Assembler-Edu: Augmented Reality Media to Improve Prospective Teacher Students' Skills

Maryatun Kabatiah[1], Fazli Rachman[2], Abdinur Batubara[3], Sri Hadiningrum[4]

{maryatunkabatiah@unimed.ac.id[1], fazli.rachman@unimed.ac.id [2], abdinurbatubara@unimed.ac.id[3]}

Pancasila and Civic Education Department of Faculty of Social Science,
Universitas Negeri Medan, Indonesia[1,2,3,4]

Abstract. Professional teachers in the 21st century are not only those who can teach well but are also capable of learning, teaching following professional standards to guarantee the caliber of instruction, and successfully utilizing technology in both direct and indirect communication. To maximize the benefits of technology integration in the classroom, educators must gain some understanding. Students' educational experiences are enhanced when they are combined with augmented reality technology and interactive learning materials. The educational process is intimately tied to both teachers' and students' instructional experiences. The purpose of this study is to characterize how well Assembler Edu-based augmented reality enhances the abilities of aspiring teachers. This study uses a one-group pretest and post-test design and is pre-experimental. The study's findings indicated that Assembler Edu-based augmented reality can help aspiring prospective teachers' students' teaching skills especially in developing learning media.

Keywords: Prospective Teacher, Teaching skills, Assembler-EDU, Microteaching

1 Introduction

Educational reform is only possible if teacher quality improves. A strong curriculum cannot be executed and realized unless it is accompanied by strong teaching skills, as instructors are the course planners, implementers, and curriculum developers [1], [2]. The transition from the traditional to the digital information era poses new problems for all existing occupations. This is not unique to the teaching profession, which is changing with the times [3]. Teachers are always expected to adapt to changing situations. This means that the world of learning has adapted to the development of information and communication technologies in the current digital era, which greatly influences student behavior so the formation of the desired character must also be regulated [4]. Considering the complexity of the teacher's role in the learning process, every prospective student teacher, their skills in classroom management should always be trained and developed, so that maximum and professional abilities can be obtained. Basic

ICIESC 2024, September 17, Medan, Indonesia

DOI 10.4108/eai.17-9-2024.2353060

teaching skills (teaching skills) are special abilities or skills (most specific instructional behaviors) that every prospective teacher must have. Through microteaching, basic teaching skills can be learned and trained well [5], [6]. Microteaching is a training concept that can be applied at various phases of improving the competence and profession of education and teaching personnel, including pre-service training for prospective teachers and education and training for in-service teachers (in-service training) [7], [8]. Basic teaching skills refer to a set of fundamental talents or abilities that must be mastered to carry out their educational responsibilities. Teaching abilities that are already good are less than ideal because prospective teacher students have not fully mastered learning methods employing learning media, and most students use presenting media that are produced simply so that they do not explicit a reaction of interest from students.

A professional teacher is shown in his competence and willingness to integrate new technology into the learning process. All teachers must have the ability and expertise to manage classes in a creative and inventive manner, enabling effective learning. To improve the quality of learning, teachers need to acquire several understandings so that technology integration may be carried out properly, also referred to as TPACK (Technological Pedagogical Content Knowledge). With this capacity, teachers may develop dynamic learning experiences that meet the demands of today's students, demonstrating a dedication to successful and relevant learning approaches [9]. TPACK skills are created during the learning process, one of which is related to the usage of learning media. Learning media is used by teachers to clarify the content they wish to transmit to students, hence improving the quality of the learning process and student learning outcomes [10].

This study aims to describe the effectiveness of augmented reality using Assembler Edu to improve the teaching skills of prospective teacher students. Assemblr edu is a software ecosystem created by Assemblr Indonesia Official that aids interactive learning styles with AR features produced, as well as its collaborative use with Assemblr Studio, Assembler Apk, and Assemblr edu [11]. Assembler Edu is an Augmented Reality (AR) platform designed primarily for educational applications. It uses 3D and AR technologies to facilitate learning by creating interactive learning media. The use of augmented reality in learning contributes positively to students' cognitive learning outcomes by allowing them to imagine, which is measured in terms of remembering, understanding, application, and analysis, and has the potential to boost engagement and learning achievement [12], [13]. Technology that allows pupils to easily access information has a significant impact on their ability to think and behave creatively while solving challenges [14]. Interactive learning media has become one of the significant innovations in the field of education [15].

2 Method

This study is a pre-experimental research type with a One-group pretest and post-test design [16]. There are sixteen students enrolled in the Micro Teaching Class served as the study's subjects. The study employed many methods for gathering data, including observation,

interviews, and questionnaires, in addition to teaching assessment sheets as instruments. The learning media sheets include eight components for assessing basic teaching skills: opening lessons, managing classes, providing reinforcement, asking questions, explaining lessons, using learning media, holding variations, and closing lessons. The indicators of the learning media sheets are as follows: Audiovisual (image and light composition), Substance (appropriateness of the media to the teaching theme), Benefits (educational and giving value), and Basic Teaching Skills. On a scale of 5, the assessment results for every component are displayed. The N-gain formula was used to analyze the study data, and the results were transformed into an N-gain conversion table.

3 Result and Discussion

3.1 Result

The purpose of this study is to describe how Assembler Edu's augmented reality might enhance the teaching skills of prospective teacher students. Assembler Edu is an Augmented Reality (AR) platform designed primarily for educational applications. It uses 3D and AR technologies to facilitate learning by creating interactive learning media. One of the most important developments in the world of education is the use of interactive learning materials [15]. To find out the level of effectiveness of Augmented Reality (AR) Based on Assemblr EDU as a Learning Media Innovation in Microteaching Courses, it can be seen through several teaching skills test results for prospective teacher students. First, carry out a quantitative descriptive test. This descriptive test uses initial test data and final test data on media use. The indicators of the learning media sheets consist of Audiovisual (image and light composition), Substance (appropriateness of the media to the teaching theme), Benefits (educational and giving value), and Eight components make up the assessment of basic teaching skills: introducing lessons, running the classroom, giving reinforcement, asking questions, explaining lessons, using learning media, holding variations, and concluding lessons. This effectiveness testing begins by carrying out a pre-test and post-test, then comparing the results of the two tests that have been carried out to determine the level of effectiveness calculated using the gain score against the student's pretest and post-test scores. Gain Score is a comparison of the results of the two tests that have been carried out to determine the level of application effectiveness which is calculated using the gain score formula. Results of the comparison of pretest scores and the students' posttest showed that there was an increase in the results of student teaching skills. The test results obtained are shown in the following diagram in **Figure 1**.

Fig 1. Diagram of Pre-test and Post-test results

All prospective teacher students have a good average score or a conversion score of 4 with a range value of 80-90, so the process can conclude effective, efficient, and meaningful learning. Figure 1 shows that according to the findings of the pretest and posttest, the majority of prospective teachers reported an improvement in learning outcomes and a rise in their teaching skills. However, several of them did not perceive an immediately apparent improvement. By utilizing the N-Gain equation to compare the pretest and posttest values and see the improvement in student learning outcomes, the data analysis results were reinforced. The resulting N-Gain values are displayed in **Figure 2.**

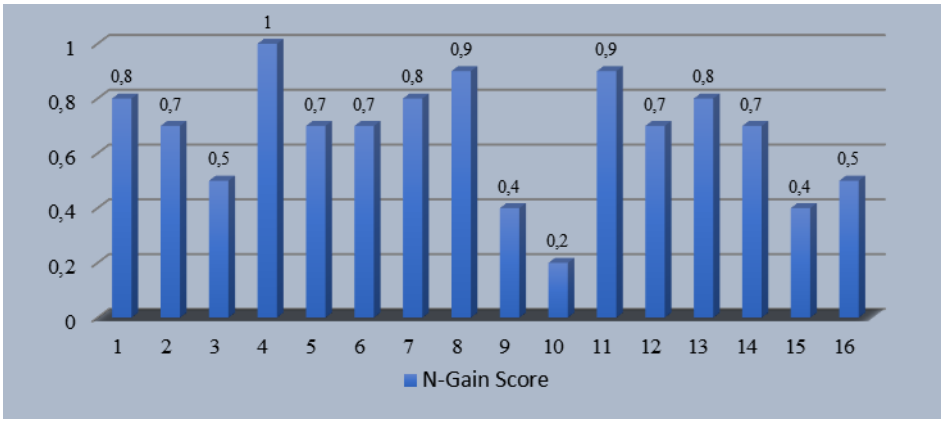

Fig 2. Diagram N-Gain Score

The results of the study concluded that Augmented Reality based on Assembler-Edu can improve the teaching skills of prospective teacher students. This can be seen from the average class N-Gain result of 0.65 with a moderate category. The average score of students' teaching skills during the pre-test was 65.5 (sufficient criteria) while on the post-test it was 81.4 (good criteria). In other words, there is increasing the value of students' teaching skills after giving project-based assignments in the form of using Assembler edu as a learning media innovation.

3.2 Discussion

Prospective teacher students must balance teaching skills with utilizing the latest technology for assistance. This is reinforced by research revealing that most importantly, students in the 21st century need instruction in various technical skills, enabling them to study and learn. The learning process is more interesting and dynamic than purely traditional methods in books and notes. For a prospective teacher, mastery of technology skills, Information, and communication are mandatory nowadays. First, this skill is used as a means to convey information to students according to the lesson material presented. Second, these skills are used as a process of coaching and guidance for students to master technology, information, and communication to improve the quality of sources of human resources in the future. Mastery of 21st-century skills becomes an important part that must be done by teachers at this time.

A creative teacher is a teacher who can create new things in learning. For example when teachers can create resources, self-study, media conversion, and combining media. Teacher creativity in developing and using learning resources consists of utilizing the environment, using objects that children often encounter, and using experience child. The teacher's creative methods are brainstorming and problem-solving. Mixed learning methods include question and answer, brainstorming, field visits or field trips, demonstrations, and assignment methods. Implementation of Augmented Reality (AR) Based on Assemblr EDU in microteaching courses can make learning activities to be more well-planned. Through the Application of AR, prospective teacher students can learn more through direct experience, gain skills in managing learning, and assess the results of the work that has been done. This is important to train students' initiative, independence, and self-confidence in learning. The use of AR can be maximized through the collaboration of Teachers' abilities in technological literacy. As prospective teachers in the digital era, prospective teacher students must have skills in managing or utilizing technology, especially in the use of AR so that teaching materials can be delivered unique, intelligent, innovative, and creative. It is undeniable that the progress of the era requires all those involved in the field of Education, especially teachers, to improve their competence in IPTEK and TPACK. Teachers must not be left behind to be able to teach and educate their students, most of whom are already proficient and skilled in using information technology.

The use of digital learning media in the TPACK-based learning process is one alternative to meet student's needs in the field of technology. One of the latest learning media innovations is Augmented Reality (AR)-based media. Various learning media innovations can be chosen by teachers by adjusting to students' learning needs. Therefore, prospective teacher students need to master this. The primary purpose of learning materials is to assist students in the learning process with or without teachers in the learning process, so the use of education and achievement. media with augmented reality can directly provide learning anywhere and anytime students want to do the learning process. Assemblr EDU's Augmented Reality-Based Learning Media can encourage students' mindsets to think critically about a problem or event in everyday life. In order to make abstract concepts easier to understand, AR learning media can depict them. Additionally, the object model's structure makes AR a more effective medium for achieving

learning objectives. Augmented Reality is used to increase students' desire to learn and their understanding so that it can improve student learning outcomes.

Through modern technology, interactive learning media presents educational material engagingly and interactively, inviting active participation from students with the help of animations, videos, images, and other interactive elements, students can engage in the learning process more enjoyably and profoundly [17], [18], [19]. Learning media using technology with AR approach has been widely used today, and has had a major influence on learning. The use of AR can be maximized through a collaboration of educators' abilities in technological literacy. The advantages of using Assemblr Edu include [20]. (1) Being able to construct visual-based output in three dimensions, this can attract attention and increase curiosity for students, (2) Helping in conveying abstract concepts to be more real so that it makes it easier for students. (3) Ready-to-use content is available that can be used by teachers, this content is available in several forms such as models, diagrams, and even simulations, (4) Teachers can create the desired content, in addition to ready-to-use content, Assemblr Edu also allows its users to construct from scratch according to what is desired, (5) Making learning activities more meaningful, one of which is by using the scan to see feature which allows two-way activities.

The results of the study concluded that prospective teacher students experienced an increase in teaching skills, based on the results of the pretest and posttest, most prospective teacher students experienced an increase in learning outcomes. Although some prospective teacher students did not experience a significant increase. Augmented Reality based on Assembler Edu can improve the teaching skills of prospective teacher students. This can be seen from the average class N-Gain result of 0.65 with a moderate category. Thus, it can be said that Augmented Reality (AR) Based on Assemblr-EDU is an effective Learning Media Innovation in the Microteaching Course. Through Augmented Reality (AR) Learning Media Based on Assemblr-EDU developed by prospective teachers, It is hoped that learning objectives can be achieved effectively and efficiently. The existence of Augmented Reality (AR) learning media based on Assemblr-EDU will help students understand and digest the material studied.

4 Conclusion

Based on the results and discussion above, it can be said that Augmented Reality (AR) Based on Assemblr-EDU is an effective Learning Media Innovation in Microteaching Courses. Through Assemblr-EDU-based Augmented Reality (AR) Learning Media developed by prospective teachers, it is hoped that learning objectives can be achieved effectively and efficiently. With Assemblr-EDU-based Augmented Reality (AR) learning media, it will help students understand and digest the material being studied.

Acknowledgments. Thanks to the efforts of numerous people, the research team has been able to complete this study. In particular, we would like to thank the Vice Rector of Unimed, the Chairman of LPPM Unimed and all of his staff, the Dean and Deputy Dean of the Faculty of

Social Sciences at Unimed, and the Head of the Department who oversees all of the Civic Education Lecturers.

References

[1] Sididk Dja'far, *Konsep Dasar Ilmu Pendidikan Islam*. Bandung: Cita Pustaka Media, 2006.

[2] E. Mulyasa, *Menjadi guru profesional, menciptakan pembelajaran kreatif dan menyenangkan*. Bandung: Remaja Rosdakarya, 2019.

[3] S. Sulastri, H. Fitria, and A. Martha, "Kompetensi profesional guru dalam meningkatkan mutu pendidikan," *Journal of Education Research*, vol. 1, no. 3, pp. 258–264, 2020.

[4] T. Triyanto, "Peluang dan tantangan pendidikan karakter di era digital," *Jurnal Civics: Media Kajian Kewarganegaraan*, vol. 17, no. 2, pp. 175–184, Oct. 2020, doi: 10.21831/jc.v17i2.35476.

[5] Y. Supiyanto and H. Sulistyaningrum, "Meningkatkan Ketrampilan Mengajar Melalui Pengembangan Pembelajaran Microteaching Berbasis Experiential Learning Melalui Peran Model Dan Kelompok," *JPEKA: Jurnal Pendidikan Ekonomi, Manajemen dan Keuangan*, vol. 3, no. 1, p. 33, May 2019, doi: 10.26740/jpeka.v3n1.p33-46.

[6] M. Ardi, "Pelaksanaan Pembelajaran Micro Teaching bagi Mahasiswa Program Studi PPKn STKIP-PGRI Pontianak," *Edukasi: Jurnal Pendidikan /*, vol. 12, no. 1, 2014.

[7] D. Sukirman, "Pembelajaran micro teaching," *Jakarta: Direktorat Jendral Pendidikan Islam Kementerian Agama*, 2012.

[8] D. W. Allen and K. Ryan, *Microteaching*. Sydney: Don Mills.Ontario, 1969.

[9] E. Oktaviana and C. B. Yudha, "Tecnological Pedagogical Content Knowledge (TPACK) Dalam Pembelajaran Abad Ke-21," *Social, Humanities, and Educational Studies (SHEs): Conference Series*, vol. 5, no. 2, p. 57, Jan. 2022, doi: 10.20961/shes.v5i2.58305.

[10] M. W. Andriani and A. Ramadani, "Pengaruh Penggunaan Media Augmented Reality Berbasis Android Terhadap Kemampuan Berpikir Kritis Siswa Kelas Sekolah Dasar," *JUPE : Jurnal Pendidikan Mandala*, vol. 7, no. 2, Jun. 2022, doi: 10.58258/jupe.v7i2.3849.

[11] S. Küçük, S. Kapakin, and Y. Göktaş, "Learning anatomy via mobile augmented reality: Effects on achievement and cognitive load," *Anat Sci Educ*, vol. 9, no. 5, pp. 411–421, Oct. 2016, doi: 10.1002/ase.1603.

[12] A. Syawaludin, Gunarhadi, and P. Rintayati, "Enhancing Elementary School Students' Abstract Reasoning in Science Learning through Augmented Reality-Based Interactive Multimedia," *Jurnal Pendidikan IPA Indonesia*, vol. 8, no. 2, Jun. 2019, doi: 10.15294/jpii.v8i2.19249.

[13] E. N. Qorimah and S. Sutama, "Studi Literatur: Media Augmented Reality (AR) Terhadap Hasil Belajar Kognitif," *Jurnal Basicedu*, vol. 6, no. 2, pp. 2055–2060, Feb. 2022, doi: 10.31004/basicedu.v6i2.2348.

[14] I. Jahnke and J. Liebscher, "Three types of integrated course designs for using mobile technologies to support creativity in higher education," *Comput Educ*, vol. 146, p. 103782, Mar. 2020, doi: 10.1016/j.compedu.2019.103782.

[15] R. A. Liliana, W. Raharjo, I. Jauhari, and D. Sulisworo, "Effects of the Online Interactive Learning Media on Student's Achievement and Interest in Physics,"

Universal Journal of Educational Research, vol. 8, no. 3B, pp. 59–68, Mar. 2020, doi: 10.13189/ujer.2020.081507.

[16] Sugiyono, *Metode Penelitian Kuantitatif, Kualitatif dan R & D*, 13th ed. Bandung: Alfabeta, 2013.

[17] A. H. Pulungan, "The Use of Interactive Learning Media for Teachers in Rural Areas," *Budapest International Research and Critics in Linguistics and Education (BirLE) Journal*, vol. 4, no. 1, pp. 524–532, Feb. 2021, doi: 10.33258/birle.v4i1.1705.

[18] F. Daryanes, D. Darmadi, K. Fikri, I. Sayuti, M. A. Rusandi, and D. D. B. Situmorang, "The development of articulate storyline interactive learning media based on case methods to train student's problem-solving ability," *Heliyon*, vol. 9, no. 4, p. e15082, Apr. 2023, doi: 10.1016/j.heliyon.2023.e15082.

[19] N. Azmi Alwi, I. Parma Dewi, and Y. Fimala, "Peningkatan Pemanfaatan Internet dan Media Multimedia Interaktif Berbasis Articulate Storyline Pembelajaran Tematik Terpadu pada Masa Covid-19," vol. 6, no. 2, pp. 16477–16483, 2022.

[20] Assemblr Studio, "Enliven Ideas in 3D & AR." Accessed: Oct. 17, 2024. [Online]. Available: https://id.edu.assemblrworld.com/how-itworks