Conference Paper

Mobile Application to Improve Student Minimum Competency Assessment

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Abstract.
This paper aims to assess whether understanding of the Minimum Competency Assessment (AKM) improves when taught to students through mobile learning. The research method was adapted from a development model whose stages consist of Analysis, Design, Development, Implementation, and Evaluation, but only carried out until the third stage (Development). Material experts and media experts carried out validation. The results show that the mobile application that has been developed was scored 87.88% in the ‘Very Good’ category by the media experts and was scored 89.62% in the ‘Very Good’ category by the material experts. Based on the results of data acquisition, it is shown that the mobile application is feasible to be used as a valid source to introduce students to AKM.

Keywords: Media Development, Mobile Application, Minimum Competency Assessment

1. Introduction

Learning mathematics is very necessary for science and technology problems. On the other hand, contextual problems require mathematics as a tool to find solutions. Thus, mathematics lessons in the context of mathematics education in schools are very important (1). Based on the results of the PISA study (2), Indonesian students’ numeracy and reading skills need to be improved. Students’ numeracy skills are more dominant at the moderate level, with a percentage of 75% (3). Thus, students must improve their literacy skills. Improving this ability can be done with a problem-based learning model. In addition, using learning media will also help students learn. Through models and media students will try to solve problems and develop their own problems (4),(5). The application of Android media in education has been widely used in the learning process. The use of Android devices is quite widespread (6). Android plays a role in exposing students to skills and situations that are not commonly encountered in real life (7).
The educational component cannot be separated from educational evaluation (8). Planning, implementation, and assessment mutually influence the achievement of learning processes and outcomes (9). The evaluation measuring instrument used is a parameter of the success of an education in measuring goals. Evaluation can be carried out on students, an institution, and educational programs aimed at achieving something better than before (10). Thus every evaluation is an effort to achieve a much better quality of education.

The Minimum Competency Assessment is an assessment of the basic competencies needed by all students in order to be able to develop their own capacity and also participate positively. AKM has two basic competencies, namely reading literacy and mathematical literacy. The Minimum Competency Assessment presents issues in a variety of contexts. AKM is intended to measure competence in depth, not just content (11). The assessment generally includes all methods used to gather information about knowledge, abilities, understanding, attitudes and motivation (12), (13). Assessment in learning activities is very important to collect data and information related to the learning process (14). This means that assessments must measure student progress over time, to provide a complete picture of progress, observations over time must be linked conceptually so that changes can be observed and interpreted (15). The data obtained can be used both to make decisions about content and teaching methods, to make decisions about classroom climate, and to assign grades (16).

Technological advances allow interactive learning, and have the opportunity to be developed into media that support learning carried out in schools (17). (Design research in education aims to evaluate interactively developed mobile applications (18). Skills in the use of technology are needed for harmonization and adaptation of one’s learning knowledge with the times in order to be able to operate in times of change (19).

It is undeniable that the presence of the internet is now able to gradually shift traditional media, such as print media, to television and radio (20). In the era of globalization, smartphones have become a daily necessity, including in education, especially learning. The use of mobile devices in the form of smartphones in alternative learning media is called mobile learning (21). One of the considerations using mobile learning is the base system used. The operating system acts as a liaison between applications and hardware so that users can perform certain functions. The android system that supports its application development is expected to produce representative learning media (22). The resulting media is not monotonous in the form of text only but also contains multimedia elements. So that the introduction and improvement of AKM understanding through mobile learning is needed by students so that students can understand AKM
well. Therefore, it is necessary to have a Mobile Application to introduce the Minimum Competency Assessment for junior high school students.

2. Method

This research method uses the ADDIE (Analysis, Design, Development, Implementation and Evaluating) model (22), but is only limited to the development stage. Because there is research on this development only assesses the validity of the Mobile Application. The Mobile Application contains elements of AKM combined with junior high school mathematics subject matter and the questions are packaged with a contextual approach to the Semarang City area. The first step in this research is an analysis which consists of an analysis of the needs and characteristics of students in the city of Semarang, material analysis, analysis of media maker tools, and specification analysis. The second step of design consists of making application storyboards, schemes for preparing questions, making images, and application buttons. The third step is development which consists of making Mobile Applications, validating Mobile Applications. The data sources in this study were two media experts and two material experts, and a questionnaire. The number of respondents involved in this study were 20 respondents from junior high school students. The instrument used is a media expert validation sheet, material expert validation, and questionnaires. The data collection technique used is the provision of expert validation questionnaires and questionnaires to students. The data analysis technique is in the form of percentage descriptive data. After the data is collected from the experts, the percentage is calculated using the formula in equation (1) (23) with the leveling according to Table 1 (24):

\[ P = \frac{f}{N} \times 100\% (1) \]

With:

- \( f \) = frequency being searched for percentage.
- \( N \) = number of cases (frequency/number of individuals)
- \( P \) = percentage number

The next step is to distribute questionnaires to students containing 10 questions that already represent the five aspects of usability. Users fill out questionnaires that have been shared based on their experiences (what they see and feel) when using the application. Each question from the questionnaire aims to indicate the level of usability according to user acceptance, which will be assessed on a five-point scale.
According to the aspects in usability testing, it includes five things (Learnability, Efficiency, Memorability, Errors, Satisfaction).

The results of the plot of the usability aspect above for the 10 questionnaire questions can be seen in Table 2. The dimensions of the usability of the application in this study were addressed to respondents using a scale of 1 to 5 (26), to obtain data that is ordinal and scored as following:

<table>
<thead>
<tr>
<th>PK</th>
<th>KMS</th>
<th>KM</th>
<th>CM</th>
<th>M</th>
<th>SM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

With:
PK : Questionnaire questions
KMS : Not so easy
KM : Not Easy
CM : Pretty Easy
M : Easy
SM : Very Easy

3. Result and Discussion

3.1. Results

The product resulting from this research and development is named “Mobile Application” as a medium for introducing AKM to students. This mobile application contains the definition of AKM, examples of AKM questions (numbering, text literacy, information text literacy), AKM practice questions, class AKM, web guides, and about AKM for junior high school, games and bibliography (Figure 1). The results of the assessment of the feasibility of the media were carried out by two material experts and two media experts. Judging from the material aspect obtained an average of 89.62 percent. These results indicate that material is in the very good category.
Meanwhile, when viewed from the media aspect, there is a difference of 1.74 percent. So from the aspect of the media obtained an average of 87.88 percent. The average results are also in the very good category. So that both the material and media aspects of the Mobile Application are very good.

![Figure 3: AKM Main Page.](image)

Game questions in the Mobile Application consist of five types of questions: Multiple Choice questions, Complex Multiple Choice questions, True False questions, Matching questions, and short questions (Figure 2). The first question starts from multiple choice questions if correct, then the player will continue the journey to complex multiple choice questions, and when players answer the 8th grade multiple choice questions in the easy category incorrectly, then the players will continue the journey to complex multiple choice questions for class 7. The second consists of two questions: the 8th grade complex multiple choice questions and the 7th grade complex multiple choice questions. In the 8th grade complex multiple choice questions, the correct answer will continue towards the 8th grade matchmaking questions, and when incorrect, the player will continue the journey towards true and false class 8 questions. Whereas in the complex multiple choice questions class 7 in the difficult category, when the player answers the questions correctly, the player will continue the journey to the 8th grade...
short entry questions, and when the player answers the questions incorrectly, the player will continue the journey to the question of true or false class 7.

The third question consists of four questions: the 8th grade matchmaking question (Figure 3), the 8th grade true-false question, the 8th grade short entry question, and the 7th grade true-false question. In the 8th grade matchmaking question, the player answers correctly, the player will get proficient results, and when the player answers the question incorrectly, the player will get a proficient result. In grade 8 true-false questions, when the player answers the question correctly, the player will get a proficient result, and when the player answers the question incorrectly, the player will get the basic result. In the 8th grade short question, when the player answers the question correctly, the player will get a proficient result, and when the player answers the question incorrectly, the player will get the basic result. Whereas in the 7th grade true-false questions, when
the player answers the question correctly, the player will get the basic results, and when
the player answers the question incorrectly, the player requires Special Intervention.

![Figure 5: Example of matchmaking questions.](image)

### 3.2. Discussion

The advantage of the Mobile Application is revealed based on the research that has
been done. Mobile Application already contains elements of AKM combined with SMP
material. The questions are packaged with a contextual approach with an attractive
appearance and the application is very easy to use to introduce students to AKM. The
product’s weakness is that the application can only be used on smartphones with the
Android operating system.

The Mobile Application can be operated in offline mode. The resulting Mobile Appli-
cation is in .apk format. The media has been validated by two media experts and two
material experts, each of which the percentage in the material aspect is 89.62 percent.
At the same time, the media section was 87.88 percent. both aspects are categorized
as “Very Good”.

### 4. Conclusion

The average results of media validation and material validation for the Mobile Appli-
cation are in the very good category, with 89.62 percent in the material aspect and
87.88 percent in the media aspect. In addition, the Mobile Application contains routes
that actually exist in real situations around students. So that the Mobile Application
makes it easier for junior high school students to get to know AKM well. Based on this
explanation, the product was a valid Mobile Application. This can be interpreted that
the Mobile Application should be used as an alternative to get to know AKM easily,
especially for junior high school students.
References


