Development Of Learning Competency Based Electricity In The Vocational High School

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Abstract

The purpose of this study are: to produce a competency-based learning software engineering of electrical power installations that meet the category used in a valid and effective learning in the Vocational School. This study uses the development of research methods. Conceptually and procedures, research and development carried out referring to the model of Plomp (1997) and SC ID models (2008) are summarized into four stages, namely: the initial assessment, design, realization and testing. Pre-development stage of the analysis begins with the competence of the workforce needs of electricity, competency and learning needs of schools. Identification of the work through the technical competence DACUM (Developing A Curriculum) by the experts of the specific electrical work. FGD is then performed with the involvement of educational practitioners to formulate competency profile, as something to be made SKKD development in instructional design and learning components of the device. The resulting product is validated by experts and teachers. The first assessment done through test validation by matter experts, expert research and evaluation, vocational technology education experts. Further assessment by teachers in the implementation of two trials conducted in 5 SMK, SMK 3 in Makassar and SMKN 1 Pallangga, Vocational Technology in Gowa. Learning the instrument validity test, performed by computational program package Microsoft Excel and statistical package SPSS for Windows 15.0.

The results are: (1) the electrical field of competency-based learning is embodied in the implementation manual pembelaran and learning modules, (2) devices that meet the criteria for effective learning and practical competency-based learning is used in the electrical field in the CMS, because the process active learning, learning objectives achieved so that individual students get an average value exceeds the value of working capital.

Keywords: Development of learning, competence field of electricity

1. Introduction

Realization of improving the quality of vocational education continues coveted by communities, especially communities directly involved in the working world. It is expected that learners do have vocational education qualifications as a workers who have specific skills relevant to their expertise, have adaptability, and can adapt to technologi developments. One-a-year national education development strategy 2005-2009, which set out the policy of the government, regarding the development of secondary vocational school (SMK) for the fulfillment of middle-level manpower, the comparison of the proportion of vocational plans: high school with a composition of 70: 30 a good number of schools and number of learners.

In accordance with the purpose of vocational above, the “PKL” who performed the students in the world of work, making the students have work experience, then it is assumed that the vocational school graduates will gain experience in the world of work.Kemdiknas follow-up plan, (2008) is the ratio of students to vocational, the proportion of vocational composition: secondary school level in 2004 to 67: 33 in 2014. This policy is intended to be more output-oriented education in the workforce and meet the needs of business and industry.Incompatibility should be recognized that the issue has become a major issue in the debate between education and the workforce, both at national and regional levels. Considered to be prospective vocational school anymore, because although the world of work-oriented but not necessarily be guaranteed upon graduation, immediately getting a job, (http://depnakertrans-depdiknas-kembangkankurikulum berbasis-kompetensi, diakses 10/12/2009).

Muhaimin, (2009) states that employment opportunities are available but can not be filled by graduates of educational and job seekers. This is due to the lack of job competence and expertise needed labor market. This problem is supported by several findings, the results of the study Samsudi (2008), that ideally the national vocational graduates who can immediately enter the workforce of about 80-85%, but the fact that the new merged 61%. In 2006 graduated from vocational school in Indonesia reached 628 285 people, while the projection of manpower...
Behavioristic learning theory is the theory of another learning theory that can complement a functioning member of society is complex. Learning is the mechanism by which one becomes adapted to its environment through classical and operant conditioning of learning by Gagne, (1972), is that learning is not a single process, but rather a series of stages that occur in a particular sequence. Importantly, conditioning effects in the learning process are dependent on the situational context and the characteristics of the learner. The phenomenon of learning is an indicator of what happens in the brains of students, and the success of learning is determined by the affective state of students. Several ways that can be taken to achieve an innovative and contextual learning, such as by improving the curriculum, improvement of learning resources and so forth. But sometimes there are factors both in terms of school management, as well as in learning systems, learning in the classroom.

It is therefore necessary learning tools that can be used as guidelines for teaching and learning resources. Module that can serve as teaching material. According to Dirjen PMPTK (2008) that the module is instructional materials designed to be studied independently by study participants. Module the media for self-study because it has been equipped for self-study guide. That is, the reader can do without the presence of teaching and learning activities directly. Module is a tool or a means of learning containing materials, methods, limitations, and how to evaluate systematically designed and attractive to achieve the expected competencies in accordance with the level of complexity. A module can be said to be good and interesting if has the following characteristics: (1) self instructional, ie through one module or the learners are individual learning, do not depend on the other hand, (2) self-contained, ie, all learning kit from one unit competencies or sub competencies learned in one single module as a whole, (3) stand alone , ie, a module that was developed is not dependent on other learning kit or should not be used in conjunction with other learning (Dirjen PMPTK, 2008).
Learning approach will use the Contextual Teaching and Learning (CTL), with delivery starting in the classroom techniques, according to Nurhadi, (2004: 65), CTL learning is a process of education that aims to help students see meaning in the lesson material in a way to connect with the context of their lives daily. Santrock, (2008:8) contextual learning is rooted in Dewey progressivism theory and research findings that show that students will learn best when what is learned associated with they know and when they are actively learning itself.

Based on the description on the background of the problem, some problems can be identified, namely: (1) the emergence of areas of expertise incompatibility issue affects the quality of vocational workforce that reflects the quality of Indonesia, as a result the number of certified workers are still lacking electricity, (2) vocational curriculum for the eyes lesson is simple to install electrical installations of buildings have been revised through the KTSP, but regarded by the world of work is still lacking electricity, (3) the plan RPP, an indicator of competence and basic competences required the workforce, have not been met, (4) much-needed development of appropriate learning tools with competency-based learning field of electricity, (5) teachers need is a means of learning modules containing instructional materials in electrical competency-based learning.

The review in this study is limited in vocational technology group electrification program, the field of power engineering installations, an interesting problem to be developed according to this research topic, namely: development of curriculum (KTSP) based on competency-based learning SKKD in the field of electricity. The purpose of this study is to find a learning device (learning modules) on the Electricity Sector KTSP models and used appropriate vocational learners in the field of electrical installation expertise.

2. Research Methods

Learning devices developed in this study belong to the type of research & development (Research & Developmental). Richey and Nelson, (1996: 122) states that through the research process-oriented product development, the most important thing is the process of development is described as precisely as possible and the final product were evaluated. Development patterns that are used refer to the model Plomp, (1997: 5). Plomp consists of five distinct phases in the process of resolving the problem, as described into the following five stages: (1) the initial investigation stage, (2) Design, (3) Phase realization / construction, (4) testing, evaluation and revision; (5) Implementation. Description of the activities in each phase as follows: (1) Preliminary Phase Investigation, the most important thing in this stage is to identify and plan activities to define the problem, (2) Design Phase, the planning is done at this stage that aims to design problem solving, involves a systematic process to divide the large problem into problems of small problems, (3) Realization Phase / Construction, built a prototype at this stage, the main design is based on a preliminary draft document, (4) Phase test, Evaluation, and Revision, at this stage the most important thing is to consider the quality of the design components learning will be developed, (5) Implementation phase, at this stage, activities to implement the designs that have been evaluated and revised. This activity relates to the pilot phase to validate the developed device. The five steps are presented in schematic form in Figure 1:

![Figure 1. The general model of educational problem solving (Plomp, 1997)](image)

3. Discussion

As was explained above that the development activities consist of two main activities, namely: (1) the research or pre-development and (2) development activities, the results of research studies according to the procedure outlined as follows:

3.1 Pre-Development Activities

Initial assessment phase of the information gathering stage is mainly concerned with the electrical engineering curriculum competencies and gathering information from the world of electrical work. Through these stages are found job competence in the electrical engineering. With the
identification of competencies through workshops involving expert worker of Electrical and Mechanical Association of Indonesia (AKLI) found Makassar, competency profiles installing electrical installation simple building, which belongs to a class of low voltage, power 450 VA up to 197 kVA, which can be seen in Table 1.

Table 1. Competency profiles
Simple Installation Installing Electrical Building

<table>
<thead>
<tr>
<th>No</th>
<th>Basic Competencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Application of Occupational Health and Safety (K3)</td>
</tr>
<tr>
<td>2</td>
<td>Electrical of single phase installation</td>
</tr>
<tr>
<td>3</td>
<td>Single-phase circuit breaker panel</td>
</tr>
<tr>
<td>4</td>
<td>Installation Grounding</td>
</tr>
</tbody>
</table>

Workshop Januari 2011

Competency profiles are then analyzed according to indicators of achievement of competencies which is used as the source of information for the preparation of Questionnaire Identification of Learning Needs in the School. Questionnaire was distributed to schools, which responded by learners and teachers. The results of the questionnaire responses of the identification of learning needs in schools, then studied by analyzing, classifying appropriate verb to each competency elemem instructional objectives into three domains of learning, namely cognitive, affective and psychomotor, according to Blooms taxonomy of learning objectives (1989), and tabulated in Table matrix Competency Profile. The next stage is to conduct focus group discussions (FGD) conducted with education practitioners. The results of a source of information for designing a learning device. So that the results of initial development phase is the prototype of the electrical engineering, in the form guide the implementation of learning, evaluation tools and learning modules.

The next stage of realization, at the conceptual stage of validation is performed on the initial prototype. In order to validate conceptual models, the first step was to show the validator, which developed the initial prototype. Composed of five experts (expert judgment) and education practitioners.

Validator was then asked to give his assessment by filling in the instrument that has been given to him. Requesting consideration as a matter experts and education practitioners, about the feasibility of the instruments that had been developed, including the design criteria of success (Rubric), the design of learning tools and assessment instruments.

Validator assessment results in the form of the assessment form were analyzed using descriptive statistics and computational data analysis performed with the aid of program package Microsoft Excel and SPSS statistical package for Windows. To measure the level of inter-rater agreement (inter-rater reliability) of the validation results of the research instruments, statistical analyzes used Cohen's Kappa Coeffisien, (Nitko & Brokhart, 2007: 80). The instrument is said reliable if the coefficient realiabilitysnya $(r) \geq 0.70$.

3.2 Development activities

Activities of product testing is done two times intended to collect data on product quality, which is a series of verification activities and revisions to the school to find effective and practical products. Test activities carried out twice, which consist of small groups and test expanded. Small group of test is a test that applies to a small group (one class) samples on the actual situation.

Through test involving a small group of twenty-eight (28) of the students and two teachers in the study, as subjects try, test activities performed four times with the use of four learning modules. Assessment criteria used are the assessment scores ranging from one to score four score, and then categorizes the corresponding score value. According Suharsimi Arikunto, (2004: 32) by using the assessment scores, and then categorizes scores into categories of assessment, will avoid the entry of any element of subjectivity in the self-appraisal, because it follows the assessment criteria, point by point is fundamental to a personal decision. After implementation of the testing is complete, the evaluation conducted through focus group testing results, along with experts and practitioners pendidikan. Saran-advice that appears in the FGD then be reviewed and analyzed, a repair material that is ready to be tested on a model test of the expanded groups on three different schools as a subject.

The final product of this development a learning device. A competency-based learning products electrical fields, which produce the development of learning tools that meet the category of effective and practical for use in learning. The realization that the implementation guidance and learning tools in the form of learning implementation plan (RPP) and rubric assessments, learning modules and assessment instruments.
4. Conclusion

Based on the development and review of the final product which has been described in the previous section, then the conclusion is the finding in this study as follows: Research, development, is a procedure in developing learning tools in the field of electricity. Through the procedure of identification of learning needs and competency, competency matrix is found, then used in the validation of FGD material to formulate standards of competence profiles and competence base (SKKD) is needed in putting up the building electrical installation is simple. The resulting learning devices are: (a) learning guide, containing, among others, background, structure and components, guidelines for implementation of learning, competency standard profile set up a simple building electrical installations, supporting the theory, assessment guidelines, (b) the learning device, namely ; lesson plans, learning modules, (c) the evaluation of the scoring rubric and competency assessment tools. To determine the quality of the learning models have been developed, initial procedure performed on the conceptual validity of the test. To measure the level of inter-rater agreement (inter-rater reliability) of the validation, the validation results were analyzed using SPSS statistical program: Coeffisien Cohen's Kappa, which is said to be reliable on the coefficient (r) ≥ 0.70. The results of validation shows the results valid and reliable, so that all the feasible and can be used for the development of data capture. Based on the evaluation of data on the test results both in test I (small groups) and in test II (extended test), it was found that the learning tools are developed, effective and practical criteria are used in learning for students implementasi vocational fields of electrical installation expertise.

REFERENCES


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