The Validity of Green Business Book Using Augmented Reality Technology to Improve the Learning Outcome in Entrepreneurship Study Program

Sabda Dian Nurani Siahaan[1], Dede Ruslan[2], Miftah El Fikri[3], and Lenti Susanna Saragih[4]

{sabda@unimed.ac.id[1], drasruslan@yahoo.com[2], miftahhelfikri@unimed.ac.id[3], lenti@unimed.ac.id[4]}

Universitas Negeri Medan, Indonesia[1234]

Abstract. One of the key factors in implementing education is the availability of teaching materials or books. With advences in technology, now textbooks can be accessed online or known as e-books (electronic books). This research was conducted at the Unimed Entrepreneurship Study Program. The problem faced by this study program is that there are still limited teaching materials in several courses, one of which is the Green Business course. The aim of this research is to develop an Android-based electronic flipbook equipped with augmented reality technology, which is valid, practical and effective in improving literacy and student learning outcomes. This research is development research (Research and Development or RnD) using the Plomp Model. The data analysis technique used in this research focused on validity testing.

Keywords: Flipbook, Augmented Reality, Green Business.

1. Introduction

Modern human life today is very dependent on technology, information and communication. One of the key elements in education is the availability of open materials, including books. With advances in technology, open books are now available in digital form or what are often called e-books. This e-book makes the learning process more effective and efficient because it can be taken anywhere, and can be accessed anytime and anywhere. This is very in line with the lifestyle of the millennial generation who likes to use smartphones. Today's pupils and students more often search for information via smartphones rather than using printed books or newspapers, take notes on lessons on smartphones, and rarely use book notes. In fact, they prefer to do assignments using smartphones rather than computers or laptops.

Another fact is that nowadays reading literacy is also decreasing. The survey found that Indonesian society still has a low literacy culture. Based on the Program for International Student Assessment (PISA) study, Indonesia is ranked 57th among the countries surveyed [1]. According to [2] one of the causes of this is the habit of using gadgets, the vast and unlimited amount of information that can be accessed or entertainment and games so that interest in reading decreases because it is considered less interesting. Therefore, increasing reading

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literacy is something that needs attention because reading is a way to open your horizons of thinking.

This research was conducted at the Entrepreneurship Study Program, Universitas Negeri Medan. The problem faced in this study program is the lack of teaching materials available for the courses being held. One of the mandatory courses offered is Green Business, which aims to provide students with knowledge and experience about the importance of entrepreneurship by paying attention to environmental sustainability. Being an entrepreneur is not just about making a profit, but you also have to consider the impact on the environment. This course is very interesting and applicable because at this stage, students have entered the entrepreneurial phase with a focus on profits as well as preserving the environment. However, until now, lecturers do not have books or special teaching materials to teach this course. Although Green Business teaching materials can be found from other sources, books on this topic are still very rare and difficult to find. Therefore, making a Green Business book is very necessary so that lecturers have guidance in teaching in class.

Apart from the absence of Green Business books, another problem faced is the absence of digital teaching materials (e-books) as visual learning media that can be used by students. So far, lecturers have only provided learning resources by Power Point (PPTs), videos from Youtube and journals. However, unstable internet connections often make it difficult for lecturers to show Youtube videos directly in class. As a result, the lecturer must download the video first and play it in front of the class, with the note that the lecturer must bring a speaker so that all students can hear it. This method is less effective and impractical because videos that have been downloaded may be lost and cannot be used again for lectures in the following semester.

One of the topics discussed in the Green Business course is environmentally friendly renewable energy, such as solar, wind and water energy. Even though this topic is very interesting, the results of interviews with several students showed that they felt that the delivery of the material was not optimal. Students only read PPT without the help of other visual media, which makes their understanding of the topic less in-depth and tends to be abstract. Currently, students need more visual teaching so they can understand the material better.

Based on this problem, it is necessary to create a digital-based book (e-book) which can contain videos that can be accessed offline, case study articles, and scientific journals. Lecturers can also include a quiz link, so that students can take the quiz, and the results can be corrected automatically. To provide e-books with this model, it is called Flipbook. Flipbook is a media in electronic format that combines animation, text, video, images, audio and navigation which makes students more interactive and learning more interesting [3]. Apart from that, the images in the book must be presented in a more realistic way (3D) so that students gain direct experience of seeing moving images. 3D based books are called Augmented Reality. Augmented Reality (AR) is a technology that can combine 2 or 3 dimensional virtual objects with the real world in real time [4]. The combination of flipbook-based e-books and augmented reality is an ideal combination to increase the availability of

textbooks in Green Business courses. This e-book will also be designed to be Android-based, so students can use it directly on their smartphones.

Based on the background above, the researcher is interested in conducting research with the title "Preparing Android-Based Electronic Flipbooks (E-Books) Using Augmented Reality Technology in Green Business Courses". Ultimately, it is hoped that making this e-book can improve student literacy and learning outcomes.

2. Theoretical Review

2.1 Electronic Flipbook

E-book (Electronic Book) is a digital file containing text and images that is distributed electronically and can be read using a special device screen [5]. E-books are easier to use because they can be accessed anytime and anywhere. Along with increasingly rapid technological developments, e-books now come with various advanced features. One of the more visual forms of e-books is the flipbook. Flipbook is an electronic book that can display sound, video and animated images, thus providing a more interactive and real reading experience [6]. The presence of flipbooks is very useful, especially because the curriculum implemented at Universitas Negeri Medan prioritizes case study-based learning (case method). By using flipbooks, lecturers can load various current and contextual case studies, as well as scientific journals that students can read and explain.

2.2 Augmented Reality Book

Augmented Reality (AR) is a technology that allows two-dimensional or three-dimensional virtual objects to be combined with the real world in real-time [7]. In simple terms, augmented reality technology is a combination of virtual objects with real objects. The use of Augmented Reality (AR) technology has great potential in the world of education through its application to teaching materials. AR-Books generally consist of two main components. The first component is a book that is equipped with a quick response code (QR code) on almost every page, and the second component is a device used to capture the code and display the results. Augmented reality books are designed to make it easier to understand the contents of the book by displaying three-dimensional objects on top of the two-dimensional images in the book, thus providing a more in-depth and informative learning experience.

2.3 Student Learning Outcomes

Reading literation is a person's desire and interest in reading. As the next generation and agents of change for the nation (agents of change), students need to improve their reading literacy [8]. Unfortunately, Indonesia is considered to be one of the countries with a low level of reading literacy. Learning outcomes, which are scores or grades obtained by students from the learning process, also reflect this. Based on the List of Final Grade Participants in the 2021 class C standard sample, of the 33 students, only 8 people got an A grade, 16 people got a B

grade, and 9 people got a C grade. This condition shows that student learning outcomes are still relatively low.

2.4 Preparing an Android-Based Electronic Flipbook (E-Book) Using Augmented Reality Technology

This research will combine these two technologies so that the resulting book is more sophisticated. The resulting e-book will be registered with Playstore (Android based) so that the e-book can be accessed on a laptop or smartphone. Currently providing Android-based e-books is very important because the tendency of students' study habits from the past to today has changed. Millennial generation students prefer studying and reading on their smartphones, therefore the important point of the e-book that will be developed is that it is Android based [9]. In this way, this e-book can be accessed anytime and anywhere.

2.5 Research Methodology

[7] conducting research entitled Development of Electronic Teaching Materials Based on Flip Book Makers for Language Skills in Elementary Schools. The research results show that flipbook-based e-book teaching materials have been tested for validity of 86% and are suitable for use, while the effectiveness test results show that the book is able to improve learning outcomes. [10] conducting research entitled Development of an Augmented Reality Book Based on Cultural Heritage Sites as a Historical Learning Resource. The book development model used in this research is the Plomp Model which consists of 5 phases including the initial phase, design phase, product realization or manufacturing phase, testing, assessment and improvement phase, and product testing phase. [11] conducting research entitled Utilizing Android-Based Interactive E-Books to Improve Student Learning Outcomes. The research results show that e-books are effective in increasing student motivation and learning outcomes, by increasing learning achievement and achieving a 100% graduation rate.

3. Research Methodology

3.1 Research Model

This research is development research (Research and Development (RnD)) using the Plomp Model. The Plomp Model consists of 5 phases, namely:

1) Preliminary Investigation

This stage can also be called situation analysis, namely looking at the problems that occur in the field:

a. Needs Analysis: Needs analysis is carried out to find out what is needed to support learning in the Green Business course. Needs analysis was carried out through interviews with lecturers teaching Green Business courses and also with students.

b. Learning Obstacle Analysis: Learning obstacles can be defined as obstacles experienced in the learning process. The information at this initial investigation stage will be a guide to the next step to determine what solutions can be provided to overcome the problem.

2) Design

a. Data design: At this stage the contents of the Green Business e-book are designed, starting from the RPS preparation stage, selecting topics to be included in the book, selecting learning videos, journals, and others. Apart from designing the e-book, at this stage the instruments for assessing the book were also designed, namely validity and practical questionnaires.

b. Navigation design: To create a flipbook, it is planned to use 3D Pageflip software. The creation of augmented reality technology is planned using Asemblr Aps, and the Android-based e-book is planned using Corel Draw and Android Studio software.

c. User interface design: At this stage, the initial menu and main menu are designed. The initial menu is the front view of the e-book. This initial menu display will appear after the loading process. The main menu appears after the menu button on the home menu page is clicked. On the main menu there are four buttons that can move to the next page, namely about which contains the profile, learning objectives, lesson materials, and evaluation.

3) Realization/Contruction

In this phase, prototype I (initial) is produced as a result of the realization of the design phase. All plans at the design stage will be realized. The resulting e-book will be developed through a validity test which will be carried out on 3 expert validators.

4) Test, Evaluation and Revision

Procedures for validation activities are carried out by material and design experts. Validation is an operational evaluation process to find out whether the product being developed is suitable for testing at the next stage. The activity carried out during Green Business e-book validation is to request a factual assessment of the suitability of the e-book that has been produced. This activity requires instruments in the form of material and design validation sheets to be submitted to the validator.

5) Implementation

Implementation is the final stage of all phases. At this stage the book can be distributed widely and used in classroom learning.

3.2 Time and Place of Research

This research was carried out at the Entrepreneurship Study Program, Faculty of Economics, UNIMED for 1 year, starting from January to December 2024.

3.3 Population and Research Sample

The population in this study were students in semesters 4 and 6 of the Entrepreneurship Study Program. The population is 160 people. The sample for this research is planned to be 80 semester 4 students. The sample selection was carried out based on considerations because the samples were participants in the Green Business course in the even semester 2023/2024.

3.4 Data Analysis

In this research, the data analysis techniques used are qualitative and quantitative:

1) Quantitative data analysis

In this research, quantitative data consists of two, the first is the results of answers during the initial investigation phase, namely the process of finding the needs of lecturers and students and also the challenges faced by lecturers and students in the Green Business course. The second quantitative data is comments and suggestions from expert validators and students regarding the e-book that has been developed. This data was obtained through questionnaires during the test and revision phases.

2) Qualitative data analysis

a. Product validation analysis

Product Validation Analysis: The percentage in the validation questionnaire is found using a formula :

$$\textbf{Validity} = \frac{\textit{Average Score}}{\textit{Maximum Score}} \; \boldsymbol{x}\; \mathbf{100} \text{ [12]} \quad (1)$$

Table 1. Validity Criteria

No	Assesment %	Citeria
1	$80 < N \leq 100$	Highly Valid
2	$60 < N \leq 80$	Valid
3	$40 < N \leq 60$	Moderately valid
4	$20 < N \leq 40$	Invalid
5	$0 < N \leq 20$	Highly invalid

4. Result and Discussion

4.1 Research Result

The entire research activity includes 5 stages, namely (1) Preliminary Investigation Phase; (2) Design Phase (Design); (3) Realization/Construction Phase; (4) Test, Evaluation and Revision Phase, and (5) Implementation.

1) Preliminary Investigation

a. Needs Analysis

The purpose of a needs analysis is to determine what actions need to be taken to achieve the desired goals and correct existing deficiencies. The needs analysis in this research was carried out to find out what is needed to support learning in the Green

Business course. Needs analysis was carried out through interviews with lecturers teaching Green Business courses and also with students. The results of interviews with lecturers revealed that teaching would be more effective if there were online teaching materials which included videos that could be accessed offline, case study articles and scientific journals. Apart from that, the images in the book must be presented more realistically (3D) so that students gain direct experience of seeing moving images. Therefore, the results of the analysis of student and lecturer needs have been obtained which are used as a guide in preparing the Green Business book.

b. Learning obstacle Analysis

Based on the results of interviews, several obstacles faced by students are: (1) Students have difficulty understanding the basic concepts of Green Business, such as the difference between greenwashing and genuine sustainable practices, (2) Students experience difficulties in analyzing case studies of companies that implement Green Business strategies due to a lack of understanding of sustainability indicators and relevant data, (3) Students lack confidence in developing Green Business strategies that can be applied in real contexts, especially in the industries they are interested in, (4) Limited Environmental Knowledge: Some students have limited knowledge of global environmental issues, which hinders their ability to understand the urgency of Green Business, (5) Some students show low interest in the topic of Green Business because they consider it an abstract concept or not relevant to their future careers.

2) Design

At this stage, the contents of the book which consists of 10 chapters are prepared. The cover design is also being developed, seen in the image below:

Fig. 1. Green Business Cover Book Design

3) Realization/Construction Phase

At this stage, there are several steps taken, including:

a. Layout Process

The book layout process is the steps taken to arrange and arrange text, images, graphics and other elements in a book so that it is ready to be printed or published digitally. The stages carried out in this process are determining the theme, determining the margins for the ebook, layout process, combining all layout pages into a PDF.

Fig. 2. Combine All Layout

b. Process of Interesting E-book into Flipbook

After completing the layout process, the next step is to insert the e-book into Flipbook. The steps taken are: 1) Open the FLIP PDF PROFESSIONAL Application>New Project, 2) Insert a PDF E-Book file that has been layout, 3) Make UI/UX Design Adjustments for the Devices That Will Be Used, Editing Pages to Add Videos, Access Links, and Other Customizations, 4) Export / Publish Files As HTML. The appearance of the e-book after being exported in HTML form can be seen in the image below:

Fig. 3. Ebook Display in HTML

c. Insertion and Editing Process in Asembler App

Once the E-Book is in HTML, it can be converted into an APK (Application) using Website 2 APK Builder. The stages carried out are: Fill in the APK requirements as needed, Build APK, Moving and Installing Apps to Android.

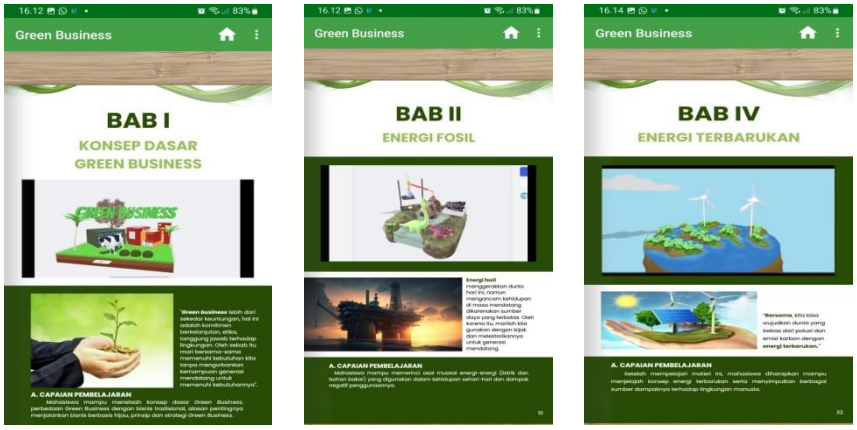

Fig. 4. Augmented Reality Flipbook Application Display on Android

4) Test, Evaluation and Revision Phase

The e-book that has been produced is then carried out a feasibility test. The feasibility test for this research involved 3 expert validators, namely senior lecturers at the Unimed Faculty of Economics.

Table 2. Green Business Book Feasibility Assessment (Validation) Instrument Grid

Aspect	Indicator	Item Number
Material Feasibility	Clarity of Material	1,2,3
	Relevance of the Material	4.5.6
	Depth of Material	7,8,9
	Interrelationships between parts	10,11,12
Feasibility of Presentation	Legibility	1,2,3
	Layout	4,5,6
	Navigation	7,8,9
	Aesthetics and Design	10,11,12
Language Eligibility	Language Clarity	1,2,3

	Appropriateness to Context	4,5,6
	Grammatical Accuracy	7,8,9
	Language Consistency	10,11,12

Based on the validator value data, a validation analysis is then carried out based on the suitability aspect of the book material using the average total score formula, namely:

$$\text{Validity (r)} = \frac{\text{Average score value}}{\text{Maximum value}} \times 100\%$$

$$\text{Validity (r)} = \frac{(52+54+57)/3}{12*5} \times 100\%$$

$$\text{Validity (r)} = \frac{54,33}{60} \times 100\%$$

$$= \mathbf{90,56\ \%}$$

Based on the data above, the validity value for the feasibility aspect of the material is 90.56%, which is in the Very Feasible category. Therefore, the resulting book is in the Very Appropriate category based on its material.

Based on the feasibility aspect of book presentation, the following is the average total validation analysis score, namely:

$$\text{Validity (r)} = \frac{\text{Average score value}}{\text{Maximum value}} \times 100\%$$

$$\text{Validity (r)} = \frac{(52+53+56)/3}{12*5} \times 100\%$$

$$\text{Validity (r)} = \frac{53,66}{60} \times 100\%$$

$$= \mathbf{89,44\ \%}$$

The validity value of the book presentation feasibility aspect is 89.44%, which is in the Very Appropriate category. Therefore, the resulting book is in the Very Decent category based on its presentation.

Based on the appropriateness aspect of the book's language, the following is the average total validation analysis score, namely:

$$\text{Validity (r)} = \frac{\text{Average score value}}{\text{Maximum value}} \times 100\%$$

$$\text{Validity (r)} = \frac{(53+56+53)/3}{12*5} \times 100\%$$

$$\text{Validity (r)} = \frac{54}{60} \times 100\%$$

$$= \mathbf{90,00\ \%}$$

Based on the data above, the validity value for the language feasibility aspect is 90.00%, which is in the Very Appropriate category. Therefore, the resulting book is in the Very Appropriate category based on the language.

The validator's assessment of all aspects is in the range of 86% and above so it can be concluded that the Green Business book that has been prepared is suitable for use. The book's validity value can be summarized in the table below:

Table 3. Validator Assessment Data

Validator	Aspect			Average	Information
	Material	**Presentation**	**Language**		
1	86,67	86,67	88,33	87,22	Highly Valid
2	90,00	88,33	90,56	90,56	Highly Valid
3	95,00	93,33	92,22	92,22	Highly Valid
Average	90,56	89,44	90,00	90,00	Highly Valid

5. Conclusion and Recommendations

1. Conclusion

The results of this research show that the Green Business book can significantly increase student learning outcomes in the Entrepreneurship study program. With the presence of an Android-based electronic flipbook enriched with augmented reality techniques, students can now access Green Business material more quickly, practically and interactively. This innovation not only makes the learning process easier, but has also proven effective in improving student literacy and learning outcomes, encouraging them to be more active and involved in learning.

Based on the validity assessment by the validators, the Green Business book has been declared suitable for preparation and use with a validity level of 86%. Apart from that, the practicality assessment from students reached 87.47%, which shows that this book is very practical and easy to use in the learning process. With these satisfactory results, the Green Business book is not only relevant academically but also recognized for its practicality in supporting improving the quality of student learning.

2. Recommendation

Because the research carried out cannot be separated from the limitations of researchers, the following recommendations are prepared:

a. It is necessary to perfect the words in the book so that it is easy for readers to understand.
b. It is necessary to perfect the e-book design so that it attracts students' interest in reading green business e-book.
c. Adding an assignment section to the e-book so that it produces an output and is able to measure student abilities

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