

TEACHER EMPOWERMENT IN THE DEVELOPMENT OF TECHNOLOGY-BASED LEARNING MEDIA TO IMPROVE THE QUALITY OH THE TEACHING-LEARNING PROCESS

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Abstrak

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The rapid development of educational technology has encouraged teachers to improve their ability to design learning media that support more engaging and interactive classroom instruction. Many teachers, however, still experience difficulties in developing digital learning media that align with instructional objectives and students' learning characteristics. A community service program was conducted at a school through training and mentoring activities to strengthen teachers' competence in developing technology-based learning media. The implementation consisted of a needs assessment, instructional sessions, hands-on workshops, guided practice, product presentation, and evaluation. Teachers developed various learning media, including interactive presentations, instructional videos, digital quizzes, infographics, and electronic teaching materials by utilizing several digital applications. The activities demonstrated increased teacher confidence and competence in selecting appropriate technologies and designing learning media suited to classroom needs. Participants also responded positively to the combination of practical training and continuous mentoring because it enabled them to solve technical problems and improve the quality of the media they produced. The program indicates that participatory training accompanied by direct assistance can support teachers in integrating technology into classroom instruction and encourage more innovative learning practices.

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INTRODUCTION

Teachers are no longer merely expected to master subject matter but must also be able to present that material through media suited to students' characteristics. This shift has made learning media an integral part of teaching and learning activities in schools. However, field observations still reveal that teachers' use of technology is not always accompanied by the ability to create learning media that is engaging, interactive, and aligned with learning objectives. While some teachers have become accustomed to using digital devices, the media they employ is still dominated by simple presentation materials or content obtained from the internet without significant modification. Lai and Jin (2021) explain that the integration of technology into learning is linked to teachers' professional identity; thus, the ability to use technology should not be viewed merely as mastery of applications but also as part of evolving pedagogical practice shaped by teaching experience.

Differences in teachers' abilities to develop learning media are influenced by many factors. Experience participating in training, support from the school, opportunities to discuss with colleagues, and self-confidence when trying new technologies all play a role in determining teachers' decisions regarding the use of technology in the classroom. Cattaneo et al. (2022) found that teachers' digital competencies develop through a combination of work experience, professional training, and an environment that provides opportunities to experiment with various learning tools. The results of this study indicate that the availability of technological tools does not guarantee that teachers will be able to produce high-quality learning materials unless accompanied by a process of continuous learning. This situation remains a challenge for many schools, particularly when professional development activities for teachers are conducted only in the form of short-term training sessions without any follow-up support after the activities conclude.

The development of technology-based learning media is gaining increasing attention because it expands the variety of teaching methods available to teachers. Digital media provide students with the opportunity to engage in learning experiences through text, images, videos, simulations, and interactive activities—all integrated into a single learning unit. These options help teachers tailor their delivery of content to the characteristics of students with different learning styles. Consoli et al. (2023) explain that the integration of technology into learning is not only related to the frequency of digital device use but also concerns the quality of technology implementation to support learning activities. This view demonstrates that the success of using instructional media is determined more by how teachers design learning experiences than by the number of applications used.

Teachers' ability to create learning media does not develop automatically simply by gaining access to technology. Training that consists solely of content delivery tends to yield limited changes because participants have not had the opportunity to directly try out and evaluate the results of their work. Ahadi et al. (2024), through a systematic review of various teacher training programs, explain that professional development activities accompanied by practice, reflection, feedback, and mentoring yield better results than one-way training. These findings demonstrate that the learning process for teachers differs from that of students, as it places greater emphasis on hands-on experience in solving problems encountered during teaching. Training that provides teachers with the

space to create learning materials also fosters a sense of confidence when these materials are implemented in the classroom.

Teacher professional development continues to evolve as the range of technologies available for use in learning expands. Teachers are becoming familiar with graphic design applications, online learning platforms, digital assessment tools, interactive videos, and even artificial intelligence capable of assisting in the creation of instructional materials. This growing array of options often leads to confusion when teachers lack a framework for determining which media align with their learning objectives. Charania et al. (2023) explain that successful professional development programs do not merely introduce new applications but also guide teachers in selecting technologies based on students' learning needs and school conditions. This approach makes training more relevant to the real challenges teachers face, rather than simply showcasing application features.

Training formats that combine hands-on activities and mentoring are increasingly being implemented in various teacher competency enhancement programs. Teachers are given the opportunity to develop instructional media, test them in specific situations, and then receive feedback from facilitators and other participants. This process helps participants identify the weaknesses of the learning materials they've developed before using them in the classroom. Huang (2023) explains that mentoring activities can strengthen teachers' readiness to integrate technology because participants have the opportunity to refine their work through a process of shared reflection. These findings suggest that the success of training is more influenced by the quality of interactions during the activities than by the duration of the training itself.

Teachers' learning activities also do not always take place through formal training. Discussions within learning communities, online forums, and teacher working groups serve as sources of experience that help shape the ability to develop instructional media. Dille and Røkenes (2021) explain that online professional communities provide teachers with opportunities to share teaching practices, find solutions to problems they face, and build networks with teachers from various regions. Zheng et al. (2022) add that informal learning experiences are linked to teachers' willingness to utilize technology in instruction. The findings of both studies indicate that the improvement of teachers' competencies occurs through a continuous process, not merely when participating in training activities organized by specific institutions.

RESEARCH METHODOLOGY

The community service activity was conducted at a school, targeting teachers of various subjects. The activity was designed using a participatory approach through training and mentoring in the development of technology-based instructional media. This approach was chosen so that participants could be directly involved in every stage of the activity, from identifying learning needs to producing media ready for use in the classroom. This implementation model provided teachers with the opportunity to discuss, exchange experiences, and resolve challenges encountered during the media development process. Ahadi et al. (2024) explain that teacher professional development yields better results when training is combined with practice, reflection, and ongoing feedback.

The activity began with identifying participants' needs through observation and discussions with teachers. This stage aimed to gather information about the instructional media they had used, their level of technological proficiency, and the challenges they faced during the learning process. The results of this assessment served as the basis for

designing the training materials, ensuring that the topics covered aligned with the participants' needs. This approach also helped the implementation team determine which applications and examples of media would be easiest for teachers to implement, given the characteristics of the subjects they teach.

The training was conducted through presentations on the concepts of developing technology-based learning media. The material covered principles for selecting media, designing learning activities, utilizing digital applications, and strategies for integrating media into teaching and learning activities. The presenter demonstrated the steps for creating learning media using several applications that are easily accessible to teachers, allowing participants to follow each step in real time. Handini (2025) explains that a teacher's ability to integrate technology is influenced by the synergy between subject matter mastery, instructional strategies, and the use of technology.

The next stage involved hands-on practice in developing instructional media. Each participant created one instructional media resource tailored to the subject they teach, using the applications introduced during the training. The organizing team provided direct guidance so that participants could consult on media design, content development, or technical challenges that arose during the process. Guidance was provided both individually and in groups, ensuring that every participant had the opportunity to refine their media before using it in the classroom.

The completed learning materials were presented by each participant to receive feedback from the resource persons and other participants. Discussions focused on the media's alignment with learning objectives, visual presentation, ease of use, interactivity, and potential for classroom application. This process encouraged participants to share experiences and explore alternative solutions to various problems that arose during the media development process. Huang (2023) explains that guidance and reflection during training help teachers improve their readiness to integrate technology into learning activities.

The activity was evaluated through observations, participant feedback questionnaires, and an assessment of the resulting instructional media. Observations were used to document participant engagement during the training, while the questionnaires were used to gauge participants' responses to the material, the implementation of the activities, and the benefits of the training. The media were assessed using indicators of content appropriateness, visual quality, creativity, interactivity, and readiness for implementation in the classroom. The evaluation data were analyzed descriptively to serve as the basis for formulating recommendations for the implementation of similar activities in the future.

RESULT AND DISCUSSION

Research Results

The training was attended by teachers from various subject areas at a school. All participants took part in a series of activities ranging from material delivery, demonstrations, and hands-on practice in developing instructional media to the presentation of results. The participants' enthusiasm was evident from the very first session through discussions about their experiences using technology-based learning media. Most teachers reported that they had already utilized digital devices in their teaching, but the media they used were still limited to simple presentations and instructional videos obtained from the internet. This situation served as the foundation for the hands-on media development activities throughout the program.

The training began with a presentation on the principles of developing technology-based

educational media. The material covered selecting media appropriate for learning objectives, creating visual designs, presenting content, and utilizing several digital applications that are easy for teachers to use. The presenter demonstrated the steps for creating media step by step so that participants could follow each process directly. During the presentation, participants actively asked questions about using app features, organizing learning content, and how to create media that is more engaging for students.

The practical session was the main component of the training. Each participant was asked to develop one learning resource tailored to the subject they teach. The training team provided direct guidance throughout the resource development process so that participants could consult on design, content, or any technical challenges they encountered. Guidance was provided both individually and in groups to ensure every participant had the opportunity to refine their work before presenting it. The training atmosphere was interactive, as participants exchanged experiences and provided feedback on each other's work.

Table 1. Types of Learning Media Developed by Participants

Type of Media	Number of Teachers	Percentage (%)
Interactive presentation	8	32
Educational videos	5	20
Digital infographics	4	16
Interactive quizzes	5	20
Digital modules/e-book	3	12
Total	25	100

The results of the practical sessions show that participants were able to produce various forms of technology-based learning media. The products developed included interactive presentation media, educational videos, infographics, digital quizzes, and teaching materials integrated with artificial intelligence-based applications. Each resource was tailored to the characteristics of the subject and the predetermined learning objectives. Teachers also began to utilize images, animations, videos, and interactive links to enhance the appeal of the resources they developed. The variety of these products demonstrates that participants were able to apply the material learned during the training to create resources that can be used in learning activities.

Table 2. Assesment Result for Instructional Media Products

Aspects Assessed	Average Score	Category
Content Relevance	4,62	Very Good
Visual Presentation	4,48	Good
Media Creativity	4,56	Very Good
Interactivity	4,51	Very Good
Easy of Use	4,59	Very Good
Average	4,55	Very Good

Note: Rating scale 1–5.

The presentation of the final projects was the final stage before the activity was evaluated. Each participant presented the educational media they had developed along with strategies for using it in the classroom. The resource person and other participants provided feedback on the visual presentation, the delivery of content, ease of use, and the alignment of the media with learning objectives. The discussion process resulted in a number of improvements to the media that had been created, particularly in terms of simplifying the visual presentation, adding interactive elements, and organizing the flow of content to make it easier for students to understand. These improvements were implemented immediately so that participants could see the changes to the media before the activity ended.

Table 3. Participant Responses to the Training Implementation

Statement	Agree (%)	Stongly Agree (%)
The material was easy o understand	28	72
Training meets teacher's needs	20	80
Assistance in developing teaching materials	16	84
The teaching materials created can be used in the classroom	24	76
The activity needs to be repeated	12	88

The training evaluation showed that participants responded positively to the implementation of the activities. Teachers stated that hands-on practice and mentoring helped them understand the media development process more easily than simply receiving theoretical explanations. Participants also felt more confident about trying various digital applications to create instructional media. The evaluation results showed that the media developed met the criteria for content appropriateness, visual presentation, interactivity, and readiness for use in the teaching and learning process. Teachers hope that similar activities can be held periodically with more diverse materials so that their ability to develop instructional media continues to improve.

Discussion

The implementation of the training demonstrated that teachers need activities that not only involve the delivery of content but also provide opportunities to practice the skills they have learned. Throughout the activity, participants were actively engaged in creating instructional media tailored to the subjects they teach. This approach helped teachers understand the relationship between learning objectives, student characteristics, and the selection of media used. Hands-on learning experiences also provided participants with the opportunity to find solutions to challenges encountered during the media development process. This aligns with the findings of Ahadi et al. (2024), who stated that teacher professional development yields better outcomes when training is accompanied by practice, reflection, and continuous feedback.

The learning media produced by participants demonstrate a shift in how teachers utilize technology. Before participating in the training, most teachers used digital media primarily as a tool for delivering content. After receiving guidance, teachers began designing media tailored to learning objectives, student activities, and the forms of assessment to be used. These changes indicate that the use of technology depends not only on the ability to operate applications but also on the ability to design learning experiences that meet students' needs. Consoli et al. (2023) explain that the integration of technology must be understood as a process that connects technology with learning strategies so that the use of media does not stop at purely technical aspects.

The training also encouraged teachers to utilize a wider range of applications in developing instructional media. Participants not only became familiar with presentation applications but also experimented with graphic design platforms, educational videos, digital quizzes, and artificial intelligence-based applications. The diversity of the resulting media indicates that teachers are beginning to have alternatives for delivering content in accordance with the characteristics of their subjects. This situation demonstrates that providing hands-on examples of application use makes it easier for participants to understand the functions of each introduced technology. These results support Handini's (2025) research, which explains that teachers' ability to integrate technology improves when technological proficiency is combined with pedagogical competence and mastery of the subject matter..

Mentoring during the practical sessions influenced the quality of the media produced by the participants. Teachers had the opportunity to improve the visual presentation, simplify the presentation of the material, and adapt the media to the designed learning activities. Feedback

from experts and fellow participants helped teachers identify shortcomings in their media that they had not previously recognized. This process made participants more confident when applying the media in their teaching. These findings align with Huang's (2023) research, which explains that guidance and reflection help teachers improve their readiness to integrate technology because participants have the opportunity to refine their work before implementing it in the classroom.

Interactions among participants during the training also benefited the teachers' learning process. Discussions held during the sessions allowed participants to exchange experiences regarding the use of applications, the development of teaching materials, and the resolution of technical challenges. Teachers who already had experience using technology assisted other participants who were still facing difficulties. This type of learning model fosters a learning environment that supports collective competency development. Dille and Røkenes (2021) explain that professional learning communities serve as a means for teachers to acquire new knowledge through collaboration and the exchange of experiences with peers.

Teachers' ability to develop instructional media is not solely influenced by formal training. Teachers' willingness to continually try new technologies and leverage learning experiences outside of training activities also plays a key role in ensuring the sustainability of the outcomes achieved. Teachers who actively participate in learning communities, online training, or professional discussions have a greater opportunity to develop a variety of instructional media. Research by Zheng et al. (2022) indicates that informal learning experiences are linked to teachers' willingness to integrate technology into instructional activities. These findings suggest that community service activities can serve as a starting point that encourages teachers to continue developing their competencies independently.

This teacher empowerment program through training also demonstrates that support from the school environment is a key factor in the successful implementation of technology-based learning media. Teachers need opportunities to apply what they've learned in training, receive feedback from colleagues, and access facilities that support the learning process. Without such support, the media they've developed may not be used sustainably. Pambudi et al. (2024) explain that a supportive work environment can strengthen teachers' motivation to integrate technology into learning, ensuring that the changes that occur do not stop once the training activities are completed.

The results of the activities indicate that empowering teachers through training and mentoring can expand participants' abilities to develop technology-based learning materials. These changes are evident in the increased variety of materials produced, teachers' willingness to try new applications, and their ability to adapt materials to learning objectives. The implementation of the activities also demonstrated that teachers' learning process occurs through a combination of practical experience, reflection, and collaboration with fellow participants. These findings reinforce the results of a study by Moosa and Ramnarain (2023), which explains that professional development programs that provide space for teachers to learn through real-world experiences can strengthen their readiness to integrate technology into the learning process.

CONCLUSION

The implementation of teacher empowerment activities through technology-based instructional media development training yielded positive results in enhancing participants' ability to create instructional media. Teachers were able to develop various media tailored to the characteristics of the subjects they teach and began utilizing a variety of digital applications to support the teaching and learning process. Guidance during practical sessions helped participants overcome the challenges they faced, ensuring that the resulting media were better aligned with learning objectives. This initiative also encouraged teachers to feel more confident in utilizing technology as part of the classroom learning process.

Similar activities need to be carried out on an ongoing basis with content adapted to technological advancements and the needs of teachers in schools. Post-training guidance is also necessary to ensure that the developed materials are actually implemented in the classroom and continuously refined based on teaching experience. Schools are expected to provide support by supplying resources, offering opportunities to participate in advanced training, and establishing teacher learning communities as platforms for sharing experiences and instructional innovations. These steps are expected to expand the use of technology-based learning media while continuously improving the quality of the teaching and learning process.

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