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Strengthening the Digital Competence of Teachers at SMAN 2 Barru: Artificial Intelligence and Augmented Reality Literacy for Inclusive Entrepreneurship Innovation

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Abstract

The digital competency strengthening program for teachers at SMAN 2 Barru focused on artificial intelligence (AI) and augmented reality (AR) literacy to support inclusive entrepreneurship innovation. This activity was conducted to overcome limitations in the use of the latest technology among teachers, which previously hindered the development of research-based entrepreneurial products. The training methods used included introductory sessions, hands-on practice, and mentoring on the implementation of KA and AR technologies. The results of this program showed a significant improvement in the digital competency of the teachers, with the average pre-test score increasing from 73% to 80% after the training. In addition to improving technical skills, the training also strengthened teachers' confidence in utilizing AI and AR technology in the learning process and entrepreneurship development. However, limited infrastructure and external support remain challenges that need to be overcome to optimize the utilization of digital technology in schools. Recommendations are given to strengthen technology support and ongoing mentoring programs to improve the sustainability of technology implementation in learning and entrepreneurship activities.

Keywords: Digital Competence; Artificial Intelligence Literacy; Augmented Reality; Inclusive Entrepreneurship; Teacher Training

1. Introduction

In today's digital era, digital competence is an essential element for educators to support effective and relevant learning processes. The digital transformation in education demands teachers to master technology literacy, including kecerdasan artifisial (KA) and augmented reality (AR), to enhance teaching quality and prepare students for future challenges (Sari & Purwanta, 2021; Susilo & Aritonang, 2023). At SMAN 2 Barru, Barru Regency, South Sulawesi, efforts to improve the digital competence of teachers still face various obstacles, such as limited AI and AR literacy, which affects knowledge gaps in analyzing market trends and developing innovative products according to current market needs (Siminto et al., 2023; Zhai et al., 2023).

Initial observations showed that entrepreneurial products created by teachers and students often lacked market research and did not utilize the latest technology, making them less competitive in the market (CAI, 2023; Gocen & Aydemir, 2020). This situation presents a challenge in creating a dynamic and responsive educational environment to changing market needs. Therefore, strengthening the digital competence of teachers at SMAN 2 Barru through AI and AR literacy is highly relevant and urgent. In line with research findings that blended learning can enhance student engagement and learning outcomes in accounting education, the implementation of blended learning integrated with AI and AR literacy could serve as an effective strategy for strengthening teachers' motivation to learn (Fadhilatunisa et al., 2020; Isma et al., 2024; Ismail et al., 2023).

This community service program was designed to address these challenges by providing intensive training to teachers on using AI and AR in the context of education and entrepreneurship. The training included how to analyze market trends using AI, develop technology-based educational content, and utilize AR to create more interactive learning

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materials and attractive product promotions (Aldosari, 2020; ÇAYIR, 2023). Furthermore, a recent study by Fakhri et al. (2024) emphasizes that the integration of AR in business education has proven effective in enhancing students' learning motivation and practical skills, reinforcing the relevance of this program in supporting the strengthening of teachers' competencies in the digital era. By improving digital literacy through this program, it is expected that the teachers at SMAN 2 Barru can more effectively guide students in creating entrepreneurial innovations that are profit-oriented and socially responsible.

The main goal of this program is to equip teachers with practical skills to integrate AI and AR technology into the learning process and entrepreneurship development. It is hoped that this enhancement of digital competence will not only enrich teaching methods but also create an inclusive and innovative educational environment at SMAN 2 Barru (Dai et al., 2020; Hinojo-Lucena et al., 2019). This activity of our community service will discuss the training implementation methods, the results obtained, and their implications for enhancing teachers' digital competence and entrepreneurship innovation at SMAN 2 Barru as an effort to create an educational ecosystem that is better prepared to face the challenges of the digital era.

2. Methods

This activity was carried out in three main stages: preparation, implementation, and reporting. The preparation stage included initial observations to understand partner needs, creating handouts and presentation materials, as well as developing satisfaction and evaluation instruments. The implementation stage included training in kecerdasan artifisial (KA) literacy in education and entrepreneurship, using Google Form and Google Analytics for market trend analysis, training in augmented reality (AR) for product promotion, and mentoring by students. Participant satisfaction evaluation was conducted to ensure program effectiveness. The reporting stage included the preparation of program outputs and a final report to document the results and recommendations for future development.

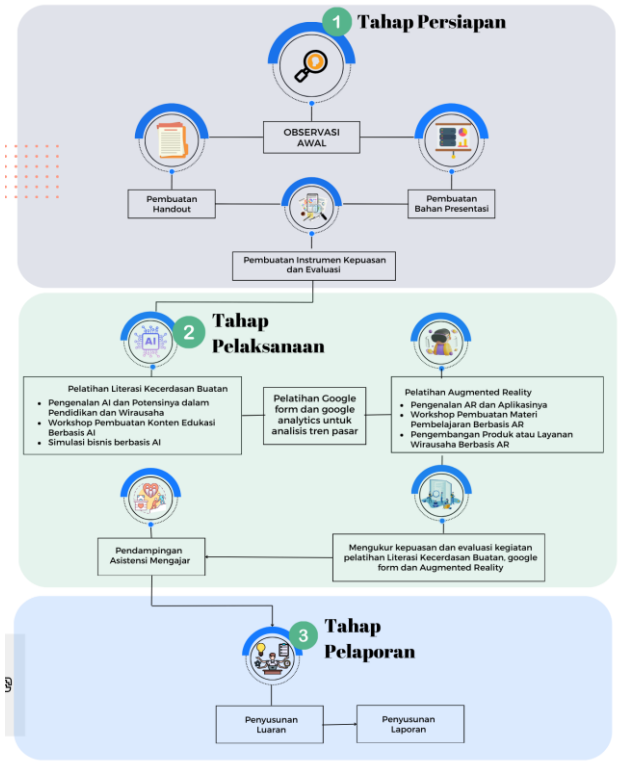

Figure 1. Activity Stages

The training and mentoring went well and smoothly with indications of success, namely the knowledge of educators increased based on the results of the pretest and posttest and educators were able to develop a map of the fun school movement program development. The KA and AR literacy training at SMAN 2 Barru was implemented following the training material, which consisted of several chapters:

1) ChatGPT and AR Introduction Training
    a) Basic Introduction to ChatGPT: Participants will be given a basic understanding of the ChatGPT concept, its working principles, and applications in various fields. This training aims to introduce participants to modern AI technologies that can be used in entrepreneurship
    b) Creating an Account and Accessing ChatGPT: Participants will be guided step-by-step through creating an account on the ChatGPT provider platform, verifying it, and accessing the platform either via web or app.
    c) Teach participants about the user interface and how to navigate within the ChatGPT platform. Participants will also be introduced to the menus and tools available and how to set user preferences according to their needs.
    d) Augmented Reality prototyping with Assembler: In addition to ChatGPT, participants will also be trained on using Assembler for the promotion of entrepreneurial products through AR technology.
2) Q&A and Discussion
    a) Ethics and Privacy in the Use of ChatGPT: This session aims to discuss ethics and privacy in the use of AI, including how to protect personal data and avoid bias in the ChatGPT application. The discussion will also cover best practices in the ethical use of ChatGPT.
    b) Participants are invited to discuss the importance of creating effective prompts and how this affects the results obtained from ChatGPT. Participants will also be given examples of good and bad prompts and tips for optimizing results.
3) Practical
    a) Case Studies Using ChatGPT: Participants will be invited to use ChatGPT in real case studies, such as searching for business ideas and developing business plans. They will brainstorm, filter ideas, and develop business plans with the help of ChatGPT.
    b) Promotional and Marketing Content with ChatGPT: This practical aims to teach participants how to use ChatGPT to generate creative marketing campaign ideas and creatives. Examples of using ChatGPT in product promotion will also be given.
    c) Using Augmented Reality for Product Promotion: In this practical session, participants will learn to use AR technology to create attractive and innovative product visualizations. They will be trained to create AR-based learning and promotional materials that can enhance product appeal.
4) Mentoring
    a) Mentoring in ChatGPT and AR Implementation: After the training, participants will be accompanied by students and facilitators in implementing ChatGPT and AR technology in their educational and entrepreneurial environment. This mentoring includes assistance in content creation, product promotion, as well as evaluation of the use of technology in daily practice.

This activity took place on Thursday, August 08, 2024, with a total of 3 meeting sessions which included material introduction, discussion, practice, and mentoring. The number of participants who participated in this activity was 49 people, consisting of teachers at SMAN 2 Barru. Through this structured implementation method, it is expected that the participants can master ChatGPT and AR technology and apply it in the learning process and entrepreneurship development.

This activity was conducted through a face-to-face meeting with the following material based on Table 1:

1) Introduction to Google Form as a Data Tool in the Context of Entrepreneurship:

    Participants were invited to discuss the use of Google Form as an effective data collection tool in entrepreneurship. The discussion included how to design market surveys, collect customer data, and analyze survey results for better business decision-making. This discussion is expected to provide a deep understanding of the importance of data in designing successful business strategies.

2) Utilization of Chat GPT in the Field of Entrepreneurship:

    This material introduced participants to the use of Chat GPT as a tool to support various aspects of

entrepreneurship, such as brainstorming business ideas, creating marketing plans, and composing promotional content. In this session, participants learned how Chat GPT can be used to increase operational efficiency and innovation in business.

3) Augmented Reality Training with Assembler for Entrepreneurial Product Promotion:

In this session, participants were given intensive training on how to use Assembler to create Augmented Reality (AR)-based promotional materials. This training covered the basic techniques of creating attractive and interactive product visualizations with AR to enhance customer engagement with entrepreneurial products.

Table 1. Activity Training Program SMAN 2 Barru

Time	Activities	Activity Methods
08.00 A.M – 09.30 A.M	Opening Ceremony • Opening Remarks by the Head of the Service Team • Opening Remarks by the School Principal	-
09.30 A.M – 10.00 A.M	Material I: Google Form and Google Analytics Training	Lecture and Practice
10.00 A.M – 10.10 A.M	Q&A (Discussion) and Evaluation	Q&A
10.20 A.M– 10.50 A.M	Material II: AI Training with ChatGPT	Lecture and Practice
10.50 A.M – 11.00 A.M	Q&A (Discussion) and Evaluation	Q&A
11.00 A.M – 11.30 A.M	Material III: AR Training with Assembler	Lecture and Practice
11.30 A.M – 11.40 A.M	Q&A (Discussion) and Evaluation	Q&A
11.40 A.M – 12.00 P.M	Closing	-

4) Practical Use of Google Form and Chat GPT in Entrepreneurship:

Participants were invited to practice using Google Form to conduct market surveys and use Chat GPT to analyze survey results and develop business ideas. This practice aimed to provide hands-on experience to participants in effectively using these digital tools in the context of entrepreneurship.

5) Discussion on Product Promotion Techniques Using Augmented Reality:

In this session, participants were invited to discuss strategies and techniques for product promotion using Augmented Reality technology. The discussion involved real case examples of how AR can enhance customer interaction and create a more engaging experience for product promotion.

6) Mentoring in the Practical Use of Chat GPT and AR in Entrepreneurship:

Participants were provided with mentoring in the practical use of Chat GPT and AR technology. This mentoring aimed to ensure that participants could effectively apply these new skills in their business strategies and product promotions.

7) Evaluation of Digital Technology Application in Entrepreneurship:

An evaluation was conducted to measure the extent to which participants could apply the use of Google Form, Chat GPT, and AR in their entrepreneurship activities. This evaluation included assessing participants' abilities in designing surveys, analyzing data, developing business ideas, and using AR for product promotion.

8) Development of a Sustainable Program for Digital Technology Application:

This program will continue to be developed with support from facilitators to ensure the sustainability of digital technology application among participants. Regular evaluations and continued mentoring will be provided to optimize the application of this technology in daily entrepreneurship practices.

3. Result and Discussion

This visible difference across all question groups demonstrates the success of the learning programme in strengthening participants' capabilities in various digital aspects. This significant improvement not only reflects the

improvement in numbers, but also illustrates the transformation of participants' knowledge and skills, as well as increasing their readiness to face challenges in technology-based learning more confidently and competently.

This observed increase is not limited to basic understanding of AI and AR but also includes practical ability in applying this technology to entrepreneurship activities. For example, teachers were trained to use AI to analyze market trends, identify new business opportunities, and design more effective marketing strategies. On the other hand, the use of AR in training was aimed at helping teachers develop more attractive and interactive products, thereby increasing competitiveness in the market.

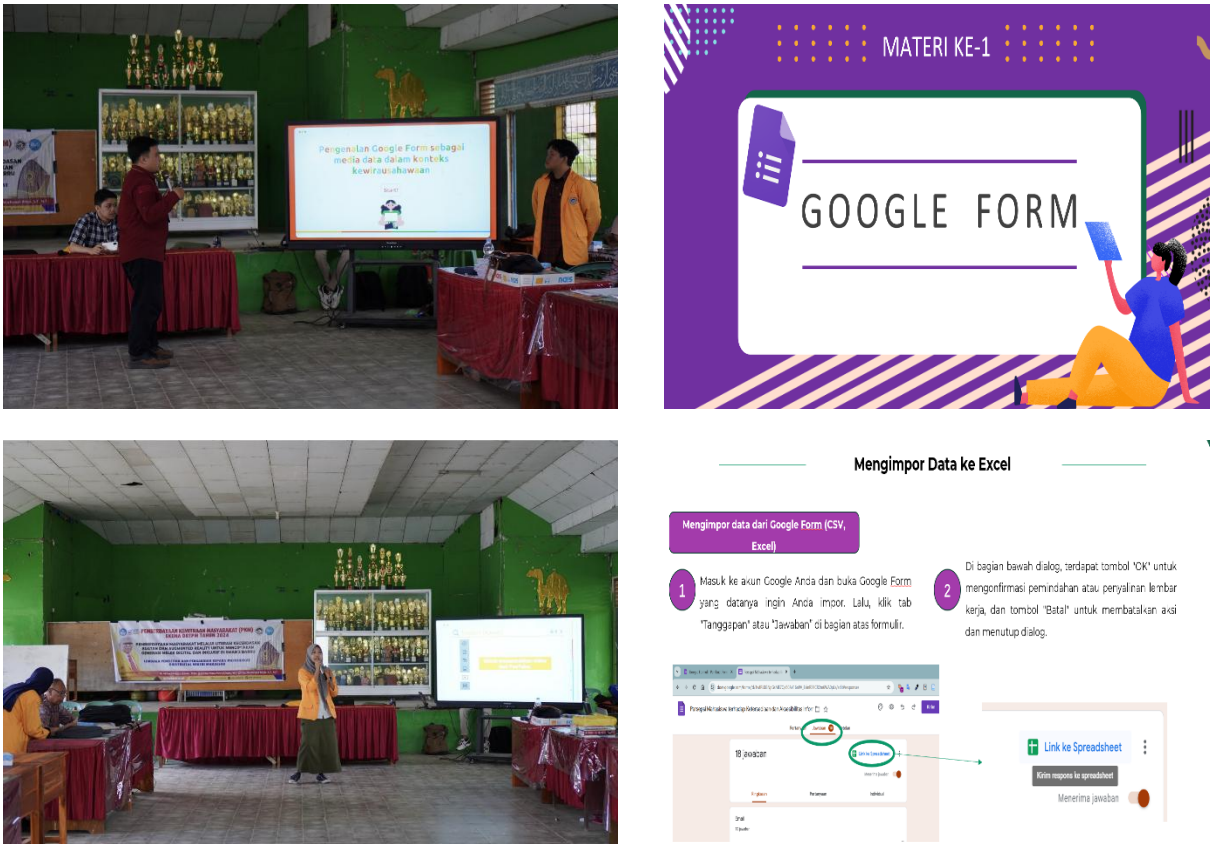

Figure 2. Delivery of G-Form

In addition, the increase in teachers' confidence in teaching using technology is also one of the important results of this training. The teachers felt more prepared to utilize AI and AR technology in daily learning, including in the context of entrepreneurship education. With this capability, they can teach students creative and innovative ways to use technology in creating new products or developing business ideas that will eventually foster an entrepreneurial culture in the school.

However, although this training has proven successful, there are still some challenges in implementing digital technology in schools. Infrastructure limitations, such as the lack of access to adequate technology devices and a stable internet connection, are one of the main obstacles in implementing the knowledge gained from the training (Louie & Slamet, 2021; Permana, 2020). These limitations result in the technology implementation not being fully realized, impacting the expected learning effectiveness.

In addition to infrastructure, the lack of support from the school and other external parties is also a hindrance. Some studies show that the success of digital technology application in education largely depends on strong organizational and external environment support, including supportive education policies and adequate resources to support program sustainability (Firmansyah & Dede, 2022). Fakhri et al. (2024) also emphasize the importance of sustainable mentoring and collaboration between educational institutions and the private sector to facilitate the implementation of

digital literacy programs. Therefore, continuous support from various parties is needed to ensure this program can run effectively.

Figure 3. Practical Use of Assembler Application

To maximize the benefits of this training, several recommendations can be considered. First, the school needs to strengthen existing technology infrastructure by providing broader access to technology devices and the internet. Second, continuous mentoring for teachers in implementing AI and AR technology in learning is necessary so they can continuously improve their competence and adapt to rapid technological changes. (Fathahillah et al., 2023) highlight that a supportive environment and continuous training are key to building teacher readiness in implementing digital literacy and AI integration in education. Third, increasing collaboration between schools, the government, and the private sector to provide better resource support, both in the form of funding and relevant additional training programs, is important to ensure the sustainability and effectiveness of digital technology use in future learning and entrepreneurship (Asih, 2023).

The implementation of this service programme aims to improve participants' understanding and skills in using digital technology, especially through the Gform, ChatGPT, and Augmented Reality (AR) applications. This programme is designed to answer the needs of participants in mastering various digital tools that are increasingly relevant in the modern learning era. Through a series of activities involving interactive and technology-based learning, this programme is expected to improve participants' competence in utilising technology effectively and efficiently.

The results of this programme were measured through a pre-test and a post-test consisting of three groups of questions, each related to the use of Gform (Q1-Q5), ChatGPT (Q6-Q10), and AR (Q11-Q15). Each group consisted of 5 questions with a maximum score of 5 points per question, so each group had a maximum total score of 25 points. The comparison between the pre-test and post-test results provides an overview of the extent to which the participants' understanding and skills have improved after participating in this service programme. The significant improvement seen in each group of questions demonstrates the effectiveness of the programme in strengthening participants' digital competencies, as well as confirming the relevance of using technology in the learning process.

Figure 4 shows the significant improvement in participants' pre-test and post-test results following the learning programme, which included three groups of questions, namely Gform (Q1-Q5), ChatGPT (Q6-Q10), and Augmented Reality (AR) (Q11-Q15). Analysis of the difference between the pre-test and post-test scores revealed a marked improvement in all aspects measured.

Overall, the difference between the total pre-test and post-test scores showed an increase of 12.61 points, from 46.74 to 59.35. In the Gform question group (Q1-Q5), the difference in improvement from pre-test to post-test was 4.67 points, from 15.87 to 20.54. This difference reflects the participants' increased understanding of the material tested using Gform. The ChatGPT question group (Q6-Q10) showed an increase of 4.02 points, from the pre-test mean score of 15.33 to 19.35 in the post-test, indicating that participants had developed better skills and understanding regarding the use of ChatGPT. Meanwhile, in the Augmented Reality (AR) question group (Q11-Q15), there was an increase of 3.91 points, from 15.54 in the pre-test to 19.46 in the post-test, indicating that participants became more skilled in understanding and using AR technology.

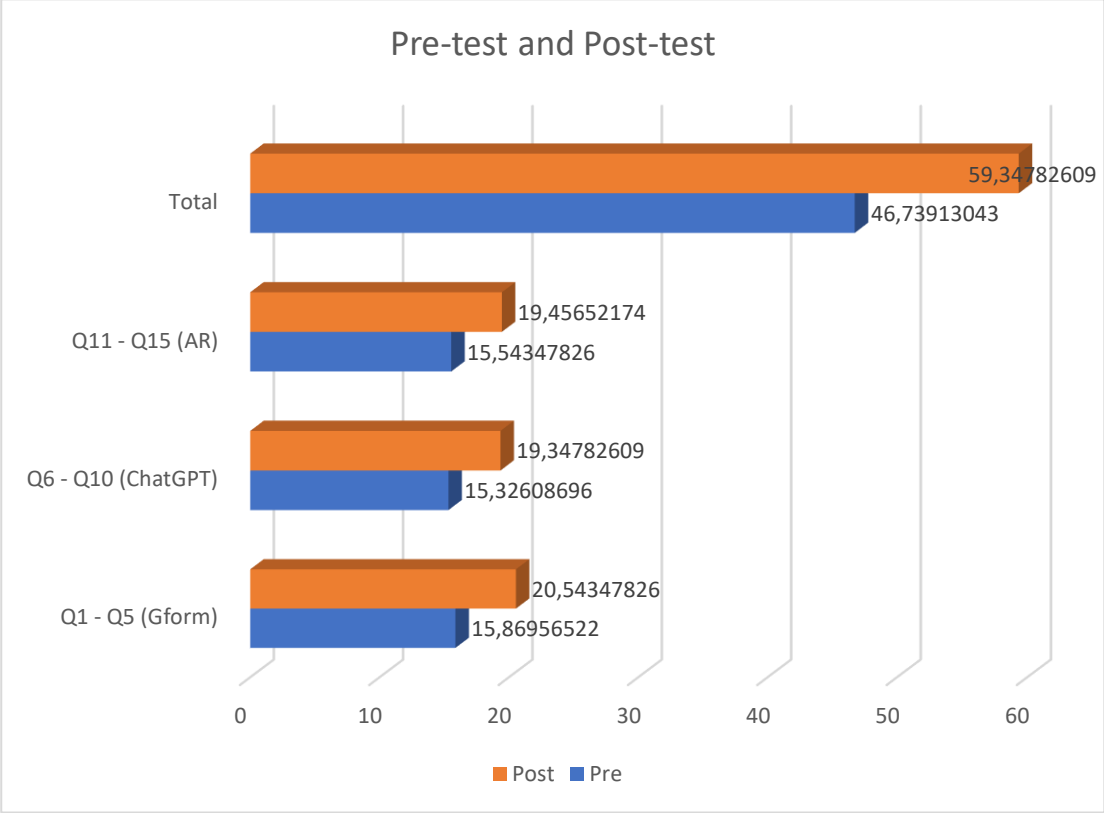

Figure 4. Graph of Pre-Test Results of Teachers of SMAN 2 Barru

4. Conclusion and Suggestions

The AI and AR literacy training program at SMAN 2 Barru successfully improved teachers' digital competence, as evidenced by an increase in pre-test to post-test scores from 73% to 80%. This training also strengthened teachers' confidence in using technology to support entrepreneurship innovation, demonstrating that with the right approach, technology can be effectively integrated into the learning process. However, to achieve more optimal results, attention needs to be paid to the development of technology infrastructure and continuous support from various parties. Therefore, it is recommended that the school strengthen technology infrastructure by providing broader access to digital devices and a stable internet connection. Additionally, continuous mentoring for teachers is necessary to ensure they remain motivated and skilled in applying AI and AR technology in the classroom. Collaboration between schools, the government, and the private sector is also essential to provide adequate resource support, both in the form of funding and relevant additional training programs, to ensure the sustainability and effectiveness of digital technology use in learning and entrepreneurship in the future.

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