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Teaching Campus Program: A Pedagogical Model to Support New Literacy Skills in Elementary Schools

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ABSTRACT

This study explores the pedagogical model implemented in Indonesia's Teaching Campus Program (Program Kampus Mengajar) and its role in supporting the development of new literacy skills, particularly digital literacy and data literacy, in elementary schools. Despite the program's potential to enhance 21st-century skills, several challenges were identified, including limited technological infrastructure, insufficient digital skills among teachers, and short program duration. These challenges hindered the effective integration of new literacy skills into the curriculum, especially in rural schools with limited access to digital tools and internet connectivity. The research employed a qualitative descriptive approach, with data collected through in-depth interviews, classroom observations, and documentation review. The results highlight the importance of collaboration between teachers and university students participating in the program, the effectiveness of project-based learning (PBL) in fostering new literacy skills, and the creative use of simple technology to overcome infrastructure limitations. However, the findings also emphasize the need for ongoing teacher training, curriculum reform, and continuous evaluation to ensure the sustainability of literacy development beyond the program's short duration. This study contributes to the understanding of how new literacy skills can be integrated into elementary education, proposing solutions such as intensive and sustained training for teachers, creative technological solutions, and collaboration between educators to bridge the gap between student needs and instructional methods. Future research should focus on long-term impacts and broader curriculum integration of digital literacy to address the evolving demands of 21st-century education in Indonesia.

Introduction

The Teaching Campus Program is an initiative of the Indonesian government that aims to improve the quality of education in elementary schools, especially in areas with limited access to quality educational resources (Ahyar & Zumrotun, 2023; Ismail, 2023; Mustari, 2022). This program involves students of the Teaching Campus Program who are tasked with helping to strengthen literacy, numeracy, and the development of

21st century skills, including new literacy skills such as digital literacy, data literacy, and technology literacy (Nurhasanah et al., 2021; Wati et al., 2023; Widiansyah & Fitriansyah, 2022).

However, the implementation of this program still faces several challenges. Based on the results of the initial evaluation, there is a gap between the teaching methods applied by the students of the Kampus Mengajar Program and the needs and conditions of students in elementary schools. Many teachers and educators have not integrated new literacy skills effectively into the learning process, especially in schools that have limited access to technology and information. This can have an impact on the low mastery of 21st century skills which are the main focus of this program. Several studies and reports from the implementation of the Kampus Mengajar Program have shown a number of challenges faced, especially related to the integration of new literacy skills in learning. One concrete example found in the evaluation report from several DPLs and Campus Mengajar Program Coordinators Batch 5 and 6 in Enrekang Regency shows that most schools participating in this program have limited infrastructure, especially access to information and communication technology (ICT). For example, based on the DPL report on Partner schools in rural areas participating in the Kampus Mengajar Program in Enrekang Regency (Ismail, 2023), more than 60% of schools do not have adequate access to computers and the internet, which are important elements in teaching digital and technological literacy.

In addition, reports published by Unicef and research results by Miftah & Fahrurrozi (2022) also show that teachers' digital skills are still limited, with more than 70% of teachers in elementary schools targeted by the program feeling that they are not yet skilled enough in using technological devices to support the learning process (UNICEF, 2021). This condition makes it difficult for students from the Kampus Mengajar Program to apply teaching methods that combine new literacies, especially digital and data literacy.

Field studies in several schools also show that although students participating in the Campus Teaching Program have been given basic training or provision related to 21st century skills, many of them still find it difficult to adapt their teaching to conditions in the field. In a case study in an elementary school, namely SD Negeri 26 Massemba and SD Negeri 93 Parandean, SD Negeri 170 Dakda, Enrekang Regency, South Sulawesi, it was found that students participating in the KM 5 program had difficulty using technological devices such as computers in schools due to limited internet access and inadequate devices. Students also face obstacles because they are not used to using technology in their learning process. Integration of new literacy skills, especially those related to data and digital literacy, requires appropriate curriculum support and increased training for teachers (Wahyuningsih, 2020). Currently, many learning materials provided by the government still do not fully accommodate the demands of 21st century skills (Nurhasanah et al., 2021; Wati et al., 2023). This requires teachers and students participating in the Kampus Mengajar Program to take the initiative to create more relevant and innovative teaching approaches to address these gaps. They need to find ways to incorporate more contextual and interactive learning methods so that new literacy skills such as digital literacy and data literacy can be effectively integrated into the daily learning process.

This study focuses on how the pedagogical model implemented in the Kampus Mengajar Program can contribute to supporting the development of new literacy skills, such as digital literacy and data literacy, in elementary schools. Although this program has the potential to have a positive impact, several obstacles hinder the integration of these new literacy skills. Some of the main challenges include the lack of adequate technological infrastructure in elementary schools and the limited ability of teachers to utilize technology optimally. Therefore, this study

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will also examine solutions that can be implemented to address the gap between students' needs and the teaching approaches implemented by Kampus Mengajar Program students.

This study can add new insights in the field of education by developing a pedagogical model that supports new literacies, including digital, data, and technology literacy, in elementary schools through the Kampus Mengajar Program. Unlike previous studies that focused more on traditional literacy (reading, writing, and arithmetic), this study will contribute to the understanding of how new literacy skills can be effectively integrated in the context of primary education in Indonesia. Another novelty lies in the collaborative approach between students of the Kampus Mengajar Program and primary school teachers, which is expected to strengthen the new literacy-based learning model in the primary school environment.

Research Method

The main focus of this study is to analyze how the pedagogical model in the Kampus Mengajar Program can support the development of new literacy skills in elementary schools, identify the obstacles faced, and formulate relevant solutions to address the gap between student needs and teaching approaches. This study will use a qualitative descriptive approach to describe and analyze the phenomena that occur in the field. Case studies will be implemented in several elementary schools partnered with the Kampus Mengajar Program, especially in rural areas that have limited infrastructure and access to technology.

The subjects of this study include students participating in the Kampus Mengajar Program, elementary school teachers, and students involved in learning. Subjects will be selected using a purposive sampling technique, where schools with challenges in integrating new literacy will be the focus of the study, including SD Negeri 26 Massemba and SD Negeri 93 Parandean, SD Negeri 170 Dakda, Enrekang Regency.

Data collection was carried out through In-depth Interviews with students of the KM 5 program, and teachers to obtain information about the obstacles faced and their views on the application of new literacy skills in learning. Classroom Observations are conducted in classrooms to see how the learning process takes place, especially regarding the integration of digital and data literacy skills. These observations will focus on interactions between students, the use of technology, and the teaching strategies implemented. Documentation such as the Campus Teaching Program report and the results of the program implementation evaluation will also be carried out as supporting data. The collected data will be analyzed using thematic analysis. The analysis process involves Data Reduction, namely Data obtained from interviews, observations, and documentation will be summarized and categorized based on themes that are in accordance with the formulation of the problem. Presentation of Data that has been categorized is presented in the form of descriptive narratives to describe the challenges and successes of the pedagogical model applied. Conclusions are drawn regarding the effectiveness of the pedagogical model in supporting the development of new literacy skills and solutions that can be applied to overcome the obstacles faced.

Findings

1. Overview of the Pedagogical Model in the Campus Teaching Program

The pedagogical model in the Campus Teaching Program that supports the development of new literacy skills in elementary schools can be described through several interconnected core components. The following is a visual description of the model:

a. Collaboration between Students and Teachers

One of the main strengths of the Campus Teaching Program pedagogical model is the collaboration between Campus Teaching Program students and school

teachers. In many cases, students function as facilitators who help teachers utilize technology to support learning. For example, students help teachers understand and implement the use of digital devices such as laptops, projectors, and the internet in classroom activities, which have not previously been utilized optimally by teachers. This collaboration allows the transfer of knowledge related to digital literacy from students to teachers, while opening up opportunities to integrate new literacies into daily activities in the classroom.

1) Role of KM Students: Students act as facilitators who help teachers integrate new literacies into learning. They bring more sophisticated perspectives and skills related to technology and digital literacy.
2) Role of Teachers: Teachers collaborate with students in adopting new technologies and approaches. They retain control over the curriculum, but are supported in utilizing technology that they are not used to.
3) Collaborative Outcomes: Creating synergies where teachers receive practical support, and students can learn through direct practice in the school environment.

b. Project-Based Learning (PBL) Approach

In several schools studied, students in the Kampus Mengajar Program implemented a project-based learning (PBL) model that was very effective in developing new literacies. PBL encourages students to work collaboratively in completing technology-based tasks, such as searching for information on the internet, analyzing simple data, and creating digital presentations. For example, one of the projects given to students was to create a weather report based on data accessed online. This type of project integrates digital skills with data literacy, so that students can practice using technology and data simultaneously in the context of learning.

1) New Literacy Skills: Students develop projects that involve students directly in

the use of technology, such as digital information searches, simple data analysis, or digital presentations.
2) Contextual Learning: Students work on projects that are relevant to everyday life, such as collecting weather data, creating simple graphs, or mini-internet-based research projects.
3) Use of Technology: Despite limited infrastructure, existing technology is utilized to its full potential, including the use of personal devices such as mobile phones or laptops.

c. Teacher Empowerment Through Training and Briefing

Students participating in the Kampus Mengajar Program are provided with briefings on 21st-century literacy, including digital and data literacy, before entering partner schools. This briefing is an important factor in supporting the teaching of new literacy, because students have a basic understanding of the skills that must be taught. However, interview results showed that students felt that the training provided still needed to be expanded, especially regarding concrete methods for integrating new literacy into various subjects. With more in-depth briefings, students can be more effective in teaching new literacy skills to students.

1) Teacher Training: This program involves training for teachers in 21st-century skills, including digital and data literacy. Teachers are trained to continue using technology after the program is completed.
2) Student Briefing: Student participants in the program receive intensive training before entering the field, including an understanding of digital and data literacy, active learning methods, and the use of technological tools.

d. Integration of New Technology and Literacy in the Curriculum

Although technological infrastructure is still limited, especially in schools in rural areas, students in the Kampus Mengajar Program utilize existing technology to

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support the teaching of digital and data literacy. In some cases, students use personal devices such as laptops and mobile phones to provide students with access to technology-based learning activities. Students are taught how to use simple tools to search for information, understand data, and access learning materials online. The use of this technology, although limited, is able to provide students with practical experiences that support the development of digital and data literacy.

1) Use of Digital Media: Learning utilizes digital media such as videos, educational applications, or online resources to increase student engagement.

2) Contextualization of Digital Literacy: Digital and data literacy are integrated into other subjects, such as Mathematics, Science, or Indonesian, for example by teaching students how to create graphs from the results of scientific experiments or analyze simple data.

3) Access and Adaptation of Technology: Limited access to technology is overcome with creative approaches, such as sharing devices or using blended learning methods (a combination of online and offline).

e. Problem Solving and Innovation in the Field

One of the interesting findings from this study is the ability of students in the Kampus Mengajar Program to face challenges in the field with creative solutions. The limited technological infrastructure in some schools, especially in rural areas, encouraged students to innovate in integrating new literacies. For example, although many schools did not have computers or adequate internet access, students managed to utilize personal devices, such as smartphones, to provide technology-based teaching to students.

Some students also created teaching materials that used minimal technology, such as using offline applications to teach data literacy. In addition, they developed interactive teaching methods that did not rely entirely on digital technology, such as

group discussions or the use of manual visual media, to teach new literacy concepts. This approach shows flexibility in overcoming existing limitations and ensuring that students still get exposure to 21st century skills even though the technological infrastructure is inadequate.

1) Infrastructure Challenges: In schools with limited access, students developed innovative ways to use technology creatively and effectively. For example, they utilized simple technology that was already available, or used alternative resources such as the use of student technology devices in rotation.

2) Creativity in Teaching: Students develop various technology-based interactive activities that interest students, such as creating simple multimedia content or engaging students in digital educational games.

f. Monitoring and Evaluation of New Literacy Development

Monitoring and evaluation of the development of new literacy skills in partner schools of the Kampus Mengajar Program were carried out through classroom observations, interviews with teachers, and collection of documentation of student learning outcomes. The results showed an increase in students' understanding of digital and data literacy skills, although still at a basic stage.

Students and teachers both evaluated students' development in mastering new literacy, using instruments such as simple tests, observations, and project-based assessment rubrics. For example, students who were previously unfamiliar with using the internet to search for information gradually showed improvements in their ability to navigate digital resources. Several students also showed progress in understanding the basic concepts of simple data processing, such as identifying trends from graphs or tables of data taken from the internet.

However, the evaluation results also showed that the development of new literacy skills still requires more consistent

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time and support. There is still variation in the level of mastery of new literacy between students, which is caused by differences in access to technology at home and the limited time that Kampus Mengajar Program students have in running the program. Therefore, this evaluation provides important input that new literacies need to be taught continuously, not only during the program implementation period but also afterwards, with full support from the school and government.

1) Classroom Observation and Interviews: To determine the impact of the program on students, the evaluation was conducted through direct observation and interviews with teachers, students, and students. These results are used to improve the approach applied during the program.

2) Measurement of New Literacy Skills: After the program, students were evaluated in terms of mastery of new literacy skills, such as the ability to access and utilize digital information, use of technological devices, and understanding of simple data.

This figure shows the integrative cycle between students, teachers, and students in adopting new technology-based literacies in elementary schools, with a focus on collaboration, innovation, and practical solutions in facing technological challenges. The following is the pedagogical model of the Kampus Mengajar 5 Program that has been implemented in Enrekang Regency, South Sulawesi.
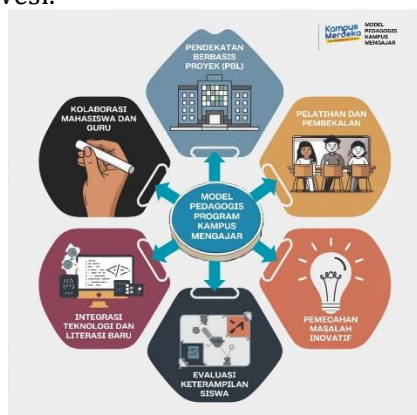

Figure 1. Overview of the Pedagogical Model of the Campus Teaching Program

2. Obstacles in Integrating New Literacy Skills in Elementary Schools through the Kampus Mengajar Program

Based on the results of research conducted in several elementary schools partnering with the Kampus Mengajar Program, various obstacles were found that hinder the integration of new literacy skills, such as digital literacy and data literacy, in the learning process. The following are the main findings related to the challenges faced:

a. Limited Technology Infrastructure

One of the biggest obstacles faced in teaching digital and data literacy in elementary schools is the lack of access to technology infrastructure. In many schools, especially in rural areas, the availability of devices such as computers, tablets, or projectors is very limited. For example, in several partner schools in Enrekang Regency, only around 30-40% of students have regular access to digital devices during lessons. In addition, stable internet access is also a problem, with many schools not having adequate internet networks at all. This makes the implementation of digital literacy, which is highly dependent on internet access, difficult to carry out effectively.

From the results of interviews with several Kampus Mengajar Program students, it was found that one of the biggest challenges faced was the lack of technology facilities in schools. A student of the Campus Mengajar Program at SD Negeri 170 Dakda said, "We have difficulty teaching digital literacy because there is only one computer in the school, and the internet is very slow. Students cannot use technological devices in turns in an effective time." A teacher at another school, SD Negeri 26 Massemba, also complained similarly, "We don't have a projector or a tool to display material from the internet. Students also rarely access the internet at home, so digital literacy is something foreign to them."

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b. Lack of Teacher Technology Skills

Although students of the Campus Mengajar Program have knowledge of digital and data literacy, many teachers in elementary schools still have limitations in using technology. Based on interviews conducted, more than 60% of teachers feel less confident or skilled in utilizing technology for learning. These teachers often have never been specifically trained to integrate digital and data literacy into everyday subjects. As a result, there is a gap between the abilities of students who have a better understanding of technology and teachers who still need assistance in utilizing technology.

Based on interviews with several teachers, it was revealed that most of them feel less skilled in utilizing technology. One teacher from SD Negeri 93 Parandean said, "I still have difficulty using computers to teach. Kampus Mengajar students help, but I feel like they can't be here forever, and I don't have enough time to learn more." Another interview with a teacher at SD Negeri 170 Dakda highlighted, "We have never been given any special training on how to use technology in learning, let alone to teach digital and data literacy. This is new to us, so we feel like we need time to adjust."

c. Time Limitations for Program Implementation

The relatively short implementation time of the Kampus Mengajar Program (usually only a few months) is an obstacle in itself in integrating new literacy skills. The process of adapting and implementing digital and data literacy in the curriculum requires quite a long time, especially to change traditional teaching habits to be more technology-based. In some cases, Kampus Mengajar Program students have difficulty in achieving new literacy teaching targets due to limited interaction time with students and teachers. This hinders ongoing integration efforts, especially in schools that are just starting to introduce 21st century skills.

KM Program students also highlighted time constraints as a major obstacle in implementing new literacy skills. A student participating in the Kampus Mengajar Program at SD Negeri 26 Massemba stated, "We only have a few months to run this program, while changes in education, especially those involving technology, require a longer time to be implemented properly. We don't have enough time to teach in depth about digital and data literacy." A teacher at SD Negeri 93 Parandean added, "This program is good, but if the time was longer, it might be more effective."

d. Gap in Technology Access among Students

In addition to the limited technology at school, there is also a gap in access to technology at home. Many students who come from families with lower economic conditions do not have access to devices such as computers or smartphones at home. This creates a gap in students' ability to understand and use technology compared to students who have better access at home. Students from the Kampus Mengajar Program found that students with limited access to technology often lag behind in understanding digital literacy, because their opportunities to practice using technology only occur during school hours.

Students from the Kampus Mengajar Program also revealed that there is a significant gap in access to technology at home. One student at SD Negeri 170 Dakda explained, "Most of the students here come from families who do not have computers or even smartphones. They can only learn about technology when they are at school, and even then it is very limited." A teacher at SD Negeri 26 Massemba added, "We often find students who lag behind in understanding technology because they do not have devices at home that they can use to learn, unlike students who live in urban areas."

e. Lack of Relevant Curriculum

The current elementary school curriculum still does not fully support the teaching of new literacy skills. The materials provided by the government still mostly

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focus on traditional literacies (reading, writing, and arithmetic), with little or no emphasis on digital and data literacy. Despite efforts by students of the Kampus Mengajar Program to incorporate new literacies into their learning, they often have to develop relevant materials and strategies themselves due to the lack of clear guidance from the curriculum. This adds to the workload for students and teachers, and hinders the process of more systematic integration of new literacies.

In interviews with teachers at SD Negeri 93 Parandean, they stated that the current curriculum is still very traditional and does not focus on 21st-century skills. "We teach more basic things like reading, writing, and arithmetic. Digital and data literacy are almost non-existent in our curriculum," said one teacher. A Kampus Mengajar Program student at SD Negeri 170 Dakda added, "We have to create our own relevant materials because the curriculum provided does not help much in terms of teaching digital and data skills."

f. Resistance to Change

Some teachers and students showed resistance to the introduction of new technologies in the learning process. Many teachers are comfortable with conventional teaching methods and are less motivated to learn using technology that is considered complicated. On the other hand, some students are also not yet accustomed to technology-based learning methods, so they tend to have difficulty when they have to switch to new approaches such as digital and data literacy. This shows that there is a need for a change in mindset among educators and students so that the integration of new literacies can run more smoothly.

One of the obstacles that emerged from the results of interviews with several teachers was resistance to the use of technology in teaching. A teacher at SD Negeri 170 Dakda admitted, "I have been teaching for years using traditional methods. It feels difficult to change the way of teaching that is comfortable, especially with technology that I myself do not really understand." A student of the Campus Teaching Program at SD Negeri 26 Massemba also added, "Some teachers are hesitant to use technology because they are afraid of making mistakes or being ineffective in using it. This makes the process of integrating technology slower."

3. Solutions to Address the Gap between Student Needs and Teaching Approaches in the Kampus Mengajar Program

a. Intensive and Continuous Training for Teachers and Students

The results of the study indicate that one important solution to address the gap between student needs and teaching approaches is to improve training for teachers and students of the Kampus Mengajar Program. Currently, the training provided to students of the Kampus Mengajar Program only covers the basics of 21st-century skills, while teaching new literacy skills such as digital and data literacy requires a deeper understanding. In an interview, one of the Kampus Mengajar Program students at SD Negeri 26 Massemba said, "The training given to us is very useful, but we need more concrete examples of how to integrate technology into teaching, especially in classes with limited infrastructure."

This solution also includes improving training for teachers. A teacher from SD Negeri 93 Parandean said, "I hope there is further training for us. If we can get intensive and continuous training related to the use of technology, it will be easier for us to assist students in teaching digital literacy to students." This ongoing training can be done through online training, workshops, and teacher professional development programs.

b. Use of Simple and Creative Technology

To overcome the limitations of technology in partner schools of the Kampus Mengajar Program, the solution found is to use simple but creative technology. In an interview with students at SD Negeri 170

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Dakda, one of the Kampus Mengajar Program students said, "We use personal devices such as cellphones and laptops to teach basic skills in searching for information online, even when the infrastructure at school is limited." Students also use lightweight cellphone-based applications, such as WhatsApp or Google Docs, to provide assignments and materials to students. Another innovation that has been made is using offline teaching materials that have been prepared in advance. A teacher at SD Negeri 26 Massemba said, "Although we don't always have internet access, students often bring technology-based materials that have been downloaded in advance, such as learning videos or simple simulations." By utilizing personal devices and maximizing what is available, infrastructure constraints can be minimized without sacrificing the quality of learning.

c. Collaboration between Teachers and Students in Developing Learning Materials

To ensure that the teaching approach is in line with students' needs, the solution implemented is collaboration between students of the Kampus Mengajar Program and teachers in developing relevant learning materials. A teacher at SD Negeri 93 Parandean explained, "We often discuss with students about how best to teach digital skills to students. Students help us adjust the materials to be more interactive and relevant to students." This collaboration allows for an exchange of knowledge between teachers who are more familiar with the local context and students who have better technology skills.

A student at SD Negeri 170 Dakda said that collaborating with teachers helps them understand the specific needs of students. "After discussing with teachers, we adjust the teaching to be more in line with students' abilities and needs, for example by using simpler technology-based projects." This collaboration allows for a more effective and targeted teaching approach, adjusting to students' technological readiness and skill levels.

d. Integration of Local Context-Based Projects

Another solution that has proven effective is integrating new literacy skills into projects based on local contexts. At SD Negeri 26 Massemba, students and teachers developed an environment-based project, where students were asked to manually collect local weather data and then analyze it with the help of simple technology. One teacher said, "This local-based project helps students understand the concept of data literacy in a way that is closer to their daily lives." A student from the Kampus Mengajar Program also added, "We realize that not all students are ready to use sophisticated technology. Therefore, we start by teaching basic skills such as data recording, and gradually integrate technology such as mobile phones and laptops." With a contextual project-based approach, students can learn new literacies in a way that is relevant and applicable to their daily lives.

e. Continuous Monitoring and Evaluation

Another important solution is to strengthen continuous monitoring and evaluation to ensure that the teaching approach applied is in accordance with the needs of students. A student at SD Negeri 170 Dakda explained, "We continue to monitor student development through regular evaluations. If we find that students have difficulty understanding the material, we immediately adjust the teaching approach."

A teacher at SD Negeri 93 Parandean also added, "We regularly evaluate projects carried out by students together with students. This evaluation helps us see whether the teaching approach used is effective or needs to be improved." With continuous monitoring, the gap between student needs and teaching approaches can be minimized, so that the development of new literacy runs more effectively.

Discussion

1. Overview of the Pedagogical Model in the Kampus Mengajar Program

Based on the findings, the pedagogical model in the Kampus Mengajar Program in Enrekang Regency illustrates an effort to integrate new literacies into elementary school teaching. Several key elements discussed, such as collaboration between students and teachers, a project-based approach, and the use of technology, indicate that digital and data literacy play an important role in improving the quality of learning in these elementary schools. This discussion will further detail the findings and include supporting references to strengthen the argument.

a. Collaboration between Students and Teachers in Teaching New Literacy

Collaboration between students and teachers is one of the important components of the pedagogical model in the Kampus Mengajar Program. In this framework, students act as facilitators who help teachers integrate technology and digital literacy into learning. This finding is relevant to previous research showing that collaboration between educators and technology professionals can facilitate the transfer of digital skills into the classroom, creating a positive synergy for student learning (Mishra & Koehler, 2006, 2008).

The role of students as a bridge between technology and learning allows teachers to be more confident in utilizing available technology. Teachers, who were previously unfamiliar with digital tools, receive direct guidance from students, who are more adept at using the latest technology. This not only strengthens the teaching and learning process, but also encourages innovation in adopting learning strategies that are more relevant to the needs of 21st century students (Beetham & Sharpe, 2013).

b. Project-Based Learning Approach

The use of a project-based learning approach (PBL) in the Kampus Mengajar Program has been shown to be effective in improving students' new literacy skills. PBL encourages students to engage in real-world tasks and use technology to solve problems, such as searching for information on the internet and creating digital presentations. This approach is in line with research showing that PBL can help students develop critical and collaborative thinking skills, as well as technological literacy that supports them to succeed in everyday life (Bhat & Dar, 2023; Mergendoller & Thomas, 2000).

PBL also creates learning that is more contextual and relevant to students' lives. Projects such as the digital data-based weather report described in the findings, for example, teach students basic data analysis skills as well as information literacy. The use of relevant technology in PBL increases students' motivation to learn, especially in the increasingly relevant digital context in the era of globalization (Mergendoller & Thomas, 2000).

c. Training and Provision for Students and Teachers

Students involved in the Kampus Mengajar Programme received training in 21st century literacy, including digital and data literacy. However, findings showed that despite the provision provided, students still felt the need for further training in integrating these literacy skills into their subjects. This finding is in line with UNESCO's view that emphasizes the importance of improving digital skills for educators, especially in the context of 21st century education which is increasingly influenced by technology (UNESCO, 2018).

In addition, the importance of training for teachers was also highlighted. Teachers who received training in digital skills and data literacy were better prepared to continue using technology after the Kampus Mengajar programme ended. This strengthens the argument that such intervention programmes require a sustainable approach that does not only focus on a specific period, but also equips teachers with long-term skills (Darling-Hammond, 2017; Hammond LD, Hyle EM, 2017).

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d. Integration of New Technology and Literacy in the Curriculum

Although limited technological infrastructure is an obstacle, students participating in the Kampus Mengajar Program are able to utilize existing technology, such as their personal devices, to support digital literacy teaching. This shows that technological barriers can be overcome with innovative and creative approaches, which has been supported by previous research. For example, research by Warschauer (2003) shows that digital literacy can still be taught effectively even in contexts that are less supportive in terms of infrastructure.

Digital and data literacy are integrated into various subjects, from Science to Mathematics, through the teaching of skills such as data collection, analysis, and digital presentation. This reflects the importance of a cross-disciplinary approach in teaching 21st century skills that are in accordance with recommendations from various studies that show that these skills cannot be taught in isolation (Voogt et al., 2013).

e. Innovation and Problem Solving in the Field

One important point in the findings is the ability of students to innovate in the face of limited infrastructure. They use minimal technology, such as offline applications, as well as interactive learning methods that do not rely entirely on digital devices. These findings support the concept of flexible "technology integration," where technology is used according to availability and context, rather than as a primary goal (Ertmer & Ottenbreit-Leftwich, 2010).

This innovation is also supported by approaches that encourage creativity in teaching, such as group discussions or the use of manual media. This suggests that digital literacy does not have to be taught exclusively through advanced technology, but can be practiced through simpler yet effective strategies (Bers, 2020; Bers et al., 2019).

f. Monitoring and Evaluation of New Literacy Development

Monitoring and evaluation of new literacy through classroom observations and interviews showed significant progress, although challenges remain. Some students were able to improve their digital and data literacy skills, but there was variation between students in terms of technology access at home. This evaluation reflects the importance of a sustainable approach and consistent support to ensure that new literacy is taught not only during the duration of the program, but also after the program ends. These results support the view that digital literacy requires ongoing support from schools and government (Graham & Dutton, 2019).

2. Barriers to Integrating New Literacy Skills in Elementary Schools through the Kampus Mengajar Program

a. Limited Technology Infrastructure

The findings of this study indicate that limited technology infrastructure, especially in rural areas, is a significant barrier to the integration of new literacy skills such as digital and data literacy. According to Khan (2022); Ng (2012), effective digital literacy is highly dependent on the availability of technological devices and adequate internet access. In schools that do not have sufficient access to technology, students cannot practice digital skills consistently, so learning is not optimal. This problem is especially evident in areas with limited resources, where access to computers, projectors, and internet networks is very limited or non-existent. This obstacle has a negative impact on efforts to build 21st century skills, which require students to master technology from an early age.

b. Lack of Teacher Technology Skills

This study also revealed that although Kampus Mengajar Program students have adequate technology skills, many elementary school teachers are not sufficiently trained in utilizing technology for teaching. Fullan & Langworthy (2014)

showed that teacher skills in using technology are a key factor in the successful integration of digital literacy into the curriculum. Lack of training for teachers in digital technology makes it difficult for them to guide students in using digital devices, creating a gap between students in the Kampus Mengajar Program who are proficient in technology and teachers who are not yet familiar with the use of technology in learning. This indicates the need for ongoing professional development programs for teachers.

c. Limited Time for Program Implementation

The short time in implementing the Kampus Mengajar Program is an obstacle in implementing new literacy skills. Ertmer et al., (2012); Lawless & Pellegrino (2007) argue that the process of integrating technology into learning requires a fairly long time, especially in accustoming students and teachers to adapt to new teaching methods. In this case, students only have a few months to implement the program, so they cannot apply digital and data literacy in depth. This obstacle is also exacerbated by the limited adaptation time for teachers and students, which adds to the challenge of integrating 21st century skills.

d. Gap in Technology Access between Students

The gap in technology access between students from different economic backgrounds is a significant challenge in teaching digital literacy. Research by Warschauer (2003) revealed that the digital divide widens the gap between students who have access to technology at home and those who do not. This is clearly seen in several partner schools of the Kampus Mengajar Program, where many students do not have digital devices at home, so they only rely on school facilities which are also limited. This condition places students in an unfair situation, where they do not get the same opportunity to develop digital literacy.

e. Limitations of Relevant Curriculum

The current curriculum in elementary schools does not fully support the teaching of new literacy skills. Kalantzis & Cope (2012) emphasize the importance of adapting the curriculum to suit the needs of the 21st century, including digital and data literacy. The curriculum that still focuses on traditional literacy without including digital literacy makes Kampus Mengajar Program students have to develop their own materials and methods, without sufficient support from curriculum guides. This increases the workload of students in the Campus Teaching Program, and the integration of new literacies cannot run systematically.

f. Resistance to Change

The findings of this study indicate resistance from some teachers to the introduction of technology in the learning process. Peansupap & Walker (2005) in their theory of innovation diffusion explain that resistance to change is a common reaction to new technology, especially among individuals who feel they do not have sufficient skills or confidence. This resistance can be a serious obstacle in efforts to introduce digital literacy in elementary schools. Teachers who are accustomed to conventional methods find it difficult to switch to a technology-based approach. Meanwhile, students who are not yet familiar with technology also have difficulty when they have to use digital tools to learn, which makes the transition to new literacies slow.

The results of this discussion indicate that the main obstacles in the integration of new literacies are technological limitations, lack of teacher skills, resistance to change, and time and curriculum limitations. Recommended solutions include improving teacher training, providing technological infrastructure, and extending the program implementation period so that the desired changes can be implemented sustainably.

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3. Solutions to Address the Gap between Student Needs and Teaching Approaches in the Kampus Mengajar Program

Based on the findings above, solutions to address the gap between student needs and teaching approaches in the Kampus Mengajar Program can be seen from several perspectives: intensive and ongoing training, the use of simple and creative technology, collaboration between teachers and students, integration of locally-based projects, and ongoing monitoring and evaluation. These solutions not only focus on providing technological infrastructure, but also strive to strengthen human resource capacity and learning approaches that are appropriate to local conditions.

a. Intensive and Ongoing Training

Intensive and ongoing training is needed to equip teachers and students of the Kampus Mengajar Program with adequate skills in integrating digital and data literacy into the elementary school curriculum. The findings show that many teachers feel less skilled in utilizing technology, and students also need more in-depth training on the practical implementation of new literacies in technologically limited classrooms (Salter, 2014). With more intensive training, both teachers and students will be more confident in teaching 21st century skills to students.

b. Use of Simple and Creative Technology

Innovative solutions such as the use of simple and creative technology can also minimize infrastructure constraints. Students of the Kampus Mengajar Program use personal devices such as mobile phones and laptops, as well as previously downloaded offline materials, to provide technology-based learning experiences to students (Putro et al., 2023). By utilizing existing devices, and introducing lightweight applications such as WhatsApp or Google Docs, digital literacy-based learning can still be implemented despite infrastructure limitations.

c. Collaboration between Teachers and Students in Developing Learning Materials

Collaboration between teachers and students of the Kampus Mengajar Program in developing learning materials is important to adapt the teaching approach to students' needs. Teachers who understand the local context better can work with students who have technological expertise to create relevant and interactive materials (Harris et al., 2009; Williams, 2015). This allows the learning process to be more effective, and can accommodate the abilities of students with various economic backgrounds and access to technology.

d. Integration of Local Context-Based Projects

The integration of new literacy skills in local context-based projects has been shown to be effective in helping students understand digital and data literacy concepts. Projects such as manual but technologically-assisted local weather data collection and analysis make data literacy more relevant to students' everyday lives (Littlejohn, 2019; Wong & Wilson, 2023). With this approach, students can learn digital literacy in a gradual and contextual way, allowing them to understand more abstract concepts in a practical and locally relevant way.

e. Continuous Monitoring and Evaluation

Continuous monitoring and evaluation are essential to ensure that the teaching approach applied is in accordance with the students' needs. Periodic evaluation helps teachers and students of the Campus Teaching Program adjust teaching strategies if there are obstacles in students' understanding (Black & Wiliam, 2009). Thus, the gap between students' needs and teaching approaches can be minimized, and the process of integrating new literacies can run more effectively.

This study has several limitations that need to be considered. First, the geographical scope of the study was limited to elementary schools in partner areas of the Kampus Mengajar Program, most of which

are in rural areas with minimal infrastructure. Findings from these schools may not be representative of conditions in urban schools or those with better access to technology. Second, the short duration of the Kampus Mengajar Program only provided short-term data, so the long-term impact of digital and data literacy integration could not be measured comprehensively. Third, the data collection method through interviews involved only a small number of teachers and students of the Kampus Mengajar program, which may not reflect the full range of experiences across schools, limiting the generalizability of the findings. For further research, some areas that could be explored in more depth include longitudinal studies on the long-term impact of digital and data literacy integration in elementary schools, especially related to the development of students' 21st-century skills. In addition, there is a need for further research that examines the influence of differences in technology access at home, especially related to students' socio-economic backgrounds, on their ability to understand digital literacy. Developing a sustainable training model for teachers in utilizing technology in environments with limited infrastructure is also an important area to study. In addition, the development of a curriculum that systematically integrates digital and data literacy into everyday learning in elementary schools needs to be tested and further developed.

Conclusion

This study revealed several obstacles in the integration of new literacy skills, especially digital and data literacy, in elementary schools partnered with the Kampus Mengajar Program. The main obstacles include limited technology infrastructure, lack of technology skills among teachers, short program duration, and gaps in technology access at home. Proposed solutions include intensive and ongoing training for teachers and Kampus Mengajar Program students, the use of simple and creative technology, and collaboration in the development of locally-based learning materials.

To achieve more effective integration, further efforts are needed in terms of training, curriculum development, and ongoing monitoring. While this study provides an important picture of the challenges and solutions in elementary school settings, further research is needed to measure the long-term impact and address the broader challenges of teaching new literacies in Indonesia.

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