

# Development of Programming Algorithm Module for Vocational Level Based on Web for PTJJ

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## ABSTRACT

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**Keywords:** module, web, distance education.

Vocational High School (SMK) is a target of Open and Distance Education (PTJJ) implementation. Since SMK have a duty in preparing students facing the challenges in the working world, then Information Technology (IT) utilization as a teaching material is one of the solutions for example in the use of interactive media. It aims to improve student's quality of learning especially students of ODL in Software Engineering (RPL) for SMK in Indonesia. Development of a web-based module is one of the use of information technology in making teaching materials. This module can be widely accessed through internet connection, anytime and anywhere.

The purpose of this proposal is to develop a web-based module on basic level programming algorithms for RPL SMK. Also, to measure the module's feasibility in producing teaching materials which are ready to use. The development method was adapted from the method of floating-owned Borg & Gall, where the development method aims to develop and validate products.

The expected result of this development is a web-based module for algorithm subjects in programming skills base level for students of Software Engineering program vocational and scientific articles with titles Module Development Programming Algorithm Based Web CMS rate on PTJJ.

## **1. INTRODUCTION**

PTJJ stands for Open and Distance Education. PTJJ emphasize on student's learning independency. Students are given the opportunity to learn separately from teacher, so the communication between students and teachers should be done through print, electronic, mechanical, and other equipment. Utilization of interactive and excellent learning media becomes very important to overcome the lack of communication between teachers and students.

Vocational School (SMK) is a target of the implementation PTJJ. SMK is a school that prepares students to be able overcome the challenges they meet in the working world. Software Engineering competency (RPL) study will answer the upcoming challenges by preparing many professionals in the field of computer technology. One of the major subjects for RPL competence in vocational is the algorithm programming basic level. In this course, students are expected to learning, mastering, and understanding the concepts of the taught lesson. It is because the subject is a basic level of programming algorithms related to majors RPL Other critical subjects.

Use of information technology as a teaching material is one of the solutions in using interactive media for improving students' quality of learning, mainly in the implementation of RPL PTJJ for SMK in Indonesia. Information technology that is currently being developed is a web-based information technology. This technology has many benefits such as ease of data exchange and also could be interactive. By adding the web-based teaching materials, students can access the learning materials anytime and anywhere, then students of RPL from all over Indonesia could learn by themselves. It is expected that students will master the knowledge so they would be ready to enter the workforce.

Development of this web-based module is ideal to master the student's knowledge about elementary level of programming algorithms. This module can be widely accessed through internet connection which can be done anytime, anywhere. The results of the development of this module will be useful to increase the student's knowledge on basic level of programming algorithms and equitable educational services for students RPL SMK in Indonesia.

## **2. METHODE**

### **2.1 Development Models**

The basic model of development will be set out as product development. The model will be developed by referring to Research and Development (R & D) of Borg and Gall. The design of development with R & D design of Borg and Gall has the objective to develop and validate products. Steps of teaching materials development that are used : (1) Data collection; (2) Planning; (3) Product development; (4) Validation; (5) Revised; (6) Trial; (7) Revision; (8) The final product, Dissemination and Report.

The products produced in this research is a web-based module for the subject programming algorithm. Development model in question can be seen in Figure 2.1.

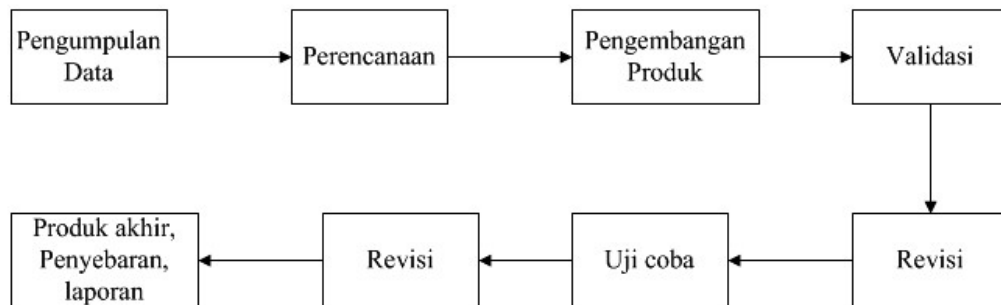


Figure 2.1 Borg and Gall Development Model that has been modified

## 2.2 Data Analysis Techniques

Data analysis is the process of finding and compiling the data set obtained, so that the results can easily be understood by others. The data presented in this development was using descriptive qualitative approach which aims to uplift the facts and circumstances that occur during the ongoing research.

Furthermore, the scoring results and the suggestion by researchers were analyzed descriptively. Those contains data processing observations, interviews with teachers and students, and the questionnaire result.

Processing of questionnaire data from the experts as well as validation of teacher and student questionnaires were analyzed by using the following formula:

$$V = \frac{TSEV}{S - \max} \times 100\%$$

Description:

V = Validity

TSEV = Total score empirical validator S-

max = expected maximum score

To obtain conclusion, it should reach the specific criteria as follows:

**Table 3.2 Assessment Qualification**

Percentage (%)	Feasibility Level	Remarks
75,01-100,00	Valid	Viable / do not need revision
50,01-75,00	Quite Valid	Pretty decent / partial revision
25,01-50,00	Less Valid	Less worthy / revision partially
< 25,00	Invalid	Not worth / total revision

### 3. Result

Product trials were conducted upon 30 students on the program expertise Software Engineering 10<sup>th</sup> grade of SMK Negeri 6 Malang on Programming Algorithm subjects. Data can be found in Annex Student Results. According to the table, we could see the score of the first students to 30<sup>th</sup> students. Data validation and media materials obtained from the validation that performed by two teachers in algorithm lesson and lecturer of SMK Negeri 6 Malang Department of Electrical Engineering, State University of Malang in Annex Media Expert Validation Results and Appendix Validation Results Matter Expert.

Data obtained as follows:

$$\frac{\sum x}{\sum x_i} \text{ Percentage matter expert validation} = \frac{295}{312} \times 100 = 94,551$$

$$\frac{\sum x}{\sum x_i} \text{ Percentage media expert validation} = \frac{89}{96} \times 100 = 92,708$$

$$\text{Percentage of student tested} = \frac{\sum x}{\sum x_i} \times 100 = \frac{1125}{1440} \times 100 = 78,125$$

Based on validation result of material expert, 94,551 stated that the algorithms module programming is valid, while validation by media experts resulted 92.708 stated that the algorithm programming module is valid and ready to be tested to the students. The trial upon 30 students of 10<sup>th</sup> grade of SMK 6 Malang obtained 78.125 which can be concluded that the developed algorithms module are valid.

The questionnaire's result which were distributed to student of programming said that algorithm module content is inline with the applicable goals and curriculum, module's materials is clear and easy to understand, its display and fonts are clear to read, the learning evaluation result are in accordance with the material delivered, worksheets are clear and easy to understand, and the use of algorithms programming module could save cost, effort, and time during learning activities. However there are some weak point that should be revised then these modules can be used as a supporting tools for students' learning independency.

#### **4. Conclusion**

Based on the results of the data analysis and discussion, it can be concluded that the module developed algorithms are valid. According to the answers of the questionnaire that was distributed to student, programming algorithm module content is in conformity with the applicable goals and curriculum, materials on the module was clear and easy to understand, display and use of fonts on the module was clear to read, the evaluation of learning outcomes were in accordance with the material delivered, worksheets were clear and easy to understand, and the use of module programming algorithms can save on the cost, effort and time in learning activities. However there were some drawbacks that should be revised so these modules can be used as a means of supporting students in independent study.

#### **5. Suggestion**

Based on the questionnaire that has been distributed to students of Software Engineering Program of 10<sup>th</sup> grade in SMK Negeri 6 Malang, responses can be obtained as follows:

- Algorithm module can be used efficiently (saving the cost, effort, and time) in learning activities when the computer specifications and software on your PC / laptop support in reading digital books.
- Use of an interesting module can increase students' interest towards learning activities.

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