Development of learning media based on macromedia flash 8 to see learning outcomes and achievements in vocational high school students

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Abstract: This research aims to produce ICT learning media based on macromedia flash 8 to see the learning outcomes of students of SMK achievement class X multimedia and determine the quality of ICT learning media products based on macromedia flash 8 to see the learning outcomes of students of SMK achievement with the development method of R&D (Research and Development). This ICT media was assessed by 30 students of class X multimedia to find out student responses. The instrument used is a check list (√) questionnaire. The type of data obtained is qualitative data which is analyzed using and will then be converted into quantitative data and then tabulated to determine the quality of the product developed. The results of this study indicate that the value of ICT learning media based on macromedia flash 8 has been produced, namely the results of user testing by students with a score of 4.78 in the very feasible category, thus it can be concluded that ICT learning media based on macromedia flash 8 to see the learning outcomes of X multimedia class achievement vocational students are declared feasible to be used as learning media on the material of basic concepts of computer operations.

Keywords: Macromedia Flash 8, Learning Media, Learning Outcomes, ICT

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1. Introduction

The development of science and technology has brought tremendous benefits to the advancement of human civilisation (Pan et al., 2020; Sha & Xiong, 2020). Types of work that previously demanded considerable physical abilities can now be relatively replaced by automatic machines. Likewise, the discovery of new formulations of computer capacity seems to have been able to shift the position of human brain ability in various fields of science and human activities (Bhatt et al., 2021). In summary, current technological advances have really been recognised and felt to provide a lot of convenience and comfort for the lives of mankind.
The utilisation of these advances in information technology challenges the world of education, especially in the teaching and learning process (Szymkowiak et al., 2021). The implementation of education is not only in a closed room with books and educators. The information technology revolution has changed the way humans work, from how to communicate, how to produce, how to coordinate, how to think, to how to learn and teach (Cervi et al., 2020; Shatri, 2020). The curriculum as the fulcrum of education, not only contains the goals to be achieved by students or not just about learning activities and what knowledge should be obtained by students but the most important attitude (Fortuna et al., 2023; Jalinus et al., 2023). The development of the 2013 curriculum is a further step in the development of a competency-based curriculum pioneered in 2004 and the 2006 KTSP which includes attitudinal, knowledge and skills competencies (Bahdin Nur Tanjung, 2020).

Based on the observations made by the author, it can be seen that several situations occur during the learning process, namely the difficulty of students in understanding the material conveyed by the teacher, finding that the teacher has not utilised the laptop and infocus to be used as media that can support the learning process that takes place in the classroom, and the laptop and infocus as tools can also be used by the teacher as usually the teacher only uses image media that is printed out and then pasted on the blackboard during the learning process, the inability of students to convey the ideas they think when the teacher asks questions, the lack of interest of students in the ongoing learning process. This situation is caused by the lack of teachers providing examples that are around students and the lack of use of media in the learning process (Fernando et al., 2020). Students also hope that teachers can and are able to design a learning media that is in accordance with the characteristics and learning objectives so that students are more motivated to learn and easily absorb the subject matter (Dewi et al., 2021; Sari et al., 2022).

The low interest of students in the learning process teachers should be able to improve this by using media that can increase the interest of these students so that students can be active and creative in the learning process (Murillo-Zamorano et al., 2021). Therefore, the author makes an update to thematic development by designing learning tools that assist teachers in developing and implementing learning strategies as an effort and effort to help students to be active and creative in the learning process. Researchers develop learning media based on interactive multimedia devices where this media is made specifically for ICT learning using Macromedia Flash 8 software.

This phenomenon is the background for researchers to conduct this research in the hope that it can contribute to developing and helping learning systems that are creative, effective and fun so as to make this learning the most attractive lesson for students. Therefore, the author is motivated to develop learning media based on Macromedia Flash. This research aims to:

1) Knowing the development of learning media based on macromedia flash 8
2) Knowing student development of macromedia flash-based learning media,
3) Knowing the validity, practicality, and effectiveness of macromedia flash 8 learning media.

2. Methods

The method used is the Research and Development Method (invention, product development and testing), which is a research method used to develop or validate products used in education and learning. The research and development is a process or steps to develop a new product or perfect an existing product, which can be accounted for (Taques et al., 2021). In general, R&D research is longitudinal (several stages) (Wibawa et al., 2018). The stages that will be carried out in this research are as follows:
The development and creation of this learning media is focused on the subject of Basic Concepts of Computer Operations (Abdulrahaman et al., 2020). This learning media was tested only on class X students of the Multimedia Department at SMK Prestasi Multi Program. The data collection techniques used for data collection in research on the development of learning media based on Macromedia Flash 8 are interviews, questionnaires, and observation (Marfuah et al., 2023; Yusup et al., 2023).

The validity instrument is used to determine whether the Macromedia Flash 8 that has been designed is valid or not. To convert qualitative data into quantitative form, the questionnaire in addition to giving alternative answers each has a weight and score of each answer to the statement ranging from strongly agree to strongly disagree.

Validity will depend on the extent to which Macromedia Flash 8 can achieve the objectives by collecting relevant data related to the use of Macromedia Flash 8 media. Consider whether Macromedia Flash 8 is easy to use for content development and whether there are more practical alternatives to achieve the objective of running on various devices and browsers. Determine metrics or indicators of success that can be used to assess the effectiveness of using Macromedia Flash 8 and conduct user testing to collect direct feedback from media users to see its effectiveness. The following validity and practicality assessments can be seen in Table 1.

### Table 1: Assessment of validity and practicality

<table>
<thead>
<tr>
<th>Mark</th>
<th>Rated aspect</th>
</tr>
</thead>
<tbody>
<tr>
<td>86%-100%</td>
<td>Very Practical</td>
</tr>
<tr>
<td>76%-85%</td>
<td>Practical</td>
</tr>
<tr>
<td>60%-75%</td>
<td>Pretty Practical</td>
</tr>
<tr>
<td>55%-59%</td>
<td>Less Practical</td>
</tr>
<tr>
<td>≤ 54%</td>
<td>Impractical</td>
</tr>
</tbody>
</table>

Adapun rumus dalam menghitung nilai rata-rata keseluruhan dan setiap aspek dengan rumus: \( \bar{X} = \frac{\sum x}{N} \)

Keterangan:
- \( \bar{X} \) = Average value
- \( \sum x \) = Total score
- \( N \) = Number of indicators

Interpreting qualitatively the overall average value and each aspect using the following criteria:

### Table 2: Criteria for converting scores to a scale of five

<table>
<thead>
<tr>
<th>Range</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.21 – 5.00</td>
<td>Very feasible</td>
</tr>
<tr>
<td>3.41 – 4.20</td>
<td>feasible</td>
</tr>
</tbody>
</table>
3. Results and discussions

1. Description of data analysis results

The creation of learning media using the Macromedia Flash 8 program and the final results of learning media made with the final learning media program can be run on any computer without installing the Macromedia Flash 8 master stored in the extension file (.exe) this aims to make the learning media program can be run on any computer without installing the Macromedia Flash 8 master. Learning media using the Macromedia Flash 8 program is also published to HTML, swf. The flash files produced on this learning media are (.fla), (.swf), HTML, and (.exe). All files are placed in one folder that cannot be separated. If (.swf) is not integrated with the (.exe) file, then the learning media programme cannot be run perfectly. The file given to the teacher is the (.exe) file which cannot be changed. Based on students' development of learning media, it can be seen that the development of ICT learning media based on Macromedia Flash 8 on the material of basic computer concepts for class X students of SMK Prestasi Multi Program is in accordance with the 2013 curriculum that applies to schools.

Validity, practicality, and effectiveness of macromedia flash 8-based learning media. At this validation stage, the validator will assess the multimedia that has been designed to determine the quality and feasibility of learning multimedia so that learning multimedia can be used. The assessment is carried out by filling out a questionnaire by providing an assessment and providing suggestions for improvement. The development product that has been validated by 4 validators will then be used as a reference to make theoretical improvements to the development product.

Before the validity of the media and material of the product that has been developed, it is necessary to assess the media validated by two media experts and two media experts. Validation is carried out to obtain data on the feasibility of macromedia flash 8-based learning media in the material of basic concepts of computer operations in Vocational High School students seen from the media and material aspects (Prasetya, Fajri, et al., 2023; Prasetya, Syahri, et al., 2023). Media expert validation includes aspects of display quality, software engineering aspects, and implementation aspects. Material expert validation includes aspects of curriculum, material presentation, evaluation and language aspects. Evaluation results by material experts in the form of scores using a Likert scale ranging from 1 to 5. (Audia et al., 2021).

2. Validation expert test

The media usage test by students was conducted at SMK Prestasi class X. The implementation of the media usage test by students was carried out on 30 students of SMK Prestasi Multi Program. Based on the results of the media usage test by the students above, it can be seen that the development of android-based mobile learning media on the material of basic concepts of computer operations for grade X high school students obtained an average score of 4.78 in the Very Feasible category. Based on the table of material expert validation results, it can be concluded that the android-based mobile learning media on the material of basic concepts of computer operations for class X high school students obtained an average score of 4.72 with the Very Feasible category which explains that it is very feasible to test use. From the average score of media and material expert validation, it can be explained through the following graph.

<table>
<thead>
<tr>
<th>Score Range</th>
<th>Feasibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.61 – 3.40</td>
<td>Less feasible</td>
</tr>
<tr>
<td>1.81 - 2.60</td>
<td>Not feasible</td>
</tr>
<tr>
<td>0 – 1.80</td>
<td>Extremely unfeasible</td>
</tr>
</tbody>
</table>
The media use test by students was conducted on class X students of SMK Prestasi Multi Program, totalling 30 students. Based on the table of results of the media usage test by students, it can be concluded that the quality of the development of ICT learning media based on Macromedia Flash 8 on the material of basic concepts of computer operations for grade X vocational students obtained a score of 4.78 in the Very Feasible category. Based on validation by media experts, material experts and trials of media use by students can be explained through the following graphs.

### 3. Practicality Test

Practicality trials are used to determine the level of practicality of ICT learning media based on Macromedia Flash 8, practicality trials conducted by 30 students. The aspects assessed consisted of conditions and use of 8 statement items, effectiveness and learning time consisting of 5 statement items, while consisting of 5 statement items.

<table>
<thead>
<tr>
<th>No</th>
<th>Item</th>
<th>STS</th>
<th>TS</th>
<th>KS</th>
<th>S</th>
<th>SS</th>
<th>Weight</th>
<th>Value</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>State of Use</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Has an attractive appearance</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>12</td>
<td>18</td>
<td></td>
<td></td>
<td>Very Practical</td>
</tr>
<tr>
<td></td>
<td>2. Has an attractive colour selection</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>15</td>
<td>13</td>
<td></td>
<td></td>
<td>Very Practical</td>
</tr>
</tbody>
</table>

Figure 2: Result of expert validation

Figure 3: Results of expert validation and user test by students
3. Size and font are clear, comfortable and easy to read

4. The material presented is clear and simple

5. Learning by using Macromedia Flash 8 stimulates learning activities

6. I do not feel sleepy when learning using ICT learning media

7. The delivery of the material is very interesting

8. I am relaxed about learning and do not get bored quickly

Total

Average

2

Learning Time Effectiveness

1. Learning is more practical and easier

2. I can learn by myself if there is no teacher

3. I can master the lesson at my own pace.

4. Can reduce the teacher's time and energy to write everything down on the blackboard

5. Can lighten the learning process to be more effective and active

Total

Average

3

Benefits

1. Can improve my memory of the Basic Networking material

2. Can stimulate my thinking

3. Makes me understand the interconnectedness of concepts

4. Illustrations and pictures make me understand the material

5. There are evaluations that help me learn

Total

Average
Table 4: Frequency distribution of practicality questionnaire scores

<table>
<thead>
<tr>
<th>Interval Class</th>
<th>$f_0$</th>
<th>%$f_0$</th>
</tr>
</thead>
<tbody>
<tr>
<td>67-69</td>
<td>1</td>
<td>5,25</td>
</tr>
<tr>
<td>70-72</td>
<td>2</td>
<td>6,25</td>
</tr>
<tr>
<td>73-75</td>
<td>4</td>
<td>12,5</td>
</tr>
<tr>
<td>76-78</td>
<td>8</td>
<td>25,13</td>
</tr>
<tr>
<td>79-81</td>
<td>10</td>
<td>31,25</td>
</tr>
<tr>
<td>82-84</td>
<td>5</td>
<td>15,63</td>
</tr>
<tr>
<td><strong>Jumlah</strong></td>
<td>30</td>
<td>100</td>
</tr>
</tbody>
</table>

Figure 4: Interval of practicality test results

4. **Effectiveness Test**

The aspects assessed in the effectiveness test consisted of 12 statement items, namely 7 items for pleasure in learning, 5 statement items for the existence of interesting teaching materials in learning. The following details of the results of the effectiveness test of macromedia flash 8-based learning media are presented in table 5.

Table 5: Macromedia flash 8 effectiveness result

<table>
<thead>
<tr>
<th>No</th>
<th>Item</th>
<th>STS</th>
<th>TS</th>
<th>KS</th>
<th>S</th>
<th>SS</th>
<th>Aspect Total</th>
<th>Weight</th>
<th>Value</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Love to Learn</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>1. Clarity of programme instructions</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>16</td>
<td>14</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>72</td>
</tr>
<tr>
<td></td>
<td>2. Readability of text and writing</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>18</td>
<td>12</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>3. Image display quality and animation presentation</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>12</td>
<td>18</td>
<td>0</td>
<td>0</td>
<td>9</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>4. Colour composition and music carrying capacity</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>11</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>5. Clarity of competency standards and basic competencies that must be mastered</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>19</td>
<td>11</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>6. Clarity of learning instructions</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>14</td>
<td>16</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>60</td>
</tr>
</tbody>
</table>
Based on the results of expert validation, there are several displays of ICT learning media based on Macromedia Flash 8 for class X vocational students that have undergone revisions, this aims to make it easier for students to operate learning media, the following is the display of learning media before and after revision.

The research conducted is development research in which the product resulting from this development is an interactive learning multimedia based on Macromedia Flash 8. The research method used is Research & Development development research.

4. Conclusions

The conclusion drawn after developing ICT learning media based on macromedia flash 8 to see the learning outcomes of students of SMK Prestasi on the material of basic concepts of computer operations for students of SMK Prestasi Multi Program has a big effect on students because macromedia flash 8-based learning media is in accordance with the 2013 curriculum that applies to schools. The learning outcomes of SMK Prestasi students make it easier for teachers and students to use macromedia flash 8-based learning media, which can be stored in the form of file extensions (.exe) this aims to make the
A learning media program can be run on any computer without installing the Macromedia Flash 8 master and can be accessed offline. The results of the validation obtained a score of 4.26 for media experts with a very feasible category, a score of 4.72 for material experts with a very feasible category and a trial use by students with a score of 4.78 with a very feasible category.

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Declarations

Author contribution

Jhonita Varadila as research implementer, designing media and collecting data. Ranny Meilisa as research and article concept designer. Imamudin as research and article concept designer. Adinda Annisa as data analyzer and Fan Folkourng as proof-reader.

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Competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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