Effectiveness of Using MIT App Inventor as an Android-Based Learning Media

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Abstract
Massive updates on technology make teachers must be more extra in determining the learning materials and media used. The technology used must be up-to-date and provide good results as a learning medium that must be used. Technological developments must truly be transferable as learning media, given that Revolution 5.0 is targeting innovation and development in more sophisticated technologies such as AI, IoT, and robots. Humans can slowly be replaced with machines, and everything may be computerized. By being given knowledge from now on, at least students have provisions for the future. The process of transferring knowledge is not only done by speaking in front of the class, but the process also requires media or intermediaries to bridge it so that the process of transferring knowledge becomes more optimal and faster. The use of appropriate learning media can certainly make students better understand what is being taught. On this basis, the purpose of this study was to determine the effectiveness of using Mit App Inventor as a learning medium. The method used is Descriptive Quantitative. Data collection was carried out by distributing questionnaires to students of SMK 1 Muhammadiyah Bima who had used Mit App Inventor in their learning process. The results of this study indicate that the use of Mit App Inventor at SMK 1 Muhammadiyah Bima is effective. The first indicator “Platform Quality” gets a percentage of 88.5%, the second indicator “Student Understanding” gets a percentage of 93.9%, the third indicator gets a percentage of “Student Preference” 81.2% and the fourth indicator “Benefits Obtained” gets a percentage 80.3%. It can be said that Mit App Inventor is of good quality, easy to understand, and provides good benefits for the learning process.

Keywords: Effectiveness, MIT App Inventor, Learning Media.

1. Introduction
Massive updates in technology mean that teachers have to go the extra mile in determining the learning materials and media used. The technology used must be up-to-date and provide good results as a learning medium that must be used.

Technological developments must truly be transferable as a learning medium, considering the 5.0 Revolution which targets innovation and development in more sophisticated technology such as Artificial Intelligence (AI), IoT and robots. Humans can slowly be replaced by machines, and everything may be computerized. By being given knowledge from now on, at least students will have provisions for the future. The process of transferring knowledge is not only done by speaking in front of the class, but this process also requires media or intermediaries who bridge it so that the knowledge transfer process becomes more optimal and faster. Using appropriate learning media can certainly make students understand better what is being taught.

The growth of mobile platform technology can now be considered very advanced and is often used in the world of IT, business, education and learning facilities (Nasution et al., 2018). In planning to raise the level of education, learning tools act as a support in the learning process. Along with the increase in technology, learning tools need to follow developments seen in using technology so that learning objectives can be realized so that they can utilize the Android system in the learning process. This facility is valuable as a source of learning for students so that they can obtain morals and information from teachers so that learning modules can be further improved and can shape students' knowledge (Dwijayani, 2019).

Mit App Inventor itself is an open-source platform released in March 2012 when Mit App Inventor was being developed by Google but has now moved to being managed by the Massachusetts Institute of Technology (MIT). Mit App Inventor allows us to independently create and program applications for Android without learning various programming languages. MIT App Inventor uses Visual Block Programming where users can arrange, view, and drag and drop blocks which are commands to create the application we want. Various interesting features in MIT App Inventor make this platform even more popular for beginners who want to learn programming. Some of the features that we can use to create Android applications include sensor features, speech recognition features (Azzawi et al., 2023; Jerke et al., 2022; Khoiri et al., 2023; Kim & Choi, 2022; Liang, 2022; Sánchez-Otávaro et al., 2022).

The aim of this research is to determine the effectiveness of using MIT App Inventor as a learning medium. By testing several indicators, firstly the quality of the
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platform, secondly student understanding, thirdly student preferences, fourthly the benefits obtained.

2. Research Method

This study uses a quantitative research approach. A quantitative approach is used to evaluate scientific theories by measuring the relationship between variables (Uyun, 2022). Obtaining research information in the form of numbers and analysis using statistics are characteristics of a quantitative approach (Sugiyono, 2022).

The type of research used is descriptive research. According to Nasir (in Ajat Rukajat, 2018: 1) Descriptive study is a study that describes the subject situation, views, incidents, or people in the current era.

The data collection process was carried out by distributing questionnaires. A questionnaire is a data collection instrument that is distributed, containing questions and statements for respondents to answer. (Sugiyono, 2022) As stated by (Rukajat, 2018) the population is all the objects studied. The respondents or population here are students of SMK 1 Muhammadiyah Bima Class XII.

\[ P = \frac{f}{n} \times 100\% \]  \hspace{1cm} (1)

**Information:**

- \( P \) = Percentage of data
- \( f \) = Total score
- \( n \) = Maximum score of statement items

To provide a comparison, an effectiveness category was created which matched the results of the percentage calculation. The effectiveness category is created using the following interval finding formula:

\[ R = \text{max score} - \text{min score} \]  \hspace{1cm} (2)

**Information:**

- \( R \) = Reach/range
- max score = highest score on the number of questionnaire statements
- min score = lowest score on the number of questionnaire statements
3. Results and Analysis

3.1. Validity Test and Reliability Test

The validity test was carried out using the SPSS application by first determining the r table. Then use the Pearson Product Moment correlation formula. The researcher distributed questionnaires to 25 respondents, based on the distribution table for a significance rtable value of 5%, a significance value of 0.396 was obtained. If both have been obtained, then a comparison will be carried out. According to (Sugiyono, 2022) the results of the validity test are declared valid if rcount ≥ rtable. The following is the Pearson product moment formula:

\[
 r_{xy} = \frac{n \sum xy - (\sum x)(\sum y)}{\sqrt{(n\sum x^2 - (\sum x)^2)(n\sum y^2 - (\sum y)^2)}}
\]

(3)

Information:

\( r_{xy} \) = Pearson Product Moment Correlation

\( n \) = Number of respondents

\( x \) = Statement item score

\( y \) = Total score of all statement items

\( \sum x_i \) = Total score of statement items

\( \sum y_i \) = The total number of statement item scores

\( \sum x_i^2 \) = Sum of squares of statement item scores

\( \sum y_i^2 \) = Sum of the total squared scores of statement items

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Inst</th>
<th>r count</th>
<th>r table</th>
<th>description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality Platforms</td>
<td>P1</td>
<td>0.697</td>
<td>0.396</td>
<td>Valid</td>
</tr>
<tr>
<td></td>
<td>P2</td>
<td>0.835</td>
<td>0.396</td>
<td>Valid</td>
</tr>
<tr>
<td></td>
<td>P3</td>
<td>0.745</td>
<td>0.396</td>
<td>Valid</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Indicator</th>
<th>Inst</th>
<th>r count</th>
<th>r table</th>
<th>description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Understanding student</strong></td>
<td>P4</td>
<td>0.752</td>
<td>0.396</td>
<td>Valid</td>
</tr>
<tr>
<td></td>
<td>P5</td>
<td>0.950</td>
<td>0.396</td>
<td>Valid</td>
</tr>
<tr>
<td></td>
<td>P6</td>
<td>0.933</td>
<td>0.396</td>
<td>Valid</td>
</tr>
<tr>
<td><strong>Student Preferences</strong></td>
<td>P7</td>
<td>0.920</td>
<td>0.396</td>
<td>Valid</td>
</tr>
<tr>
<td></td>
<td>Q8</td>
<td>0.828</td>
<td>0.396</td>
<td>Valid</td>
</tr>
<tr>
<td></td>
<td>P9</td>
<td>0.910</td>
<td>0.396</td>
<td>Valid</td>
</tr>
<tr>
<td></td>
<td>P10</td>
<td>0.881</td>
<td>0.396</td>
<td>Valid</td>
</tr>
<tr>
<td><strong>Benefits obtained</strong></td>
<td>P11</td>
<td>0.897</td>
<td>0.396</td>
<td>Valid</td>
</tr>
<tr>
<td></td>
<td>Q12</td>
<td>0.917</td>
<td>0.396</td>
<td>Valid</td>
</tr>
<tr>
<td></td>
<td>Q13</td>
<td>0.925</td>
<td>0.396</td>
<td>Valid</td>
</tr>
</tbody>
</table>

Source: Research Result (2023)

Suharsimi in (Rukajat, 2018) Reliability tests are carried out to find out whether the instruments we apply are competent and can be trusted. The reliability test in this study was carried out using the SPSS application using the Alpha Cronbach formula:

\[
r_{11} = \left[ \frac{k}{k-1} \right] \left[ 1 - \frac{\sum \alpha _b^2}{\alpha _t^2} \right]
\]

(4)

Information:
- \( K \) = Number of questions or statements
- \( \sum \alpha _b^2 \) = Total Item Variance.
- \( \alpha _t^2 \) = Total Variance.

The research instrument is said to be reliable if the Cronbach Alpha value \( \geq 0.70 \).
Table 2. Reliability Test Results

<table>
<thead>
<tr>
<th>Testing Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference Value</td>
</tr>
<tr>
<td>Cronbach Alpha value</td>
</tr>
<tr>
<td>0.70</td>
</tr>
</tbody>
</table>

Source: Research Result (2023)

3.2. Data analysis

In statement 1 (P1) 8% of research subjects or respondents responded Strongly agreed, 15% responded Agree, 4% responded Neutral, 1% responded Disagree and 2% responded Strongly Disagree. Statement P1 is "MIT App Inventor is easy to use.

In statement 2 (P2) 6% of research subjects or respondents responded Strongly agree, 10% responded Agree, 1% responded Neutral, 0% responded Disagree and 3% responded Strongly Disagree. P2’s statement is "MIT App Inventor has very good features for learning.

In the statement (P3) 9% of research subjects or respondents responded Strongly agreed, 5% responded Agree, 3% responded Neutral, 1% responded Disagree and 2% responded Strongly Disagree. P3’s statement is "MIT App Inventor is easy to access anywhere and anytime.

In the statement (P4) 6% of research subjects or respondents responded Strongly agreed, 13% responded Agree, 3% responded Neutral, 1% responded Disagree and 1% responded Strongly Disagree. P4’s statement is "I became more understanding about coding when learning to use the MIT app inventor.

In the statement (P5) 10% of research subjects or respondents responded Strongly agreed, 1% responded Agree, 0% responded Neutral, 1% responded Disagree and 1% responded Strongly Disagree. P5’s statement was "I asked the teacher for help when learning to use MIT App Inventor.

In the statement (P6) 11% of the subjects or respondents responded Strongly agreed, 17% responded Agree, 1% responded Neutral, 1% responded Disagree and 0% responded Strongly Disagree. P6’s statement is "I saw tutorials from other sources like Youtube.

In statement (P7), 4% of research subjects or respondents responded Strongly Agree, 15% responded Agree, 2% responded Neutral, 0% responded Disagree and 2%
responded Strongly Disagree. P9’s statement was "I am enthusiastic about learning to make Android applications using MIT App Inventor.

In statement (P8) 6% of research subjects or respondents responded Strongly Agree, 16% responded Agree, 2% responded Neutral, 1% responded Disagree and 1% responded Strongly Disagree. P8’s statement is "I like the MIT Inventor app for learning.

In statement (P9) 5% of research subjects or respondents responded Strongly Agree, 15% responded Agree, 2% responded Neutral, 0% responded Disagree and 2% responded Strongly Disagree. P9’s statement is "I use MIT App Inventor because the features I need are already available.

In the statement (P10) 7% of research subjects or respondents responded Strongly agreed, 10% responded Agree, 1% responded Neutral, 1% responded Disagree and 1% responded Strongly Disagree. P10’s statement is "I will recommend MIT app inventor to my friends to learn programming.

In the statement (P11) 4% of research subjects or respondents responded Strongly agreed, 14% responded Agree, 3% responded Neutral, 0% responded Disagree and 2% responded Strongly Disagree. P11’s statement was "I feel my ability to understand programming flow increases when using MIT App Inventor.

In statement (P12) 9% of research subjects or respondents responded Strongly Agree, 4% responded Agree, 0% responded Neutral, 0% responded Disagree and 2% responded Strongly Disagree. P12’s statement was "MIT App Inventor really helped me create an Android application.

In statement (P13) 9% of research subjects or respondents responded Strongly Agree, 0% responded Agree, 0% responded Neutral, 0% responded Disagree and 2% responded Strongly Disagree. P13’s statement is "The application I created can run well on a smartphone.

The results of this research can be reviewed by matching the effectiveness categories with the percentage of data processing. Creation of effectiveness categories is based on the following calculations:

\[
\text{Interval length} = \frac{\text{Range (R)}}{\text{number of classes}} \quad (5)
\]

\[
\text{Range (R)} = \text{max score} - \text{min score}
\]

\[
\text{max score} = 5 \times 13 = 65
\]

\[
\text{min score} = 1 \times 13 = 13
\]
range \( r = 65 - 13 = 52 \)

interval length \( = \frac{52}{5} = 10 \)

Table 3. Results of the Effectiveness Category Test

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very effective</td>
<td>83% - 100%</td>
</tr>
<tr>
<td>Effective enough</td>
<td>73% - 82%</td>
</tr>
<tr>
<td>Less effective</td>
<td>63% - 72%</td>
</tr>
<tr>
<td>Ineffective</td>
<td>53% - 62%</td>
</tr>
<tr>
<td>Very Ineffective</td>
<td>( \leq 52 )</td>
</tr>
</tbody>
</table>

Source: Research Result (2023)

Table 4. Effectiveness Test Results for Using MIT App Inventor at SMK 1 Muhammadiyah Bima

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Total Score</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Platform Quality</td>
<td>32</td>
<td>88.5%</td>
</tr>
<tr>
<td>Student Understanding</td>
<td>52</td>
<td>93.9%</td>
</tr>
<tr>
<td>Student Preferences</td>
<td>06</td>
<td>81.2%</td>
</tr>
<tr>
<td>Benefits obtained</td>
<td>01</td>
<td>80.3%</td>
</tr>
</tbody>
</table>

Source: Research Result (2023)

Based on the table 4, the use of MIT App Inventor at SMK 1 Muhammadiyah Bima, the two indicators of Platform Quality and Student Understanding are in the "Very Effective" category and the other two indicators, namely Student Preferences and Benefits obtained, are in the "Quite Effective" category. on the platform Quality indicator with a percentage of 88.5% is in the "Very Effective" category, the Student Understanding indicator with a percentage of 93.9% is in the "Very Effective" category, the Student Preference indicator with a percentage of 81.2% is in the "Quite Effective" category, the Benefits Obtained indicator with a percentage of 80.3% is in the “Quite Effective” category.

4. Conclusion

Based on the results of quantitative data analysis, the use of MIT App Inventor at SMK 1 Muhammadiyah Bima was declared effective. It can be seen from the
percentages in Table 4, the Platform Quality indicator with a percentage of 88.5% is in the "Very Effective" category, the Student Understanding indicator with a percentage of 93.9% is in the "Very Effective" category, the Student Preference indicator with a percentage of 81.2% is in the "Quite Effective" category, the Benefit Obtained indicator with a percentage of 80.3% is in the "Quite Effective" category.

Acknowledgements

Thank you to SMK 1 Muhammadiyah Bima for giving us the opportunity to conduct research regarding the use of MIT App Inventor in Class XII Computer Department. Hopefully this research will open our perspective on today's technological advances and the students of SMK 1 Muhammadiyah Bima will be more advanced in using developing technology in the future.

Author Contributions

Miftahul Jannah proposed a topic; Khairunnisa and Teguh Ansyor designed the experiments and illustrations; Sahru Ramadhan worked on the validity formula; Miftahul Jannah processes data using the SPPS application.

References


