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The Management Of On-The-Job Training Through Web-Based Application At Vocational High School (SMK) In Network Computer Engineering Majors

Tito Suryono

Magister of Vocational Education

Pascasarjana

Universitas Negeri Semarang

Email: ttsuryo@gmail.com

Hari Wibawanto

Magister of Vocational Education

Pascasarjana

Universitas Negeri Semarang

Samsudi

Magister of Vocational Education

Pascasarjana

Universitas Negeri Semarang

Abstract:

Multiple system education in SMK through On-the-job training is an effort to increase graduate quality in industrial capability. The stages of this research are data collection stage (introduction), system development stage, and evaluation phase (testing). This study, which is research and development, aims to know the feasibility and practicality of the design of web-based applications.The research was conducted at State Vocational High School (SMK Negeri) Jumantono Karanganyar particularly in majors of network computer engineering which involved 12 students of small trial group and 109 students of large-scale test.The data collection method used was observation, documentation, and questionnaire. The data obtained were then analyzed by descriptive analysis technique. The result of black box test done by using 43 items was in accordance with its function. The application expert's validation of this research was 88% meaning that it was very reasonable criteria. Meanwhile, the validation of substance was 89% meaning that it was very feasible. The result of the usability test for the small-scale group was 68% then, it was improved and tested on a large scale that resulted 85% and was considered as practical. Thus, it can be concluded that the development of web-based On-the-job training management applications is very feasible and practical to be used On-the-job training management in SMK. It is suggested that the use of On-the-job training applications must be intensified.

Introduction

National education system expects the implementation of education can create the process of students' personal quality development as future generations of the nation. Therefore, every student is encouraged to be qualified and capable person who proactively responds the challenges of the age. Besides, students are also expected to be educated people who believe in and are pious to the Almighty God, to have noble character, to be healthy, knowledgeable, skillful, creative, independent, and to be democratic and responsible citizens. Moreover, in order to make graduates ready for work field competition, the development of students' competence is based on the capability of educational institution that is influenced by natural resources and local potential of schools.Vocational education is one of national education program in Indonesia that is designed to prepare students entering work field. Vocational education develops a professional attitude and ability to compete in a particular area of expertise to prepare students in work field later. The Government Regulation No. 29 in 1990 on secondary education, chapter I in article 1 paragraph 3 states, "Vocational secondary education is education at secondary education which prioritizes the development of students' ability to perform certain types of work." Then, chapter II in article 3 paragraph 2 states, "Vocational Secondary Education prioritizes the preparation of students to come into the work field and to develop a professional attitude.

The implementation of On-the-job training which located in various areas both in the city and outside the city demands students and teachers to communicate optimally, so the problems in the implementation of On-the-job training can be solved together. Hence, it requires tools which are Information and Communication Technology (ICT). Therefore, it obliges people to always follow the development and to always improve their skills in order to improve the quality of their expertise in On-the-job training which undergone by every majors including Network Computer Engineering program. In addition, the students are required to find their own DUDI location where will be used for On-the-job training. Then, school gives a recommendation letter of On-the-job training in DUDI. The implementation of Industrial Work Practice covers the implementation in the field where in this case the students are required to be in DUDI to follow the activities undertaken by DUDI and the preparation of daily journals for the report of the implementation of the Industrial Work Practice (On-the-job training) Along with some considerations above, it is necessary to develop an application in helping the management of On-the-job training because it provides the information about the implementation of On-the-job training including the following features: journal of online activities of On-the-job training, monitoring the implementation of On-the-job training, and evaluation of the implementation of On-the-job training in school. The application is made through programming language PHP (Hypertext Preprocessor) using Code Igniter (CI) framework which then is uploaded on a website that can be accessed generally by internet.

Literature

2.1 Literature Review

Dual System Education is a design of training implementation that is jointly managed between SMK and industry / professional association as a pairing institutions (Depdiknas, 2004: 11). Multiple system education is a design of education and training held in two places, namely in schools and in business / industry / institution as partner institutions. The desain of PSG is implemented in Vocational High School to impend graduate quality with the capabilities demanded by industry. Therefore, contents of curriculum should clearly distinguish the sections to be studied in the school and the parts that students will learn through working in an industry / company that is a pairing institution, in addition both parties should be involved together in the preparation curriculum. Strategies that can be used in formulating the curriculum include: synchronization strategy and expert position analysis strategy (Rr.Prihantini Trianingsih, 2013).

A web-based application is process of develop a computer application based on a web page that displays various text, image, audio, video, and animated information use a hypertext transfer protocol (Arif, Nur Saiful; Wanda, 2013).Implementation of a web-based information system is a complex process that requires significant resources and typically proceeds through several phases. Defining a generic high-level architecture would potentially guide and facilitate the implementation and enhance the reusability and interoperability of various applications (Li & Zhu, 2013), application is developed using the codeigniter framework. Codeigniter is a PHP MVC framework that aims to make common operations easy while enforcing structured code making it easier to debug, scale and develop as a team. If you compare Codeigniter to another framework such as Zend it is not as restrictive in terms of enforcing the MVC

structure. This could be seen as a negative or positive, it all depends what you, as the coder wants from Codeigniter and how you use it.(Amit & DR. S. E. Yedey, 2016)

3. Research Methods

In the software development model, it used Waterfall method. The Waterfall method was a sequential software developmental process which the progress was seen as constant flowing-down (like a waterfall) through planning phases, modeling, implementation (construction), and testing. The method used was a method often used by system analysts in general. The core of the waterfall method was the execution of a system performed in sequence or in a linear. Thus, if the first step had not been done, it would not be able to do the second, third, and so on. The third stage was done inevitably once the first and the second stages had been done. In general, the waterfall method had the following steps (1) analysis, (2) system and software design, (3) implementation and testing, (4) integration and testing, and (5) operation and maintenance. The research was conducted for the students of class XI Network Computer Engineering major at SMK network computer engineering majors where consisted of 3 classes. 3 students from each class as a sample were used for individual and small-group trials, while other classes were used for large-scale trials of 109 students. The data collection method was observation, documentation, and questionnaire. The application expert's data is tested using Instruments to test the feasibility of an application from an expert using several aspects in accordance with ISO 9126. the technique of data analysis using technique analysis of descriptive analysis. The formula used is (Sugiyono, 2014:93):

$$Final\ Score = \frac{Total\ Score}{maximum\ score}\ x\ 100\%$$

The following criteria have been changed from the overall score that has been obtained

Final Score	Criteria
80,01 – 100,00	Very Feasible
70,01 – 80,00	Feasible
60,01 – 70,00	Less Feasible
50,01 – 60,00	Not Feasible
0,00 – 50,00	Very Inappropriat

(Source :Riduwan, 2012:22)

3. Research Results and Discussion

Research Results

Web-based application development for On-the-job training management applied PHP programming language with codeigneter framework. The result of the application development was uploaded on URL http://apkrin.web.id. The User Interface was divided into 3 (three) sections, which included Student User (On-the-job training participant), DUDI User (Supervisor/Manager), and Administrator User (Pokja). Based on the application development procedures that have been implemented, in the development of web-based application design for On-the-job training management divided into 3 as follows pre-prakerin, monitoring & evaluation and follow-up

The implementation of On-the-job training using web-based application on vocational high school in computer networking engineering major applied the procedure as follows.
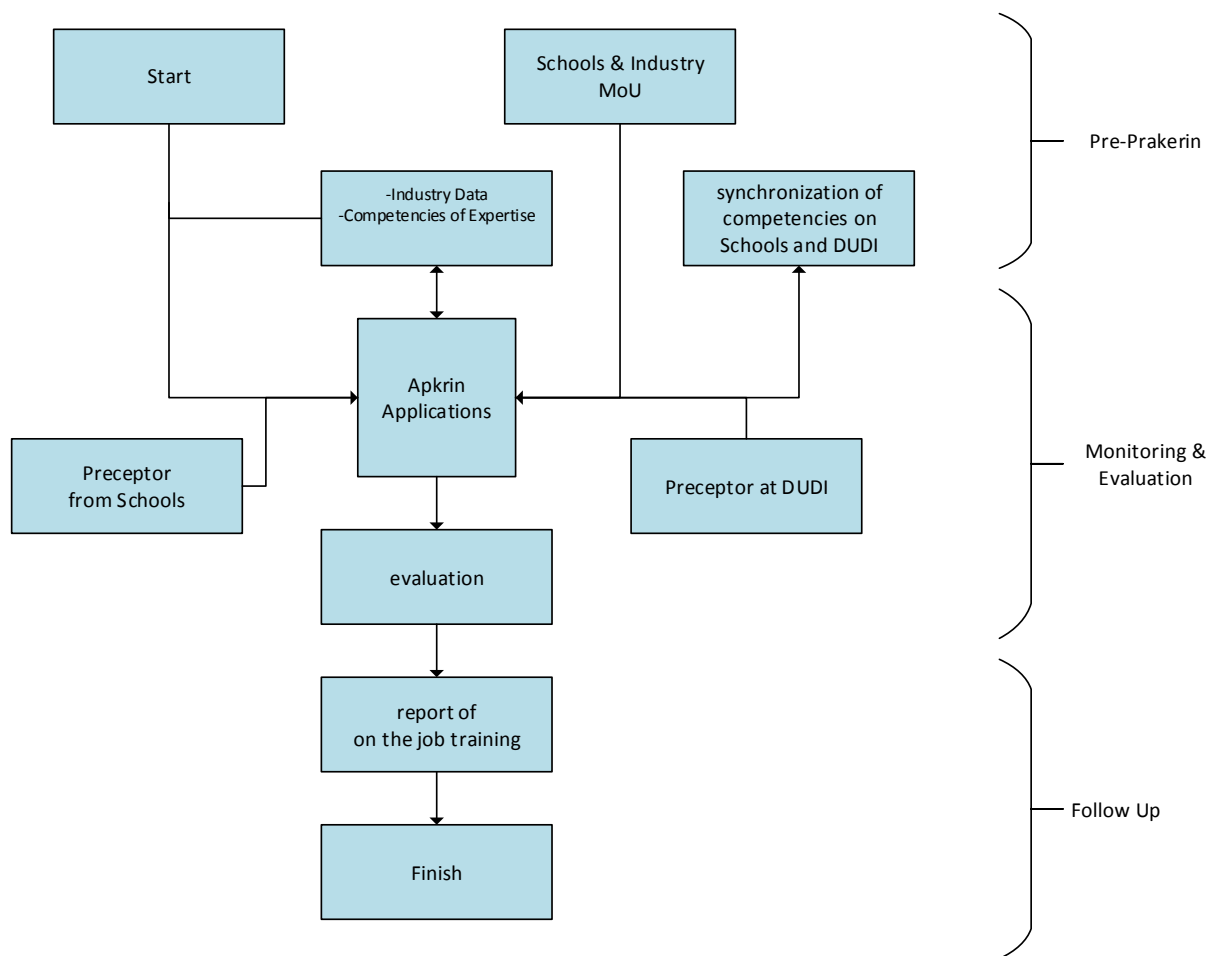
Figure 1.Procedure On-the-job training

In the pre-prakerin stage is divided into 3 stages before the school conduct prakerin implementation in DUDI namely: DUDI assessment (initial data prerequisite DUDI), school had Memorandum of Understanding (MoU) or cooperation with DUDI to implement On-the-job training and the school had communication regarding to competency sync quota. Students who carried out On-the-job training must be registered on the application. Once the students were registered, they got an account (user and password) to log in to On-the-job training application. Students who were enrolled in the application chose DUDI in accordance with the DUDI available quota and then had to see the competencies that would be obtained by students from On-the-job training at particular DUDI location. The school determined On-the-job training teacher and then assigned to Pokja of On-the-job training after the working group determined the supervisor's data for each DUDI. Afterwards, the supervising teacher processes the on duty letter and SPPD in order to be submitted to the DUDI and monitoring on the execution and withdrawal of On-the-job training. Meanwhile, students filled the activity journal on the application. Filling the student activity journal was in line with the technical aspect of competence which was based on the competence aspect in DUDI. Then, the validation process of the student activity journal was done by the supervisor from the DUDI. The results of the journal were recorded into a student activity report so that it can be the material for evaluation of On-the-job training implementation in DUDI. Eventually, after the implementation of On-the-job training was completed, it appeared as the output of the journal activities of students during the DUDI and produced a competency achievement certificate of students who applied On-the-job training. Furthermore, the results of the expert validation test are depicted as follows.

Table 1. Expert validation test

No.	Rated aspect	Resp	Score	Totol Score	Percentage
1.	The accuracy of application development	4	100	89	89%
2.	Easy access	4	100	86	86%
3.	Process and data flow	4	160	138	86%
4	App views	4	120	106	88%
5	Application sustainability	4	40	36	90%
6	Application compatibility	4	40	38	95%
7	Application stability	4	40	37	93%
	Total		**600**	**530**	**88%**

The application was made by application experts which resulting the accuracy of choosing application development to reach 89%. Besides, On-the-job training application ease of access was 86% while process and data flow aspect were 86%. Moreover, it revealed 88% application aspect, 90% application sustainability, 95% application compatibility, and 95% application stability. Overall, the average percentage of obtained data was 88% or it could be judged feasible.

Table 2. Expert validation test

No.	Rated aspect	Resp	Score	Totol Score	Percentage
1.	The accuracy of application development	3	60	54	90%
2.	Completeness data On-the-job training	3	45	39	87%
3.	Easy Access	3	120	106	88%
4	Competency Sync	3	75	68	91%

	Total	300	267	89%

The result of respondent data processing and trial of application were done by expert of substance. It acquired 90% of system suitability aspect. Then, process of data completeness was 87% whilst ease of access of On-the-job training application was 88%. Moreover, synchronization aspect Competence and DUDI reached 91 %. Based on the data of some assessed aspects, the average percentage was 89% or it could be judged feasible. Meanwhile, the results of reusability are portrayed as follows.

Table 3. Usability Test

No.	Rated aspect	Resp	Score	Totol Score	Percentage
1.	The accuracy of application	109	2180	1976	91%
2.	Easy Access	109	2725	2172	80%
3.	Ease of Data collection	109	2725	2363	87%
4	App Views	109	3270	2759	84%
	Total		10900	9270	85%

The assessment of conformity aspects of the system increased by 91% percentage, while the ease of access to On-the-job training management application also increased by 80%. The aspects of ease of data collection correspondingly increased to 87% and application program display reached 84%. Besides, the average of reusability test result was 85%. Based on the table of the results of student responses, the application had an average with a very decent percentage category

Reliability aspect test using LoadImpact measurement tool is used to test the stress testing of web-based prakerin management application. The reliability test result using LoadImpact with 25 virtual users for 5 minutes.

Figure 2 Loadimpact Test

the test results note that stress testing testing using LoadImpact with 25 virtual users for 5 minutes yield success rate of 144 and failed rate 0. Testing is done gradually at certain time. Green line show growing number of users. While the blue line indicates visitor waiting time (load time).

5. Conclusion and Suggestion

Conclusion

Based on the results of research and discussion in the previous chapter, it can be concluded as follows; (1) The form of web-based application design On-the-job training management includes 3 stages of pre-prakerin, monev and follow-up, (2) the development of web-based application products for developed management is deemed to be eligible by web application experts and On-the-job training substance experts, and (3) the development of web-based application products for On-the-job training management has practicality value with good category due to system suitability, ease of access, and ease of the collection of program display data.

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