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The TPACK Method Workshop as a 21st Century Learning Innovation for Teachers at SMP N 2 Gadingrejo

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Abstract

The article aimed to train teachers at SMP Negeri 2 Gadingrejo in implementing the Technological Pedagogical Content Knowledge (TPACK) framework in classroom learning. Rapid technological advancements require teachers to continuously update their technological competencies to effectively support teaching and learning processes. The quality of learning is determined not only by teachers' mastery of subject matter and pedagogical skills but also by their ability to integrate technology meaningfully into instruction. Moreover, the use of educational technology contributes to the development of students' digital literacy and critical thinking skills. The training introduced two technological tools: Google Classroom as a web-based digital learning platform and Adobe Animate as software for developing engaging and interactive learning media. The results indicated that all participating teachers were able to utilize Google Classroom effectively as a digital learning platform. However, additional training is required for Adobe Animate, as many participants experienced difficulties, particularly in understanding ActionScript. This article contributes to strengthening teachers' TPACK competencies by providing practical training in digital learning platforms and interactive media development, thereby supporting innovative learning practices aligned with 21st-century education demands.

Keywords: Independent Learning Curriculum, Learning Achievements, Mathematics

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INTRODUCTION

The development of digital technology and automation is a characteristic of the 21st century's 4.0 revolution, improving human work efficiency and quality of life through various innovations. The 4.0 revolution has had a broader impact on various sectors of life, not just limited to industry and manufacturing companies. Education is no exception, as it has also benefited from these technological advances, particularly in facilitating the learning process (Ajizah & Huda, 2020). This was demonstrated during the COVID-19 pandemic, where online learning...*e-learning*is highly dependent on technology (Oktaviana & Yudha, 2022). Therefore, the learning process at that time was determined by the

readiness of schools, teachers, and students to utilize digital technology. This, of course, was also supported by adequate digital devices and internet infrastructure services.

The COVID-19 pandemic has become a turning point in the world of education, demonstrating the importance of technology in learning. Therefore, integrating teachers' knowledge, teaching methods, and the use of technology to deliver it is crucial for ensuring quality education, even without face-to-face interaction. Since then, various types of technology have become known for their application in learning, especially*e-learning*However, this presents a challenge for Indonesian education due to a lack of preparedness in utilizing technology at that time (Astini, 2020). Therefore, the government's top priority in post-COVID-19 education is to increase technologically savvy human resources to improve the quality of education in line with changing times (Sirajuddin, Darwin, Muzaini, & Resmi, 2023). The presence of innovation also demands that humans be proficient in technology, even if it is constantly updated.

Mastery of Information and Communication Technology (ICT) is a requirement for teachers today to improve the quality of classroom learning through various innovations (Jayawardana & Gita, 2020). In their teaching process, teachers engage in complex activities that involve various types of knowledge. In 21st-century learning, a teacher is not only required to master the subject matter, but also to master the content.*(content knowledge)*and how to teach it*(pedagogical knowledge)*, but teachers are also required to be proficient in the use of technology in learning*(technological knowlege)* (Budiyono, Haris, Yana, & Wildani, 2023). These three things are known as*Technological Pedagogical and Content Knowledge*(TPACK), all of which must be integrated to achieve quality learning (Rahmatullah & Kadarwati, 2023). The impacts of TPACK include making teachers more creative in using teaching media to deliver learning content, making learning more interesting due to the match between learning media and material, the learning process becoming less boring because it is varied and interactive, so that pleasure and comfort in learning can be realized, which ultimately has implications for improving learning achievement (Nisa, Florentia, Febriana, Prandika, & Azizah, 2024).

Although the COVID-19 pandemic has long since passed, the reality on the ground shows that teacher mastery of technology in learning remains uneven (Sembiring, Hadi, & Pramuniati, 2023). Many teachers in schools still lack the knowledge and understanding of how to use technology in learning. Meanwhile, teachers are required to improve the quality of their learning services in accordance with current demands. The goal is to improve learning quality, make students' learning experiences deeper and more meaningful, enjoyable, effective, and efficient (Syawang, 2024). One school that stated the need to increase learning innovation for teachers through TPACK is SMP Negeri 2 Gading Rejo. Therefore, the goal of this community service program is to provide mentoring and training for teachers in schools to recognize and master various types of technology in today's learning.

METHOD

This community service activity was carried out at SMP Negeri 2 Gadingrejo on December 16, 2024. This activity was carried out in order to*In House Training*(IHT) with the theme "Innovative Learning through TPACK." The community service team conducted workshops, provided training and mentoring to develop junior high school teachers' knowledge and skills in utilizing technology to support learning activities in schools. The steps taken were:

1. Preparation: Activities carried out during the preparation stage include confirming the schedule and participants, determining the location, and preparing computer equipment as a medium for training in learning innovation through TPACK. Participants can use laptops provided by the school or their own.

2. Implementation; the implementation activities will be carried out on December 16, 2024, starting at 08.00 WIB – 13.00 WIB at SMP Negeri 2 Gading Rejo. The activities carried out include providing training on the use of LMS applications and technology to support learning activities such as: Google Classroom, Google Meet, and Adobe Animate.
3. Evaluation; evaluation activities are carried out to determine the extent to which training participants are able to understand and master the learning technology that has been delivered, and to determine whether ongoing training and mentoring are needed to further master the technology in creating interesting learning innovations.

RESULTS AND DISCUSSION

Training and mentoring in the use of technology in learning is a form of concern for the world of education, which continues to change with the times. The presence of technology has transformed the educational landscape in various parts of the world, including Indonesia, by introducing various learning innovations. The use of digital learning platforms can replace the classroom during previously conventional teaching and learning activities (Mu'minah & Gaffar, 2020). Furthermore, the presence of technology also provides various applications that can be utilized to make learning more engaging and interactive by presenting lesson materials virtually, especially for topics that cannot be presented in person. Previous research has shown that the use of technology can improve the quality of learning by providing meaningful learning experiences for students (Toyibah, Hayadi, Yusuf, Suirat, & Roseno, 2024).

The demands of the times require teachers to continually update their skills to avoid technological illiteracy. A teacher's ability to master technology in learning reflects their readiness to manage digital-era learning in their classroom. Utilizing technology in learning not only builds digital literacy for teachers but also fosters digital literacy in students. Therefore, to achieve digital literacy in students, teachers must first understand the appropriate learning media and technology to enhance their pedagogical skills (Sulistyarini & Fatonah, 2022). Therefore, teachers need training that supports the implementation of TPACK. The training activity conditions can be seen in Figure 1 below.

Figure 1 TPACK Utilization Training Activities

The team's presence was enthusiastically welcomed by all participants, driven by their curiosity about technology in learning. Participants had prepared their laptops as training resources. In fact, every seat was occupied by someone eager to learn. This activity provided skills training in utilizing two learning platforms: Google Classroom, a web-based digital learning platform, and Adobe Animate, a software application for creating interactive learning multimedia.

Google Classroom as a learning platform is actually nothing new in the world of education, having become widely known since the massive implementation of online learning during the COVID-19 pandemic, with its more comprehensive learning features than ever before. However, many teachers are still unfamiliar with its various features and how they can be utilized to support learning. Consequently, TPACK learning remains rare, even though it is the easiest platform to implement. This is due to numerous obstacles in its implementation, particularly the unpreparedness of teachers and schools to facilitate online learning at the time (Giyarsih, 2021). However, after the pandemic ended, learning shifted back to offline learning, leading to the abandonment of online learning. Meanwhile, the government demands that digital literacy skills continue to be developed to keep pace with technological developments in the 21st century.

Through Google Classroom training, teachers receive guidance in classroom management, including opportunities to learn how to create virtual classes, invite or remove students, manage learning materials, and schedule assignments and deadlines. Google Classroom enables collaboration between teachers and students to share information.*file*and learning documents, conducting online discussions through comment sections, and providing feedback and assessing student performance online (Barokah & Untung, 2024). This allows learning to continue to be two-way, interactive, thanks to the reciprocal nature of the process.

Google Classroom is also integrated with Google Meet as a virtual class which is...*real-time*This can be done face-to-face through a computer screen. The presence of Google Meet further facilitates online learning activities, as teachers can explain lessons as they normally would in an offline classroom. Teachers can display material explanations using PowerPoint. Teachers can even access the whiteboard through the Jamboard menu. This whiteboard menu is very helpful for subjects like mathematics and science, where learning often involves drawing and solving calculation problems accompanied by formulas. Not only can teachers access Jamboard; students can also use it because it is a collaborative whiteboard (Hafid, Barnoto, & Abuhsin, 2022).

Another advantage of Google Classroom is that teachers can attach YouTube links containing instructional videos and Google Forms links as quizzes (Switrayni, Wardhana, & Aini, 2021). Using Google Forms makes grading more effective and efficient because teachers don't have to bother correcting students' answers to multiple-choice questions (Elfira, Syamsurizal, & Lufri, 2023). Students can see their learning outcomes immediately without waiting for the teacher to correct and announce them. Students can even find out the correct answers immediately after taking the test. The presence of Google Classroom as a learning medium allows teachers to conduct teaching and learning activities effectively.*blended learning*This approach combines online and offline learning to improve the quality of learning (Dewi, 2021; Nugroho, Setiawan, & Romadhoni, 2021). Learning can be conducted remotely through online classes, allowing interaction between teachers and students to continue even when they are not in the same location. This type of learning trains students to develop their digital skills. Another benefit for students is reduced awkwardness, allowing them to express themselves more confidently, such as by asking questions or expressing their opinions, compared to face-to-face learning in the classroom (Hutapea, 2023).

This training activity only involves teachers, so to simulate learning activities, we invite fellow teachers as students to join each other in Google Classroom. Each participant is given the opportunity to utilize the features provided by Google to support learning activities integrated with Google Classroom. This integration makes learning more efficient by increasing collaboration between students and teachers, saving time because students and teachers do not need to come to the same location, data collection can be done easily online, and can be done remotely as long as there is a supporting digital device

and an internet connection. The device can be a computer, either in the form of a laptop or smartphone.

Another training program focuses on creating teaching media using Adobe Animate. This software is designed to create 2D or 3D animations, short films, or other interactive media that can be used in learning, fostering feedback. With Adobe Animate, teachers can develop creative ideas for engaging and engaging learning. Teachers often use the software to create digital modules, virtual labs, educational games, and even learning quizzes. Using Adobe Animate to create teaching media can even make abstract material more concrete (Rahayu, Sakdiyah, & Chrisyarani, 2022).

Adobe Animate can be used to create virtual laboratories (Asmarany, Mudriadi, Solissa, Sudadi, & Sudyana, 2023). Using Adobe Animate to create learning media allows teachers to engage students in science experiments, such as physics, without the need for laboratory equipment. Teachers can design experimental activities in the form of 2D or 3D simulations. Teachers can design and create several variables for students to experiment with. This virtual lab allows students to conduct experiments even when limited by laboratory equipment. Teachers can even visualize the effects of experiments that are invisible to the naked eye, such as depicting magnetic field lines, electric fields, electromagnetic waves, sound waves, and others.

The use of Adobe Animate allows experimental activities to be integrated with learning modules equipped with worksheets and quizzes, making learning media more interactive (Lestari, Handayani, & Suyantri, 2023). Students can even see their pass rate directly from the assignments they complete, because the learning media can be designed with an answer key correction system. Teachers can also create educational games as learning media using Adobe Animate, such as crosswords, matching games, and others. Learning media can also be presented more engagingly because it can display not only text and animation but also sound and video effects.

Due to time constraints, this training taught new teachers how to create quizzes using the Adobe Animate application, consisting of three simple and easy questions. This involved displaying text, creating answer fields, adding buttons, and adding animation and sound effects. The main point is that teachers can create quizzes that can be operated effectively. The quiz featured a menu of questions, with the student's name as identification. Students were then directed to a page containing the quiz questions. Each correct or incorrect answer was responded to with a sound effect. At the end of the quiz, students were able to see their total score and whether they passed or failed.

During the training, each participant was observed to obtain a general overview for evaluation and decision-making. Good training should be conducted periodically to ensure participants truly master the objectives of the training. Even with Adobe Animate, not all menus have been tested, despite the numerous interactive learning media it can create. The results of the training are presented in Table 1 below.

Table 1. Teacher Mastery of Learning Technology

Type	Mastery Level
Google Clasroom	- 100% of participants were able to create classes and add students, upload materials and assignments and schedule them.
Adobe Animate	- 30% of participants only understood how to use it to create quizzes.

Based on observations, all participants completed the training, mastering Google Classroom as an online learning platform and utilizing its features. However, many participants still lacked understanding of how to create learning media using Adobe Animate due to the difficulty of using ActionScript when creating quizzes and ensuring

they ran smoothly, while the training time was limited. Participants also lacked a thorough understanding of display and animation settings. Therefore, more intensive training is needed in the future, given the importance of digital literacy to support TPACK (Comprehensive Action-Based Learning) in 21st-century digital learning. TPACK-based learning is known to benefit students, particularly through improved critical thinking skills (Susilawati & Khaira, 2021). Furthermore, TPACK-based learning with interactive media can enhance teacher and student engagement, as well as learning outcomes (Amalia & Radiansyah, 2023).

CONCLUSION

Mastery of digital literacy for teachers is an important thing to support the TPACK learning process that is in accordance with the developments and needs of the 21st century. Presenting interactive digital learning media in the learning process makes teachers more creative and innovative, thus creating fun and comfort for students to learn and think critically. Based on the results of the training that all participants understand the use of Google Classroom as a web-based digital learning platform and are able to use the features available in it. However, only a small number of participants are able to utilize the Adobe Animate software application to create digital learning media in the form of quizzes due to limited time and an understanding of the use of ActiontScript that has not been mastered. Therefore, further training is needed to assist teachers in understanding the use of Adobe Animate.

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