EST Journal of Educational Science and Technology
Volume 4 Number 2 August 2018 page 119-125
p-ISSN:2460-1497 and e-ISSN: 2477-3840
DOI: http://dx.doi.org/10.26858/est.v4i2.6064

Development of Product-Based Job Sheet as Instructional Media in Vocational Education

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(***Received***: June-2018; ***Reviewed:*** July-2018; ***Accepted:*** August-2018; ***Published:*** August-2018)

ABSTRACT
The purpose of this research is to produce a product-based job sheet that can be used as an instructional media on practicum activities. In this study also tested the validity of the job sheet developed. The research method used is research development with a 4D model consisting of define, design, development and disseminate. The research instrument used is a validation sheet consisting of content validation, format, and presentation of the job sheet which is analyzed by descriptive analysis technique. The results showed that 1) the product-based job sheet developed was highly valid on the content/content aspects, 2) the product-based job sheet developed valid on the aspect of the format, and 3) the product-based job sheet developed was valid in the presentation aspect. Based on the results of the study can be concluded that the product-based worksheet developed valid for use in Object Oriented Programming subject.

Keywords*: job sheet; media; product-based learning.*

INTRODUCTION

Higher Education has a demand to produce qualified graduates. It is certainly inseparable from the learning process that takes place on this level of education. Because the results of education will highly depend on the input and educational processes that occur (Rusman, 2011). As part of the educational process, the current learning paradigm has undergone a shift towards student-centered learning. The consequence of this learning is to place students as subjects of learning and demanding students to learn more actively and independently.

Vocational education serves to prepare learners for work (Djohar, 2006), so that the implementation of learning in vocational education requires a learning component that can promote student activity and oriented to employment. To meet these demands education must be able to involve students as learners actively to develop their potential to have knowledge, skills, and attitudes that are useful for themselves or for their environment. Activity and independence of learners in the learning process is an absolute as a consequence of student-centered learning.

As a learning center in the classroom, educators have an important role in adjusting the learning conditions with the aim of learning to be achieved, in terms of models, strategies, methods or instructional media. Educators are required to be able to adjust the learning conditions well to support the change of teaching paradigm from teacher-centered to student-centered.

Object Oriented Programming is one of the subjects of working expertise that must be studied by students of Informatics and Computer Engineering Education Program at Universitas Bung Hatta. Learning activities in this course, in addition, to pursue the concept/theory materials, students are also faced with learning skills conducted through practical activities. As the final goal of college students are required to be able to build an information system based on practicum activities that have been done.

As a field of science that continues to experience the development from time to time, learning on practice Object-Oriented Programming must be held dynamic and flexible. This means that learning is tailored to the development of science so that students who follow the learning activities have up-to-date skills. An important part of Object Oriented programming that continues to develop is the programming language. One of the most popular and widely used programming languages today is Java programming. Some of the advantages possessed of Java language, such as: simple and relatively easy to use, object-oriented, distributed, multiplatform and multithread (Benny, 2007). Various technology applications are built using the technology platform. So learning practicum in lecturing programming Object Oriented should also adapt and follow these developments. Because the developments that occur directly or not will affect the changing demands on the job.

But in fact, based on observations and interviews with lecturers of Object-Oriented Programming describes the still weak ability of student practicum so that at the end of the student course is still difficulty in building an information system as the output of the courses studied. This is seen from only a small percentage of students who are able to complete the final task in accordance with what is expected.

Some things that are identified as the cause of the low ability of student practicum among others are 1) Learning practicum is still held centrally to the lecturer, where the lecturer guides students in practical activities together, the learning constraints that take place like this is the time of the lab becomes less because students often ask repeatedly. It has not achieved the learning objectives maximally, 2) There are no learning media that can involve students actively and independently in the learning activities, ie there is no job sheet practicum as a guide for students to create a system information at the end of practicum activities 3) The learning process is still focused on the mastery of theory and the provision of skills which is fragmentary or not comprehensive so that the implementation of science in practice has not been done perfectly. 4) The low motivation of students in learning practicum activities.

Practicum will certainly be different from theoretical learning. Practicum activity is an effort to give participants the opportunity to gain direct experience. This learning is a process to improve the skills of learners by using a variety of methods appropriate to the skills provided and the equipment used (Wawan, 2012).

Media is a tool to deliver messages from sender to recipient. According to Smaldino (2012), the media is to anything that carries information between a source and a receiver. Instructional media is a tool used to support learning activities and serves to clarify the meaning of the message to be conveyed so that the learning objectives can be achieved.

Instructional media is a means to improve teaching and learning activities. Media can be visual media, audio media, audiovisual media, and multimedia (Smaldino, 2012; Rayandra, 2011). In using instructional media, the educator must pay attention to the target of the competence to be achieved. Some other factors that must be considered in the selection of media such as: material suitability, effectiveness, and conformity with the applicable education system. As Muslaini (2018) explains that every lesson has different needs and situations, so educators need to choose the right instructional media, of course, according to the needs and goals they want to achieve.

To solve the problems contained in course of Object Oriented Programming are described above, one of the things that can be done is to use the appropriate learning media such as product-based job sheet. According to Slamet (2005) job sheet is a printed type of teaching aid that supports instructors, especially in workshops, whose contents are a set of guides and drawings on how to create or complete a job. Job sheet is a form of print media that contains steps to be followed when operating a piece of equipment or work (Arsyad, 2003). While Abdillah (2013) defines the worksheet as sheets that contain tasks that must be done by

learners.

Product-based learning is an instructional model that provides an opportunity for teachers to manage the learning in the classroom by involving project work. According to Ganefri (2013) mentions "production-based learning model is defined as the procedures or steps that need to be performed by the educator to facilitate learners to actively learn, participate and interact, with a competency-orientation to produce a product either goods or services required".

The use of product-based job sheets can enhance the learner's active role in the practicum activities, as the use of product-based job sheets poses challenges to learners in enhancing the active, motivating, and creative roles of learners that ultimately are expected to improve student learning outcomes. The utilization of the worksheet as a learning medium can also make students focus on practicum activities that are taking place, avoiding the students to frequently ask so that make effective the time used for the lab (Setyanto, 2015; Noktavianda, 2011). The use of the worksheet as a media in learning activities contributes positively to the learning outcomes (Amin, 2015; Primary, 2014; Nurrahmawati, 2012).

Given the product-based job sheet as a guide in practicum activities, it is expected to improve students' learning motivation as they are involved to learn actively and have a wider opportunity to organize their own learning in the learning process so that the learning objectives can be achieved. Based on the above description, the researcher considers it necessary to conduct research of product-based job sheet development as an instructional media that can improve student's competence in vocational education.

METHODS

The research method used in this research is a development research that aims to produce a product that is a job sheet that can be used as an instructional media for Object-Oriented Programming practicum activities. The development model used is a 4D model. In accordance with the development model, this development procedure consists of four stages, which consists of define, design, development and disseminate (Trianto, 2007: 65), but in this research just done until the stage of development.

At the define stage, is conducted an identification of the field conditions related to the teaching and learning process (Dewy, 2016) was conducted. At this stage, some needs analysis such as basic matter analysis will be developed in the design of worksheet practice and also analyze the characteristics and ability of students.

The next stage of the design consists of the activities of designing the worksheet such as the format of the worksheet, the main concepts of the subject matter for each meeting and the exercises that must be done by the students.

The next stage is the developing stage. At this stage is established validation test of the product that has been developed. The validation sheet is filled by experts and used to determine the validity of the developed product. In this paper, the validation sheet contains several aspects of the assessment of the worksheet developed. Aspects assessed include content, presentation, and format of the worksheet.

The last stage is the dissemination stage. Dissemination is done by way of distribution of job sheet in limited quantities to lecturers and students. It aims to see responses and feedback to the media that has been developed. If the user's target response to the media is good then the printing in large quantities and marketing so that media that has been developed can be used by a broader target.

Data analysis technique used in this research is descriptive data analysis that is by describing the validity of a product-based jobsheet. Data on product-based job sheet validation in the form of content validation, presentation validation, and format validation were analyzed using the following steps: 1) Give score answers with criteria 4 = very valid, 3 = valid, 2 = quite valid, 1 = less valid, 0 = invalid, 2) Summing up the scores of each validator for all indicators, 3) Giving validity percentage values with the formula:

$$persentase = \frac{\sum Skor\ masing - masing\ item}{\sum Skor\ ideal\ item}\ x\ 100\%$$

Table 1. Category of Product-Based Jobsheet Validit

No	Tingkat Pencapaian (%)	Kategori
1	90 – 100	Sangat valid
2	80 – 89	Valid
3	65 – 79	Cukup Valid
4	55 – 64	Kurang Valid
5	0 – 54	Tidak Valid

Sumber: Ngalim Purwanto (2009)

RESULTS AND DISCUSSION

Results

The product-based job sheet is developed according to the steps contained in the development model which consists of define, design, develop and disseminate. In the define stage, needs analysis is carried out consisting of problem analysis, curriculum analysis and analysis of the characteristics of students. In this phase, the job sheet design is carried out based on the results of the analysis in the previous stage. In the next stage, namely the stage of developing the job sheet design that has been made assessed by the validator to see the validity of the product being developed.

The validity data of product-based job sheet is obtained from the validation sheet provided to three validators who validated content, formatting, and presentation of the worksheet. Content validation consists of conformity and supporting aspects. The average score of the validation results is 90.31% and is included in the very valid category.

Table 2. Validation Results of Product-Based Jobsheet Contents

No	Validation Aspect	Percentage	Category
1	Suitability	90.62	Very valid
2	Supporting aspect	90	Very valid
	Average	**90.31**	**Very valid**

Furthermore, validation of the format of the worksheet has two aspects that are aspects of the format and characteristics of the worksheet. The average validation of both aspects is 83.48% and is included in the valid category.

Table 3. Validation Results of Product-Based Jobsheet Formats

No	Validation Aspect	Percentage	Category
1	Format	81.25	Valid
2	Characteristics	85.71	Valid
	Average	**83.48**	**Valid**

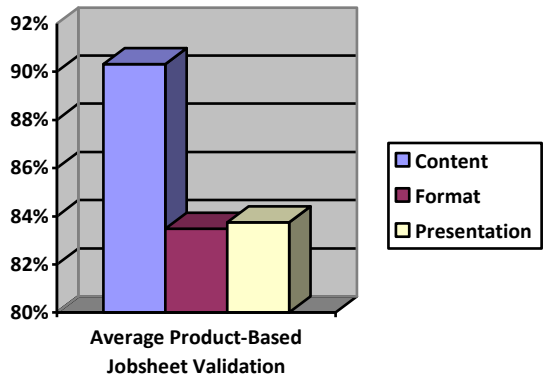
And the validation of job sheet presentation has two aspects, namely the use of sentences and language and aspects of images. The average value of presentation validation is 83.75% and is included in the valid category.

Tabel 4. Validation Results of Product-Based Jobsheet Presentations

No	Validation Aspect	Percentage	Category
1	Sentences and language	80	Valid
2	Images	87.5	Valid
	Avera	**83.75**	**Valid**

The three average validation values can be seen in the following graph:

Graph 1: Average Product-Based Jobsheet Validation Value



Discussion

Student-centered learning paradigm puts students as a subject of learning which requires activity and student independence in learning. To realize this, lecturers as educators need to apply learning that can support the realization of the learning demands in terms of strategies, methods or media used. Instructional media occupies a role and function that is very strategic in learning. It can help students in understanding the subject matter delivered by lecturers. And instructional media is one factor that can influence the success of students in learning (Hamalik: 2005). The use of appropriate media will provide maximum

learning outcomes.

One of the media that can increase student activity and independence in practicum learning activity is worksheet lab also known as job sheet. The benefits of using jobsheet in the activities of Pratikum include: 1) Increase the learning activities so that students will be more active in learning, 2) Increasing independence, 3) Absorbed knowledge can last longer (Setyanto, 2015).

The job sheet is a sheet containing material and operational steps on a topic to be practiced. Jobsheets are also equipped with an evaluation sheet so students can measure their abilities after using this media. Jobsheet is used in practicum activities to facilitate students in working on certain practicum activities. Supriadi et al. (1997) said the worksheet functions as follows: 1). Guidance for lecturers directs all their activities in the learning process, 2) Guidelines for students in the practical learning process, 3) As a means of evaluating achievement/mastery of training results.

Jobsheet used learners at the time of carrying out the lab so that learners easier to do what it does because it contains operational steps that systematically systematically (Abdillah, 2013; Aryadi, 2011). In the research developed a worksheet practicum that can be used in lecturing activities on Object-Oriented Programming. Job sheet developed can lead students from the introduction of simple java programming until the end of practicum activities, students will be required to create an information system built using java programming language using Netbeans IDE tool.

Development is carried out using the 4D development model (define, design, develop and disseminate). Based on the development model, the first step taken is the define stage. At this stage a background analysis consisting of problem analysis, curriculum analysis, and student characteristics analysis is carried out.

In the problem analysis, it was found that the student practicum was still weak. This is reflected in the lack of ability of most students in completing the final project. Students are still very dependent on lecturers and have not been able to work creatively, actively and independently. Based on this problem, it is proposed to develop a learning media that can help students to be more active in learning, namely the job sheet media. As found by Ulum (2016) that job sheet can help students improve learning effectiveness.

The next background analysis is curriculum analysis. This is done to identify the material to be disserted on the worksheet. Based on the curriculum analysis, the jobsheet is developed in accordance with the course syllabus. And the last background analysis is the analysis of student characteristics. Students who take an eye on Object Oriented Programming are 4th semester students, where they have the ability to study independently and creatively if given adequate encouragement and facilities.

The next stage is the design stage. At this stage, the design is based on the results of the analysis in the previous stage. Job sheets developed also adopt product-based learning that takes into account aspects of orientation, program development, the scope of material, learning strategies, approaches, patterns of organization and evaluation of students where product-based learning can better help students to develop their knowledge, attitudes and skills in the learning process (Ganefri, 2015; Ansar, 2015, Ilyas, 2012). The design is then carried out on the component and format of job sheet.

Job sheets that have been produced, before being used/ implemented in learning activities need to be validated /assessed by experts. Validation is intended to find out and measure whether the developed job sheet is in accordance with the provisions. Validation is done by the validator on the content, format, and presentation. If it has not fulfilled the criteria, then it is revised so that a valid job sheet can be created that can be used as a medium for practicum learning.

To produce a valid content, the development of jobsheet must pay attention to the suitability and supporting aspects of learning. To achieve this, the development of the material is based on the curriculum and syllabus of the course. In this study, it can be concluded that the material/ content developed in this jobsheet belongs to the very valid category.

Object-Oriented Programming practicum material has a wide scope and requires students to be able to work independently so that this jobsheet media is one solution to overcome the above problems. This is consistent with Arsyad's (2003) opinion that using jobsheet can adjust the speed of students in learning and students can repeat the material.

Another component of validation is the jobsheet format developed. Validation of this format has two aspects of the format and jobsheet

characteristics. Validation of this format ensures that the developed jobsheet contains elements that must be included in the jobsheet. As outlined by Depdikas (2008) that jobsheet has certain structures and components such as goal titles, work steps, for evaluation.In this study assessment on the aspect of the format included in the valid category.

The third validation done in this research is validation to the presentation of jobsheet which consists of two aspects that are aspects of language usage and image aspect as a supporter. Of course, for jobsheet can be used easily, it must contain a standard language that is easy to understand. In the validation test, the jobsheet presentation is included as a valid category.

CONCLUSSION ANDD SUGGESTION

The development of product-based jobsheet is carried out to create a media that can support students' independence in practicum activities and increase the effectiveness of learning. Through the use of product-based jobsheet, it can help educators to change the learning paradigm towards student centered learning. Jobsheets that are developed are valid to be used as one of the media in Object-Oriented Programming practicum activities.

It is suggested for educators to be able to use jobsheet as one of the media in practicum learning activities as an effort to prioritize students' activities in learning.

ACKNOWLEDGEMENT

The authors thank the Ministry of Research, Technology and Higher Education of the Republic of Indonesia for financial support through the *Hibah Penelitian Dosen Pemula* in year 2018.

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