The Development of Mobile Learning-Based Digital Learning Comic in English Subject of Class VIII of SMP Muhammadiyah 16 Lubuk Pakam

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Abstract. This study aims to: (1) determine the feasibility of mobile learning-based digital learning comics used for learning English for class VIII (2) to determine the effectiveness of mobile learning-based digital learning comics in English learning of class VIII. This type of research is research and development that uses the ADDIE product development model. This research was conducted on eighth grade students of SMP Muhammadiyah 16 Lubuk Pakam. The research sample was 30 students. The feasibility of mobile learning-based digital learning comics is measured by data analysis based on validation questionnaires by media experts, design experts, material experts, and field trials. While the effectiveness of digital learning comics based on mobile learning is measured by data analysis using n-gain scores based on learning outcomes tests (pretest and posttest). The results of the validation of mobile learning-based digital learning comics by media experts were obtained by 80.56% in the appropriate category, by design experts it was obtained by 92.22% in the very feasible category, and by material experts it was obtained by 93.61% in the very feasible category. The results of field trials on students amounted to 93.13% with a very decent category. The results of the pretest and posttest learning outcomes in the field trial obtained an average n-gain value of 0.70 in the high category with a percentage of 70% in the quite effective category. So it can be concluded that mobile learning-based digital learning comics are very feasible and quite effective to use in learning English for class VIII SMP Muhammadiyah 16 Lubuk Pakam.

Keywords: Digital Learning Comic, English Learning Outcomes, Mobile Learning.

1 Introduction

The rapid development of information and communication technology towards digital has led to changes in new habits and lifestyles for the community. This change to the digital era is known as the industrial revolution era 4.0. This is marked by the widespread use of the internet in all aspects of life, known as the Internet of Things (IoT). Almost all aspects of life cannot be separated from the use of information technology, including education.

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The UN (United Nations) special agency which handles education, UNESCO formulates that education in the era of the industrial revolution 4.0 must be able to build a knowledge-based society that has: (1) skills in ICT and media literacy (ICT and media literacy). skills), (2) critical thinking skills, (3) problem-solving skills, (4) effective communication skills, and (5) collaborative skills (collaborative skills).[1]

The use of information and communication technology in education, especially in the learning process, is needed so that learning can run effectively, efficiently, and attract the attention of students. Mekhlafi [2] states that the use of information and communication technology in learning has a positive impact on student performance and learning achievement.

Learning media is one of the supporting components of the success or failure of a learning activity. This is inseparable from the importance of the media in instilling understanding of the material to students. According to Arsyad [3] learning media can also help students to improve understanding, present data in an interesting and reliable way, facilitate data interpretation, and condense information.

The use of comics as a learning media can help students to more easily accept the material presented in the learning process because it can describe facts that are less understood if they are not visualized.[4] In addition, according to Sudjana & Rivai [5] comics are also able to make students improve language skills, artistic activities, and innovative statements in communicating, writing, reading, painting, or dramatizing and being able to help interpret and remember material.

In learning English, there are four aspects of skills that must be mastered by students, namely listening, speaking, reading and writing. Reading is one of the most important literacy skills. However, based on the results of a survey conducted by the Program for International Student Assessment (PISA) released by the Organization for Economic Co-operation and Development (OECD), the Indonesian people have a very low literacy level. This low interest in reading certainly affects student learning outcomes.

Learning English in Indonesia has not been carried out optimally. The factors that influence the process of learning English as a foreign language are that the process of learning English is still conventional, namely the lecture method and less use of media so that students feel bored, besides that learning English is still teacher centered. In addition, less available learning facilities and media make the learning process less attractive and reduce student learning motivation which has an impact on not achieving learning objectives.[6]

The high use of mobile devices in the form of smartphones in daily life can facilitate work. The use of mobile devices in the learning process is known as mobile learning. According to Ally et al [7], mobile learning is the delivery of electronic learning materials on mobile computing tools to be accessed from anywhere and anytime.

Responding to this reality, students can use smartphones for various learning purposes regardless of the old paradigm that learning only takes place in school but learning can be done anywhere and anytime. However, in reality, English teachers still do not use mobile devices optimally in the learning process.

Initial observations made at the Muhammadiyah 16 Lubuk Pakam Private Junior High School (SMP), it was found that the school had adequate learning facilities. Facilities that support the

learning process include the availability of projectors, computer laboratories, and also the availability of a wifi network to access the internet network that can assist teachers and students in finding information and knowledge in accordance with current technological developments. In addition, it was also found that the English learning outcomes of class VIII students were still low.

Based on the description above, the researchers will develop a digital learning comic based on mobile learning that is fun and can support independent learning because it can be accessed from anywhere and anytime so that it is expected to improve student learning outcomes in English subjects.

The formulation of the problems contained in this study, namely: (a) Is the mobile learning-based digital learning comics that was developed suitable for use in learning English for class VIII SMP Muhammadiyah 16 Lubuk Pakam?; (b) Is the mobile learning-based digital learning comic that was developed effective in learning English for class VIII SMP Muhammadiyah 16 Lubuk Pakam?

2 Theoretical Description

Learning outcomes are abilities obtained by individuals after going through the learning process. According to Hamid [8], learning outcomes are all effects that can be used as indicators of the value of using learning methods under different conditions. Learning outcomes can be classified into three, namely: (1) Learning effectiveness; (2) learning efficiency; (3) The attractiveness of learning.

In learning English there are four skill competencies which are the learning objectives, namely reading (reading), speaking (speaking), writing (writing) and listening (listening). Reading is the main skill that a person must have, because without reading a person will never know anything. Finochiaro & Bonomo [9] defines reading as picking and understanding the meaning or meaning contained in written material. Reading (reading) in learning English aims to make students able to understand various meanings in written texts.

Some definitions of media by experts and international organizations are: (1) Association for Education and Communication Technology (AECT) defines as all forms used for the process of distributing information. (2) Blake and Haroldsen [10], said the media used to carry or convey a message where this medium is a path or a tool in which a message runs between the communicator and the communicant. (3) Gerlach & Ely [11] states that the media, if understood in broad terms, are human, material, or events that build conditions that make students able to acquire knowledge, skills, or attitudes. (4) Arsyad [3] suggests learning media are everything that can be used to convey messages or information in the teaching and learning process so that it can stimulate the attention and interest of students in learning.

McCloud [12] defines comics as placing one image with another image side by side (juxtaposed pictorial) and intentionally so as to form a series/sequence to convey information or achieve a response from the reader. Meanwhile Munadi [13] said that comics have a simple nature in their presentation. , and has a story element that contains a big message but is presented in a concise and easy-to-digest manner, moreover, it is equipped with a dialogical verbal language. This combination of verbal and nonverbal language speeds up the reader's

understanding of the content of the intended message, because it helps the reader to stay focused.

Visual media are media that involve the sense of sight. There are two types of messages contained in visual media, namely verbal and nonverbal messages. Sriadhi [6] states that the principle of multimedia emphasizes learning that it will be better if it is through visuals and words rather than just through words. Learning activities and achievements will increase if there are additional graphics or visual images in the text. In addition, learning will be better when related text and images are presented integrated rather than separated.

According to McQuiggan, et al [14] mobile learning is an experience and opportunity provided by the evolution of educational technology. Learning anywhere, anytime, provided instantaneously, on-demand access to a personal world filled with the tools and resources we love to create our own knowledge, satisfy our curiosity, collaborate with others, and develop unattainable experiences.

3 Method

This research uses research and development type. Research and development methods are research methods used to produce certain products, and test the effectiveness of these products. The development research model used is the ADDIE development model (Analysis, Design, Development, Implementation, and Evaluation). The ADDIE model is an easy-to-implement model where the process used is systematic with a clear framework to produce effective, creative, and efficient products [15].

Data collection techniques in this study used test and non-test techniques. The test technique is used to collect data on learning outcomes, while non-test is used to collect product data. To measure the feasibility of the developed digital learning comics, data analysis was carried out based on a multimedia assessment questionnaire compiled by Sriadhi [16], in the form of an expert validation questionnaire consisting of material experts, design experts, media experts, and user acceptability. The processing of the questionnaire data in this research and development is for calculating the validity of the media with the percentage of answers using formula (1). Descriptive analysis of the percentage [17] with the following formula:

$$x = \frac{\text{Total score obtained}}{\text{Total number of ideal score of all items}} \text{ x } 100\% \quad (1)$$

Meanwhile, as a basis for making decisions to revise mobile learning-based digital learning comics products, the eligibility level criteria are used as written in Table 1 below:

Table 1. Product Eligibility Level Criteria

No.	Criteria	Percentage (%)
1.	Very Feasible	85 ≤X≤ 100
2.	Feasible	75≤ X < 85
3.	Less feasible	65 ≤ X < 75
4.	Not feasible	55 ≤ X < 65
5.	Very Inappropriate	0 ≤ X < 55

To measure the effectiveness of the developed digital learning comics, data analysis was carried out based on the students' pretest-posttest using the N-gain score [18]. Data analysis of the pretest-posttest results to determine the increase in learning outcomes was carried out using formula (2) as follows:

$$\text{N} - \text{gain score} = \frac{\text{Posttest score} - \text{Pretest score}}{\text{Maximum score} - \text{Pretest score}} \quad (2)$$

After obtaining the results from the data managed using the formula (2), the results are matched with the N-gain score criteria in Table 2 below:

Table 2. N-Gain Score Criteria

No.	Criteria	Limitation
1.	High	N-gain score ≥ 0,7
2.	Middle	0,3≤ N-gain score <0,7
3.	Low	N-gain score < 0,3

The criteria for interpreting the effectiveness of n-gain [19] can be seen in Table 3 below:

Table 3. N-Gain Score Criteria

No.	Criteria	Percentage (%)
1.	Effective	> 76
2.	Quite effective	56 - 75
3.	Less effective	40 - 55
4.	Ineffective	< 40

4 Results and Discussion

The development of digital learning comics goes through 5 stages, namely analysis, design, development, implementation and evaluation. The results of the analysis of the data obtained show that the mobile learning-based digital learning comics that have been developed are declared feasible and effective for use in learning English with simple present tense material.

4.1 Product Eligibility

Based on product validation through a series of trials and revisions that have been carried out, digital learning comics based on mobile learning are declared very feasible. The experiment was carried out in 4 stages, namely: (1) evaluation of learning media experts, learning design experts, and learning materials experts; (2) individual trials, (3) small group trials, and (4) field trials.

The validation of learning media is carried out by media experts on mobile learning-based digital learning comics. Learning media experts carry out product validation on aspects of guidelines and information, programming, systematics, aesthetics, language and typography.

Table 4. Media Expert Validation Result

No.	Aspects	Percentage (%)
1.	Guidelines and Information	80
2.	Programming	91
3.	Systematics	80
4.	Aesthetic	80
5.	Language and Typography	80
	Average	**80,56**
	Interpretation	**Feasible**

Based on the results of the validation of learning media experts in Table 4, it can be seen that mobile learning-based digital comics learning in English subjects received an assessment in every aspect, with an average score of 80,56% with a "feasible" interpretation.

The validation of learning design is carried out by design experts on mobile learning-based digital learning comics. Learning design experts carry out product validation on aspects of information design and learning design.

Table 5. Design Expert Validation Results

No.	Aspects	Percentage (%)
1.	Information Design	94,4
2.	Learning Design	90
	Average	**92,22**
	Interpretation	**Very Feasible**

Based on the results of the validation of learning design experts in Table 5, it can be seen that mobile learning-based digital comics learning in English subjects received an assessment in every aspect, with an average score of 92,22 % with a "very feasible" interpretation.

The validation of learning materials is carried out by material experts on mobile learning-based digital learning comics.. Learning material experts validate products on aspects of guidelines and information, the materials, and evaluation.

Table 6. Learning Materials Expert Validation Results

No.	Aspects	Percentage (%)
1.	Guidelines and Information	97,5
2.	Multimedia Materials	95
3.	Evaluation	88,33
	Average	**93,61**
	Interpretation	**Very Feasible**

Based on the results of expert validation of learning materials in Table 6, it can be seen that mobile learning-based digital comics learning in English subjects received an assessment in every aspect, with an average score of 93,61% with a "very feasible" interpretation.

Based on the results of the acceptance of learning media by students in individual trials, it can be seen that mobile learning-based digital comics learning in English subjects received an

assessment in every aspect, with an average score of 93,6% with a "very feasible" interpretation.

Based on the results of the acceptance of learning media by students in small group trials, it can be seen that mobile learning-based digital comics learning in English subjects received an assessment in every aspect, with an average score of 92,76% with a "very feasible" interpretation.

Based on the results of the acceptance of learning media by students in field trials, it can be seen that mobile learning-based digital comics learning in English subjects received an assessment in every aspect, with an average score of 93,13% with a "very feasible" interpretation.

Validation results based on data that have been described by media experts, design experts, material experts, individual trials, small group trials and field trials are in the range of 85% $\leq X \leq$ 100% with a very feasible category. Thus, it can be concluded that the mobile learning-based digital learning comic that was developed is very suitable for use in English subjects for class VIII SMP Muhammadiyah 16 Lubuk Pakam.

The use of digital learning comics based on mobile learning in English learning is considered very feasible because it is able to attract the attention and interest of students in the learning process, which can be seen from the positive responses of students to the data from field trials. The above statement is supported by the results of Hidayah [20] which shows that digital comic media attracts the attention and interest of students in the learning process, which is in line with the opinion of Levie & Lentz in Arsyad [21] which suggests four functions of learning media, especially media visual, namely (1) the function of attention, (2) the affective function, (3) cognitive function, (4) compensatory function. In other words, visual learning media serves to accommodate students who are weak and slow to accept and understand the content of the lesson presented by text or presented verbally.

This mobile learning-based digital learning comic is also able to provide convenience for students to understand the learning material presented in the form of digital comics. This is in line with research by Aeni & Yusupa [22] which shows that students like the e-comic learning model and feel learning is like reading comics in digital format.

4.2 Product Effectiveness

The data normality test was carried out to find the normality of the sample under study. The normality test conducted in this study uses the chi square formula, provided that the data is normally distributed if it meets the criteria for $x^2_{count} < x^2_{table}$. The results of the pretest and posttest normality test can be seen in Table 7.

Table 7. Data Normality Test Results

No.	Data	n	Mean Score	S	X^2_{count}	X^2_{table}	Conclusion
1.	Pretest	30	54,27	7,20	7,20	9,49	Normal
2.	Posttest	30	85,60	6,58	7,84	9,49	Normal

From the table of normality test results above on the pretest data, it is known that x^2_{count} is 7,50 and x^2_{table} is 9,49 which meets the criteria for $x^2_{count} < x^2_{table}$, so it can be said that the pretest

data is normally distributed. In the posttest data, it is known that x^2_{count} is 7,84 and x^2_{table} is 9,49 which meets the criteria for $x^2_{count} < x^2_{table}$, so it can guarantee that the posttest data is normally distributed.

Homogeneity test was conducted to determine the distribution of the data to be analyzed came from the same population (homogeneous) or not. The homogeneity test carried out in this study used the F test, provided that the data was homogeneous if it met the criteria $F_{count} < F_{table}$. The results of the homogeneity test can be seen in Table 8.

Table 8. Homogeneity Test Results

No.	Data	S	F_{count}	F_{table}	Conclusion
1.	Pretest	7,27	1,08	1,86	Homogen
2.	Posttest	6,69			

From the table of homogeneity test results above on the pretest data and posttest data it is known that F_{count} is 1,08 and F_{table} is 1,86 which meets the criteria $F_{count} < F_{table}$, so it can be concluded that the pretest and posttest data are homogeneous.

Gain score is the difference between the posttest score and the pretest score. After all the data is collected to determine the increase that occurs before and after this learning is calculated with the n-gain formula (normalized-gain). The results of the n-gain calculation can be seen in Table 9.

Table 9. N-Gain Test Results

No.	Data	n	Mean Score	N-Gain Score	Criteria
1.	Pretest	30	54,27	0,70	High
2.	Posttest	30	85,60		

From the results of the data analysis above, it is known that the average n-gain in the field trial is 0.70 in the high category or with a percentage of 70% which is included in the quite effective category. From the data from the students' pretest and posttest results in the field trial, it is known that there is an increase in student learning outcomes after using mobile learning- based digital learning comics.

The increase in student learning outcomes is caused by the direct interaction of students with teaching materials, in addition to the digital learning comics developed to overcome the limitations of space and time so that students can access teaching materials anytime and anywhere which is in line with the research of Wirawan [23] which says that mobile learning can make it easier for users to access learning content anywhere and anytime, without having to visit a certain place at a certain time.

Research conducted by Pranata, Sariyatun, & Ardianto [24] also revealed that the application of comic media in the classroom is not only described in printed form, but through digital access so that students can independently access digital comics and are closer to reading and capturing messages in comic stories. In other words, this developed mobile learning-based digital learning comic can support independent learning.

From the explanation above, it can be concluded that mobile learning-based digital learning comic in English subject of class VIII of SMP Muhammadiyah 16 Lubuk Pakam is feasible and quite effective because it has been compiled based on existing theories so that mobile learning-based digital learning comic can be used in learning.

4 Conclusion

Based on the results and discussion of the development of mobile learning-based digital learning comic in English subjects, it can be concluded as follows:

The product in the form of a digital learning comic based on mobile learning in the Class VIII English subject at SMP Muhammadiyah 16 Lubuk Pakam has worthy results as a final product that can be disseminated and implemented to users. This is supported by several stages, namely the validation of learning media experts (80,56%), learning design experts (92,22%), learning materials experts (93,61%), individual student trials (93,6%), testing student group trial (92,76%), and field trial (93,13%) with the "Very Feasible" category.

Based on the results of data processing, the average value of student learning outcomes using mobile learning-based learning comics that were developed was quite effective. This is indicated by the results of the calculation of the n-gain score of 0.70 in the high category or with a percentage of 70% which is included in the quite effective category. So it can be concluded that there is an increase in students' English learning outcomes after using mobile learning-based digital learning comics.

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