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The Quality Management of Education in Elementary Schools in Improving Teachers' Digital Literacy in the Era of Online Learning

Sri Marmoah^{1*}, Jenny I S Poerwanti², Suharno³, Rivan Gestardi⁴

¹⁻⁴Universitas Sebelas Maret, Slamet Riyadi St No.449, Pajang, Laweyan, Surakarta City, Central Java 57146, Indonesia

ABSTRACT

Digital literacy is a significant need in the 21st-century world. Mastery of digital literacy in the context of learning can streamline and improve learning processes and outcomes. Digital literacy is a new life skill currently. This study aims to describe the quality-based management model of elementary schools in enhancing the digital literacy of elementary school teachers in one of the provinces of Central Java, Indonesia. The qualitative approach used involves 10 principals and 20 elementary school teachers. The instruments used are observation, interview, and questionnaires. The analytical technique used Miles and Huberman's analysis. Based on the results of this study, there is an increase in teacher digital literacy after education quality management is implemented through a teacher digital literacy training program that is designed continually. Forms of participation include involvement in teacher digital literacy training program activities, namely training program planning (Plan), implementation of teacher digital literacy training programs in schools (Do), implementation of supervisory functions, monitoring and evaluation of digital literacy training programs (Check), and follow-up actions. continued teacher digital literacy training program (Action). Teachers' digital literacy on the basic level improves from 62.74% to 84.74%. The secondary level turns 51.33% from 45.56%. This research can be an attempt to improve teachers' digital literacy.

Keywords: Education Quality Management, Teachers' Digital Literacy, Elementary School.

INTRODUCTION

In the 21st century, technology and information have been developing rapidly. It brings so much change, especially in the education field (Binkley, M., Erstad, O., Herman, J., Raizen, S., Ripley, M., Miller-Ricci, M., & Rumble, 2012; Popkova, E. G., Ragulina, Y. V., & Bogoviz, 2019). This change can bring benefits when people have can maximize it and possess digital literacy skills. This change also becomes a problem if people cannot use it wisely, and cannot use the technology (Pratiwi & Nola, 2019). The change in technology development influences all life aspects, including education.

Education in Indonesia becomes a challenge for the management to compete with the digital world and respond the world change. To trace the learning process during the Covid-19 pandemic, digital literacy principles need to be used to discover the technology development and interaction with various types of media. Digital literacy is the world's main need in the 21st century. Digital literacy can be defined as the ability and skills needed to use the internet and technology effectively (Haryanto et al., 2022). Digital literacy is especially needed by teachers, especially during online learning like what is happening due to the pandemic outbreak.

The pandemic outbreak has been responded to seriously by several sectors, including the education field (Sulisworo, Fatimah, Sunaryati, & Sanidi, 2020). Digital literacy provides flexibility for an individual to access education information using ICT. The modern technology era needs correct digital literacy. Some technology-based online learning applications

can be used during online learning in the Covid-19 pandemic era, either paid subscription or free. Moreover, an individual also obtains additional learning materials from blogs or the internet.

Nevertheless, teachers' digital literacy in some regions of Indonesia is still low because digital information media has not been understood effectively (Asari, Kurniawan, Ansor, Bagus, & Rahma, 2019). Another teacher's digital literacy problem is the lack of facilities. According to UNESCO, some schools in some countries lack ICT equipment and internet connection; 90% in Bangladesh, Kyrgyzstan, Nepal, and 50% in Indonesia (Febliza & Oktariani, 2020). Moreover, age

Corresponding Author e-mail: marmuah@staff.uns.ac.id

https://orcid.org/0000-0003-3485-1551

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becomes another problem in teachers' digital literacy where the old teachers do not have the motivation to learn new things. The next factor is the time limitation to learning, and the lack of confidence in using digital technology in the teaching-learning process (Landa, Sunaryo, & Tampubolon, 2021). The low ability of teachers to plan learning activities using digital applications is a problem in planning the implementation of online learning management (Nafiah et al., 2022). Even though the teacher's digital literacy skills are very necessary because they will facilitate the learning process. This situation is following preliminary information found in research on primary schools, that teachers' digital literacy skills are still lacking. Even though the teacher's digital literacy skills are very necessary because they will facilitate the learning process. This situation is consistent with the initial information found in the research on elementary school.

According to the results of an interview with some principals and teachers in Simo district, Boyolali region, it is found that during online learning, most of the teachers only used WhatsApp applications. The use of WhatsApp applications is considered user-friendly for teachers and students. The teachers need assistance from the school operator if they want to use video conference applications such as Zoom and Google Meet. This shows that most teachers do not have any knowledge and skills to work using digital technology. They have not used facilities or meaningful smart, accurate communication connections, and obey the law to take, evaluate, use, or create information. According to the interview with elementary school principals and teachers in the Simo district, improving teachers' digital literacy capability needs quality management of education that can solve the problem so learning only can run smoothly.

In light of the aforementioned assertion, it is interesting to study Teacher's digital literacy for the learning process. There have been many studies on the correlation between teachers and digital literacy skills but so far the research has looked at the influence of more factors that affect the success of teachers in utilizing technology in learning, research that discusses quality management in learning is still very little, therefore this research has a novelty because it examines the quality of learning using information technology.

This research intends to explore whether principals' quality management of education can improve teachers' digital literacy abilities during online learning. The researcher intends to discern how elementary school quality control improves the education quality and maintains it following the standard of education nation, in this case, the improvement of digital literacy skills.

This research is indispensable to be done to improve teachers' digital literacy because digital literacy can prevent negative informative spread in society, build creative and critical thinking, in addition, to ease the teaching-learning

process, especially in the use of source and learning media (Ihda Latifatus Syarifah, 2021). Based on the interview with the principals and teachers in elementary schools in Simo district, Boyolali regency, the improvement of teachers' digital literacy capability needs quality control or education management in schools which can solve the digital literacy problem. The improvement of teachers' digital literacy needs teamwork from all school stakeholders in school quality management.

The previous topic quality management and digital literacy talk about the research on library management to support digital literacy (Supriati, 2021). The result reveals that library management can support digital literacy. This was done through the management process which consists of program planning, implementation, and program evaluation. Another research is about the principal's role to improve digital literacy during online learning in elementary schools during the Covid-19 pandemic (Suhendra, Noor, & AM, 2022). The result discovers that the principal's roles give a positive impact to enhance teachers' digital literacy. However, this research is different from the previous research because this research used PDCA (Plan, Do, Check, and Action) quality management of education to improve teachers' digital literacy in elementary school.

LITERATURE REVIEW

Digital Literacy

Digital literacy is a compilation of knowledge abilities and skills needed to succeed in a culture where technology is dominated. Digital literacy involves the use of technical tools to find information and solve problems and assignments (Hobbs, 2017). Digital literacy is frequently used as a set of minimum skills that allows the user to operate the software effectively, or find basic information (Perdana, Riwayani, Jumadi, & Rosana, 2019). The implementation of online learning needs digital information to support learning success. Teachers' creativity and innovation are needed to support learning online by improving teachers' and students' digital literacy. To enhance elementary school teachers' digital literacy, school management or facilities that support teachers' digital literacy are required. In managing quality management of school education it needs the principal's leadership, teachers' digital literacy, and citizen participation. A teacher has to learn and use digital tools and create a digital environment in the classroom (Hanafie & Halik, 2021).

Quality Management

Many schools face quality management of school education as a problem. Some research indicates that there is an influence of principals and leadership strategies on the implementation of quality management of education in schools (Daud, 2015). Another study reveals that the practical implementation of

quality management of education in school encourages and enhances school performance (T. Sihono, 2012). Through quality management of education in schools, principals can organize and manage schools based on the needs of the community served.

Some research judges that the implementation of quality management of education in school will affect school achievement. They are mainly related to three things which are improving student education outcomes, efficient service, and enhancing local decision-making (Nishimura, 2017). The idea of decentralized education is to give authority and autonomy to principals to increase efficiency, equity, and quality.

Education quality is defined as the extent to of an institution educates students and improves the learning outcomes of its program (Almudara, 2018). Quality management of education in school is one of the ways to improve education quality that depends on the school and uses a set of techniques based on the qualitative and quantitative data applied. All school components must be strengthened to enhance the capability and school competence in fulfilling the student and community needs (Maswan, 2015). Schools have to create short-term, middle, and long-term programs (Deni Sutisna, Dyah Indraswati, Nursaptini, Setiani Novitasari, 2020).

Education quality covers input, process, and output. Input is something that must be prepared to conduct the process. The process refers to the better ways and integrates input into the supportive and effective learning situation. The outcome is the work result in school, and it can be measured from quality, quantity, innovation, and productivity (Fitrah, 2017). One of the attempts to improve education quality is by enhancing the school management quality (Pasaribu, 2017). The study about principles of school management based on quality has been done by Sastradiharja (2019) following progressive improvement, standardized, cultural school change, organization change, characteristics, and local wisdom, including improving good programs and maintaining customer satisfaction.

METHOD

Research Design

This study uses a qualitative research approach, which is a type of research whose findings are not obtained through quantification procedures, statistical calculations, or other forms of methods that use numerical measures. The qualitative approach as the most important instrument is equipped with knowledge and insight about the research subject, thus, the researcher can describe the research results subjectively and complexly. The advantage A qualitative approach allows the researcher to take the point of view of the actual problem and the fact that it occurred at the time of the study. The method used is a descriptive qualitative research method that is taking

problems on actual problems and facts that occurred as they were at the time the research was carried out. The descriptive method itself is a procedure for identifying the problem being investigated by describing/describing the state (subject / object) of the research at the time of the research based on the facts that appear or as they are (Bungin, 2007). The description in this study is to describe the quality management of education in elementary schools in enhancing the digital literacy of elementary school teachers in one of the provinces of Central Java, Indonesia. The subjects of this study were teachers and principals of elementary schools in Simo Boyolali district

Participants

The criterion sampling method, which is a purposeful sampling method, was used to choose the participants of the study. In the criterion sampling method, the researcher works with situations and participants that meet the predetermined criteria (Creswell, 2013). The subjects of this research are 10 principals and 20 teachers in elementary schools in Simo district, Boyolali regency, Central Java. The sample criteria are based on the schools which implement Curriculum 2013 and have implemented quality management of education in school the previous research

Data Collection Tools

Data were collected through observation, interviews, and questionnaires. Observations were carried out in the form of participatory and structured observations. Aspects of program implementation consist of the availability of program management, planning documents, implementation, and supervision. The content and construct validation of the instrument was carried out through expert judgment and validation tests. The data were analyzed qualitatively in percentage units. The data analysis technique uses qualitative analysis through the following stages: data reduction, data presentation, interpretation, conclusion drawing, or verification.

The questionnaire was used to measure teachers' digital literacy skills which were modified from (Celot & Pérez Tornero, 2009). The observation and interview instruments used to obtain the detail of the implementation of quality management of education in schools were adapted from Deming which covers PDCA (Plan, Do, Check, and Action) quality management of education (Sobry, 2018).

Below is the questionnaire and interview on teachers' digital literacy. As for the grid in the collection of data attached to Tables 1 and 2

Data Analysis

Data analysis using Miles and Huberman analysis consist of data collection, data display, data reduction, and conclusion drawing (Miles, M. B., Huberman, A. M., & Saldana, 2014).

Table 1: Questionere Digital Literacy

No.	Indicators	Questionnaire number	Questionnaire questions (divided into 3 levels: primer; secondary; advance)
1.	Use (Technical skills) The capacities related to media access and use	1	Can use all three media meetings (Google meets, Zoom meetings, and Microsoft teams)
		2	Can use all information search applications (google, Yahoo, and Bing)
		3	Can use all applications to create power points (Microsoft PowerPoint, Canva, and Google slides)
2.	Critical understanding (cognitive competencies) The aspects related to the comprehension and evaluation of content and media	4	Can find and understand the information in digital media and classify types of information in specific fields.
		5	Analyze and interpret information in digital media, its functions, and its purposes.
		6	Can evaluate the information in digital media and the validity of the source of information, and know the rules of authorship on the internet.
3.	Communicative abilities (Social, participation, creative abilities) The aspects related to content creation, social relations, and citizens' participation	7	Can communicate with people and send documents using all of the following applications (iCloud, Email, Yahoo)
		8	Can use all the following applications for discussion (Facebook, Instagram, and Whatsapp)
		9	Can create and edit learning video content using all of the following apps (Kinemaster, FilmoraGo, and Inshoot)

Table 2: Interview of Questions

No.	Indicators	Item number	Interview Questions
1	Use (Technical skills) The capacities related to media access and use	1	What apps are used during online face-to-face learning?
		2	Can you use the application properly and correctly?
		3	Are there any obstacles in accessing the application or learning media used during learning?
2	Critical understanding (cognitive competencies) The aspects related to the comprehension and evaluation of content and media	4	Do you or your teacher understand the information on the internet? For example, who is the use and shown for?
		5	How do you distinguish accurate information from false information (hoaxes)?
		6	What kind of valid and reliable information is it? And where the father or mother of the teacher finds excellent and reliable information?
3	Communicative abilities (Social, participation, creative abilities) The aspects related to content creation, social relations, and citizens' participation	7	Do you use social media? What is the purpose of the father or mother using social media?
		8	Can you make learning videos a teaching medium in schools?
		9	What applications are used to create PPT content and learning videos, and what are the difficulties in creating them?

Data collected through questionnaires, interviews, and observations were reduced and selected that were valid and by the instrument, then presented into one, and conclusions were drawn.

FINDINGS

Implementation of quality management of education

Based on the interview and observation in some schools in Simo district, Boyolali regency, the researcher surveyed to

confirm the implementation of the quality management of education in school, starting from planning, implementing, monitoring, and evaluating the programs. This demonstrates the process used to identify the current state and culture of the school, as well as its strengths, flaws, opportunities, and threats.

Based on the principals' observations and interviews, total quality management, a theory developed by W. Edwards Deming, is being used in education quality management to improve teachers' digital literacy. We were able to describe

the results using the PDCA (Plan, Do, Check, and Action) steps as follows:

Plan

In the planning stages, the principals make workshop planning or training for the teacher to improve digital literacy. The digital literacy training was conducted based on the observation result where the teachers used monotonous teaching media during online learning. The majority used the WhatsApp application and hardly ever used Zoom Meeting or Google Meet. Based on the fact above, training needs to be held so the teachers will be able to operate technology-based teaching media.

Based on the results of interviews with school principals said:

"The teacher literacy program, digital literacy training for teachers that we implement in schools, includes training on the use of laptops and androids in learning, making emails, training on zoom meetings or google meet, making power points through Canva software, making evaluation questions using the Kahoot and Quizizz apps."

Do

According to the findings of interviews with teachers and principals, teacher digital literacy was implemented in June 2022. In this teacher digital literacy training, the principal organized all school resources and recruited a committee consisting of teachers to organize the training. In this stage, the teachers, the principals, and the school committee conducted digital literacy training for the teachers. The training contents are how to use media for online learning, how to create learning material using an online application, and the ability to distinguish valid and reliable information and hoax. An interview was done during the training to obtain the problems and obstacles found by the teachers in operating digital technology etc. The teaching media presented during the terming are Canva and interactive PowerPoint as the teaching media, Google Meet and Zoom Meeting for video conference during online learning, and using Kahoot and Quizizz for learning evaluation during online learning. Based on the results of interviews with teachers and principals said that the implementation of teacher digital literacy was carried

out in June 2022. In this teacher digital literacy training, the principal organized all school resources and recruited a committee consisting of teachers to organize the training.

Check

Check is a stage function to monitor the current situation compared to the expected situation in improving teachers' digital literacy. If there is a big gap between these situations, then program evaluation will be required by constructing and doing the procedures. Evaluation by using a questionnaire has also been done in this stage to measure the digital literacy training conducted. After the evaluation of the implementation and digital literacy measurement had been done, there is an improvement in teachers' digital literacy as can be seen in table 4 showing the percentage before teachers' digital literacy program and after quality management of education was implemented. However, the evaluation also shows that several things need to improve in the implementation of digital literacy training such as the frequency of to use of various technologies in learning. At this stage, internal and external monitoring and evaluation are also carried out. This implementation aims to add insight as well as a consultant regarding the running of the program.

Action

Action is a follow-up activity if there is a weakness. Based on the program evaluation, the frequency of using various technologies in learning needs to be increased. Therefore, the follow-up activity is alternatively using the WhatsApp application and video conferences (Zoom Meeting and Google Meet) and using applications for learning evaluation such as Kahoot and Quizizz besides Google From. These aim to develop students' digital literacy skills too. In addition to the follow-up program, to improve the digital literacy skills of teachers, the next training program is training on making innovative learning videos using the Kinemaster and Powtoon applications as learning media for students.

Teacher's Digital Literacy Level in online learning

Based on the research, there are some levels of teachers' digital literacy they are:

Table 3: Questionnaire Result of Teachers' digital literacy Basic Level

No.	Indikator	Results Before Implementing	Results After Implementing
		Quality Management	Quality Management
	Use (Technical skills)	62.89%	85.78%
	Critical understanding (cognitive competencies)	65.33%	84%
	Communicative abilities (Social, participation, creative abilities)	60%	84.44%
	Average	62.74%	84.74%

Table 4: Questionnaire Result of Teachers' digital literacy Secondary Level

<i>No.</i>	<i>Indikator</i>	<i>Results Before Implementing Quality Management</i>	<i>Results After Implementing Quality Management</i>
	Use (Technical skills)	47.11%	51.78%
	Critical understanding (cognitive competencies)	43.33%	50.89%
	Communicative abilities (Social, participation, creative abilities)	46.22%	51.33%
	Average	45.56%	51.33%

Table 5: Questionnaire Result of Teachers' digital literacy Advanced Level

<i>No.</i>	<i>Indikator</i>	<i>Results Before Implementing Quality Management</i>	<i>Results After Implementing Quality Management</i>
	Use (Technical skills)	37.78%	45.56%
	Critical understanding (cognitive competencies)	35.78%	43.11%
	Communicative abilities (Social, participation, creative abilities)	36.67%	42.67%
	Average	36.74%	43.78%

DISCUSSION

Based on the research, Boyolali's elementary schools' quality management of education has been successful in raising teachers' levels of digital literacy. The teachers' digital literacy levels are categorized as follows: (1) Basic Level, the users know the basic features of media and how to use it correctly. The users have limited abilities to analyze the information critically and have limited communication skills. (2) Secondary level, the users have moderate media use, understand well the media function, and can operate media more advanced. The users know how to gain and evaluate valid or invalid information. The users actively make content and involve in social activities. (3) Advanced Level, the users are familiar with the media and aware of the ethical implication and their consequences for the users. The users know well and can analyze the media and detailed language and change the influencing condition in message composition and communication. Moreover, the users have already known valid and reliable information in digital media. In the public space, the user can lead group collaboration to solve the problem.

Using the information in table 3 above, we can see that the average basic level rises from 62.74% to 84.74%. It can be seen that teachers' digital literacy on a basic level is very good s using digital tools for online learning in the pandemic era. Based on the observation and interviews after the implementation of quality management of education, online learning during the pandemic Covid-19 id conducted via WhatsApp. The teachers explain the learning material using Google Meet or Zoom meetings. It is suitable because online learning becomes an alternative to learning using media or online applications in the pandemic era (Ng, Y.-M., & Or, 2020). Internet and technology knowledge can be a solution to change transmitted

knowledge and learning implementation (Zhang, D., Zhao, J. L., Zhou, L., & Nunamaker, 2004). The infrastructure needed for online learning must be suitable and supportive. The use of smartphones, laptops, and internet connections become facilities for learning management.

According to table 4, the average literacy skills at the level secondary level is 51.33%. It increased from 45.56%. Based on the interview and observation results, the teachers state that besides WhatsApp. The teachers also used Google Meet and Zoom meetings. However, the teachers have not optimally used the 'breakout Zoom' menu for student group discussion. The teachers need peer assistance to help them. Moreover, in creating and editing learning videos, the teachers already used Inshoot or Kinemaster. The digital literacy skills at this level are getting better on the use of technology creatively where the learning process was conducted through WhatsApp, Google Meet, or Zoom Meeting even though they need peer assistance sometimes. They also know credible sources of information. Dinata (2021) in the research titled "Digital Literacy in Online Learning" explains that digital literacy skills have a significant role to support online learning success. Digital literacy skills will expand the teachers' communication skills, thinking, and achieving learning goals.

Table 5 shows the improvement of the average digital literacy on the advanced level from 34.74% becoming 43.78%. The advanced level shows analysis skills in using digital media for learning and combining it with other related media. It indicates that they are already skillful to handle media and aware of the ethical implication and their consequences. In addition, they have already understood to evaluate the information from digital media and its resources. Based on the interview and observation, the teachers on the advanced

level has already mastered online learning application, able to analyze and evaluate, and can distinguish between credible information and hoax. The teachers can collaborate, and conduct virtual interaction to create a project such as teaching media, interactive PowerPoint, etc. the ability in the technology field is noted from developing, designing, managing, and integrating some supportive media (Zaenudin, H. N., Affandi, A. F. M., Priandono, T. E., & Haryanegara, 2020). This is in line with the survey done by Karsoni Berta Dinata (2021) which mentions that several things can be done by the principals to develop teachers' digital literacy including digital literacy in school and creating a team to improve digital literacy. They can be done by the principals by implementing the quality management of education through digital literacy training.

Digital literacy can help teachers to improve teaching professionalism. The teachers can use digital literacy to access many learning resources, and supportive teaching media using digital technology provided (Sánchez-Cruzado, C., Santiago Campión, R., & Sánchez-Compañía, 2021). In addition, the implementation of digital literacy could improve learning quality. It suggests that digital literacy skills are crucial and needed by the teacher or each individual (Park, H., Kim, H. S., & Park, 2020). Teachers are expected to apply digital technology effectively and have digital literacy skills so they can go along with digital transformation (Anggraeni, H., Fauziyah, Y., & Fahyuni, 2019). Nowadays, students are familiar with the globalization era and the sophisticated technology with many applications that can be used for fun and interactive learning media (Sukarno & Widdah, 2020). Therefore, teachers have to develop themselves to use technological devices so they can modify learning.

The improvement of digital literacy happens because of the quality management of education that has been done by the principals and covers four steps i.e.: plan, do check, and action. In the planning stage, the principals design the digital literacy training based on the observation of the teacher's teaching-learning process. The planning stage was conducted by deciding the goals of the program which are improving teachers' digital literacy, budgeting, time, and targets. The Do stage was done by conducting the digital literacy training to create teaching media using the Canva application, and PowerPoint, and making learning videos using Kinemaster and Powtoon applications. Then, the evaluation is conducted using Google Forms, Kahoot, and Quizizz. The check stage was done by controlling and monitoring the digital literacy training and checking the training's target progress. The action stage is a follow-up activity habituation to use technology in teaching-learning so the teacher can maintain and improve their digital literacy. The goal of the quality management of education is for the teachers can operate online learning applications such as WhatsApp, Google Meet, and Zoom Meeting. In addition, teachers also can analyze and evaluate reliable and valid learning resources from digital media. The

teachers have already used online applications such as Kahoot and Quizizz to evaluate the learning. Therefore, teachers are expected to create teaching videos using Kinemaster and Inshoot applications. A teacher needs an intermediary or selected learning media in delivering learning material or information. The selection requires digital literacy skills both technically, socially, and other aspects that are adequate so that the information conveyed by the teacher can be conveyed properly to students (Triawang & Kurniawan, 2021).

The advantage of the quality management of education is the program procedures are suitable for the needs analysis so the program suits the teacher well. In addition, there are monitoring, evaluation, and follow-up activity program for digital literacy.

The result of this research is in line with the previous research (Primayana, 2015). It reveals that the quality management of education is decided by the principals to manage human resources. The leader becomes the key to improving education quality. Moreover, this research agrees with the research done by (Feri & Jusuf, 2016). It presents that the quality of medical education will improve if the institution has good quality management of education. The simplest approach and most used in the management of education is PDCA (Plan-Do-Check-Action) cycle. Another research also discovers that the PDCA approach can improve theoretical level quality and nurse practice (Su, Cui, Pu, & Zhou, 2022). It explains that PDCA quality management can maintain and develop the existing program based on observation. Moreover, the checking process uses integrated assessment, evaluation, and intervention so it can measure the skill effectively.

CONCLUSION

Based on the result and discussion, the quality management of education is beneficial to improve teachers' digital literacy. The result of the implementation can be seen in the teachers' digital literacy improvement after quality management of education is implemented through teachers' digital literacy training that is designed continually. The involvement in the teachers' digital literacy training covers designing a training program (Plan), implementing teachers' digital literacy training in school (Do), implementing controlling, monitoring, and evaluation function of the teachers' digital literacy training (Check), and follow up program of teachers' digital literacy (Action). The quality management of education increase the teachers' digital literacy on the basic level from 62.74% becomes 84.74%. The secondary level increased from 45.56% to 51.33%. Then, the advanced level increases from 36.74% to 43.78%.

SUGGESTION

It is recommended to formulate program and policy strategies that strengthen the implementation of components in schools

and strengthen the consistency of School education quality management policy implementation in improving teacher digital literacy.

LIMITATION

This research is limited to the topic of quality management of education in improving the digital literacy skills of teachers in the scope of the city of Boyolali, Indonesia.

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