
Validity And Practicality E-Book Based On Android Of Materials Structure And Function Of Animal Tissue 11th Grade Senior High School

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Abstract

Education is one of the supporting factors to improve the quality of human resources and is shown by the higher standard of education and along with progress in the 21st century. In this century, we know the term generation millennial, in general, it is found among students who are approaching adulthood and already have many communication devices inform of the smartphone. The use of a smartphone as educational media that is not maximally used.-based electronic teaching materials for android students is not available until now although there are currently very few to use. The purpose of this study is to produce an e-book based on android the structure and function of animal tissue that is valid and practical. This type of research is research and development. The method used in this research development is to use a plomp model. The object of the study consisted of one biology teacher and 35 students of 11th grade science Senior High Public School 3 Padang. Based on the results of this study produced e-book based on android on the material structure and function of animal tissue that showed an average value of 86.56% (very valid) based on validator ratings, practicality assessments by biology teachers showed an average value of 96.25% (very practical) and practicality assessment of field tests by 35 students obtained an average value of 86.66% (very practical). So, it can be concluded that the e-book based on android on the material structure and functions of animal tissue developed is very valid and very practical to use.

Keywords: validity; practicality e-book; android; structure and function of animal tissue

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INTRODUCTION

Education is one of the supporting factors to improve the quality of human resources and is shown by the higher educational standards and along with progress in the 21st century. Therefore we are required to follow the changing times at this time. In this 21st century, we know the term generation millennial, generally found among students who are approaching adulthood and already have many communication devices in the form of gadgets (smartphones/ phone tablets) based on Android.

Gadget is a small electronic device such as a smartphone (smart cell phone) and tablet with a variety of special functions (Anggraeni and Hendrizal, 2018). In the opinion of Hasballah et al, (2018) states that generation millennial this is growing and developing in a world filled with electronic goods and social media online. Electronic goods and activities online on social media are innovations from the development of Science and Technology (Science and Technology).

According to Oktafiana, et al (2018) the development of science and technology is progressing rapidly. Nowadays technology has many negative and positive impacts. One positive impact is the use of technology in the world of education, namely, the use of learning materials in the form of e-book based on android as a tool in the learning process. The use of e-book based on android can improve the efficiency and effectiveness of learning (Sholeh and Buditjahjanto, 2015). In the learning process, there needs to be innovation and a new atmosphere in learning so that students feel interested in teaching and learning activities. This is where the role of teaching materials e-book based on android that involves students in the process will lead to the deeper curiosity of students, students will experience their own experiences that can cause students to become addicted to learning.

The learning process at school using tools in the form of an e-book based on android is very easy for students and teachers to identify problems that often arise during the teaching and learning process. In the opinion of Sakat (2012) that teaching materials in the learning process are very effective and can be implemented in the world of education. This, the use of information technology in the learning process in the classroom has become a necessity for students and schools. One alternative teaching material

used in the material structure and function of animal tissues is to use teaching materials in the form of an e-book based on android.

Android is a-based operating Linux system that is intended for mobile devices that have many other features such as, office, video, e-book, digital book reader, and so on (Muhammad et al, 2015). Android is an operating system that is in great demand by various groups because it is very easy to use. By Nurjanah's opinion (2015) states, that teaching materials e-book based on android can ease, facilitate the delivery of learning, and can improve the quality of learning of students.

The results of observations made in several high schools (high schools) in the city of Padang seen no availability of learning materials in the form of an e-book based on android. In the author's interview with the biology teacher at Senior High Public School 3 Padang on April 23rd, 2019, was one of the few schools whose teaching materials were not yet available in the form of an e-book based on android. Students are allowed to bring a smartphone to school. Teaching materials used during the learning process are student work sheet or LKPD, books, modules, and browsing from the internet.

In the learning process during the use of teaching materials as a whole have not been able to visualize the material structure and function of animal tissues as evidenced by the average value of students 76.44 is still below the average not reaching the minimum completeness criteria (KKM) which are 80 so that most students must do a remedial to achieve the specified KKM. This is because of the difficulty of students in understanding the concept of structure and function of animal tissues so that the impact on student learning outcomes is low.

The results of the questionnaires of teaching materials in the form of e-books based on android regarding which were distributed to 35 students, showed problems regarding learning materials, almost all materials felt difficult to be learned by students because there were still many concepts that were still abstract and not yet visualized. As many as 94.29% of students have a smartphone and tablet based on android. Judging from the percentage of student observation questionnaires stated that the use of smartphones is used for chatting (27.89%), browsing (26.92%), playing games (24.04%) than for learning (21.15%). The learning difficulties of students for some of the materials in 11th grade semester 1, especially the structure and function of animal

tissues with a percentage of questionnaires 23.76%. The use of communication devices can be used as an educational medium to facilitate students in understanding the material structure and function of animal tissues.

Device communication devices have not been used to the fullest because students spend more time large enough to play the device which results in reduced reading power and their time to learn based on electronic teaching materials for android students is not available until now although there are currently very few to use.

Therefore there needs to be an innovation developed by electronic teaching materials in the form of an e-book based on android on the material structure and function of animal tissues for students of 11th grade science Senior High Public School 3 Padang. According to Akbar and Razak (2019) states that an innovation that is owned to develop teaching materials that can improve learning in accordance with the needs and characteristics of students. Teaching materials that can guide to do activities related to learning objectives and the needs of students to be able to understand the concepts in the structure and function of animal tissue.

Based on the above problems, the researchers conducted a study of the validity and practicality of e-book based on android the material structure and function of animal tissue for students of 11th grade science Senior High Public School 3 Padang.

RESEARCH METHOD

The type of research is research and development which aims to produce -e-book based android the valid and practical. Development e-book based on android of models a Plomp development. The research stage consists of three stages, namely: preliminary research phase, development or prototyping phase, and the assessment phase (Plomp and Nieveen, 2013). Formative evaluation is present in all phases and recurring cycles of the research design. The subjects were one biology teacher and 35 students of 11th grade science Senior High Public School 3 Padang.

RESULTS AND DISCUSSION

Results

1. Preliminary Research Phase

a. Problem Analysis of Students

Analysis of the problems of students is done to get the characteristics of e-books based

on android that are of interest and favored by students who are targeted users of e-books based on android to be developed and determine the e-books based on android that teachers need as tools help in the learning process.

Based on interviews with biology teachers at Senior High Public School 3 Padang on April 24th 2019, it was found that students were allowed to bring smartphones to school. Teaching material used in the form of printed books and student worksheet and sources from the internet. By using these teaching materials are still not able to visualize the structure and function of animal tissue material. So that it takes teaching materials in the form of an e-book based on android that can visualize the material structure and functions of animal tissues with e-book based on android and interactive which has clear writing, pictures, and videos that are easily understood by students. Because almost all the material felt by students is difficult to learn and understand during the learning process, it can be seen that there is still an average grade below the minimum completeness criteria (KKM).

The results of the questionnaire analysis of the problems distributed to 35 students showed that almost all of the material in class XI semester 1 was difficult to understand, especially material structure and function of animal tissue with a percentage of 23.76%. This indicates that there is still no teaching material that can visualize material that makes students able to understand the material. As many as 94.29% who have smartphone-based android is used for chatting (27.89%) browsing (26.92%), playing games (24.04%) than for learning (21.15%). The use of smartphones should be used as an educational medium that makes it easy for students to understand the material structure and function of animal tissue.

b. Analysis Curriculum 2013

Analyzing curriculum aims to understand the sequence and scope of material needed following existing core competencies (KI) and basic competencies (KD), and formulate indicators of achievement of competencies and learning objectives. Curriculum analysis is focused on KI and KD analysis on the material structure and function of animal tissue with the reference used in the development process, namely the curriculum 2013.

c. Concept Analysis Results in Concept

The analysis aims to signify, detail, and arrange systematically the concepts needed and be used as a reference in the development of e-

books based on android. The material discussed is a general description of the structure and function of animal tissues. The concepts that must be understood by students are the types of tissues in animals which include epithelial, connective, muscle and nerve tissue, organs in animals, namely the inside and the outside and tumors and cancers along with their causal factors.

2. Development or Prototyping Phase

a. Development of Prototype 1 Results

The design of prototype 1 e-book based on android starts with designing storyboard e-book based on android, then produces e-book based on android containing components including:

1. cover e-book based on android
2. Opening page
3. Menu
4. Profile
5. Preface
6. Instructions for use
7. KI, KD, and IPK
8. Concept maps
9. Meeting material
10. Discussion
11. Practical activities
12. Learning videos
13. Summary
14. Evaluation
15. Bibliography

Results of prototype development 1, then carried out Self-evaluation is with the results obtained, that the display e-book based on android overall has a complete cover display, the main menu containing profiles, foreword, concept maps, discussions, videos, meeting activities, summaries, evaluation, and library list. But there are some technical mistakes in entering the "HOME" button, writing errors in words, and using incorrect punctuation. Based on the mistakes made, a revision was made so that the

"HOME" button could be used following its function and improved writing of words and punctuation.

b. Development of Prototype 2 Results

In the prototype 2 development stage, a validity test was conducted with experts (expert review). Expert assessment is based on the valuation aspects of the construct, the content aspect, the aspect of graphics, and language aspects. The results of the validity of e-book based on android can be seen in Table 1.

Table 1. The average results of a validation e-book based on android.

No.	Aspects assessed	Validation value (%)	Criteria
1.	Aspect Constructs	90.00	Very Valid
2.	Aspects of Content	89.58	Very Valid
3.	Aspects of Graphic	83.33	Very Valid
4.	Aspects of Language	83.33	Very Valid
Total		346.25	Very Valid
Average		86.56	

Based on the data in the Table, the results of the validation assessment show an average total value of 86.56% (very valid). It can be concluded that the requirements to meet the validity criteria of an e-book based on android the material structure and function of animal tissue have been fulfilled from all aspects of the construct, content aspects, graphic aspects, and language aspects.

Then conducted one to one evaluation is on three students with different levels of ability, namely low, medium, and high. Based on the results (one to one evaluation) with students, it is known that the e-book based on android structure material and function of animal tissues that developed the material is complete and clear, the language is according to EYD and easy to understand, the presentation of complete material, and following basic competencies following curriculum 2013, the graphics of colors, pictures and videos are very interesting and good so that they are easy to understand and can increase students' interest in reading.

d. Development of Prototype 3 Results

At this stage, practicality testing is carried out by small groups. At this stage, the evaluation of six students with different abilities is low,

medium, and high. The results of the practice in small groups can be seen in Table 2.

Table 2. The Results of Small-Group Practicality Tests E-Book Based on Android.

No.	Aspects Assessment	Average (%)	Criteria
1.	Ease of Use	93,73	Very Practical
2.	Efficiency of Learning	91,67	Very Practical
3.	Benefits	95,14	Very Practical
Total		280,56	Very
Average		93,52	Practical

Based on the data Table This shows the results of the small group practicality assessment (Small Group) with an average total value of 93.52% (very practical). It can be concluded that the e-book based on android on the material structure and functions of animal tissue developed can already be used and is very practical so it does not need to be revised. So that it can proceed with large group trials at the stage field test.

d. Development of Prototype 4 Results

Prototype 4 is the same as prototype 3. This is because at the stage small groups there is no revision and the practicality test results show an e-book based on Android so that it can be used to the stage (field test).

3. Assessment Phase

Results Assessment phase this is data obtained test results practicalities of e-book android-based for teachers and learners large groups (field test). The results of the assessment phase (Assessment Phase) are as follows.

a. Practicality Test -E-Book Based Android for Teachers

This activity was carried out to see the practicality of e-book based on android. The practicality assessment was carried out by one of the biology teachers who taught at Senior High Public School 3 Padang. The results of data analysis on the practicality of an e-book based on android can be seen in Table 3.

Table 3. Average Results of Analysis of the Practicality Test of an E-Book Based on Android for Teachers.

No.	Aspects Assessment	Average (%)	Criteria
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1.	Ease of Use	93,75	Very Practical
2.	Efficiency of Learning	100	Very Practical
3.	Benefits	95	Very Practical
Total		288,75	Very
Average		96,25	Practical

Based on the data of the table. Shows practicality test results for teachers with an average total grade of 96.25% (very practical). It can be concluded that the practicality test for teachers -e-book based on android the structure and function of animal tissue are very practical to be used in learning activities.

b. Practicality Test E-Book Based on Android by Group Students Large

This activity is carried out to see the practicality of e-book based Android by students. The average results of the analysis of the practicality of tests e-book based on android students can be seen in Table 4.

Table 4. The Average Results of the Analysis Practicality Tests for E-Book Based on Android Group Students Large

No.	Aspects Assessment	Average (%)	Criteria
1.	Ease of use	88,66	Very Practical
2.	Efficiency of Learning	86,07	Very Practical
3.	Benefits	85,24	Very Practical
Total		259,97	Very
Average		86,66	Practical

Based on data Table these, show the results of practicality tests by students with an average total value of 86.66% (very practical). It can be concluded that the practicality test by learners e-book based on android the material structure and function of animal tissues is very practical to be used in learning activities.

DISCUSSION

1. The validity of E-book Based on Android

On the results of the validity test analysis assessed by experts shows an average value of 86.56% with very valid criteria. e-books based n android declared to be very valid by experts because they meet all four aspects, namely the

construction aspect, the content aspect, the graphic aspect, and the language aspect. This is following the opinion of Afriadi et al. (2013), who states that a very valid product shows the suitability, meaningfulness, and usefulness of a product.

Validation assessment average overall value of 86.56% with very valid criteria, this is the average of the four aspects of the validity test by experts in terms of the four aspects, namely the construct aspects, content aspects, graphic aspects, and language aspects.

In terms of construct aspects, the average value is 90.00% with very valid criteria. This shows that e-book based on android is designed to be operationalized properly, the instructions for use are following the material described in sequence (systematic) so as to increase learning activities and student learning outcomes. This is by the opinion of Arikunto (2013) states that the data generated from a product is valid, so it can be said that the product developed can provide an overview of the development goals correctly and with the real situation.

In terms of content, the average value is 89.58% with very valid criteria. This shows that the e-book based on Android adjusted to the expected learning outcomes, the material on the e-book based on android contains difficult concepts and can be visualized in the form of pictures and videos so that students can understand the material structure and function of animal tissues. By the opinion of Bustomi (2010) that e-book based on android able to visualize abstract material through pictures and videos, making it easier for students to understand the subject matter.

From the graphic aspect, the average value is 83.33% with very valid criteria. This shows that the e-book based on android the graphic aspect contains visual media components in the form of writing, images, and videos, and the design as an e-book based on android a whole is interesting and able to provide attractiveness to students to enhance students' understanding and learning activities. By the opinion of Syafruddin (2019) states that an attractive design one of which is the graphic aspect which contains an attractive display of images and videos following the basic needs and attractiveness of a product.

In terms of language aspects, the average value is 83.33% with very valid criteria. This shows that e-book based on android can be understood and understood using the correct language and using communicative language. The

sentences in the material are by the rules of the Indonesian language. According to Hamdani (2011) states that in the aspect of language that needs to be considered is in the preparation of teaching materials, language sentences used should be a language that is easy to understand and simple language.

2. The practicality of E-Book Based on Android

The results of the interview evaluation get a positive response, this is because students feel the e-book based on android developed is complete and clear material, the language is according to EYD and easy to understand, the presentation of complete material, and by the basic competencies and curriculum 2013, graphics are interesting because the colors, pictures, and videos are very interesting and good so they are easy to understand and can increase students' interest in reading.

The results of a small group evaluation carried out by 6 students with low, medium, and high academic abilities, it can be concluded that with an overall average of 93.52% (very practical). It can be seen by students showing a positive response in the use of e-books based on android and able to increase students' understanding of learning in the learning process. Based on the results of the students' practicality assessment, it is known that the students showed very good responses and the e-book based on android that was developed was already usable and very practical.

The assessment of the results of the practicality of e-books based on android for teachers shows an average total value of 96.25% (very practical). The value of practicality is the average of the three aspects in the practicality test for teachers in terms of ease of use, the efficiency of learning time, and benefits.

In terms of ease of use with a value of 93.75% criteria is very practical. This shows that e-books based on Android are easy to use, the commands are easy to follow, the navigation buttons function well, the language used to explain subject matter is easy to understand, and the display of letters, pictures, and videos is easy to explain to students. So that it can be easier for teachers to explain the material in the learning process following the learning objectives.

Judging from the efficiency of learning time with a value of 100% criteria is very practical. This shows that learning with an e-book based on android can save time in teaching and

learning as well as the time provided to explain the subject matter by using an e-book based on android in the classroom has been adjusted.

Judging from the benefits with a value of 95% criteria is very practical. This shows that an e-book based on android can help teachers in explaining the subject matter to students, making the learning process fun, pictures and videos can help explain well and is very practical to be used as a teaching and learning tool.

It can be concluded that the practicality test for a teacher is an e-book based on android very practical to be used in the learning process activities. Plomp and Nieven (2013) state that what is meant by practical categories is that products that are developed can be used, can be used, are easy to use, and are by research objectives. Strengthened by the opinion of Asyhar (2012) states that one of the criteria of an e-book based on android a good practical, flexible, and resistant.

The results of a large group of practicality assessment students by 35 students showed an average total value of 86.66% with very practical criteria. The practicality value is the average of the three aspects in the practicality test of large group students in terms of ease of use, the efficiency of learning time, and benefits.

In terms of ease of use, an average value of 88.66% with criteria is very practical. This shows that there are no obstacles to using e-books based on android. Applications e-book based on android that has been installed on smartphone students can be used properly. Besides the commands that there e-book based on android, navigation buttons, and instructions for use that serves to facilitate the process of using e-book based on android. According to Calimag et al. (2014) revealed that one of the devices that could be used for educational purposes was smartphones based on android.

Furthermore, the language is easy to understand, the letters used are easy to read, the images displayed clearly and the video is not too fast to understand. Thus the ease of use shows good responses to students. According to Sanjaya (2012) e-book based on android is a media that can be operated easily by users, so users can choose what to do for the next learning process. This teaching material is an e-book based on android made so that it can be used anywhere and anytime and is easy to carry anywhere. Worth the opinion Gonzalez et al. (2015) states that the smartphone based on android facilitate learners

in accessing sources of teaching materials, which do anytime and anywhere.

Judging from the efficiency of learning time, the average value of 86.07% with criteria is very practical. This shows that the use of an e-book based on android can easily understand the material structure and function of animal tissue, and students can save students' learning time in class. Students can make use of free time to be able to learn to use e-book based on android whenever and wherever easily. According to Sadiman et al, (2009) states that one of the uses of learning media can overcome the limitations of space, time, and senses.

Judging from the average benefit value of 85.24% with very practical criteria. This shows that the e-book based on android can help students in understanding subject matter, make learning more enjoyable, increase learning enthusiasm, pictures and videos that are presented help visualize students' understanding of the material structure and function of animal tissues, and are practically used as facilities in the learning process. Therefore, it can be concluded that the e-book based on android that was developed meets very practical criteria based on its assessment aspects.

CONCLUSION

Based on the results of the validity and practicality tests that have been carried out e-books based on android the material structure and function of animal tissue for students of 11th grade science Senior High Public School 3 Padang that have been analyzed it can be concluded that the validity test fulfilling very valid criteria with an average value of 86.56% and the practicality test for teachers fulfilling very practical criteria with an average value of 96.25% and the practicality test of large group students fulfilling very practical criteria with an average value of 86, 66%.

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