



Augmented Reality in Improving Photographing Skills in Educational Technology Students

Hirnanda Dimas Pradana^(✉) and Andi Kristanto

Universitas Negeri Surabaya, Surabaya, Indonesia
hirkandapradana@unesa.ac.id

Abstract. The digital era has penetrated all sectors of the world except education. Augmented reality-based media is one of the products in the digitalization era. Augmented reality can help students in their learning activities. Photographing skills are one of the competencies for students of Educational Technology, Universitas Negeri Surabaya. From the observations made, Education Technology students still need to take pictures. Augmented reality-based media is here to overcome these problems. The results of this product development are augmented reality-based media on photographic materials. In product development, researchers use the ADDIE development model. This development research aims to develop a valid and effective augmented reality media. After all the steps of action have been completed, from design to evaluation, we can say that augmented reality-based press can be used for learning in terms of their validity and effectiveness.

Keywords: Augmented Reality · Skill · Students

1 Introduction

The world of education has entered an era of digitalization and the era of disruption. The period of upheaval requires the development of an open and flexible learning model based on the omnipresence of new technologies [1]. The world of education has entered an era of digitalization and the era of disruption. The period of upheaval requires the development of an open and flexible learning model based on the omnipresence of new technologies [2]. The world of education has entered an era of digitalization and the era of disruption. The period of upheaval requires the development of an open and flexible learning model based on the omnipresence of new technologies [3]. The world of education has entered an era of digitalization and the era of disruption. The period of upheaval requires the development of an open and flexible learning model based on the omnipresence of new technologies [4].

Learning media in digitalization today must also make changes. All physical learning media must be digital-based learning media. Learning in today's era does not need to meet face-to-face [5]. The application of digital technology to facilitate human needs, especially in the field of learning [6], means that education in the digital era also needs to use the media. In an age of digital and disrupted, all kinds of changes have become

things that are always there and happen so fast [7]. In rapid change, teachers and students also need access to learning media to help them learn well. Today, learning at various institutions requires learning media that can help facilitate teaching and learning [8].

From observations made in the Education Technology Study Program at the State University of Surabaya, students find it challenging to carry out learning activities in photography. This is because, in this photography course, no media can accommodate students' complex learning needs. In this digital era, students need learning media that can be used anytime and anywhere [9]. These media are necessary for practical learning in photography courses to be improved. Students need help understanding various techniques for taking pictures. Students need media that can enhance their skills in making photo media [10]. Applying different shooting techniques is a required competency in developing photo media.

Students of the Education Technology Study Program at the State University of Surabaya should have skills in developing digital media. These competencies are competencies that students possess. There is a problem that many students have in developing photos because they need more ability to understand the technique of taking moving pictures and how to practice it. This happens because no media can accommodate students' different learning styles.

Every student has a different learning style. These different learning styles must be facilitated in all learning [11]. Learning styles are not mistakes; learning styles are the diversity that exists in each individual [12]. This diversity must always be maintained and accommodated so that they have the same learning opportunities. Humans are unique. Uniqueness in humans is a gift, and it must be facilitated in any case, including learning [13].

Augmented reality in learning has been proven to be an exciting and valuable learning medium for improving students' skills [14]. Augmented reality is a sophisticated tool for learning that promotes skill improvement [15]. Augmented reality has become a commodity often used to carry instant and precise knowledge. Augmented reality, as a suggestion in the development of learning media, is expected to be a weapon to solve problems in student learning [14, 16].

2 Method

The development method carried out by the researcher uses the ADDIE development method [17]. Researchers chose this development method because this development model is very complex and suitable for digital-based media development [9]. The ADDIE development model can accommodate all the aspects needed to develop digital media. This development model is very complex, and the stages are considered in detail. The ADDIE development model consists of Analysis, Design, Development, Implementation, and Evaluation [18].

The analysis stage in the ADDIE development model is the initial and fundamental stage. This stage is crucial in the development process [19]. This is because the analysis looks at all aspects related to development. In the analysis phase, the researcher saw that students had difficulties understanding the motion picture shooting technique because no learning media available could accommodate students' different learning styles. Currently, we also need media that can be used anywhere and anytime. Considering that this

digital and disruptive era emphasizes learning, it can be done anywhere [1]. Therefore, we need a media that can accommodate learning styles and existential field conditions (i.e., it can be used anytime and anywhere).

The design stage is the second stage in the ADDIE development model. In the design stage, the researcher describes the specifications of the media developed [20]. The media developed is an application that integrates Augmented Reality (AR) technology through several markers [3]. The quality in the expanded press serves as a bridge to show how to take moving images in photography. This media requires a smartphone that uses Android OS Jelly Bean. In the developed media, markers have been provided and operated by students as intermediaries.

The development stage is crucial in developing media [21]. In the media in which some photos are integrated with augmented reality technology, at this stage, researchers make prototypes of products that are useful for learning [22]. Development stage is the realization of the design that has been made by the researcher [23]. The development stage is a benchmark for whether the product is created well [24]. Researchers develop gradually according to the flow of the ADDIE model [25]. At the development stage, the product needs to be consulted with experts. In this case, the appointed expert is an expert in photographic materials and a media expert.

The implementation stage is where the product developed is tested [26]. At this stage, the researcher conducts trials on the targets of the developed prototype [27]. This trial was conducted on students of the Education Technology Study Program at the State University of Surabaya. This trial is used to see whether students can appropriately use the developed product to overcome their problems. The test is a step that needs to be taken by researchers, considering that before a product is massively disseminated, it is necessary to conduct an intense experiment so that it can be seen how the product being developed performs [28].

The next stage is the evaluation of the developed product [29]. In this development, the developer only evaluates up to the formative evaluation stage. Researchers conduct a formative assessment to determine the quality and quality of the system that has been developed. The development of this system has included three formative assessments: material experts, media experts, and students. This data is used as the basis for improving the products that have been developed [30].

3 Result and Discussion

3.1 Result

Augmented reality-based media developed in photography courses has become an innovation in education. The results of this product development are augmented reality-based press that can be used in photography courses. The developed media can bring positive changes in the world of learning for Education Technology students. The diverse learning styles of students and the digital era are the basis for the product development carried out. Students' various learning styles can be well accommodated in learning that applies augmented reality technology.

To measure the feasibility and effectiveness of the developed media, the researchers collected data from material experts, media experts, and students. To determine the

feasibility level of a press, validation from various experts is needed. These experts were asked to fill out a helpful questionnaire for researchers to prove the product being developed. Experts' input will be used as raw material to perfect the generated augmented reality media. Before conducting trials with students, researchers asked for as much detail as possible for input from experts to ensure maximum results before the media was tested. Trials are needed to get students' input to improve the developed media.

The first step the researchers took was to validate the augmented reality media to media experts. Based on the assessment of media experts, a score of 89.30% was obtained. The score can be categorized as valid. So, in terms of media feasibility, it can be classified as valid. In addition to quantitative data, researchers also received input from media experts regarding the products developed, including (1) icons in the application made in harmony with photography, for example, camera images or the like; (2) barcodes were made more attractive, they could use a combination of colors and images (3) Broadly speaking, the augmented reality media developed can be said to be feasible to use.

In the next step, the researcher asked for recommendations from material experts for the developed product. Based on the assessment of content experts for augmented reality media, the percentage figure is 92.03% and is included in the valid category. Researchers get input from material experts to improve the media so that it is better than before. The information from content experts is to add moving pictures. Students can take good photos using the Panning technique.

In the next step, the researchers conducted individual trials on students. Subjective tests were conducted with three students as users of the developed media. From the results of personal trials, the percentage score was 88.92% and was categorized as valid. In addition to conducting individual tests, researchers conducted small group trials. In a small group trial, the developer selected six students as targets. The data from the small group trial results obtained a percentage figure of 85.71%. These numbers can be grouped into valid categories. Next, the researcher conducted a field trial and received an assessment from 35 students. From the questionnaire results, the media developed got a score of 82.10% and was included in the valid category. From the overall assessment that the developer has done, a conclusion can be drawn that the augmented reality media developed is feasible for use in learning.

3.2 Discussion

The research that has been done also looks at the product's effectiveness in developing students' skills in taking pictures. The effectiveness trial was obtained by comparing the pretest and posttest scores obtained by students. The results of student skills in using cameras are much better than before using augmented reality media. Students who initially had difficulty applying photo media composition knowledge found that the resulting image composition results were better after using this media. In addition, students who have difficulty performing various shooting techniques in the field of photography find that after using this media are more proficient than before.

To measure the feasibility and effectiveness of these adaptive learning teaching materials, researchers collected various data from material experts, media experts, individual trials, small group tests, and field tests. Material experts, media experts, and students

provide constructive input so that the products developed are valid and suitable for use in learning. These inputs will be material for developers to revise the product.

4 Conclusion

The product developed is in the form of augmented reality-based media that can be used to improve students' skills in taking pictures. The developed augmented reality consists of applications that can be used on smartphones and a QR code that is used as a bridge to display the developed media. Augmented reality-based media is flexible because students can use it in various conditions. So, using adaptive learning teaching materials is not only in the classroom. Augmented reality-based media can help students improve their photography skills in photography courses.

To determine augmented reality media's achievement level in helping students in their learning activities, the researchers conducted a feasibility test. They tested the effectiveness of this developed product. Based on the developer's feasibility tests with material experts, media experts, and students, it can be seen that augmented reality media can be categorized as valid.

In looking at the effectiveness of the products developed, the researchers conducted questions and answers and saw the photos taken by students. This shows a significant difference in the images produced by students after using augmented reality media. After all the development processes are carried out, from design to evaluation, a conclusion can be drawn that augmented reality media can be said to be suitable for use in learning, both in terms of validity and effectiveness.

References

1. R. Bloomfield, H. Khalaf, P. R. Conmy, and G. Fletcher, "Disruptive Innovations and Disruptive Assurance: Assuring Machine Learning and Autonomy," *Computer (Long Beach Calif.)*, vol. 52, no. 9, 2019, <https://doi.org/10.1109/MC.2019.2914775>.
2. A. Kristanto, Sulistiowati, and H. D. Pradana, "Brain-Based Online Learning Design in The Disruptive Era for Students in University," *J. Educ. Soc. Res.*, vol. 11, no. 6, p. 277, 2021, <https://doi.org/10.36941/jesr-2021-0147>.
3. J. C. Sanabria and J. Arámburo-Lizárraga, "Enhancing 21st-century skills with AR: Using the gradual immersion method to develop collaborative creativity.," *Eurasia J. Math. Sci. Technol. Educ.*, vol. 13, no. 2, pp. 487–501, 2017, <https://doi.org/10.12973/eurasia.2017.00627a>.
4. Y. Helsa, Y. Ariani, and A. Kenedi, "Digital Class Model in Mathematics Learning in Elementary School Using Social Learning Network Schoology.," vol. 3, no. 2, p. 6, 2021, <https://doi.org/10.4108/eai.4-11-2020.2304599>.
5. P. Ajibade and S. M. Mutula, "Virtual learning: a disruptive service in academic libraries.," *Libr. Hi-Tech News*, vol. 38, no. 1, 2021, <https://doi.org/10.1108/LHTN-07-2020-0067>.
6. R. Huang, J. M. Spector, J. Yang, and A. W. Garnar, "Educational technology: a primer for the 21st century." *In Springer, Springer*, 2019, <https://doi.org/10.4324/9780203735657-8>.
7. L. M. Camarinha-Matos and H. Afsarmanesh, "A Roadmapping Methodology for Strategic Research on VO," in *Collaborative Networked Organizations*, Boston, MA: Springer, 2004, pp. 275–288.

8. M. Chauca, Y. Phun, O. Curro, C. Chauca, R. Yallico, and V. Quispe, "Disruptive innovation in active activity-based learning methodologies through digital transformation." *Int. J. Inf. Educ. Technol.*, vol. 11, no. 4, 2021, <https://doi.org/10.18178/ijiet.2021.11.4.1512>.
9. D. Handayani, I. Elvinawati, and M. Alperi, "Development Of Guided Discovery Based Electronic Module For Chemical Lessons In Redox Reaction Materials. International," *Int. J. Interact. Mob. Technol.*, vol. 15, no. 07, pp. 94–106, 2021, <https://doi.org/10.3991/IJIM.V15I07.21559>.
10. T. Alodwan and M. Almost, "The Effect of a Computer Program Based on Analysis, Design, Development, Implementation, and Evaluation (ADDIE) in Improving Ninth Graders' Listening and Reading Comprehension Skills in English in Jordan.," *English Lang. Teaching*, vol. 11, no. 4, p. 43, 2018, <https://doi.org/10.5539/elt.v11n4p43>.
11. S. A. Awolola, "Effect of the brain-based learning strategy on students' achievement in senior secondary school mathematics in Oyo State, Nigeria.," *Cypriot J. Educ. Sci.*, vol. 2, pp. 91–106, 2011, [Online]. Available: https://www.researchgate.net/publication/268400987_Effect_of_brain-based_learning_strategy_on_students%27_achievement_in_senior_secondary_school_mathematics_in_Oyo_State_Nigeria.
12. F. Shirazi and S. Heidari, "The relationship between critical thinking skills and learning styles and academic achievement of nursing students.," *J. Nurs. Res.*, vol. 27, no. 4, 2019, <https://doi.org/10.1097/jnr.0000000000000307>.
13. T. Cavanagh, B. Chen, R. A. M. Lahcen, and J. Paradiso, "Constructing a Design Framework and Pedagogical Approach for Adaptive Learning in Higher Education: A Practitioner's Perspective. The" *Int. Rev. Res. Open Distrib. Learn.*, vol. 21, no. 1, pp. 172–196, 2020, <https://doi.org/10.19173/IRRODL.V21I1.4557>.
14. A. B. N. Putra, M. R., N. A., Ulfatin, M. Tuwoso, Subandi, H. S., and A. K. Muhammad, "The Innovation of Disruptive Learning Media with Augmented Reality-Based 3D Object Concept with Drill Machine Design to Improve the Quality of Distance Learning in The Era of Education 4.0.," *Int. J. Interact. Mob. Technol.*, vol. 15, no. 12, 2021, <https://doi.org/10.3991/ijim.v15i12.21579>.
15. R. Gusmida and N. Islami, "The Development of Learning Media for the Kinetic Theory of Gases Using the ADDIE Model with Augmented Reality.," *J. Educ. Sci.*, vol. 1, no. 1, pp. 1–10, 2017, <https://doi.org/10.31258/jes.1.1.p.1-10>.
16. A. Syawaludin, Gunarhadi, and P. Rintayati, "Development of augmented reality-based interactive multimedia to improve critical thinking skills in science learning.," *Int. J. Instr.*, vol. 12, no. 4, 2019.
17. C. M. Budoya, M. Kissaka, and J. Mtebe, "Instructional Design Enabled Agile Method Using ADDIE Model and Feature Driven Development Process.," *Int. J. Educ. Dev. Using Inf. Commun. Technol.*, vol. 15, no. 1, pp. 35–54, 2019.
18. A. Nurafni, H. Pujiastuti, and A. Mutaqin, "Pengembangan Bahan Ajar Trigonometri Berbasis Kearifan Lokal.," *J. Medives J. Math. Educ. IKIP Veteran Semarang*, vol. 4, no. 1, p. 71, 2020, <https://doi.org/10.31331/medivesveteran.v4i1.978>.
19. F. Y. Irsyadi, D. Al, Puspitassari, and Y. I. Kurniawan, "ABAS (Ayo Belajar Sholat): Game Edukasi Pembelajaran Sholat Untuk Anak Tuna Rungu Wicara.," *J. Mana-jemen Inform.*, vol. 9, no. 1, pp. 17–28, 2019, <https://doi.org/10.34010/JAMIKA.V9I1.1537>.
20. A. Faqih and F. A. Pratama, "Pengembangan Adaptive Learning Berbasis Multime-dia 3D Materi Sistem Bilangan Real. Prosiding Seminar Nasional Unimus, 2(0).," *Pros. Semin. Nas. Unimus*, vol. 2, 2019.
21. M. Arsanti, "PENGEMBANGAN BAHAN AJAR MATA KULIAH PENULISAN KREATIF BERMUATAN NILAI-NILAI PENDIDIKAN KARAKTER RELIGIUS BAGI MAHASISWA PRODI PBSI.," *J. Ilm. Ba-hasa Dan Sastra*, vol. 1, no. 2, pp. 68–88, 2018, <https://doi.org/10.24176/KREDO.V1I2.2107>.

22. S. Idris, T. Malim, W. Ab, A. Wan, G. Development, and K. Jeli, "Adaptation of the ADDIE instructional model in developing an educational website for language learning." *Glob. J. Al-Thaqafah*, vol. 8, no. 2, pp. 7–16, 2018.
23. M. V. and B. S. |Saragih Sahat|Sinaga, "Development of Learning Materials Oriented to Problem-Based Learning Models to Improve Students' Mathematical Problem Solving Ability and Metacognition Ability," *Int. Electron. J. Math. Educ.*, vol. 14, no. 2, pp. 331–340, 2019.
24. G. Amirullah and R. Hardinata, "Pengembangan Mobile Learning Bagi Pembelajar-an.," *JKKP (Jurnal Kesejaht. Kel. Dan Pendidikan)*, vol. 4, no. 02, pp. 97–101, 2017, <https://doi.org/10.21009/jkkp.042.07>.
25. J. Friadi, R. Ganefri, and R. Efendi, "Development of product-based learning-teaching factory in the disruption era." *Int. J. Adv. Sci. Technol.*, vol. 29, no. 6, 2020.
26. A. M. Sayekti and Suparman., "Development of PJBL-based LKPD with STEM approach design to improve critical thinking skills. International Journal of Scientific and Technology Research, 9(3)." *Int. J. Sci. Technol. Res.*, vol. 9, no. 3, 2020.
27. R. M. Branch, *Instructional design: The ADDIE approach*, vol. 722. Springer Science & Business Media, 2009.
28. N. J. Fratiwi *et al.*, "Developing memory on Newton's laws: For identifying students' mental models.," *Eur. J. Educ. Res.*, vol. 9, no. 2, 2020, <https://doi.org/10.12973/eu-jer.9.2.699>.
29. B. P. Syafina and Suparman., "Designing student worksheets to improve critical thinking ability based on problem-based learning." *Int. J. Sci. Technol. Res.*, vol. 8, no. 10, 2019.
30. B. Baiduri, B., Taufik, M.-, and L.-. Elfiani, "Pengembangan Media Pembelajaran Pop-Up Book Berbasis Audio Pada Materi Bangun Datar Segiempat Di Smp.," *AKSI-OMA J. Progr. Stud. Pendidik. Mat.*, vol. 8, no. 1, pp. 248–216, 2019, <https://doi.org/10.24127/ajpm.v8i1.1951>.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

