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Development of Vocational Interactive Multimedia based on Mobile Learning

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Abstract. Interactive multimedia-based learning can enhance the learning process, either online, through video-conference or in traditional way through the face-to-face process. The highlighted research problems in this study are the feasibility and students’ responses toward the interactive multimedia-based mobile-learning in vocational subjects. This study is aimed to get the description of the feasibility assessment from m-learning media and to know the students’ responses toward the m-learning media in vocational subjects. This study employed 4D method (Define-Design-Develop-Disseminate) as the research method and the instruments involved in this study were: validated questionnaires of the materials’ feasibility, teaching media, and questionnaire to get students’ responses. This study also involved three instruments validators. Descriptive qualities technique was employed in analysing the data. The results show that the percentage of votes from the experts indicate that the feasibility of the m-learning media as a whole is at a level of 74.88%, which indicates that the feasibility of m-learning media developed under the category of Eligible to be used in learning activity. Furthermore, the students’ responses toward the m-learning media is at a level of 79.37%.

1. Introduction
One of the forms of the information and communication technology (ICT) which can be utilized as a tool or medium for learning is the interactive multimedia [1]. Interactive multimedia-based learning can enhance the learning process, either online through video-conferencing [2] or in traditional way through face-to-face process. However, the use of interactive multimedia is still constrained by the issues of space and time. Fortunately, the results from the rapid technological advancement, such as internet, can overcome those space and time problems. In fact, the internet has changed the patterns of interaction in various communities. In education aspect, the widespread use of internet is a potent solution for the development of the online learning system, thus the standards of education and the global demands can meet in one harmonious point. The advent of online education system, better known as m-learning, indicates a learning medium which has a higher flexibility. The greater flexibility carries the meaning that learners can access various materials at once and they can re-read the materials anytime and anywhere. Moreover, the m-learning has numerous further benefits [3].

Vocational education possesses the combination of theories and practices which are balanced to the orientation of the job readiness of its graduates. One of the advantages of the vocational education, among other types of education, is that students can directly develop their expertise tailored to the needs
of fields of the task to be faced. This description is consistent with the opinion which highlights that the vocational education is an education with the primary aim to prepare its students to work by using a competency-based learning approach [4].

This study explored the use of various camera features on the cell phone. This exploration means to record the research subject during the creation of the Javanese traditional make-up by wearing many traditional costumes from various area in Java, in video format. The collected videos were edited by using Adobe Premiere and the files could also be viewed in pdf format. The findings of this study suggest that the students were eager to produce some creative portfolio videos by using various different techniques. As addition, a mini glide cam was involved to stabilize the video recorder from any disturbing moves and shakes. This study broadens the knowledge in utilizing various techniques in order to create a creative portfolio. Furthermore, this study also helps many people, who have the same passion in developing a simple yet professional portfolio [5].

Based on the explanation above, it is true that a medium, which can improve the understanding of its user anytime and anywhere, is needed during teaching and learning process, especially in the vocational education. The fact shows that mostly students face boredom in the class because of the ‘old-school’ teaching and learning materials. The existence of innovative media is expected to eliminate the space and time barriers in learning the materials, thus, there will be no challenging and tedious atmospheres in teaching and learning.

2. Methods
This study is classified as a development study because of its aims; to produce and test the effectiveness of the multimedia products. Through the development process, an interactive m-learning multimedia-based was produced. In order to produce the high-quality media, several necessary or procedural steps were conducted during the development.

Since this study is a development study, the development procedures or 4D were conducted to obtain the expected results [6] [7]. These procedures were: define, design, develop and disseminate or in other compositions of 4D; defining, design, development, and deployment. However, the result of this study (revised media) was not disseminated/spread due to time limitation. Each stage of the development involved in this study is outlined below.

2.1 Key stage 1: Stage definition (define)
According to Thiagarajan, the purpose of this stage is to establish and define various terms of learning. This stage includes five basic steps; a) the front-end analysis, b) the analysis of the student, c) task analysis, d) the analysis of the concept, and e) the analysis of the formulation of the learning objectives

2.1.1 Front end analysis (front-end analysis). This analysis aims to bring the front end and set the basic problems encountered in the learning, so that it takes the development of learning materials. The underlying issues are college students tend to be passive, learning monotonously and most of the students do not understand the material. Moreover, one of the solutions to solve those college students’ problems is developing a product/medium which can significantly improve the students’ understanding toward the learning materials.
2.1.2 The analysis of students (learner analysis). The student analysis was done by looking at the characteristics, capabilities, and the students’ experiences in both group and individual working. An observation was conducted to identify and observe the students’ behaviours during learning in the classroom.

2.1.3 The analysis of task (task analysis). A collection of task analysis procedures was employed in order to determine the contents of the learning unit. In this analysis, the details of the material content outline were adapted to RPS vocational subjects.

2.1.4 The analysis of concept (concept analysis). The analysis of the concept aims to identify the facts, concepts, principles, and rules which are beneficial in teaching. This analysis was conducted by creating a concept map of the leadership education, apprenticeship, and dual education.

2.1.5. The analysis learning objectives (specifying instructional objectives). This analysis was carried out to convert the task analysis and analytical concepts into specific learning objectives to become more operational. This goal is also used as a basis for making multimedia to become more interactive.

2.2. Key stage 2: The stage of designing (design)
This stage aims to design media which will be developed later. Broadly speaking, the design phase includes two steps, namely the selection of multimedia formats and multimedia design.

2.2.1. Media format selection (unmatched media format). The format consists of the development of multimedia contents and physical design as follows.
(1) Contents
(a) Media containing three items concerning the RPS is Leadership Education, Apprenticeships, and Dual Education, (b) There is a video that serves to support the delivery of the material, (c) There is a quiz at each end of the matter.

(2) Physical
(a) type of media file .apk shaped

2.2.2. Preliminary design media (initial design). In this stage, preliminary design activities media called the draft 1. The material on this medium adjusted to some relevant reference to the RPS.

2.3. Key stage 3: The stage of developing/development (develop)
At this stage the interactive multimedia-based m-learning was produced. This stage included the validation process, the test media, and revision.

2.3.1. Validation. In this validation phase, the request, approval, or ratification of the media was processed as needed. The validation of m-learning media covers the feasibility of the content, the feasibility of presentation, the feasibility of languages, the appropriateness of the display, and proprietary software. The validation aims to gain recognition and to validate the multimedia’s conformity towards the needs of the interactive multimedia-based m-learning, in order to make sure it is feasible and suitable to be involved in learning. In conducting the validation phase, three experts were employed as the validators.

2.3.2. Trial (limited and wide). The trial phase of the media was done to determine its practicality and effectiveness before it is used in general context. The trial was conducted in order to ascertain the ability of the students to involve the interactive multimedia during learning and to identify the efficiency and effectiveness of the media in learning the materials with no time restriction (anytime). The trial was held with some strict considerations; based on experts’ validations, draft 1 and involved 15 students as the research participants. The extensive trial was conducted, after the initial trial result was revised, by involving the media draft II and involving 40 students as the research participants. The results of the trial are expected to be used widely as the tested draft for the beneficial input in developing an interactive multimedia m-learning.

2.3.3. Revision. This stage also means the improvement or the refining process after the input from the validation and testing activities was obtained. This stage aims to finalize the revision of the comprehensive review of the media.

The sources of the data in this study are the results of the data validation and the students’ responses data. The analysis of the obtained data was conducted under the technique of descriptive qualitative. Basically, the analysis was done by analysing the obtained from questionnaire expert test and field test. The data were interpreted in qualitative way (sentences).

The analysis of the results of the validation performed on each of the criteria associated with each component of interactive multimedia which developed when each student’s responses. The analysis carried out on each of the criteria related to the response of each student for vocational learning by using interactive multimedia-based m-learning. Moreover, the second analysis was done by using the same formula.

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

Description:
\( P \) = Percentage of
\( f \) = Number value obtained
\( N \) = Number of maximum value
The percentage was searched with an intention to determine the status of something presented in percentage mode. Furthermore, each percentage can be associated with several qualities (qualitative representation), as shown in table 1 below:

| Achievement Level | Qualification |
|-------------------|---------------|
| 81% - 100%        | Very Decent   |
| 61% - 80%         | Worth         |
| 41% - 60%         | fairly decent |
| 21% - 40%         | Less Worth    |
| 0% - 20%          | Not Eligible  |

Table scale percentage is used to assess the feasibility of the product (media) and the responses of the students. The conclusions of the product were used as a reference to assess the product whether it is feasible or not.

3. Results and discussion
Based on m-learning research project conducted by Attewell and Savill-Smith [8], some of the benefits of m-learning are: a) it serves flexible learning (anywhere and anytime) and it is personalized; b) it can be used to turn on, or add variation to, the conventional learning; c) it can be used to remove some of the formalities which are considered as non-traditional learners unappealing or intimidating, and can make the lessons to be more attractive; d) it can help to provide and support the learning of literacy, numeracy and language; e) it facilitates the learning experience, both individually and collaboratively; f) it can contribute to fight the resistance of the use of ICT by providing a bridge between blind mobile phone and PC technology; g) it has been observed and proved that it can help young learners to maintain their focus in longer periods of time; and h) it can contribute to improving confidence and self-assessment in education.

M-learning possesses a possibility to bring a positive impact during learning because of its flexibility (can be learned anytime and anywhere), its unconventional way, and its implications in improving self-confidence and self-assessment in education [10]. Here the recapitulation of validation as shown in the table 2.

| No. | Calculation       | Aspects          |
|-----|-------------------|------------------|
|     |                   | Relevance | Pengorgani pupil | Language |
| 1   | Total Question    | 12         | 12               | 12       |
| 2   | Score Maximum     | 60         | 60               | 60       |
| 3   | Score obtained    | 44.6       | 44.99            | 46.34    |
| 4   | Score Average - Average | 3.71 | 3.74            | 3.86     |
| 5   | Percentage        | 74.33%     | 74.98%           | 77.23%   |

The feasibility media are shown in table 3:

| No. | Calculation       | Aspects          |
|-----|-------------------|------------------|
|     |                   | Relevance | Pengorgani pupil | Language |
| 1   | Total Question    | 6          | 4                 | 4        |
| 2   | Score Maximum     | 30         | 20                | 20       |
| 3   | Score obtained    | 21.32      | 15                | 15.34    |
| 4   | Score Average - Average | 3.55 | 3.75            | 3.83     |
| 5   | percentage        | 71.06%     | 75%               | 76.7%    |
Based on table 2, the percentage of the feasibility of the material on the material aspects at a level of 74.33% with its relevance to the decent category. The percentage of the aspects of organizing material worthy of 74.98% and the percentage in language worthy of 77.23%. It can be concluded that the percentage of the feasibility of m-learning material as a whole is at a level of 75.51%, which is categorized as feasible. Based on Table 3, the percentage of the media feasibility towards the aspects of the visual display worthy of 71.06%, the percentage of the aspects of software engineering is at a level of 75%, which can be categorized as feasible, and the percentages of media language is at a level of 76.7%, which can be classified as feasible. It can be concluded that the percentage of the feasibility of the media on the m-learning media as a whole is at a level of 74.25% and clearly can be categorized as feasible. The percentage of the overall feasibility of the m-learning media is at a level of (75.51% + 74.25%): 2 = 74.88%. Based on the percentage of the achievement in chapter III, the include value of the level from the achievement is at the level of 61-80%. Thus, the m-learning media can be said to be worth it as a medium involved in students’ learning process. The responses of the students toward the media are shown in table 4:

**Table 4. Summary of Student Response**

| No. | Calculation          | Aspects | Ease of Use | Usefulness |
|-----|----------------------|---------|-------------|------------|
| 1   | Total Question       |         | 4           | 4          |
| 2   | Score Maximum       |         | 20          | 20         |
| 3   | Score obtained      |         | 16.25       | 15.5       |
| 4   | Score Average - Average |       | 4.06       | 3.87       |
| 5   | Percentage of       |         | 81.25%      | 77.5%      |

Based on table 4, the students’ responses toward the m-learning media on the aspects of ease of use [11] got a percentage of 81.25%, and the usability aspects (usefulness) got a percentage of 77.5%. Thus, it can be said that the students’ responses, to the m-learning media in enhancing their understanding of the material vocational, is good. As it can be seen from the overall percentage which is 79.37%.

The results show that in overall process, the college students found themselves in such easiness in operating or using the media. M-Learning media is easy to use because there are clear instructions on it. From the aspect of usefulness, the students found the presented materials were easy to understand and very useful. In general, students like to learn in using the m-learning media because of its flexibility and it can be used in their smartphones respectively. In the media implementation process, the researchers explained the material to be conveyed was about the leadership education, apprenticeship, and dual education. Then the researchers gave the form of a .apk file for each student. Students responded positively to the given files. At that time of their learning process which was focused on the material on their smartphones’ screens, they were trying to understand the material. It is essential because there were some quizzes included in order to measure students’ comprehensions toward the material. The results of the quiz would be the additional value for students.

4. Conclusion

Based on the results of data analysis and discussion, some conclusion can be concocted as follows: (1) the results validate the feasibility of the m-learning learning which consisted of both the materials’ feasibility and the feasibility of the media. The feasibility of the materials categorized by 75.71 % or very decent. Feasibility of the media is at a level of 74.25% or can be categorized as very decent. Overall feasibility of the m-learning media is at a level of to 74.88% or can be categorized as feasible. The percentage of the level of achievement is at a level of 61-80%. (2) The responses of the students toward the instructional m-learning media-based on its aspects of easiness (Ease of Use) is at a level of 81.25% and on aspects of its usability (Usefulness) is at a level of 77.5%. The students’ responses toward the m-learning media in either category, can be seen from the overall percentage of 79.37% is entered at the level of achievement of 61-80%.
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