

Augmented Reality (AR) Application Usage Training to Improve Teacher Digital Literacy at SMP Negeri 1 Jeneponto

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Abstract

SMPN 1 Jeneponto received a donation of 63 Evercoss gadget units (tablets) from the government, intended for use by teachers in the learning process. However, the use of these gadgets has not been optimal due to inadequate internet connectivity at the school and the low digital literacy of the teachers. To address this issue, the solution implemented involves enhancing the digital literacy skills of teachers and utilizing the gadgets (tablets) as learning media, both offline and online, with the application of Augmented Reality (AR). Training and mentoring have been conducted to maximize the use of gadgets (tablets) as learning media. The results of the training show an increase in understanding of the importance of ICT literacy and AR as an innovative learning medium, reaching 95.6%. The improvement in teachers' digital literacy is recorded at 87%, and skills in using AR have increased by 78.2%. These findings prove that the training and mentoring provided are effective in enhancing the digital literacy of teachers at SMP Negeri 1 Jeneponto. It is hoped that through this activity, teachers will stay updated on the latest technology developments and work towards improving their professionalism through understanding and applying digital literacy in teaching.

Keywords: *Augmented Reality, Digital Literacy, Middle School Teachers*

Introduction

Technology and information are currently advancing rapidly and undergoing swift changes. Information technology plays a crucial role in aiding, facilitating, and supporting the learning process to achieve high-quality teaching (Qumillaila et al., 2017; Dhar et al., 2021). The government is now working to leverage technology in education as a means of supporting educational innovation by providing technical assistance, technological equipment, training, and mentoring to optimize the use of educational technology by teachers (Hsu et al., 2019; Jamrus et al., 2021; Hug et al., 2017). SMP Negeri 1 Jeneponto in South Sulawesi, it has been found that 63 government-provided tablets since 2019 have not been utilized effectively. This issue is due to very slow or unstable internet connectivity and the low digital literacy of teachers in using gadgets as learning media. Teachers believe that effective use of gadgets requires a good and stable internet connection, whereas offline learning media can still be utilized (Mystakidis et al., 2021; McMahon et al., 2016).

Changes in the field of education today have increased interest and capability in engaging students through Industry 4.0 innovations, particularly with the implementation of mobile-based learning media in the educational process (Rahmat et al., 2019; Simonova et al., 2022). Technology promises significant advancements for the future (Carbonell et al., 2017; Chiang et al., 2022; Lin et al., 2022). One such technology is Augmented Reality (AR), which integrates the real world with digital visualization (Farshid et al., 2018; Riyanti et al., 2022). With AR, students can view and understand objects in 3D and obtain data about the real world. The strength of AR lies in its interactivity and real-time capabilities, making it an excellent tool for learning. For example, AR can be used to introduce cultural heritage or history (Arvanitis et al., 2021). AR technology is effective because teachers only need to provide a marker that is scanned by a phone camera to display 3D images of objects, without requiring large media in the classroom (Arifin et al., 2020; Alalwan et al., 2022). Considering the challenges and limitations faced by teachers in using learning media, the community service team in the community partnership stimulus program (PKMS) has innovated by introducing and optimizing the use of AR as an innovative and alternative media to enhance the quality of the learning process (Chiang et al., 2022; Gómez et al., 2020).

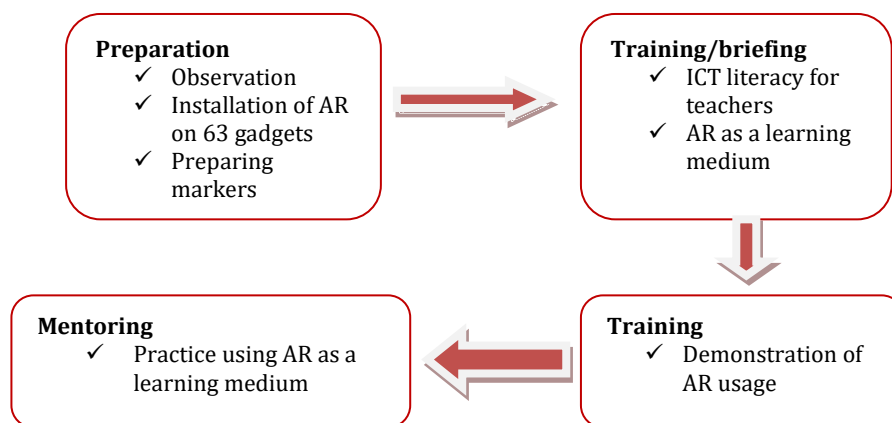
Intensive efforts to enhance teachers' digital literacy through Augmented Reality (AR) media are carried out through a series of assistance and training activities (Howorth et al., 2019). This is due to several identified issues: (1) only 4 teachers are capable of using technology as a teaching medium, such as creating PowerPoint presentations; (2) The school's internet network is inadequate due to its location in the middle of a rubber plantation, preventing teachers from fully utilizing technology (tablets/gadgets); (3) Low digital literacy among teachers in creating, designing, using, and leveraging technology (tablets/gadgets) as a learning medium (Korenova et al., 2019). This Community Service Program (PkM) aims to improve digital literacy among secondary school teachers by providing training and mentoring that utilize gadgets (tablets) and the implementation of Augmented Reality.

Method

The community partnership program began on Saturday, August 13, 2022, led by two lecturers from the Physics Education Program at Nurul Huda University, along with one lecturer from the Information Technology Education (ITE) Program. This PKMS activity was also supported by six students from the ITE and Physics Education programs. The Head of the Education Department for Disabled Persons in the Eastern Region was also present at the event. The program was attended by 23 teachers from SMP Negeri 1 Jeneponto. The program was carried out because the PKMS team identified several key issues: (1) Low digital literacy among teachers in using technology-based learning media; (2) Partners have not utilized 63 government-provided tablet units as learning media; (3) Very slow internet network and difficult access (Garcia et al., 2019).

After setting priorities, the team discussed solutions with the partners. The partner team then planned the steps to be taken. The methods used in this PKMS involved assistance and implementation of practices regarding the use of Augmented Reality (AR) to optimize gadgets as learning media (Peterson et al., 2020). At the initial stage, the team conducted observations and direct interviews with the Principal of SMP Negeri 1 Jeneponto regarding the learning media used by teachers in the teaching and learning process. Based on the identified problems, the solutions proposed by the PKMS team included counseling, training, and mentoring for the teachers.

During the preparation stage, the team coordinated the implementation of activities, developed materials on AR learning and ICT literacy, and installed AR applications on 63 gadgets. During the training, the team provided explanations and demonstrations on the use of AR. In the mentoring process, teachers were asked to practice using the AR applications independently. At the end of the stage, the team distributed a questionnaire to evaluate understanding of ICT literacy and AR usage. Some stages of the partnership program activities are shown in Figure 1.



Picture 1. Network Stages PKMS implementation

The indicators for the implementation and success of this program include: (1) an increase in understanding of the importance of ICT in the learning process and the recognition of AR as one of the technology-based learning media; (2) improvement in teachers' skills in using AR; and (3) progress in teachers' digital literacy.

Results and Discussion

The PKMS program is carried out through several stages, namely preparation, socialization training, and mentoring. During the preparation stage, the team conducted an interview with the Principal of SMP Negeri 1 Jeneponto to discuss the learning media that had been used at the school. The issues identified in the field include the low level of digital literacy among teachers in utilizing technology-based learning media, which is also affected by the inadequate internet network at the school.



Figure 2. Presentation Materials and Support by the PKMS Team

In the socialization stage, the main goal is to enhance teachers' understanding of ICT literacy and AR as an innovative learning media. Once the socialization phase is complete, the activities proceed with training and demonstrations on the use of AR that has been installed on the gadgets. The team presents material covering the installation of AR through the Ministry of Education and Culture's portal and Assembler Edu, as well as its usage. The material on socialization and mentoring by the PKMS team can be seen in Figure 2.



Picture 3. Display of learning media based on AR

The teacher assistance request form is prepared in groups of 5 people and given the opportunity to practice and try the procedures independently using the AR application, with direct guidance from the PKMS Team and students. The material related to the partnership program is publicly displayed in Table 1.

Table 1. Stages Activity Training and Assistance in PKMS activities

Activity	Material
Socialization	The importance of ICT literacy for educators and the introduction of Augmented Reality (AR) as an advanced learning tool.
Training	Stage I: Create an account on Rumah Belajar and study methods, then download the AR application from the Rumah Belajar portal and the Play Store, namely the Assembler Edu application. Explore various AR topics such as (Art Music, Biology, Viruses, My Goals, Science, Mathematics, Physics, History, English). Stage II: How to make use of the AR application from Rumah Belajar and Assembler Edu.
Accompaniment	Practice using the AR application from Rumah Belajar and Assembler Edu, followed by a discussion and Q&A session, and an open evaluation of the partnership program implementation.

The final stage evaluation aims to assess the achievements of PKMS implementation using the following indicators: (1) understanding the importance of ICT in education and

recognizing AR as an innovative learning media; (2) teachers' skills in using AR; (3) improvement in teachers' digital literacy. The percentage of teachers' ability to optimize gadgets with AR applications as a learning medium is shown in Figure 3.

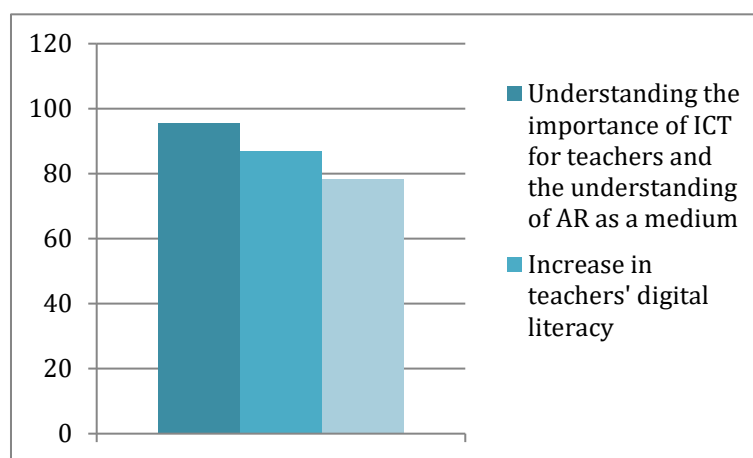


Figure 4. Percentage The ability of teachers at the moment follow PKMS activities

Based on the conducted analysis, there has been an increase in understanding the importance of teachers' ICT literacy and recognition of AR as an innovative learning medium by 95.6%. The improvement in teachers' digital literacy is recorded at 87%, while their in-depth skills in using AR reached 78.2%. These results indicate that the training and mentoring have been effective in enhancing the digital literacy of teachers at SMP Negeri 1 Jeneponto, enabling them to apply it in the learning process.

The entire training and mentoring stages successfully achieved the intended goal of improving teachers' digital literacy. Currently, the material delivery team provides information on Technological Pedagogical Content Knowledge (TPACK) that teachers need to master to meet 21st-century skill demands, including Digital Literacy. A teacher also needs to have strong skills in application technology, content/concept mastery, and material or teaching delivery (Herizal et al., 2022). TPACK is known as the knowledge, competence, and skills of teachers in integrating it into the learning process (Kabakci et al., 2014). The subsequent material is about Augmented Reality as a learning medium. Teachers indicated that they are hearing the term AR for the first time and have not yet used it as a medium. The mentoring stages involved forming 5 groups, each consisting of 5-4 teachers.

The mentoring by the PKMS team with the assistance of students has shown high enthusiasm from teachers for using AR in learning. AR applications can be downloaded for free through the Ministry of Education's portal and the Edu Assemblers app on the Play Store. The training and mentoring aim to introduce learning media such as Augmented Reality. The results show an increase in teachers' competence in learning media and understanding of ICT literacy, with a 52% improvement after the training (Sari et al., 2020; Arigiyati et al., 2021).

Conclusion

The PKMS activities, which include training and mentoring, proceeded smoothly and effectively. This indicates a significant increase in teachers' understanding of the importance of ICT literacy and the recognition of AR as an innovative learning medium, with an improvement of 95.6%. The increase in teachers' digital literacy is recorded at 87%, while their in-depth skills in using AR reached 78.2%. These results demonstrate that the training and mentoring have been effective in enhancing the digital literacy of teachers at SMP Negeri 1 Jeneponto. It is hoped that through these activities, teachers will continue to keep up with technological advancements and strive to improve their professionalism, including through understanding and applying digital literacy in the learning process.

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