

Validity of Android Application-Based Interactive Media to Improve Literacy

May Yati^{1*}, Titik Harsiati², Muh Arafik³

¹Pascasarjana Pendidikan Dasar, Universitas Negeri Malang, Malang, Indonesia.

²Pendidikan Bahasa dan Sastra Indonesia, Universitas Negeri Malang, Malang, Indonesia.

³Pendidikan Guru Sekolah Dasar, Universitas Negeri Malang, Malang, Indonesia.

Received: July 13, 2023

Revised: September 10, 2023

Accepted: October 25, 2023

Published: October 31, 2023

Corresponding Author:

May Yati

mayyati3105@gmail.com

DOI: [10.29303/jppipa.v9i10.4657](https://doi.org/10.29303/jppipa.v9i10.4657)

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Abstract: Literacy is a major component of school success, so students with deficits in reading skills generally experience a disadvantage in educational attainment. Reading is an activity to find meaning and writing that involves physical and mental activities. This is also in line with the opinion of () that Reading is one's mental process towards a text. In its narrow sense, reading means analyzing a text composed of letters and trying to interpret it as a whole. Learning to read according to is one of the most important skills children will acquire in the early years of school and difficulties in acquiring this skill can have adverse educational outcomes. there are still grade 1 Students whose reading skills are low, so there needs to be an effort made by the teacher in improving reading skills, one of which is using learning media. This study aims to create an interactive media product that is valid for use in early reading learning activities for grade 1 elementary school students. It is hoped that this developed product can help students learn to read. interactive media development using the Lee & Owen development model. products developed in validity by media, material, and language experts. the results of the product development validation test fall into the valid criteria and can be used to learn to read beginning. from the results of the interactive media validation carried out, it obtained a validity value of 81.66% in the "very valid" category. Interactive media products were developed based on the needs of 1st grade students. Validity of Android Application-Based Interactive Media to Improve Literacy in Class 1 Elementary Schools.

Keywords: Android Application; Interactive Media; Literacy; Validity

Introduction

Reading is an activity to find meaning and writing that involves physical and mental activity (Auliyah & Flurentin, 2016). Learning to read according to Thomson et al. (2020) learning to read is one of the most important skills that children will acquire in the early years of school and difficulties in acquiring this skill can have a negative impact on educational outcomes (Jones & Christensen, 2022). Therefore, teaching reading learning is an important focus point in education, towards the importance of teaching reading. According to (Karadeniz & Can, 2015) this is also supported by the opinion of (Al-Mansour & Al-Shorman, 2011) that

reading is a skill that very important and action that everyone should learn).

Reading activities are explained in more detail by (Karadeniz & Can, 2015). Reading is defined as a process of perceiving printed and written words through the senses, interpreting and understanding them, mental and intellectual acquisition, communicative activity with printed and written symbols, processes reception, interpretation, and reaction which consists of several perceptual and cognitive activities. There are 2 stages in the reading process, namely preliminary reading which will be obtained at the beginning of the first year of school and reading comprehension (Fahmi et al., 2020). The early stages in reading are defined as initial reading or early reading by Pertiwi (2016) with more emphasis

How to Cite:

Yati, M., Harsiati, T., & Arafik, M. (2023). Validity of Android Application-Based Interactive Media to Improve Literacy. *Jurnal Penelitian Pendidikan IPA*, 9(10), 8627-8635. <https://doi.org/10.29303/jppipa.v9i10.4657>

on recognizing and pronouncing sound symbols in the form of letters, words and sentences in simple forms. So in other words the child will combine the sound of letters with other letters which will become a meaning.

What novice readers do is explained by (Tunmer & Chapman, 2002) as reading beginners must learn to use alphabetic codes to achieve progress in reading, then using word-based strategies must be positively associated with reading achievement). Takashima & Verhoeven (2019) also presented their opinion regarding what a novice reader does, namely. As a beginner reader learns to read alphabet words, children acquire letter sounds that allow them to recode and pronounce words phonologically, which in turn leads to the identification of appropriate words (Lopes & Barrera, 2019).

There are several stages in beginning reading explained by Munthe & Sitinjak (2019) namely the initial reading stage is taught to early childhood starting with recognizing letters, assembling letters, combining syllables, words, and forming sentences. At this initial reading stage is the first step to the next stage, namely reading comprehension. There are five patterns in beginning reading which are explained according to (Koorneef & Kraal, 2022) children read slower; the child makes shorter saccades and skips lower words; children fixate and re-fixate words more frequently; longer duration of child fixation; and children show a higher probability of regression).

Given that 4 to 5 percent of the population according to Thomson et al. (2020) is affected by reading and spelling disorders, and 4 to 6 percent of adults have not attained fourth grade level literacy. However, most educators are lacking of knowledge to utilize an instructional media and to produce innovation as instructional tools according to (Phosuwan et al., 2013). However, most educators lack the knowledge to utilize learning media and produce innovation as a learning tool. This requires deep attention considering that learning media in the current era is easily accessible with technological developments, one of the technology-based learning media is digital media. interactive, interactive media according to (Maulidita & Sukartiningsih, 2018) is a media or learning aid that can be used to improve student learning outcomes, because interactive media is quite effectively used in learning in schools (Novaliendry et al., 2020).

This interactive media can be accessed with various devices as described by (Arsyad, 2014) to show that the media can be accessed with a computer or with other devices, to make learning media easier by using various available software. So that it can create interesting learning media from the support of various software. Learning media must be used simultaneously, easily reproduced and can be used in various places.

Rapid growth in educational and communication technology according to Akom (Phosuwan et al., 2013) becomes one of our instructional tools for educators. Back to the last ten decades, the overhead projector, transparency, CD-ROM and other media were used as instructional. Currently, people are expected to use the mass media actively. As an educational process to help students use mass media effectively and consciously in this perspective. So that the utilization of technology-based media can motivate students in line with the opinion of (Phosuwan et al., 2013) that technology is a potential tool for instructors to motivate and engage their students in learning. According Thomson et al. (2020) digital game-based learning that uses computers or touch device applications is becoming increasingly important, because they have been found to be effective in encouraging academic skills), in line with the opinion of (Thomson et al., 2020). Various applications have been focused on helping students improve their reading skills.

The results of observing reading activities carried out at SDN Ngadilangkung 01 school that there are still students who have low reading ability, so that efforts are needed by teachers to improve their reading ability, one of which is by utilizing learning media, currently technological developments so that learning media can developed from technology, because according to Digital game-based learning, using computers or touch device applications is becoming increasingly important, as it has proven to be effective in developing academic skills.

In accordance with the media developed in this study, namely the development of interactive media smading (smart reading) based on Android applications for learning to read beginning in grade 1 students at SDN Ngadilangkung. This media will be given animated images with an attractive design so that students will be interested in the media, in this media various stages of beginning reading are presented, starting from recognizing letters to knowing words and sentences, so that not only spelling but all stages of beginning reading students will learn. In developing this media the researcher also looked for references from previous research in order to find out the differences and similarities of the media that were previously developed.

Previous research has been conducted to determine the advantages and benefits of interactive media development. Developmental research conducted by Atika (2018) with the title of research on the development of interactive learning media using Adobe Flash CS6 for early reading in children aged 5-6 years. Based on the results of the expert review of interactive learning media, it was declared very valid with an

average value of 3.69, which means that the display of the media is easy to understand. Then, seen from the one-to-one evaluation and small group evaluation, interactive learning media is stated to be practical with an average value of 93% and 04% (very good category), meaning that interactive learning media is able to increase learning motivation and can be remembered for a long time, so that children can be cognitively motivated because this media has elements of audio, visual and interactivity and the media is easy to get because it is in the form of an interactive CD.

Based on previous research that interactive media is very interesting, practical, and effective in facilitating teachers and students in learning to read beginning. The difference between previous research and this research is in interactive media based on Android applications, which are packaged in Android cellphones so that it makes it very easy for students and teachers to study anywhere and anytime, then previous research uses the Adobe Flash application in the form of a CD so that it is only used on computers or laptops. The development model used by previous research is the Alessi & Trollip development model, the research model that researchers use is the Lee & Owens development model and in this study the researcher only tests the validity of the learning media that is developed. Based on the description above, it is necessary to conduct research with the title "Validity of Android Application-Based Interactive Media to Improve Literacy in Class 1 Elementary Schools".

Method

This study using a type of development research, namely research & development (R&D), the product developed refers to the Lee & Owens research model which is one of the development research models. There are several stages in the lee & owens development research model according to (Lee & Owens, 2004) there are several steps that must be followed in each phase of the developing process, namely: analysis (Analyze), planning (Design), development (Development), implementation (Impementation), and evaluation.

The reason researchers use the Lee & Owens development model is because this model is specifically for developing multimedia. The product development plan is arranged in a chart as shown in the figure.

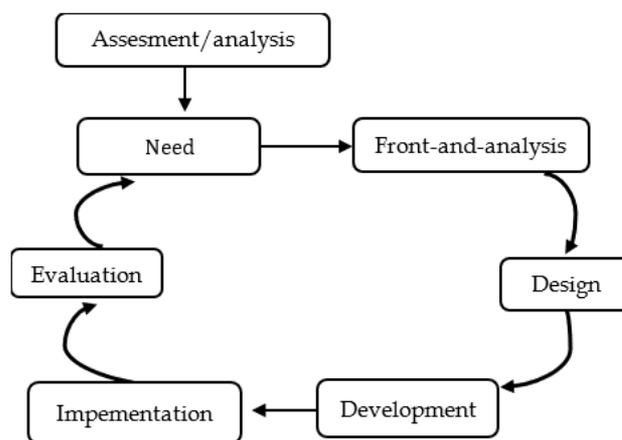


Figure 1. Lee & Owens research model

Data analysis in this study was in the form of qualitative and quantitative data analysis. Qualitative analysis data analysis, namely descriptive data, the presence of a researcher is the key in qualitative research because it is a key instrument in research according to (Romlah, 2021). Analysis of quantitative data is data analysis that has systematic, planned and clearly structured characteristics from the beginning to the creation of the research design, both regarding the purpose of the data sample, the data source and the methodology according to Rijali (2019) Qualitative data analysis in the form of quantitative data analysis is used to analyze data obtained from the evaluation results of experts in the form of suggestions, input, comments, and others. And quantitative data analysis is used to analyze the results collected from experts through questionnaires to determine the feasibility of the product being developed. Data analysis techniques in this study are described as follows

The product validity test was carried out by 3 validators who are experts in their fields to determine the feasibility of the interactive media being developed. The percentage validation results from the validator are calculated using Formula 1.

$$\text{validity value} = \frac{\text{total score from the validator}}{\text{total maximum score}} \times 100\% \tag{1}$$

The values of the validators are then summed up to obtain an average percentage, so that the criteria or level of validity of the product being developed can be determined, based on the provisions in the Table 1 (Ulfa et al., 2022). Referring to these criteria, the product being developed is said to be feasible if it is in quite valid criteria with a percentage range of 41-60%, valid 61-80% and very valid 81-100%.

Table 1. Range Of Validation and Criteria

Range of validation percentage values (%)	Criteria
0 -20	Totally invalid
21-40	Less valid
41-60	Pretty valid
61-80	Valid
81-100	Very valid

Result and Discussion

In this study the researchers produced a product, namely an interactive media that was packaged in an Android-based application, in developing this interactive media using several other software and the final result was in the form of an APK file. The material contained in the interactive media is to recognize letters, syllables and words, sentences that are introduced from a simple story. By combining a communicative approach and a whole language approach. Then the developed product has been tested for validation by an expert validator so that it can determine the validity or feasibility of the product being developed before carrying out field trials. The validity of interactive media is obtained from the results of validity tests by validators. Obtaining validity data results consists of validation of material, media and cognitive test questions. Validation of the questionnaire uses a rating scale type scale with modifications (Ernawati, 2017). The product developed has been declared valid and has been validated by media, material and language expert validators. Referring to the criteria according to Ulfa et al. (2022), the product being developed is said to be feasible if it meets the criteria of being quite valid with a percentage range of 41-60%, valid 61-80% and very valid 81-100%. The average results of the validity of interactive media products are 81.25% in the category "very valid / very feasible" so that interactive media can be used in initial reading learning.

The product that the researcher developed was tested for validity based on three aspects, namely the median aspect of the material and the language. The first is the validity of learning media in the language aspect. Testing the validity of the media according to Hutabri (2022) is to measure the feasibility or validity of the media being developed, by carrying out several stages, namely determining validators who are experts in their field, providing the media that has been developed for assessment and carrying out revisions if there is a revision of the validator. The components measured in analyzing the validation of learning media are ease of use, appearance, language, readability and achievement of objectives (Kurniawan & Murni, 2020; Listianingsih et al., 2021; Solikhin & Wijanarko, 2021). So that the product that the researcher has developed is then tested

by experts for its feasibility or validity by measuring the validity of the media, material and language aspects. According to (Ernawati, 2017). Before the media is used and implemented in the classroom, the media needs to be tested on several indicators for assessing suitability from the media aspect and the material aspect. The aspects that are assessed in measuring media suitability are subject matter, auxiliary information, affective considerations, interface, navigation, pedagogy and robustness so that the media can be said to be suitable for use.

For material experts, the aspect measured is Subject matter, namely whether the material provided is in accordance with the initial objectives of creating the program and whether the depth of the material is appropriate to the level of students who will use the product and whether it is in accordance with the objectives to be achieved. Is the content structure appropriate and the material presented in the product is correct?. The material included in the media is initial reading material which covers reading aspects such as recognizing letters, syllables, words, and even simple sentences.

The results from expert validators and practicing validators are in the form of quantitative data and qualitative data, quantitative data obtained from questionnaire scores obtained from expert validators and practicing validators using the Liker scale (Mudiartana et al., 2021) with criteria 1-5, namely 5 points for the very appropriate category, 4 points for appropriate category, 3 points for moderately appropriate category, 2 points for unsuitable category, and 1 point for very inappropriate category. Then for the qualitative data in the form of suggestions or input from the validator on the product being developed. The validation test was carried out by 3 validators. as a media validator, language, and material in the developed media.

Initial View

In this initial display is the display after the application is installed, then click restart to log into the application, after clicking restart a warning will appear to students to adjust the screen brightness and duration of playing cellphones, students who cannot read can click the volume button to listen to a warning. Then click the understand button to go to the application homepage.



Figure 2. Initial display of the product

Home view

In this view there are several menus, namely the let's learn menu, and the let's play menu. Then in the upper left corner there is an information symbol denoted by a lowercase i (i) to find out the instructions for use, and the profile of the application developer. Students can click on the instructions for use before using the application. The home menu display can be seen in the Figure 3.



Figure 3. display the homepage of the product being developed

Display instructions for use

On the user manual menu there are instructions for using the buttons contained in interactive media, so that it can make it easier for students and teachers to use this interactive media. If you have finished viewing the instructions for use, students can return by clicking the arrow button in the upper left corner. The following is a picture of instructions for using interactive media.

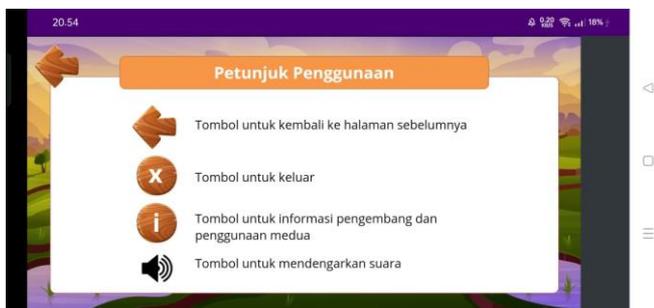


Figure 4. displays the instructions for using the product being developed

Developer profile menu

On the developer profile menu there is information from the application developer which contains developer biodata and photos of interactive media developers. The floating profile display can be seen in Figure 5.



Figure 5. displays the product development profile that has been developed

Menu let's learn

On the let's learn menu there are 2 menus, namely the recognize letters menu and the story menu, students are directed to learn to recognize letters first. On the Recognizing Letters menu, you will learn letters by giving students an example of a word that starts with the letter being studied, each letter is given an example of 3 words starting with that letter. Students can sing about the letters of the alphabet before learning letters. Here is a picture of the menu display, let's learn to recognize letters.



Figure 6. menu display Let's learn about the products being developed

Story menus

On the let's tell story menu, there are 3 stories, students will be directed to read a simple one and at the same time will learn letters so that the communicative approach that the researcher uses will be seen through a story, the letters introduced in the first story are a and b. then every word that begins with a and b will be colored red. Then, not only reading the story, there are 4 language skills activities, namely listening or listening, speaking, reading, and writing, so that the whole language approach used by the researcher will be seen

in the story menu. The story menu can be seen in Figure 7.



Figure 7. display menu let's tell the product being developed

The results of the analysis from the expert validator and practitioner validator are in the form of quantitative and qualitative data, where the quantitative data is in the form of results from the validator and the qualitative data is in the form of input and suggestions from the validator. The results of expert and practitioner validators are described as follows:

Media validation

The developed media is validated by validators who are experts in their fields, using a questionnaire with Likeker scale analysis. It was found that the average value of the validity of the validator was 82.25% with the validity criterion being very valid, so the researchers described in the table below the validator values for each component of the statement.

Table 2. Media experts validation score

Statement to-	Score obtained	Max Score	Criteria validity
1	5	5	Very valid
2	4	5	valid
3	4	5	valid
4	4	5	valid
5	4	5	valid
6	5	5	Very valid
7	4	5	valid
8	3	5	Pretty valid
9	3	5	Pretty valid
10	4	5	valid
11	4	5	valid
12	4	5	valid
13	4	5	valid
14	5	5	valid
15	4	5	valid
16	5	5	Very valid
Score obtained	66	80	
Average		82.50	Very valid

Based on the table 2, the score results from the media validator obtained a validity percentage of 82.50%

with the criteria for the level of validity referred to as a very valid category. From the validation results by the material expert validator not only obtains quantitative data in the form of an assessment score from the questionnaire, the validator also provides comments or suggestions in developing the media so that it becomes input for improving the media that has been developed for the better, along with comments or input from the expert validator.

Material Validation

The developed media needs to be validated by material in the media by validators who are experts in their fields, using a questionnaire with Likeker scale analysis. It was found that the average value of the validity of the validator was 80.00% with the validity criterion being valid, so the researchers described in the table below the validator values for each component of the statement as Table 3.

Table 3. Material experts validation score

Statement to-	Score obtained	Max Score	Criteria validity
1	4	5	valid
2	3	5	Valid Enough
3	5	5	Very Valid
4	3	5	Valid Enough
5	4	5	valid
6	5	5	Very valid
7	4	5	valid
Score obtained	28	35	
Average		80.00	Valid

Based on the Table 3, the score results from the media validator obtain a validity percentage of 80.00% with the criteria for the level of validity referred to as a valid category. From the validation results by the material expert validator not only obtains quantitative data in the form of an assessment score from an angle, the validator also provides comments or suggestions in media development so that it becomes input for improving the media that has been developed for the better, along with comments or input from the validator expert on material provisions.

Language Validation

Language validation needs to be done to determine the suitability of the language used in the media for the characteristics of grade 1 elementary school students and in accordance with the adjusted spelling (Sari et al., 2023). Then language validation is carried out by validators who are experts in their fields, using a questionnaire with Liker scale analysis. It was found that the average value of the validity of the validator was 82.50% with the validity criterion being valid, so the

researchers described in the table below the validator values for each component of the statement as follows Table 4.

Table 4. Language experts validation score

Statement to-	Score obtained	Max Score	Criteria validity
1	4	5	valid
2	3	5	Valid Enough
3	4	5	valid
4	5	5	Very Valid
5	4	5	valid
6	4	5	valid
7	4	5	valid
8	5	5	Very valid
Score obtained	33	40	
Average		82.50	Verry valid

Based on the Table 4, the score results from the language validator obtained a validity percentage of 82.50% with the criteria for the level of validity referred to as a very valid category. From the results of the validation by the linguist validator not only obtained quantitative data in the form of an assessment score from the questionnaire, the validator also provided comments or suggestions in media development so that it became input for improving the language that had been developed for the better, along with comments or input from the expert validator the material.

Data analysis was carried out in this study to determine the feasibility or validity, attractiveness, practicality and effectiveness of the products that have been developed. Based on the data presented above, the following data analysis was carried out:

Interactive Media Validity Data Analysis

To find out the validity or feasibility of the product as a whole, the average value of media, material and language validation will be added up. So that the validity or feasibility value of interactive media will be found, namely 81.25% with a validity level that is very valid, so the researchers describe it in the Table 5.

Table 5. Percentage of product validity or suitability

Parameters	Media validation	Material validation	Language validation
Validity %	82.50	80.00	82.50
Average %			81.66
Validity Level			Verry Valid

Based on the Table 5 it can be seen that the validity or feasibility of the product obtained from al-media experts is 82.50% with the "very valid" criteria, 80.00%

material validation in the "valid" category and 82.50 from the language validator with the "very valid" category. valid". The average result of the validity of interactive media products is at 81.25% with the category "very valid / very feasible" so that interactive media can be used in beginning reading learning.

The development research that has been carried out focuses on the development of interactive media in early reading learning (Harper et al., 2020). This product development aims to produce interactive media based on android applications that are valid, practical, attractive, and effective for use in early reading learning for 1st grade students. In developing this interactive media using the lee & owens development model according to Lee & Owens, (2004) there are several steps that must be followed in each phase of the development process, namely: analysis (Analyze), planning (Design), development (Development), implementation (Implementation), and evaluation (Evaluation). In the first stage, the initial analysis collects information from interviews and observations to find out the real conditions, expected circumstances, and aims to provide solutions to the conditions faced. Then do a start-end analysis consisting of ten aspects in the analysis.

In the second stage, namely designing the product, at this stage designing the product development schedule, determining the team, cost details, product specifications, and determining the material, then the third stage carries out the product development that was designed in the previous stage. At this development stage, the team is involved in developing the product. Then the product that has been developed and declared feasible or valid is then implemented to be tested on users, both teachers and students. And the last is to evaluate the results obtained from the trial as a material for product improvement.

The results of the product developed are in the form of interactive media based on Android applications. The interactive media developed is meant as multimedia because it combines many media such as text media, audio, video, visuals, realia, and models (Pratomo, 2019). Which are used simultaneously which are usually controlled by a computer according to Kustiawan (2016), The product developed has been tested for validity and tested so that its validity can be proven. Testing the validity of the media according to Hutabri (2022) is to measure the feasibility or validity of the media being developed, by carrying out several stages, namely determining validators who are experts in their fields, providing media that has been developed to be assessed and revising if there are revisions from the validator. The components measured in analyzing the validation of learning media are ease of use, appearance, language, readability, and goal achievement.

Conclusion

The product developed has been declared valid and has been validated by media, material, and language expert validators. Referring to the criteria according to (Ulfa et al., 2022), the product developed is said to be feasible if it is in quite valid criteria with a percentage range of 41-60%, valid 61-80% and very valid 81-100%. The average validity of interactive media products is at 81.25% in the "very valid / very feasible" category so that interactive media can be used in beginning reading learning.

Acknowledgements

This journal article was written by May Yati, Titik Harsiati, Muh Arafik based on the results of research entitled (Validity of Android Application-Based Interactive Media to Improve Literacy) which is the final assignment given by the Postgraduate Faculty of the Basic Education Study Program. I would like to thank all parties who have participated in the creation of this article. The content is the sole responsibility of the author

Author Contributions

In this short study, researchers state that all contributors play an active role in the portion of cooperation that has been agreed together, so that the contribution is very valuable and provides an extraordinary completeness of the study.

Funding

This research is independent with the basis of funding from the research team. There is no sponsor in this research.

Conflicts of Interest

There is no conflict of interest in this study. All team members were dedicated to the research objectives and conducted with a high degree of independence.

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