teachers also stated that they still make learning materials using digital media, such as *powerpoint slides*, *canva* slides, and videos, as well as videos uploaded to Youtube (Figure 8). Some teachers still use google classroom or LMS and Microsoft Team as supporting media in learning. As shown in figure 7 and figure 8.
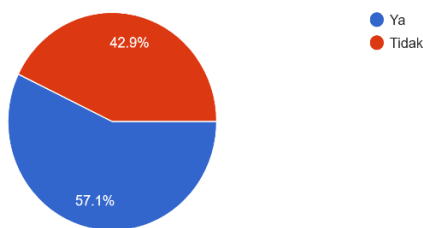
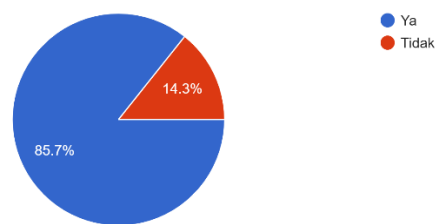**Figure 7.** *Use of Digital Media for Learning*

Figure 8. *Creation of digital materials for learning*

By looking at the pictures mentioned above, it can be concluded that digital culture has not completely disappeared along with the return of the face-to-face learning process in schools. Teachers and schools continue to use digital media as part of the implementation of learning tasks and activities because the use of digital media has become a culture. As stated by one of the teachers from Telkom Purwokerto Junior High School, Mrs. Siti Maratus Solikah who said that:

We have been using digital media since before the pandemic. During the pandemic, the use of digital media is increasing and more routine because learning is carried out online. Post-pandemic the use of digital media returns to normal as before the pandemic (Interview, January 9, 2023)

In addition to still using digital media as a learning support medium, teachers also continue to share knowledge about the use of digital media both with fellow teachers and students. In general (85.7%) teachers remind their students of the ethics of digital media.

Discussion

Teacher Digital   Literacy based on Educator's Digital Competency Framework

Referring to the Educator's Competences Framework (ECF), teachers' digital competencies can be analyzed using four competency areas, which are the skill of developing, *applying, sharing*, and *communicati*ng (UNICEF (Regional Office for Europe and Central Asia), 2022). Based on the results of this study, it is known that during the pandemic, all teachers have been able to master competencies in the first area, namely knowledge development. This is indicated by the various efforts made by teachers to improve mastery of technology and ensure that learning can continue, especially during the COVID-19 pandemic.

The second area of competence, namely knowledge application, has also been carried out by teachers, including teaching the use of digital media to students and ensuring that students can understand the material provided online. Teachers have also taught and reminded students to use digital media safely and ethically.

The third area of competence is knowledge sharing. Teachers carry out competence in this third area by sharing, discussing, and providing mentoring for other teachers. They share information about the use of digital media that can improve their knowledge and skills in using digital technology.

Meanwhile, the fourth area of competence, namely knowledge communication, is carried out by teachers by establishing communication with students and families. Based on the research results, it is known that to ensure the learning process of students during a

pandemic, it is common for teachers to come directly to students to their homes and know the problems that occur. Teachers have also made efforts to invite stakeholders, especially parents, to collaborate in developing students' digital literacy during the pandemic.

Thus, based on this EDC, teachers already have adequate digital competence, especially during the COVID-19 pandemic.

Post-pandemic Teacher Digital Literacy

The results of this study revealed a tendency to decrease the frequency and intensity of digital media use in some teachers to return to pre-pandemic conditions, in contrast to the results of research on media and information literacy during and post-pandemic in Russia (Khanina et al., 2021). The research conducted before the COVID-19 pandemic stated that for most people in Russia, the change in the intensity of digital media use due to the COVID-19 pandemic was actually considered an opportunity. They believe that when the COVID-19 pandemic is entirely over, the use of digital media will remain high. Even if it experiences a decline, it will not occur significantly until it returns to its original level in 2019 when the COVID-19 pandemic has not yet occurred.

Based on the results, there are some exciting things to re-discuss. The first is the difference in respondents' conditions before the pandemic. Most teacher respondents in this study may be included in the group with limited digital skills. They would not be ICT teachers with high skills in accessing digital media, even if they were at a level below their students' digital skills. Meanwhile, respondents to Khanina et al.'s research come from a group of people who were previously quite familiar with digital media, so they believe that even after the pandemic ends, they will continue to use digital media. Second, the ecosystem encompasses both groups of respondents. In this study, teachers who became teachers in schools with adequate internet access facilities, and supportive student backgrounds, such as Telkom Junior High School and Al Irsyad IT Junior High School stated that before and after the pandemic, they had and will continue to use digital media. So even though compared to the pandemic period, the use of digital media has decreased, it does not mean that it is no longer used because, before the pandemic, it was used to using digital media. That is why the development of the school environment, which is one of the target areas for literacy development, is so important. Based on the book Digital Literacy Support Material, published by the Ministry of Education and Culture in 2017 (Nasrullah et al., 2017), school digital literacy indicators include the number of digital training received by teachers, the intensity of using digital media and ICT in learning, the intensity of using digital media and ICT in providing other services in schools, the availability of digital books and also the infrastructure to access and produce digital content provided by schools to the involvement of families, and community communities in the development of digital literacy in schools. Problems related to inadequate ecosystem support have also been found in many studies on the problems of online learning during the pandemic (Febliza & Okatariani, 2020; Jamila et al., 2021; Setiansah, Novianti, & Sutikna, 2021). Thus, to maintain the digital learning outcomes of teachers and students during the pandemic, developing an ecosystem supporting digital literacy in schools by involving families and communities must also be a priority.

Conclusion

Based on the results of this study, it was concluded that:

1. Teachers' digital literacy competencies have experienced a tremendous acceleration during the COVID-19 pandemic. Despite facing various obstacles, all teachers have learned and adapted quickly to ensure the learning process can continue. Teachers can access and use digital media in the learning process. Teachers also share knowledge with their colleagues regarding the use of digital media and confirm the information they get from digital media. The teachers also teach students about how to use digital media, how to use digital media safely and ethically. Furthermore, it should have collaborated with students, families, and the environment to jointly develop digital literacy in schools.
2. After the COVID-19 pandemic subsided, teachers' intensity of digital media uses varied. Teachers with a supportive school environment generally continue to use digital media in their learning process. Meanwhile, teachers in a school environment with limited support for optimizing the development of digital literacy no longer use digital media in the learning process at school.

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