The Effectiveness of mobile learning media using Smart Apps Creator on Economic subjects

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Abstract: This study aims to produce mobile learning media using the Smart Apps Creator and to determine the effectiveness of these media in increasing student interest in learning. The 4D model (Define, Design, Develop, and Disseminate) is used in the research and development process for this project. This research is limited to the development phase. The participants in this research were XI IPS SMA PGRI Pekanbaru students. Data was obtained based on interviews and questionnaires. Based on the substantiation of media and content specialists, the research findings indicate that the use of mobile learning media created by smart apps creator is feasible, with 87% of the categories being very appropriate according to media experts and 83% of the categories being very appropriate based on subject matter experts. Paired sample t-test obtained differences and positive increases in student learning interest before and after using smart apps creator-based mobile learning media, so the media is said to be effective. The use of media received a good response from students; 64.5% consider mobile learning media using smart app creators to be very practical and helpful in learning, while the remaining 35.5% consider it practical. This research is limited to APBN and APBD material and is only carried out until the development stage.

Keywords: development; media; mobile learning; Smart Apps Creator.

A. Introduction

The contemporary epoch of globalization, coupled with the advancement of information and communication technology, has significantly impacted every aspect of human life, including education. As an era advances, the educational system also undergoes transformations. Every component of education must be able to swiftly adapt

to rapidly advancing technology as a result of the ever-increasing magnitude of globalization-era changes. The learning system that was previously manual changed to use technology. Information technology offers cyber teaching, where the teaching process is done via the Internet (Emalia & Farida, 2019). Therefore, it is necessary to innovate in education because this is a demand that must be met in order to remain competitive in the era of globalization. According to Serdyukov (2017), innovation in education is intended to increase the efficiency, productivity, and quality of learning. Therefore, innovating in education will improve the quality of education itself.

Innovation in learning and education is closely linked. An effective learning process can enhance student engagement in the educational experience. Unquestionably, one of the essential requirements for success in the learning process is the implementation of learning innovations that can pique students' interest in the learning process (Yani et al., 2021). Learning innovation is very important to develop and implement to prepare students to face the challenges of Industry 4.0. According to Simanjuntak (2019), innovative learning is learning that applies existing technology as a supporting tool.

Innovating the learning component is one means of enhancing educational quality. Media as a learning component serves as an opportunity for teachers communicate learning content to students (Karo-Karo & Rohani, 2018). The utilization of educational media positively influences the pedagogical and cognitive processes because educational technology can help teachers deliver effective and efficient teaching. Teachers can help students learn or deepen their understanding of a subject using the best media. Thus, by utilizing learning media, students will more easily understand the information the teacher presents (Ningsih & Pritandhari, 2019).

According to Dale, who emhasized the importance of using media into classroom, success was obtained mainly through the senses of sight 75% and hearing 13%, with other senses accounting for 12% of learning outcomes. Therefore, learning will be maximized if it can utilize all the existing senses (Rasyid et al., 2017). Teachers must be selective when selecting learning media since the usage of media in the classroom must begin with the student's needs and readiness. It is better if the selected media is flexible to be used in various situations and conditions (Nurrita, 2018).

Based on the results of interviews conducted with economics educators at SMA PGRI Pekanbaru, the media teachers use in teaching are textbooks and power points (F, personal communication, November 16, 2022). Educators believe that the use of PowerPoint will make it easier for students to comprehend the material. However, in reality, students experienced boredom and decreased interest in learning. Students become fatigued simply by viewing the displayed text, resulting in their inattention to the teacher's explanation of the topic. Therefore, it is essential to implement innovative educational instruments to pique students' interest in learning.

The growing popularity of various types of educational media corresponds to the advancement of information and communication technology. Mobile learning is one of the technologically-based instructional formats (Ardiansyah & Nana, 2020). Mobile learning is an electronic learning system that allows students to access course material regardless of where they are physically located using wired and wireless communication channels (Khairunnisa, 2019). Thanks to the availability of mobile learning, teachers are no longer required to write lessons on whiteboards and draw diagrams; instead, they can use apps that contain various images, animations, audio clips, fun quizzes, and other learning resources. Teachers can also use the application as a tool to assess students. Teachers can encourage students' interest in learning by presenting lessons through media with exciting writing and content.

According to Samsinar (2020), a potential benefit of mobile learning media is their accessibility, as they can be accessed at any time and from any location. Mobile devices facilitate student-centered and distance learning because they are less expensive and more portable than desktop computers. Comparatively less expensive than PCs and capable of increasing student-teacher interaction.

One of the devices for creating mobile learning media is the Smart Apps Creator. Smart Apps Creator can create multimedia features for mobile devices, desktop computers, and websites. The Smart Apps Creator program generates HTML5 web, desktop, iOS, and Android formats that can be viewed from any web browser (Susanti et al., 2021). The advantage of the smart apps creator as a multimedia tool is that its use is uncomplicated because it can be created without programming, allowing teachers without a programming background to create high-quality and visually appealing mobile

applications. Various features and tools are available to make media creation easier, such as the insert menu for inserting images, music, videos, and text. The edit menu is for adjusting or tidying text; the interaction menu gives effects to images or animations (Yallah & Huda, 2022). Apart from having advantages, smart app creators also have weaknesses; this application is free for only 30 days and must be reinstalled to use it; it is also only available in English (Azizah, 2020).

Previous research by Setiadi and Ghofur (2020) on the development of Android-based mobile learning media has produced products in the form of mobile learning media that can be used with Android; this research indicates that learning media can enhance students' comprehension. Wiro'i and Sulistyowati (2021) have conducted additional research on the evolution of Android-based mobile learning in creative and entrepreneurial product subjects. The final product consists of learning media created with Adobe Flash CS6 script 3.0 software that can enhance student learning outcomes. In addition, Fitriyah and Dewi's (2022) research on the development of Android-based interactive media for economics subjects results in producing media in the form of applications containing material explanations and assessments. Due to the lack of innovation in smartphone-based learning media, his research demonstrates that Android-based interactive media offer students novel experiences.

Referring to the previous data, the researcher's objective is to create mobile learning media utilizing Smart Apps Creator to facilitate the teaching and learning process, thereby preventing students from experiencing disinterest during the learning process. Teachers can use this media to present learning materials with writing and materials through their mobile devices. One factor to consider when developing mobile learning media is that mobile learning is a learning solution that promotes convenience and portability and can be used anywhere (Aripin, 2018). The smart apps creator device is chosen because it does not require special skills in its manufacture; it can combine several features so that the media becomes more attractive and that students feel more interested in learning.

This development research aims to: 1) assess the viability of using mobile learning media based on smart apps creator, 2) assess the efficacy of using media on student learning interests, and 3) analyzing the level of practicality (response) of students towards using smart apps based mobile learning media creator. This research is anticipated to

pique students' interest in learning economics-related subjects and can serve as an alternative learning method in the future.

B. Method

This research falls under the category of research and development (R&D). Manufacturing a particular product while evaluating its effectiveness is research and development (Sugiyono, 2018). The study was carried out utilizing a 4D framework comprising four distinct phases: Define, Design, Development, and Disseminate. The research was constrained to the developmental stage solely due to temporal limitations and the requisite quantity of subjects.

This study was conducted at SMA PGRI Pekanbaru because the problem under study could be located there. The location was accessible in terms of cost and time to facilitate the research procedure. The subjects in this study were students of class XI IPS because according to the material used in the study, namely the APBN, and APBD, this material was taught in class XI. Interviews and questionnaires were used to collect the data for this study. Questionnaires were given in questionnaires on student learning interests, student response questionnaires, and questionnaires from media experts and material experts. The research instrument consisted of questionnaires for student learning interests, student response questionnaires, and validation sheets for media and material experts. The media and material expert validation instruments used refer to the instruments from Astari et al., (2018) and Nurrita (2018). Meanwhile, the student interest questionnaire instrument was prepared based on interest indicators from Friantini & Winata (2019). The student response questionnaire instrument refers to the theory presented by Jamilah (2021).

The obtained data were then qualitatively and quantitatively analyzed. Analyzing data derived from expert evaluations of educational resources and media as recommendations and criticisms for future enhancements of the learning media requires qualitative descriptive analysis. Meanwhile, data gathered using a Likert scale were analyzed using quantitative descriptive analysis. Table 1 shows the requirements for media and material validation eligibility.

Table 1. Media and material validation criteria (Riduwan, 2015)

No	Percentage (%)	Criteria
1	81 – 100	Very Worthy
2	61 – 80	Worthy
3	41 – 60	Pretty Decent
4	21 – 40	Not Worthy
5	0 – 20	Not Feasible

Data obtained from student response questionnaires are converted into quantitative values and grouped according to the criteria contained in Table 2.

Table 2. Criteria for student responses to media (Milala et al., 2022)

No	Percentage (%)	Criteria
1	81 – 100	Very Practical
2	61 – 80	Practical
3	41 – 60	Practical Enough
4	21 – 40	Less Practical
5	0 – 20	Not Practical

C. Result and Discussion

1. Development Process of Smart Apps Creator-Based Mobile Learning Learning Media

Media Mobile Learning based on Smart App Creator for Economics subject was developed with a 4D model. The stages of development with the 4D model are presented as follows:

a. Definition Stage

The definition stage is the first step in creating mobile learning media with the Smart Apps Creator. The defining phase involves analyzing the actions taken during the development process. This phase entails beginning-to-end analysis, student analysis, task analysis, concept analysis, and the specification of learning objectives. The initial-final analysis identifies the fundamental challenges instructors and students face during the learning process. Next, identify several possible alternative solutions for learning. The assets and weaknesses of these alternatives are then evaluated, as well as their ability to solve the problems.

Student analysis involves identifying relevant student characteristics applicable to the design and development of educational programs. Among the essential characteristics to analyze are the pre-learning competencies that students already possess. This analysis is related to the actual conditions of students, such as students'

knowledge and cognitive abilities. At that point, a task analysis is conducted to identify fundamental skills that students must attain. This analysis is also carried out to ensure a comprehensive coverage of the roles of the learning media to be developed. The outcomes of this analysis will determine every feature that must be included into the being developed product.

Following the analysis of students, the subsequent step involves conducting a concept analysis, which entails identifying key concepts to be taught and their systematic arrangement. This analysis helps describe how each of the features to be developed can work. Furthermore, objective specifications were prepared; The researcher summarized the findings of the initial-end analysis, student analysis, task analysis, and concept analysis in order to determine the most suitable treatment for the research object. This goal follows its incorporation into learning media to be used by teachers and students. The analysis findings indicate that the proposed media to be developed is mobile learning media that utilizes the smart apps creator platform, focusing on delivering content related to economics subjects.

b. Design stage

The findings obtained in the early stages became a guide in making the developed media design. The execution of both the design of learning materials and the design of the subject matter. Media design begins with finding sources of subject matter, photos, videos, backgrounds, animations, and sounds. Afterwards, look for various kinds of programs that can be used to help create learning media. The material on economics is organized systematically and divided into sub-discussions to make it simpler for students to reread the material according to the sub-discussions.

To facilitate the design and development of learning media, the researcher first made a flowchart according to the concept that had been made. The learning media was then named siBEKO (Aplika**si B**elajar **Eko**nomi). The media that has been designed can be seen in Figure 1.
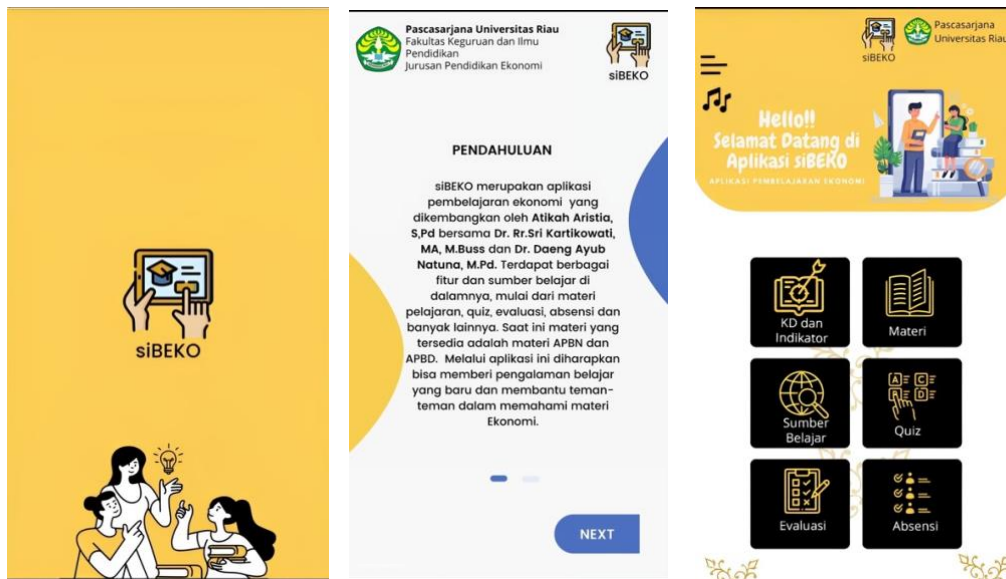
Figure 1. Initial Appearance of the siBEKO Application

The first display before the application is run is the splash screen which displays the logo of the siBEKO application. The choice of logo is adjusted to the type of mobile-based media, so a logo with a mobile device is chosen. After the splash screen, an introductory display will appear, which contains a brief explanation of the application so that users get to know the application they are installing. After that, a home page will appear containing several menus and features found in the application, such as KD and Indicators, Materials, Learning Resources, Quiz, which are available online and offline, Evaluation, Attendance, Other menus, and background music on/off buttons. The application display is designed vertically to make it easier to use. Providing background music aims to make students feel comfortable in learning, but for students who do not want to listen to music, there is a button to turn it off. The application display is designed vertically to make it easier to use.

Figure 2. Display of material and quiz on siBEKO application

Figure 3. Quiz on siBEKO application

The visual representation depicted in Figure 2 illustrates that the material has been organized according to sub-discussions, facilitating comprehension. Before engaging with the assigned material, students are prompted to respond to brief inquiries about the content at hand. On each page of the subject matter, there is an audio button containing an explanation adapted to the text on the page being opened. Students have access to various videos that may be watched without an internet connection, making it much simpler for them to comprehend the material. As shown in Figure 3, The online quiz feature is integrated with the Wordwall website. Wordwall was chosen because, based on research by Lestari et al., (2022), employing word walls

in educational contexts makes teaching and learning more interactive and piques students' interest.

c. Development stage

The development stage occurs when the learning media prepared using the SAC application are completed. The media that has been created undergoes a validation process by professionals in the relevant field to assess its feasibility. The validation process was conducted by a panel of four experts, consisting of two individuals with expertise in media and two with expertise in materials. The expert statement is subjected to analysis and description to serve as a foundation for enhancing the developed media.

Media eligibility is obtained through validation by experts in their field. In this study, two media experts who work as lecturers at the University of Riau and two material experts who work as economics teachers validate the media that has been created. The validation sheet containing information about how well the media meets the quality standards of learning media is given to each expert. Experts will provide an assessment of the developed media in a qualitative form in the form of comments and input.

Each item of the expert statement is analyzed and described as a basis for improving the developed media. Media trials can be conducted if all experts provide statements on the validation sheet that the media is suitable for testing. The validation results regarding the eligibility of the media experts can be seen in Table 3.

Table 3. Media expert validation results

No	Aspect	Percentage (%)	Category
1	Appearance	94	Very Worthy
2	Programming	76	Worthy
3	Flexibility	92	Very Worthy
4	Functionality	87	Very Worthy
	Average	87	Very Worthy

From the validation results of media experts regarding the mobile learning media called siBEKO, the programming aspect obtained the lowest percentage, 76%, in the proper category. In comparison, appearance, flexibility, and functionality get a percentage of > 80% with a decent category. Overall, an average media rating of 87% was obtained with a decent category.

Table 4. Expert validation results

No	Aspect	Percentage (%)	Category
1	Content	89	Very Worthy
2	Learning	87	Very Worthy
3	Language	75	Worthy
	Average	83	Very Worthy

The material validation results had an average of 83% with a very practical category. Aspects of truth content get a percentage of 89%, learning aspects of 87%, and aspects of language 75%. In general, the developed mobile learning media exhibits a high degree of usability and is, therefore, feasible for widespread deployment. The findings are under the research conducted by Setiadi & Ghofur (2020), which posits that mobile learning media is suitable for educational purposes. Aligned with this perspective, a study carried out by Wiro'i & Sulistyowati (2021) shows that the mobile learning media developed is very suitable for learning.

Media that have completed due diligence by all experts and declared feasible is then tested limited to students to see the effectiveness and students' responses to the media and find media deficiencies for further improvement. Students who were previously disinterested in studying economics because they perceived economics classes to be tedious became interested in learning when the material was presented in the most engaging manner possible, according to the findings of this limited trial. Evidently, the students exhibit a high level of enthusiasm and are dedicated to learning and eager to work on the media-related questions. Students also become more active in discussing with their friends. Students who initially struggled to comprehend the material felt assisted by the learning media resources available. The various behaviours exhibited by students during the learning process are consistent with the interest indicators delineated by Friantini & Winata (2019), Dan & Todd (2014), and Ernawati (2016).

The developed mobile learning media has several aspects that are different from other mobile learning media, including:

1) SiBEKO learning media can be used on Android and accessed via iOS, laptops, or computers. For Android users, media can be used by downloading the application via the link listed. Meanwhile, for iOS, laptop, or computer users, media can be accessed in html5 format via the link provided.

2) The subject matter can be heard in audio form. The purpose of adding audio to the subject matter is so that students can access learning material without reading it. The available audio is synchronized with the text on each page, so that what students read and hear are identical.

3) Students must answer quizzes to access the subject matter. The student is unable to explore the required material if the quiz is not completed. The purpose of making the quiz is to create interaction between users and learning media, as well as to hone students' thinking power.

Although there are several advantages, mobile learning media using a smart apps creator named siBEKO has limitations. Only one material is available, namely APBN and APBD material. Overall, the findings from the research and development that have been carried out indicate that the use of mobile learning media is likely to lead to successful learning in the future. In line with this, Ofori & Lockee (2021), in their research on the next generation of mobile learning, stated that mobile learning is a learning trend that will develop. Considering that most students use mobile devices, mobile learning media allows students to study anywhere and anytime without being limited by distance and time. Students can still access the media both online and offline.

2. Effectiveness of Using Smart Apps Creator-Based Mobile Learning Media

After going through a development process with three stages consisting of definition, design, and development, two meetings were held at SMA PGRI Pekanbaru class XI IPS to determine how effective the media is. These meetings were held to test the media in a restricted manner. The purpose of the effectiveness analysis is so that a developed product can know the level of success (Sari, 2016). The effectiveness test of this study aims to determine whether mobile learning media developed using smart app creators can arouse students' interest in learning. The effectiveness of media employment can be identified through various assessments. The statistical method being referred to is the Paired Sample t-Test. The different test was conducted by looking at the average difference in students' learning interest before and after using the SiBEKO learning media. The questionnaires about students' learning interests were subjected to statistical analysis using SPSS 22, both before and after using media. Table 5 displays the outcomes of the assessments conducted on the pretest and posttest learning interest surveys.

Table 5. Paired Sample Statistical Test Results

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pretest	43.55	31	8.710	1.564
	Posttest	48.71	31	5.751	1.033

The paired sample statistical test results showed that 31 samples completed the pre-test and post-test questionnaires. Before using the media, the average student interest questionnaire answer was 43.55, with a standard deviation of 8.71, indicating a significant difference between the sample data and the overall average. While the average student interest questionnaire after using the media is 48.71, higher than the average before using the media (43.55 <48.71), it can be concluded that there are differences in the level of interest students show in studying before using mobile learning media and after using smart apps creator.

This aligns with Aziz's research (2015), which states that using media in the classroom will awaken students' interest and understanding by stimulating their visual and auditory senses. This theory is also supported by Yakin (2021), who argues that using media in the classroom can arouse students' interest and motivate them to pay attention. To highlight how these differences are statistically significant, a paired sample test was carried out, as can be shown in Table 6.

Tabel 6. Paired Sample Test Results

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pretest Posttest	-5.161	7.755	1.393	8.006	2.317	3.706	30	.001

According to the table 6 for the paired sample test, the statistical significance level (2-tailed) was found to be 0.001. The observed numerical value falls below the established statistical significance threshold, commonly set at 0.005. The paired sample t-test indicates disparities in student learning interest pre and post-utilization of mobile learning media founded on smart apps creators. Therefore, the decision-making basis supports the notion of dissimilarities in this regard. The results of this research align with the findings of the studies carried out by Nazmi (2017) and Rasyid et al., (2017), which demonstrated that the utilization of mobile learning media can enhance students' motivation towards learning.

3. Practicality and usefulness of using Smart Apps Creator-Based mobile learning media

The reactions of students and teachers after utilizing the media can be used to demonstrate the practicality and usefulness of the medium. After all, homework assignments and survey reply from students and teachers were issued at the previous meeting. The outcomes of the questionnaire of student responses are presented as follows.

Table 7. Results of Responses to Media Use by Students

Category	Rating Percentage	Frequency	Percentage (%)
Very Practical	81 – 100	20	64,5
Practical	61 – 80	11	35,5
Practical Enough	31 – 60	0	0
Less Practical	21 – 40	0	0
Not Practical	0 – 20	0	0
Total		31	100

According to the Table 7, Student responses to the use of siBEKO media are very practical and practical. As many as 20 students, with a percentage of 64.5%, thought that siBEKO media was very practical and helpful in learning economics, while the remaining 11 students, or as much as 35.5%, considered using siBEKO media practical and valuable in learning economics. The questionnaire sheet also provided a comment column; the majority of students concluded that economics lessons were more enjoyable with the SiBEKO media. Economics lessons become more exciting with quizzes, audio, and video availability.

Overall, students responded positively to using siBEKO media in economics learning. In accordance with this, research by Faqih (2021) also received a positive response because delivering learning content through mobile learning media will attract students' attention and allow them to easily comprehend the teacher's message.. Research by Yallah & Huda (2022), addressing the utilization of mobile learning in the educational process also received positive answers from students, with a percentage of 90%. Thus it is included in the category of being extremely practical.

D. Conclusion

The culmination of the research and development efforts yielded a mobile learning platform, siBEKO. According to the validation conducted by media and material experts, it was found that siBEKO media was deemed appropriate for utilization. Specifically, 87% of

media experts categorized it as "very worthy," while 83% of material experts also categorized it as "very worthy." Prior to and following the use of mobile learning media based on smart applications creator, the results of the controlled experiment indicate variations and an increase in the students' propensity for learning, thereby establishing the efficacy of the media. The implementation of siBEKO media was well-received by students, with a significant proportion of 64.5% indicating its high level of applicability. Additionally, 35.5% of students expressed that siBEKO media was deemed suitable and valuable.

Mobile learning media has good prospects that lead to successful student learning outcomes in the future. Considering that most students use mobile devices, mobile learning media allows students to study anywhere and anytime without being constrained by physical distance or the passage of time. Apart from students, the media is also recommended to teachers to assist teachers in teaching. Teachers can be trained to create media, and media teams can be formed to create additional content and tools to help students attain their learning objectives more effectively.

Even though it has good prospects, the mobile learning media based on smart apps creator named siBEKO also has limitations, including only one available material, namely APBN and APBD material. In addition, due to time constraints, this research was carried out only after the development stage. Therefore, it is suggested to further researchers that the media can be developed with other, more complete materials. In the future, further researchers can conduct research up to the dissemination stage so that the developed product will become more widely known.

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