

Interactive Mobile Learning for Self-Learning of Vocational High School

Didik Dwi Prasetya

Jurusan Teknik Elektro Fakultas Teknik
Universitas Negeri Malang
Malang, Indonesia
didikdwi@um.ac.id

Abstract— One of the problems faced by vocational students who are conducting field industrial practice (prakerin) is the lack of access to learning resources. On the other hand, they must be ready to take the test when industrial activities are finished. Referring to the existing problems, this paper proposes the development of an interactive mobile learning application in the web programming subject for vocational students called iLearnHTML. As is known, to learn web application, required at least three software tools, a text editor, web browser, and web server. This solution provides a practical approach, through an interactive mobile application interface so that students can study independently. This application runs on a mobile operating system platform that is very flexible to use anytime and anywhere. The results of the validation and field testing in SMK Malang 4 shown that the developed product is already feasible to use, in which there is a very high degree of validity media, 87.08%.

Keywords— *Mobile learning, interactive, self-learning, web, SMK*

I. INTRODUCTION

Vocational High School (SMK) is an education at the secondary level that promotes the development of students' skills. Skill possessed is the result of learning in school and in industry. Therefore, the vocational curriculum implements a program of field industrial practice (prakerin) in order to provide learns directly to students about real life in the industry. This activity is intended to improve the professional skills of students and in accordance with the demands in the field.

Prakerin is a form of implementation of education and vocational training that combines learning activities in schools and learning through working directly in the field and an atmosphere of real and relevant in the real work/industry [1]. Basically prakerin is a model that combines the provision of education as a whole and integrated learning activities of students in schools with the mastery of vocational skills through working directly in the field of employment. The method implemented in order to improve the quality of vocational high school to achieve the relevance of education to the need of workers [2].

The implementation of prakerin in each SMK may vary, but generally held around 6-12 months. One of the SMK in Malang that also implementing prakerin program is SMK 4. Even this school apply prakerin for 12 months fully. The location of prakerin also spread in different cities, even to abroad such as Malaysia.

One of the problems faced by vocational students who are conducting field industrial practice (prakerin) is the lack of access to learning resources. The industry typically does not provide related facility for the student learning. If students need to bring teaching materials such as books, of course they have a limited ability. Moreover, for those students who the location of industrial practice outside the city, is certainly more limited in bringing the teaching materials. In addition, problems also arise in studying the proficiency level teaching materials. Not easy for students to focus on studying the subject matter on the sidelines of the industrial activities.

On the other hand, the students must be prepared for a variety of exams when they back to school. In many cases, when students directly face the test without any treatment from a teacher or school, many were not successful. Finally, to overcome this problem, the school is actively providing additional material outside of school hours. It would be extra work for schools

Referring to the existing problems, this paper proposes the development of an interactive mobile learning application in the web programming subject for vocational students called iLearnHTML. Subjects of web programming is one of the core subjects, particularly in the software engineering study program. This subject requires the student's skills in creating web applications, not just only theory. As is known, to learn web application, required at least three software tools, a text editor, web browser, and web server.

Interactive mobile learning application solution developed is in accordance with the conditions praktikan students who have limited learning resources. Application design is also very practical and easy to learn and implemented. This is corroborated by the fact that the trend in the use of various mobile applications continued to show improvement. According to the Nielsen survey conducted in the 2nd quarter

2015, 85% of adolescents aged 18-24 years are users of smartphone [3]. This number is predicted to continue to grow in line with the market's enthusiasm is very positive.

II. LITERATURE REVIEW

A. Interactive Mobile Learning

Interactive learning can be conceptualized as a learning process that involves some form of digital mediation between teachers and learners [4]. Interactive learning allows visitors to communicate and interact with the application system directly. Thus, this learning requires digital devices (such as computers) and at least one learner. Actually, interactive learning has long been introduced, in which about year of 1980 proposed a classic model using of computers in education as a "tutor, tools, and tutee" by Taylor.

Learning with the interactive model growing on the basis of conventional learning are less able to meet the needs of learners in learning. The fact in the classroom showed that students are less motivated to learn because the approach used was conventional. Along with the development of information and communication technology, the use of digital devices in the learning widely used. In line with this, a lot more comprehensive studies, one of which is computer assisted learning (computer aided instruction).

Interactive learning can not be separated from the use of multimedia that combine various elements of media such as video, sound, animation, text, and images that are packed in a container that is interactive, creative, and fun. These media types can be divided into two categories: linear multimedia and interactive multimedia.

Linear multimedia is a multimedia that is not equipped with any control device that can be operated by the user. Multimedia is running sequential (sequential), for example: TV and movies. On the other hand, a multimedia interactive multimedia is equipped with a controller that can be operated by the user, so the user can choose what is desired for further processing. The examples of interactive multimedia is interactive learning, gaming applications, etc..

Multimedia that used as a demonstration and learning research makes it possible to improve the teaching and learning environment [5].

B. Self Learning

Self learning is an approach to learning that emphasizes active learners. Pemberton and Dickinson [6] identify various different terms in the literature on self-learning, some of which are used synonymously, and some of which have been ascribed a number of separate meanings: self-instruction, distance learning, individualized instruction, flexible learning, self-access learning, self-direction, self-learning, semi-self learning, and self-access material.

Independent study is a process, a method and a philosophy of education: in which a student acquires knowledge by his or

her own efforts and develops the ability for inquiry and critical evaluation [7]. It includes freedom of choice in determining those objectives, within the limits of a given project or program and with the aid of a faculty adviser.

According Wedemeyer in Keegan [8] suggested that students who learn independently have the freedom to learn without having to attend lessons given in the classroom instructor. Learners can study the subject or topic specific lesson by reading a book or viewing and listening to media program's view heard (audio visual) without assistance or with limited assistance from others. In line with Wedemeyer, Moore [9] argues that the main characteristic of a self-learning process is the opportunity given to students to participate in determining the destination, source, and evaluation of learning.

Independent learning is not a new concept, nor is it a concept where there is universal agreement on its meaning. In its broadest and most accessible/known context, independent learning was defined by the Open University [9] as: 'working with increasingly less structured teaching materials and with less reliance on traditional kinds of tutor support'.

A comprehensive audit of terms used to describe 'independent learning' was undertaken by Kesten [10]: 'Autonomous learning, independent study, self directed learning, student initiated learning, project orientation, discovery and inquiry, teaching for thinking, learning to learn, self instruction and life long learning'.

Self-learning is a teaching strategy that puts learners actively and independently, and take responsibility for their learning. With this approach participants will be able to develop critical thinking skills, develop social support systems for their learning, being able to choose the most effective learning styles and is expected to be and have the entrepreneurial spirit.

III. METHOD

This research is the development of research, which is the process used to develop and validate the product.

A. Research Design

The research model used ADDIE adapt the model developed by Dick and Carey [11]. Stages activities include analysis, design, development or production, implementation or delivery, and evaluation

Stages of research activities can be explained as follows:

- Analysis

This phase aims to identify the problems, analyze requirement, and define product requirements specification software that will be developed. The Analysis is the most important step in the process. This phase determine the basis for all future decisions in this model.

- Design

At this stage, the results of the requirement analysis will be poured into the form of design, including process, data, interfaces, and overall system design.

- Development

This stage aims to realize the analysis and design results to form the finished product. Development of the application is done using HTML and CSS. Furthermore, the application is converted to a mobile device by using PhoneGap framework.

- Implementation

This stage aims to present the results of the development directly. The purpose of this phase is to implement in the field.

- Evaluation

This stage aims to ensure that the product is in conformity with the initial specifications. If there is a revision it will return to the phases related, whereas otherwise it directly to the next stage. Evaluation stage plays from beginning to end for reflection.

Overall the phase of ADDIE models describe the steps of product development are simple yet very comprehensive. Between one phase to another phase aligned to produce the final product.

B. Product Description

This media is a mobile application (mobile apps) that can run on all mobile operating system platforms, such as Android, iOS, Windows Phone, and BlackBerry. More about the architecture of the proposed system development is shown as Figure 2.

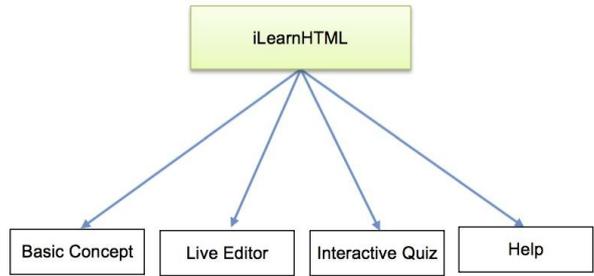


Fig. 2. Sitemap of iLearnHTML

This mobile learning application composed of several parts that make up an integrated learning application. The parts are becoming media content development plan is composed of basic concept of web programming, live editor, quiz/exercise, and help the use of the product. Sitemap form of content development is shown.

In order to facilitate access to content that is available, made a major navigation simple and focus on product functionality. This form of navigation design adapts to the characteristics of Smartphone apps and tablet.

C. Research Subject

The research subjects or respondents are parties which used as a sample in a study. Another term used to describe the subject of the research was the respondents, that is, those who give in response to a treatment that is given to him. Subjects in this study were students of SMK N 4 Malang in the Software Engineering study program of class IX.

Determination the subject of research can be done with the approach and the population sample. Population approach done when taking a population approach the subject of research covering the entire population. Sample approach is taking a subject of research by using some of the existing population. Qualitative research often using purposive technique as a way to determine the subject of research.

D. Research Instruments

Research instruments are instruments that are used to obtain or collect data in order to solve research problems or achieve the research objectives. The instrument used in this study there are two kind: treatment and measuring instruments.

Treatment instrument is an instrument used to provide treatment to the students during the learning process. This treatment instrument in the form of interactive mobile learning application named iLearnHTML.

Measurement instrument used to measure the level of satisfaction of users of the products developed. This instrument is a form of checklist sheet related to product functionality that is provided to the sample in this research.



Fig. 1. ADDIE Model

E. Product Testing

Validation by media experts was conducted to determine the validity of instructional media so it can be valid whether or not the media. This stage involves a media expert who is deemed competent, the practitioners who have competence in the field of computer assisted learning media, especially interactive mobile applications.

F. Data Analysis Techniques

The data analysis is an activity performed after the data from all data sources collected. Based on the results of the assessment of validity and feasibility of the product, will be made of statistical data on the product. The data analysis technique used is descriptive statistics.



Fig. 3. Main Interface of iLearnHTML



Fig. 4. Main Interface on Windows Phone Platform

IV. RESULT AND DISCUSSION

A. Result

Stages of implementation or development of real-world systems describe the manifestation of processing functions and information structures. In this stage, the aspects related to the behavior and structure of the system is represented as it would be built [12]. This stage illustrates the implementation details for each operation are expressed through a message. At this stage the system is implemented interactive learning applications for Smartphones and tablet environments.

This stage focuses on the main system that will accommodate the learning contents. Referring to the results of interface design, implementation main interface of interactive mobile learning application is shown as Figure 3.

The development of an interactive mobile learning application consists of two main modules:

1. The main engine
This module represents the main functionality of the application as an interactive media system. The function of this module is to provide a container to accommodate the learning contents.
2. Learning content
This module represents content-content that is an interactive learning.

The main idea of this research is to produce an application that can run on cross platform mobile operating system. The main objectives are to provide a variety of products in a variety of platforms that can be chosen by the user. The results of the implementation of the main interface of interactive learning applications in the Windows Phone platform is shown as Figure 4.

Page of basic concept presents the basic learning content material on the basics of HTML. There are five main topics are provided, namely HTML Document, Text Format, List, Image, and Link.

One of the main advantages offered by this application is an interactive learning features interactive editor. Here, users are presented a page like text editors generally, but with the ability to display the translation result the HTML code at the bottom. Once the code is completed typed in text editor, the display will be immediately displayed on the screen.

An interactive editor approach considered highly allowing users to practice basic HTML code.

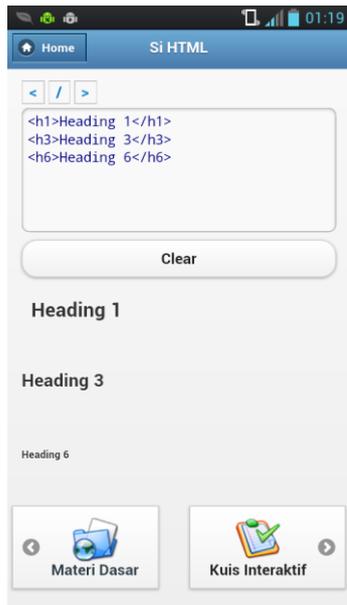


Fig. 5. Interactive HTML Editor



Fig. 6. Field Testing

When compared to the standard approach requires a minimum of two devices, namely a text editor and a browser, then this approach is more practical. The existence of an interactive editor can be an alternative when students are not carrying basic equipment such as desktop computers or laptops/notebooks.

A test conducted focus group aimed to determine the usefulness of the product directly. This test is limited to 10 students taking the subject SMKN 4 Malang drawn at random. To be more optimal test results, the selection of subjects is done by the teacher.

The testing phase begins with the installation of each product to the students and then continued with the operation

of the application features. Furthermore, students are given feedback assessment instrument to respond objectively.

B. Discussion

Application development focuses on interface design with the visual impression that is simple and clear. This solution can help students to understand the material easily and comfortably.

Limited field test aims conducted to determine the usefulness of the product directly. This testing is limited to 10 students taking the subject SMKN 4 Malang drawn at random. In order for optimal test results, the selection of subjects randomized by the teacher. The testing phase begins on the installation of the product to each student device and then proceed with the operation of the application features. Furthermore, students are given feedback assessment instruments to respond objectively.

Results of interactive mobile learning application development offer responsive dynamic features. This feature allows the application to provide the right look in all screen sizes. The application of the material and interactive text editor able to provide feedback to the user directly.

Based on a limited test group, showed an average of 87.08. Referring to the validity of the table, it can be concluded that the trial in the restricted group is at very high criteria. That is, learning interactive media web applications for Smartphones and tablets developed a great response by the students of SMK Negeri 4 Malang (represented by 10 samples) with the percentage of eligibility or satisfaction of 87.08%.

V. CONCLUSION

Referring to the implementation and outcomes of targeted research, conclusions can be outlined as follows:

1. Development of interactive mobile learning application for smartphones and tablets platform have the potential to help improve self-learning in field industrial practice (prakerin). This application is able to run on the cross platform and varied screen sizes. Media content developed widely accessible anytime and anywhere so it is appropriate for the students who conduct prakerin. This approach at least is a distance learning solution that is attractive in addition to the use of existing conventional media.
2. The test results through a series of verification and validation show that the online application is the interactive whiteboard is in conformity with the initial specifications and feasible for use in support of prakerin services.

ACKNOWLEDGMENT

We thank to Ministry of Research, Technology and Higher Education of the Republic of Indonesia (through the DITLITABMAS program) and the Department of Electrical

International Conference on Electrical Engineering, Informatics, and Its Education 2015

Engineering, State University of Malang (UM), which has been fully supports this research activity.

REFERENCES

- [1] I. Harjono. Implementasi Praktik Kerja Industri (Prakerin) pada Kompetensi Keahlian Teknik Instalasi Tenaga Listrik SMK Negeri 4 di Kota Tangerang. Tesis. Fakultas Ilmu Sosial dan Ilmu Politik. Universitas Indonesia. 2012.
- [2] POKJA. Program Praktik Kerja Industri (Prakerin) Smk Negeri 3 Kayuagung Cianjur. 2011.
- [3] Nielsen. <http://www.nielsen.com/us/en/insights/news/2014/mobile-millennials-over-85-percent-of-generation-y-owns-smartphones.html> (Online 2015)
- [4] T. Reeves, Hedberg. Interactive Learning Systems Evaluation. Educational Technology Publications, Inc. USA. 2003.
- [5] C. A. Wissick. Multimedia: Enhancing Instruction for Students. Journal of Learning Disabilities, v29 n5 p494-503 Sep 1996.
- [6] L. Dickinson. Self-instruction in Language Learning. Cambridge University Press. 1987.
- [7] K. Nagpal. International Journal of Social Science & Interdisciplinary Research. Vol 2 (2) 2013.
- [8] D. Keegan. Six distance education theorists. Cambridge: International Extension College. 1983.
- [9] M. G. Moore. Concepts of adult education, in: R. Bell (Ed.) Education for Adults (Milton Keynes, The Open University Press). 1984.
- [10] C. Kesten. Independent learning: a common essential learning, A study completed for the Saskatchewan Department of Education Core Curriculum Investigation Project, Saskatchewan Department of Education, University of Regina. 1987.
- [11] W. Dick and L. Carey. The Systematic Design of Instruction, (4th Ed.). New York: Harper Collins College Publishers. 1996.
- [12] D. Prasetya. Web-Based Interactive Multimedia Applications for Children with Learning Disability. ADIC International Conference, Malaysia. 2010.