DEVELOPMENT OF LAND SURVEYING MOBILE LEARNING IN MODEL DESIGN AND BUILDING INFORMATION STUDY PROGRAM

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Abstract. The learning process requires media to facilitate the delivery of material and build interaction. The research objective of developing mobile learning-based media is to assist students in analyzing and working on practicum assignments on land surveying. Media was developed on the Alessi & Trollip model. Questionnaires were used to collect data for a sample of 50 respondents. The findings revealed that the learning media developed, 87% of respondents said it was very feasible in terms of the feasibility of the material content, 87% of respondents said it was very feasible in terms of the feasibility of the visual appearance, and 85% of respondents said it was very feasible in terms of the operational feasibility of the media. The conclusion from this development shows that 86% of mobile learning-based media for material analyzing land surveying results is very suitable for use in learning in vocational high School.

Keywords: Mobile Learning, Measurement Analysis, Multimedia, Media Development.

INTRODUCTION

The learning process requires strategies to support the maximum achievement of goals. The strategy includes using approaches, methods, techniques, media, learning resources, and groupings of students to generate educational interactions between teachers and students, between students, and towards learning outcomes (Nasrulloh & Umardiyah, 2020). Learning media that can facilitate the delivery of material and build interaction is necessary for the learning process so that learning activities run optimally. The results of observations in the subject of land surveying, students do not understand the steps of doing land surveying tasks, so the analysis results are not optimal. In addition to these facts, based on unstructured interviews with teachers of soil science subjects, it is said that there is a deterioration in learning outcomes and student attention during online learning.

The current post-COVID-19 pandemic situation presents new challenges to various fields in daily life. Educational institutions have switched some or all of what was initially done face-to-face in the classroom or laboratory to learning with a blended online strategy (Sengupta, 2022). However, many things make this learning ineffective. One of them is the use of learning media to explain the analytical material and practicum that is difficult to understand. During learning, teachers often give material and assignments without providing in-depth explanations of the material that are easy for students to understand. Therefore, the Microsoft team provides the material to solve the problem. However, practicum learning requires Learning applications that can facilitate learning outside the classroom and access to information anytime and anywhere (Kumar et al., 2022).

One of the learning applications is a mobile learning-based application containing material and steps for completing tasks and practices in digital form. land surveying is a compulsory subject for SMK students of the Building Modeling and Information Design (DPIB) study

program, which consists of knowledge of how to analyze land surveying to apply land surveying practices.

The application in the form of Mobile learning is one of the new multi-context learning models that involve interaction with personal electronic devices (Danish & Hmelo-Silver, 2020), which in this case refers to the use of smartphones, tablets, as well as computers for educational purposes (Sung et al., 2019). This model influences learning by concretizing knowledge, strengthening a learning, or demonstrating learning activities (Hsieh & Tsai, 2017). In addition, mobile learning has the potential to improve student learning outcomes (Yaniawati et al., 2021), allowing learners to learn according to their individual needs and preferences (Troussas et al., 2022), as well as being able to increase student motivation because they are involved in the learning process directly (Li & Heng, 2021).

The purpose of developing this Mobile Learning Application is to assist students in analyzing and working on practicum assignments on land surveying subjects. Furthermore, to add learning media in the form of new mobile learning. This mobile learning contains teaching materials, discussion forms, student assignments, and evaluation tools. With Mobile Learning, students can read and do assignments better because they provide instructions for working on assignments, materials, and self-evaluation of what to do. In addition, there is a discussion form that is useful for interaction between teachers and students during distance learning. The specification of the development product is in the form of Mobile learning, which contains teaching materials for analyzing land surveying results, doing practicum assignments, and evaluation tools which are material from the subject of land surveying.

RESEARCH METHOD

Alessi & Trollip Adaptation Development Research (2001, p. 407). The adaptation stages in this study include planning, design, and development. After validating the test of material and media experts, mobile learning-based learning applications are tested in the classroom. The sample used as a trial was a class X student of SMK N 2 sragen of the Modeling Design and Building Information study program who had participated in the subject of Land Surveying. Data were obtained from questionnaires distributed to students, and 50 respondents collected questionnaires. The questionnaire indicators used include material feasibility, display feasibility, and operational feasibility consisting of 20 questions based on the National Education Standards (Kurniawan Putra et al., 2019; PP RI No. 4, 2022). The scale used is a Likert scale modified (Sutrisno Hadi, 1991) by numbers one to four with specific details such as 1 (Not feasible), 2 (Less feasible), 3 (feasible), and 4 (Haighly feasible).

The Likert scale measures a person's attitudes, opinions, and perceptions about social phenomena (Riyanto & Hatmawan, 2020). The Likert scale scoring guidelines are presented in table 1 below.

Table 1. Likert Scala Scoring

Catagory	Scores
Highly Feasible	4
Feasible	3
Less Feasible	2
Not Feasible	1

Data analysis uses the percentage formula as follows:

P = S/N X 100%

P = percentage searched

S = number of answer scores obtained by respondents

N = maximum number of answer scores by the respondent

To interpret the results, the percentage (%) of frequencies will be converted into frequency ranges (Syafril, 2019, p. 19).

Highest percentage = 100%

Lowest percentage = 0%
Percentage range = 100% - 0% divided by 4 = 25%
From the above measurement of the interpretation of the score, the results are based on Table 2 Scoring Interval.

Table 2. Likert Scala Scoring

Percentage	Answer Criteria	Result
76% - 100%	Highly Feasible	The media is very suitable for use without any correction
51% - 75%	Feasible	The media is suitable for use without correction
26% - 50%	Less Feasible	Media is not good to use
0% - 25%	Not Feasible	Media is not very good to use

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RESULT AND ANALYSIS

The results of the trial of the mobile learning-based iIlmu Ukur Tanah application were implemented in SMK class X students of the Modeling Design and Building Information Study program who had participated in the Land Surveying subject. From the questionnaire distributed after learning, 50 respondents returned it.

Table 3. Result of Study

No	Indicator	Criteria		Conclusion
		Feasible	Not Feasible	
1	The choice of material presented is in accordance with the learning objectives.	84%	16%	Very Good
2	The flow of matter from beginning to end is interrelated with each other and sequentially.	86%	14%	Very Good
3	The language used is easy to understand	86%	14%	Very Good
4	After reading the introduction, students know the benefits of studying the material in the media.	88%	12%	Very Good
5	Students become more interested in learning the science of Land Surveying after using media.	88%	12%	Very Good
6	Students are more motivated to learn if they learn to use this media.	82%	18%	Very Good
7	Students can learn on their own by using this media.	92%	8%	Very Good
Content Feasibility		87%	13%	Very Good
8	The use of letters is easy to read	78%	22%	Very Good
9	Students love the look of the media.	84%	16%	Very Good
10	The selection and combination of colours are not too noticeable.	88%	12%	Very Good
11	Images presented according to the text of the material	78%	22%	Very Good
12	The presented image can illustrate the actual	90%	10%	Very

	condition.			Good
13	The video shown is clear and clear enough.	90%	10%	Very Good
14	When pressing a button, the screen moves quickly.	96%	4%	Very Good
15	Navigation buttons work fine by name and function.	86%	14%	Very Good
16	There are clear instructions for use in the media.	88%	12%	Very Good
17	The symbols presented make it easier for me to understand the operation of the media.	88%	12%	Very Good
Display Feasibility		87%	13%	Very Good
18	The work steps provided help practicum students.	82%	18%	Very Good
19	Worksheets on this medium are easy to work with	84%	16%	Very Good
20	Students' smartphones feel heavy/stuck when using this simulation media.	90%	10%	Very Good
Operational Feasibility		85%	15%	Very Good

Table 3 is the results of the trial on students of SMK N 2 Sragen class X of the Modeling Design and Building Information Study program who have participated in the Land Surveying subject stated that this medium is very well used to teach material on analyzing Land Surveying results and guidance on doing practicum assignments. This can be seen from the material, display, and operational feasibility, all getting an average score of 86,7%. These results are supported by student responses regarding the use of learning media that attract attention and facilitate the learning process of Land Surveying, especially during practicum. The following figure 1 is the average result of each indicator.

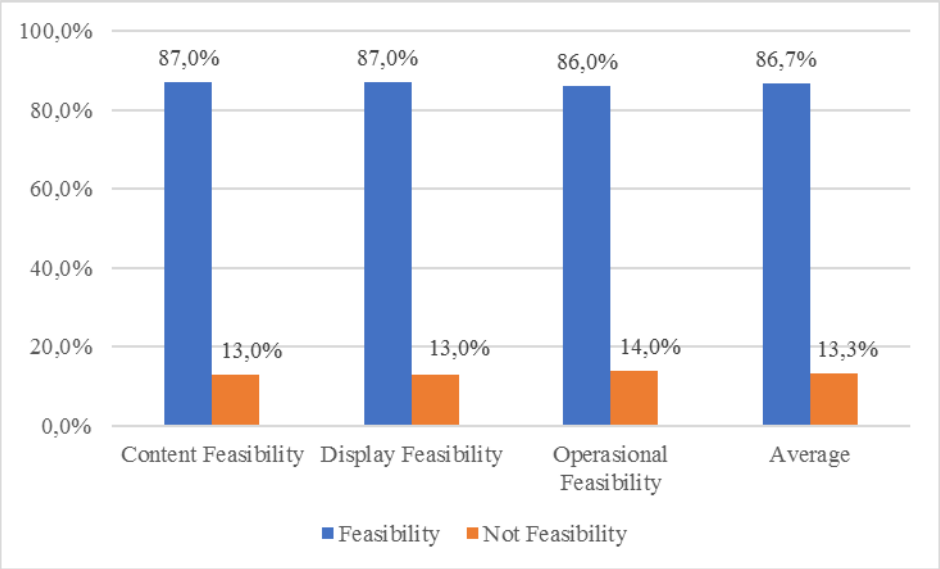

Fig. 1. Average Result of Each Indicator

The feasibility of the material from 7 mobile learning-based media statements, 87% of respondents stated that the content of the material in this learning media is very feasible. And 13% of respondents stated that the content of the material in the media was inappropriate. This means that the feasibility of the material's content in mobile learning-based media is included in the very feasible category. The suitability of the material's content is very important because it supports

student competencies achievement. The selection of effective material must be in accordance with the demands of indicators to maximally increase competence achievement (Supriyatna & Asriani, 2019, p. 31). According to Nasrullah and Umardiyah , the process of learning activities requires strategies that can support the achievement of goals optimally (Nasrulloh & Umardiyah, 2020). The strategy includes the use of approaches, methods and techniques, media, learning resources, and grouping of students to generate educational interactions between teachers and students, between students, and towards learning outcomes. Thus, learning media is needed to help facilitate the delivery of material and student's understanding of the material being studied.

Overall based media, 87% of respondents stated that the display or visual used was very feasible, and 13% of this mobile learning-based media's visual appearance or design was not feasible. This means that the display used in this medium is already feasible. The visual display in the learning medium must be attractive and can stimulate the student's interest in thinking (Prawiradilaga, 2015). From this opinion, the visual display in the mobile learning-based media that is made also clarifies the presentation of the material presented by the teacher so that students are more easily receptive to the material's content. This is in line with Livie and Lentz (Ibda & Nashihin, 2017, p. 38) mentions that the visual display of media can create and attract students' attention to focus on the learning material. For example, Images and text are both presented visually, which will result in double the sense of sight processing visually. However, if the text is presented in the narrative, then the visual sense only processes animation, and the sense of hearing will process the narrative.

Regarding the feasibility of the operation of media use, 85% of respondents stated that the presentation of the operation in mobile learning-based media was very feasible, and 15% of respondents stated that it was not feasible. From the results of this study, it can be said that mobile learning-based media is very suitable for teaching material on analyzing Land Surveying results and guides for doing practicum tasks. This is in accordance with Ismayani (2018, p. 3) explanation that mobile learning-based media offers ready to be able to access to learning easy and fun. Mobile devices are a technology often used by students in and outside the classroom to fill their spare time and find learning references. In addition, Spector (2015, p. 36) explains the benefits of using Mobile Learning in learning, namely: (1) engaging students in an authentic and located learning experience without the limitations of place, time, and device, (2) allowing students to continue their learning activities, starting inside the traditional classroom, outside the classroom through interaction and communication with their classmates or tutors, (3) support on-demand access to learning resources and on-demand communication and knowledge exchange with experts, peers, and practice communities, regardless of student location or device used, (4) expand teacher-led classroom learning planning with informal learning activities conducted outside the classroom.

CONCLUSION

The results showed that from the feasibility of the material, the feasibility of visual display, and the operational feasibility of mobile learning-based learning media, it is very suitable to be used to teach material on analyzing Land Surveying data and guidelines for doing practicum assignments for SMK class X students of the Modeling Design and Building Information Study program who have followed the subject of Land Surveying. However, because learning is still carried out in small classes of 50 students, it is necessary to conduct trials in larger groups or other schools and in classes that have yet to receive material analyzing the results of Land Surveying.

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