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2016_ ICVET-Yogyakarta-10-15.pdf

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DESIGN EXPERIENTIAL LEARNING ON COMPETENCE BASED TRAINING COMPUTER ENGINEERING AND NETWORKS IN VOCATIONAL HIGH SCHOOL

Riana T. Mangesa, Dyah D. Andayani
Universitas Negeri Makassar
riana.tangkin@unm.ac.id

ABSTRACT

Experiential learning is one of several models of learning that can be used to enable students to learn through the experiences of individuals in the learning process of computer engineering and network (*keahlian teknik komputer dan jaringan-TKJ)* Vocational High School. The purpose CBT of applying the learning model is to reflect a process of making meaning from direct experience through the pattern of activity gradually, step by step associated with the delivery of the contents of teaching materials. Therefore, the objective of this research is; (i) designing a model of learning in the CBT and (ii) Test the feasibility of the model and the instrument of the aspects contained in the learning experience directly. This study employed the research and development methods, which refers to the stages Borg and Gall. To assess the feasible and consistency of agreement among raters, an analysis was conducted by means of coefficients of Cohen's Kappa. The research was conducted at Vocational High School (SMK), SMK Negeri 1 Somba Opu in Grade X, which is used as a test subject. The results; (i) This study employed the research and development methods CBT models qualify the validity and (ii) the feasibility study model and instruments.

Keywords: experiential learning, competence based training, CBT, vocational high school

I. INTRODUCTION

Empirically professional labor problems in Indonesia have not achieved the expected results. Some of the problems with regard to Human Resources professional labor is as inadequate. Yusid Toyib, (2015) the number of workers certified construction sector is still small,(http://bisnis.liputan6.-com/read/5-tenaga-kerja-konstruksi).

Based on the projected growth of the industry in 2010 the productivity of IT personnel Indonesia just 25,000/year. This means that in 2015 Indonesia may experience a shortage of around 327 813 people. According to Telkom PDC Raden Center Director Moh. Kusno (2013), explained that the manpower needs of ICT competency areas is very high, moderate employment growth IT Indonesia only 9.2%/year, (http://www.pikiranrakyat.com/pendidikan/kebutuhan-tenaga-ict).

In particular problems in Vocational High School (*Sekolah Menengah Kejuruan - SMK*) is generally associated with limitations; equipment, the low cost of the practices, and the learning environment that does not conform to the world of work. This condition causes the unpreparedness of graduates in entering the world of work. In connection with these problems , the fulfillment of claims curriculum to improve the system in a demand driven principles on which to base the implementation of competency-based learning will also problematic.

Sukamto (2001), stating that the reconstruction of the vision of education into the world of work through a learning approach, which gained a conducive environment, will evolve, if the momentum of decentralization can be utilized carefully to analyze the context of the potential and needs of each region.

SMK managed with reference to the vocational educational purposes, namely, to prepare skilled graduates who are ready to enter the world of work and the industry so that the curriculum should be developed based on the needs of the workforce, (demand driven). Equipment for the practice should be provided with the same criteria or at least close with the world of work. Learning in SMK such that graduates actually ready to enter the world of work, in the sense of having

the knowledge, skills, and attitudes needed in the workplace.

Partnership *SMK* and industry in the organized learning is something that should be obvious. Learning a vocational education can not only organize learning that are school-based learning, but also must work-based learning because prepare graduates for work. Institutions of vocational education providers must also conduct educational programs with teaching and learning based CBT, which is trying to close between educational in schools with the industrial world.

Axioo industrial world, which is an institution of electronic products Indonesia, has a training program for vocational learners and educators throughout Indonesia, called Axioo Class Program (ACP). This program is held on the industrial grade TKJ in some vocational majors with the aim of preparing graduates according to the passing criteria in the industry (industrial competence). But do not set up a learning tool and educators.

According Hamalik O, (2007) learning is a combination that includes elements composed humane, facilities, equipment and procedures that influence each other to achieve the goal of learning itself. The learning process is the most basic activities in the whole process of education, because education success or failure depends on how one's learning process occurs after the end of learning activities.

Many teaching methods based industry that can be implemented by vocational education, such as EL learning as a process whereby knowledge is created through the transformation of experience, produce draft Work Based Learning (WBL) were trying to close between educational at school with the world of work. WBL is a contextual approach in which the workplace (business - industrial) provides a set of workplace-based learning experiences are structured. Riana Mangesa, Dyah D. A. (2015) explained that productive learning in vocational programs are inherently dual - based, learning in school and strengthening businesses and employment.

In the process of learning the learning process is expected to occur immediately (= EL) or a modification of an industry-based learning model, so that dual-based in the context of partnerships with industry, can contribute to improve the quality of learning outcomes and graduate. Learners will go through stages in the learning process immediately, which is expected to be designed on the model EL -based CBT.

Instructional design , including the development of materials and learning activities, testing and assessment of materials, as well as the implementation of an overall process of learning about the needs and learning objectives. Instructional design as a discipline, discuss various studies and theories about development strategy and process learning and implementation.

Sudira Putu (2009), stated that the concept of competency-based learning/CBT focuses on what can be done as the think ability and consistently as an embodiment of knowledge, attitudes and skills possessed. Arends (Trianto, 2009: 41) , direct learning is one instructional approach is specifically designed to support the learning processes related to knowledge of something (declarative) and knowledge (procedural) is structured and activity patterns that gradually, step by step .

Powered Nur (2011) suggested teaching models directly aimed at the achievement of two main objectives, namely, the completion of academic content is structured and acquisition of all types of skills The principle of competency-based learning by Sudira Putu, (2009) the principles of competency-based learning include (1) Focused on learners, (2) Focusing on the acquisition of competencies, (3) learning objectives specific, (4) The emphasis of learning on performance/ performance, (5) Learning more individual, (6) the interaction using multiple methods: active, problem-solving and contextual, (7) Educators function more as a facilitator, (8) oriented to the needs of the individual, (9) Feedback is immediate, (10) using the module, (11) Study field (practice), (12) The assessment criteria using the reference benchmark.

Jubaedah (2010), CBT is learning process of planning, implementation and assessment refers to the mastery of competencies that have been defined as a standard reference for learning achievement standards compliant workforce. Characteristics of learning activities as

follows: (1) The learning activities are the mastery of competencies by learners; (2) The process of learning should have equivalence, competence condition where it will be used; (3) Activities are individual learning, the learners with other learners no dependence; and (4) Must be provided enrichment (enrichment) for students quicker and program fixes (remedial) for slow learners.

The quality of educational outcomes assessed both in terms of input, process and output, which is heavily influenced by the readiness of learning tools and learning approaches used and assessment. So as to achieve the learning objectives, need to be designed according to the needs competencies be achieved, Pardjono (2003).

TKJ field curriculum, vocational generally refers to K13. Therefore, in designing a learning tool EL-based CBT and evaluation tool refers to the curriculum in 2013 and the industrial world. Referring to the characteristics of direct learning the principles and characteristics of CBT, is considered very appropriate to be applied in a modified learning called direct learning(=EL) model based CBT. Model is serving as guidance to educators in planning and carrying out teaching and learning activities.

II. METHOD

This study employed the research and development methods, which refers to the stages Borg and Gall (1983). This research seeks to produce a model Learning Direct (= EL) in the CBT, on the course for class X TKJ SMK Somba Opu. Appropriate stages of research R & D, do the needs analysis phase to identify and analyze to determine the competency profile, within the framework of the contents of the analysis results, curriculum and materials. Then design (design) prototype (learning tools, evaluation and research instruments) Judgement validated by experts of TKJ, lecturer and teacher.

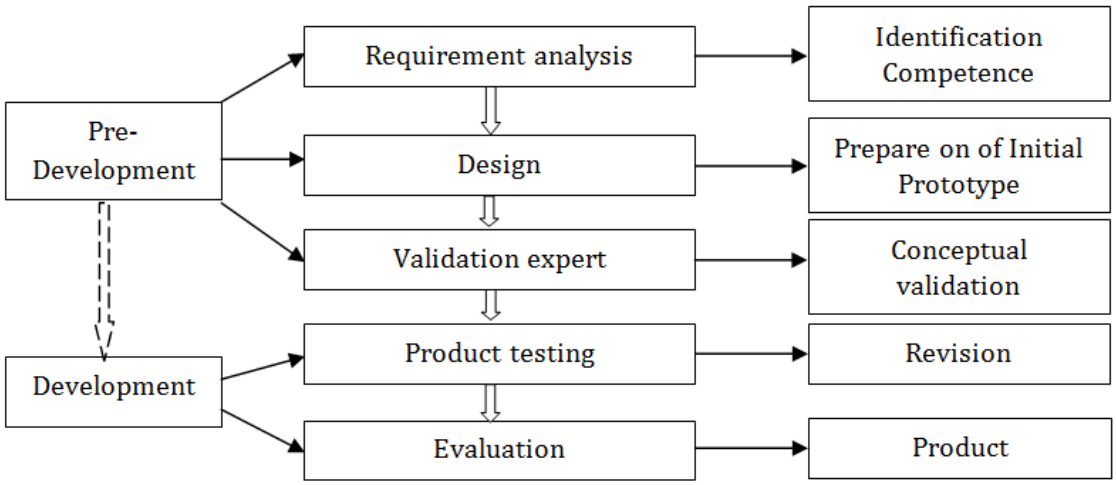

Figure 1 Stages of Research and Development

Chart stages of research in Figure 1, is divided into two main activities, including activities in the pre-development in the first year, include: (1) the requirement analysis phase, (2) the design of development phase and (3) the validation expert, then revised. After revision in draft, prototype is a model. The next activity at this stage of development, are: (4) the testing phase of the product; and (5) evaluation stage several schools.

Analysis of data is using qualitative descriptive analysis techniques. Grading scale using Likert scale with a scale of 1-4 refers Azwar Saifuddin, (2010) were modified.

Table 1 Categories Validity

No	Category	Values
1.	Valid	$3{,}6 \leq M \leq 4{,}0$
2.	Fairly Valid	$2{,}6 \leq M < 3{,}5$
3.	Less Valid	$1{,}6 \leq M < 2{,}5$
4.	Invalid	$0{,}0 \leq M < 1{,}5$

Description: M = mean score

III. RESULT AND DISCUSSION

Competency needs analysis conducted by collecting data documentation K13 curriculum competencies computer engineering expertise and networks. Furthermore, identifying the competencies required by the world of work through a joint workshop. The results of the analysis of the needs formulated draft Competency Profile Skills Package Computer Engineering and Networks.

Table 1 Basic Competency Profile TKJ

No	Basic Competence (Competency Indicators)		
	Cognitive	Affective	Psychomotor
1.	Understanding the values of faith according their religion	Understanding the network operating system security.	Presenting the results of the audit server network
2.	Describing the greatness of God	Understanding the resource administration of computer networks.	Configuring the operating system integration with a network (internet)
3.	Practice the values of faith according to the teachings of his religion	Understand the results of the administration of network resources.	Configure network security systems and testing network security system
4.	Appreciating the work of individuals and groups	Understand communications (IP), tools (tools), and a digital system (how many ports).	Installing software for network monitoring
5.	Demonstrate scientific behavior in everyday activities.	Understanding how to configure integration with the network operating system.	Presenting the results of using the network monitoring software
6.	Getting used to live mutual respect, and ensuring orderly working environment.	Presenting the results of the configuration of the operating system integration with a network (internet)	Presenting the results of the configuration of traffic and bandwidth management on network
7.	Understanding the importance of cohesion in the work	Understanding IP management , each devices must has an identified IP	Enabling Integration with the network operating system (Internet)
8.	Understanding the types of security the network operating system	Understanding how traffic management and bandwidth on the network	Presenting the results of using the network monitoring software

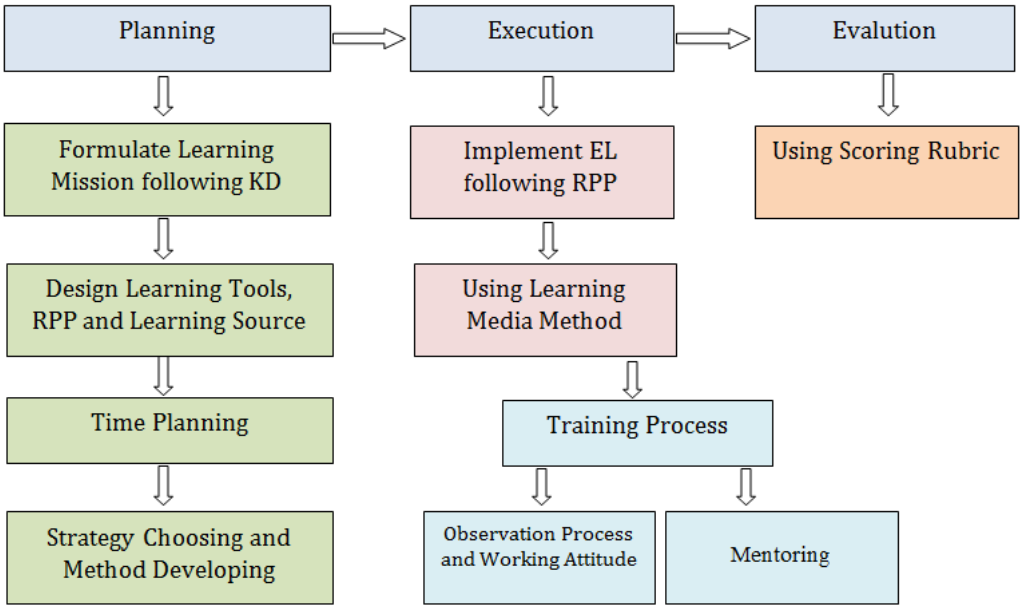

Figure 2 Draft Learning Model

The formulation of the competence profile is becoming the starting material design of the draft model of learning and research instruments as follow Figure 2. The research instrument that has been validated, analyzed by statistical tests Coefficient Cohen's Kappa, (Nitko AJ & Brokhart S.M., 2007: 80). Instrument to be reliable if coefficient (r) ≥ 0.70. So the instrument used as feasible, are tabulated in Table 3.

Table 3 Results Validation Instrument and Device Model

Instruments	Rerata Skor (M)	Koefisien Kappa ®	Valid (3,6 ≤ *M* ≤ 4,0)
1.Assessment RPP	3,77	0,874	Valid
2. Scoring Rubric	3,91	0,873	Valid
3.Respon student	3,74	0,738.	Valid
4.Respon Teachers	3,80	0,749	Valid
5. Teachers activities	3,69	0,738	Valid

This research is R & D, referred to Borg and Gall development model, which results in EL CBT learning model in the field of TKJ SMK Negeri 1 Somba Opu. The results showed that a decent used models CBT is considered effective to improve the competence of learners, through the stages of learning directly.

In the opinion of Nur (2011) model of direct teaching is an effective way to teach skills, aimed at the achievement of two main objectives, namely, the completion of academic content is structured and acquisition of all types of skills. CBT learning model development is processing on learning EL. In detail, the research is done in several stages. Stage design is validated by expert of subjects/areas of expertise are same. All the instruments have been validated. Validity is the degree that shows where a test measures what it intends to measure, Sukardi (2011).

Based on the validation results, the draft was revised in accordance with the advice of the expert. Suggestions are used to revise some basic competencies and repair instruments scoring. Based on Azwar Saifuddin (2014), validity refers to the extent to which the accuracy of a test or scale the measurement functions.

Some of the material found on the competence of the workshop to the world of work, has been formulated as a competence profile TKJ. According to Tri Budi Siswanto, (2010) partnerships with a vocational education institution in the world of work is one way learning institutions in the reconfiguration of its resources while utilizing a variety of competencies possessed by others.

IV. CONCLUSION

Competence shared identification method TKJ field practitioners and Telkom through the workshop is effectively used to analyze TKJ competencies required by the labor market, referring to the K13 curriculum. To design models and tools are needed learning competency profile. Model and learning devices suggests the importance of revamping the CBT learning competency-based workforce. EL models are empirically-based CBT has the advantage to improve the morale of participants and educators because there is an active mentoring, to help create a conducive learning atmosphere for learning that is individual, there is openness from various directions, encourage and develop creative thinking for participatory to find something .

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