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The Development of Digital Books Aided Augmented Reality (AR) to Improve Self Efficacy in Favor of Distance Learning

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Abstract

This study aims to create a Digital Book mathematical economics to improve the self-efficacy of students, where Media Powtoon, Augmented Reality (AR) and application Kahoot already present in the design of digital books. To see the feasibility of the book, the attractiveness of the book and the effectiveness of using AR-assisted Economic Mathematics Books to increase student self-efficacy. The research method used in this research is the development of the ADDIE model which has five stages of research implementation, namely Analysis, Design, Develop, Implement, and Evaluate. Through these five stages, researchers will develop an AR-assisted Mathematics Economics book. In this book, several applications will collaborate in providing the presentation of the material in the form of learning videos using the application Powtoon, displaying animations with Augmented Reality (AR) and evaluating learning outcomes using the application

Kahoot, so that this book can help the distance lecture process become more interesting. and effective both in presenting the material, the media used to evaluate learning in lectures. The results of this study show that the Digital Book was developed to conclude that it is feasible, interesting and effective to be used as a distance learning medium and helps students in increasing self-efficacy in learning.

Keywords: Digital Book, Augmented Reality, Self Efficacy, Augmented Reality (AR).

1. Introduction

Along with the development of technology, information and communication that is growing rapidly, learning resources must also be able to display interactive presentations by collaborating between video, animation, audio, and images into a more interesting media where the combination can make learning resources more interactive and interesting. more innovative than ever. The presence of technological devices contributes to the quality of education, as we have seen for ourselves. This applies to the campus where we teach. Most of the teaching staff utilize the use of technology in learning and communicating with students, either using email or other social media. About 73% of students from higher education in the United States said that they could not learn without the help of technology, while 38% of higher education students said they could not spend 10 minutes without checking email, tablet, laptop, or smartphone. In addition, 91% of students said that they used to communicate via email with the teachers.

The reality on the ground shows that it is rare for our students to have textbooks other than books that are required by their lecturers to have textbooks as references and references used when conducting lectures. Based on this experience, students rarely read textbooks due to several factors, namely 1) Material the lectures in the textbooks are less interesting and present more theories which are quite boring to read, 2) the media or pictures presented in the textbooks are also not interesting and boring to see, 3) the design of the textbooks is also not good enough. causes students to be less interested in using the given textbook, 4) Evaluation or discussion of questions in the textbook is often not understood and does not connect with the material in the subject matter.

The development of this digital book is not only a series of material texts, pictures and tables, but also the creation of a digital book with the help of a flipbook with the addition of an evaluation link packaged in the kahoot application in accordance with the current Indonesian economic phenomenon, equipped with virtual videos related to learning materials for each Augmented Reality (AR) materials and media and can complement the previously abstract learning process to become more real. So this digital book that is designed to make learning simpler, interactive, interesting and easy to understand, of course all of this can facilitate, increase student self-efficacy when carrying out distance learning processes.

Seamolec (2013: 231) and Noorhidawati & Giib (2008) in Mawarni (2016) state that being able to read digital books requires an ebook reader such as a personal computer or an ebook reader type that allows publishers and software developers to use a format that can be read by devices. anywhere and use a variety of digital book reader software. Digital books are often referred to as e-books or can also be referred to as digital textbooks which

basically have one thing in common, namely they both use digital devices.

Learning media using Augmented Reality technology can easily increase student self-efficacy because 3D objects, text, images, videos, audio can be displayed to students in real time stated by Abbas Abdoli Sejzi (2015). Students can be involved interactively, which causes Augmented Reality to be a learning medium that can provide feedback to students so that students get comfortable using the media. The development of mobile device technology, Augmented Reality has entered various fields conveyed by Martin Owen, Sue Owen, Mario Barajas, Anna Trifonova (2013) namely In the field of education, Augmented Reality has been widely used as a research tool in the laboratory and can also be used as a learning medium. in the classroom. Augmented Reality technology makes it possible to incorporate virtual objects into the real environment and assign appropriate information to the surrounding environment. By using Augmented Reality technology, learning materials supported by interactive media will make learning more interesting.

Through the combination of several media, students feel an attitude or feeling confident about their own abilities so that the person concerned is not too anxious in his actions, can feel free to do things he likes and is responsible for his actions, warm and polite in interacting with others. Other people can accept and respect others, have the drive to excel and recognize their strengths and weaknesses, which is the statement of Peter and According to Gibson et al., (1997) in his book.

2. Research Method

This research was conducted at the Medan State University in the Odd semester of FY. 2021/2022 with the research subject being students majoring in Mathematics Education in semester 5 (five). The data collection techniques carried out in this study were validation sheets from material experts and media experts for self-efficacy questionnaires were analyzed using normality, homogeneity and hypothesis testing. The research method used in this study is the development of the ADDIE model (Analysis, Design, Develop, Implement, and Evaluate) developed by Reiser and Mollenda.

Figure 1 – ADDIE Stages.

3. Results

1. **Initial stage**

In the initial activity, the researcher conducted a preliminary study related to the development of a digital book that would be used as a learning resource in economics mathematics lectures. The development of this digital book is not only a series of material texts, pictures and tables, but the creation of a digital book with the help of an additional flip book in the form of an evaluation link packaged in the Powtoon application, hots questions according to the current Indonesian economic phenomenon, virtual videos related to material. learning for each material and Augmented Reality (AR) media to complete the previously abstract learning process to become more real, followed by determining the method and problem formulation how to design AR-assisted digital books to increase self-efficacy in supporting distance learning in the new normal era, and how the feasibility and effectiveness of the digital book in learning.

2. **Implementation Stage**

Furthermore, digital books assisted by AR to increase self-efficacy in supporting distance learning were developed which had previously been validated for validators

showing an average of 3.53 on a scale of 4, which indicates that the learning media that have been developed in the very category of worthy. The results can be seen as follows:

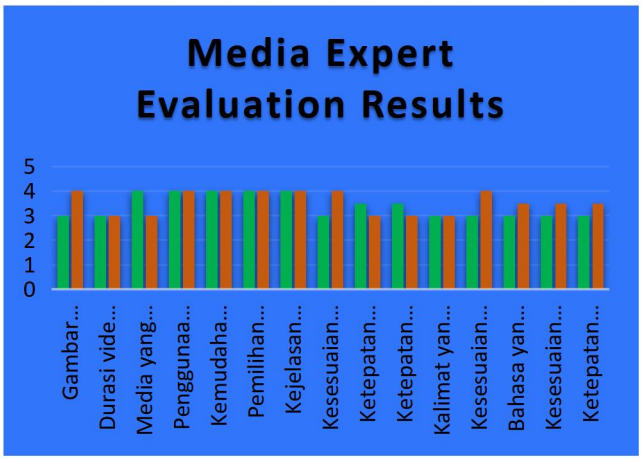


Figure 2 – Media expert evaluation results

Results of the validation of the learning materials that have been assessed show an average of 3.94 on a scale of 4, indicating that the learning materials that have been developed are in a very feasible category, with the following results:

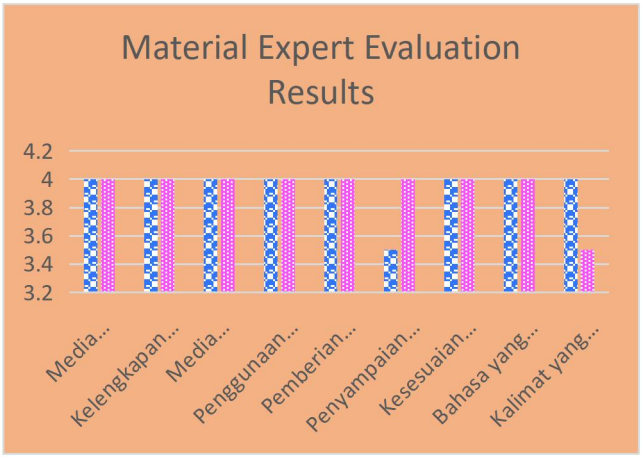


Figure 3 – Material Expert Evaluation Results

After expert validation and the media continued with a trial for 5th semester students majoring in Mathematics Education at the Faculty of Mathematics and Natural Sciences, Medan State University, the trial will be carried out in 2 stages, namely a small group trial which will involve 5 students and a large group trial which will involve 40 people. Students. The trial conducted was aimed at seeing the attractiveness of the digital book being developed. Trial of test questions was also carried out to assess the effectiveness of the development of the digital book. Where the test questions are tested in two classes. One control class that did not get a product trial, and the other class was an experimental class which was a product trial class.

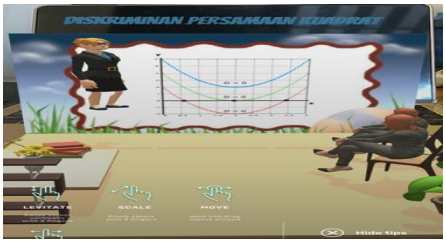
The trial was carried out 2 times, namely small-scale trials and large-scale trials or field trials to be able to determine the level of attractiveness of electronic books by distributing self-efficacy questionnaires. In small-scale product trials, the average result is 3.43. Meanwhile, in field trials or large-scale trials, the average result was 3.52. So it can be concluded that AR-assisted e-books to improve student self-efficacy in distance learning meet the attractiveness criteria so that it is said to be feasible to be implemented in 5th semester mathematics students majoring in Mathematics Education Unimed.

Seeing the effectiveness of e-books, it is measured from the test of 5th semester mathematics student learning outcomes majoring in Unimed Mathematics Education. By giving a post test to students who use e-books and students who do not use e-books, which aims to see if there is a difference between the experimental class (electronic book trial class) and the control class (non-tested class). Based on the data analysis as well as the calculations that have been carried out, the normality and homogeneity tests in the final test (post test) show that the sample from the population is normally distributed and has the same variance, with that conclusion the t-test can be performed. The results of hypothesis testing are obtained that tcount = 2.154 ttable = 2.0821 is accepted, so it can be concluded that student learning outcomes using electronic books have an average higher than the average control class learning outcomes. This states that there is a difference between the experimental class and the control class.

3. Final Stage

The electronic book used is an AR-assisted economic mathematics electronic book to see students' self-efficacy in doing distance learning. With the existence of electronic books with the help of AR media, it increases students' confidence when carrying out the learning process in the classroom where so far the learning that has taken place has been using monotonous textbooks with a mediocre appearance. In addition, the advantage of this book itself is that it is equipped with interesting and more real AR media so that it gives a new atmosphere to the learning process. Electronic books with the help of AR media can also help reduce paper usage and make it easier for users to access them anytime and anywhere through electronic media such as computers, laptops, cellphones, android, iPhone, iPad and other technologies based on this AR-assisted economic mathematics electronic book to improve self-esteem. Efficacy to support distance learning is quite effective in distance learning. The following can be seen from the results of digital books that have been completed and have been tested.

Figure 4 – Digital book cover and digital book display



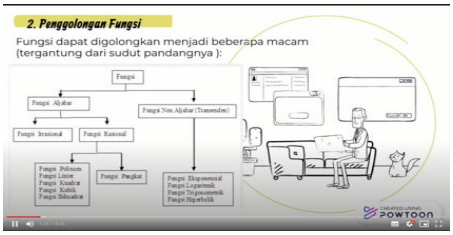


Figure 5 –AR media display, Kahoot and Powtoon

With AR-assisted economic mathematics electronic books to increase self-efficacy to support distance learning, it is quite effective in online learning, blended learning, and offline in this new normal era .

Conclusion

From the results of the research that has been carried out with the title of developing this AR-assisted digital book, it can be concluded:

1. This development research creates a product in the form of an AR-assisted digital book on economics to improve self-efficacy in supporting distance learning.
2. The creation of this digital book was designed using the ADDIE development model. The material presented in this digital book is material according to the curriculum content for economics mathematics courses.
3. The developed economic mathematics digital book is declared very feasible in terms of material or media. For the assessment of the effectiveness obtained from the questionnaire, it also shows that the criteria are very feasible both in trials and large-scale trials. Referring to the results of the questionnaire, it can be seen that the experimental class or trial class has a greater influence on self-efficacy in learning using AR-assisted digital books compared to the control class, so there are differences in learning outcomes between students using AR-assisted digital books and students who do not use AR-assisted digital books. This can be seen from the average results per class. Where the experimental class has a higher average value than the control class. The data above shows that the Digital Book was developed to conclude that it is feasible, interesting and effective to be used as a distance learning medium and helps students in increasing self-efficacy in learning.

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