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8 The Indicators of Instructional Design for E- learning in Indonesian Vocational High Schools

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Abstract

1 Teaching a subject in Vocational High School (VHS) needs specific strategy, which is part of instructional design. Recently the VHSs use computer base in instructional to deliver theory and practice subject. The computer will help teachers to make media as a part of instruction and using a system of instruction, which is usually called as e learning in instruction. Teachers need skill for operating and planning e learning as an instructional media. To make easier to deliver some subjects, the instructional design for e learning should be well prepared by teacher. This means that the teacher is required to know the model of instructional design, which is suitable for e learning for VHS and what are the indicators that are needed in implementing instructional design for e learning.

Study exploration and references collection were used to find the model of instructional design for e learning. Focus group discussion (FGD) 1 was used to define the good model for instructional design in e learning including to find the indicators, which cover the model. In this case 5 experts from 5 universities and 5 experts from the profession of information and communication technologies (ICTs) were involved. Further, the respondents that consist of 20 teachers and 165 students were used to define the good indicators in each asp 1.

The study finds the draft model of instructional design for e learning in VHS. The model has four aspects, including: 1) needs analysis, 2) selection and order of competence, 3) instructional development and 4) learning evaluation. The four aspects have five indicators in each.

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Keywords: Indicators; Instructional Design; e learning for VHS (Vocational High School)

1. Introduction

6 Vocational education in Indonesia is an education that promotes mastery of skills in certain skills that graduates are prepared to work in jobs. The closeness between the learning materials being taught with the knowledge needed in the workplace is something that must be realized in the timeframe in vocational education. Number of vocational

high school (VHS) in Indonesia reached 11738 with details 3037 publics and 8701 private (<http://datapokok.ditpsmk.net/>). The condition number of VHS students rose 200.000 every year and this time amounted to 4.3 million, while the target in 2019 to reach 5.5 million students (<http://acdindonesia.wordpress.com/2014/08/25/lulusan-smk-ready-bersaing/>).

When you look at the extent and geographical condition of Indonesia, then in terms of the implementation of education, especially VHS need to design appropriate learning standards VHS graduates can be achieved. On the other hand the rapid development of technology in the workplace must be accommodated by preparing teaching materials appropriate for the right target, and determine the learning strategy that allows students to obtain a complete learning experience.

Submission of conventional learning that relies on the transfer of knowledge in the classroom and teacher-centered learning already is not possible where the learning outcomes wants to appropriate use of technology in the world of work. Speed and ease as well as present information as teaching materials can be obtained easily if the learning using computer-aided media. Computer-aided multi-media rich changes obtained only by using internet service. Through learning program that is loaded on the e-learning package is very possible that the interaction of information very quickly as required. In addition, learning materials in e-learning have easily repeated nature, searched and stored so that the high and low groups of students can be accommodated his needs.

Based on the results of preliminary observations on the use of the Internet for learning in several VHS, general internet network conditions for learning is still lacking, especially in the use of e-learning. Almost all users of e-learning in VHS have not been equipped with instructional design. E-learning instructional design appropriate to the vocational teaching materials will facilitate the management of e-learning itself so that the role of the teacher as a facilitator can be more focused to develop innovative learning according to the learning goals. Another problem associated with the use of e-learning is the ownership of the web, web updates, the amount of bandwidth, and student interest in the use of computers for learning is still less attention. Though this condition is an important thing that must be optimized both performance and presence that e-learning can take place properly and easily. To improve and facilitate the use of the Internet for learning, instructional design requires a model of e-learning that can be used for various subjects in vocational subjects. Through research on instructional design models in e learning VHS will produce guidelines on how to plan instructional by utilizing e-learning. Making setting up guidelines that facilitate teacher to prepare instructional design e-learning require the determination of the criteria and their indicators. The criteria and indicators will be used as guidelines for the implementation of e learning in VHS.

2. Use of Information in Technology

Various aspects of information services are highly dependent on the utilization of information technology (IT). Support these technologies affect the rapid development of Information Technology (IT), especially the Internet for learning in education. In education, the use of IT is realized in a system called Electronic Learning (E-learning). Development of E-Learning aims to support education, so schools can provide better information to citizens during the school directly concerned inside and outside the school through the Internet. Other educational services that can be implemented by means of the internet are to provide online course materials and course materials can be accessed by anyone who is in need.

Information and Communication Technology has a broad sense covering all matters relating to the communication of information, the use as a tool, manipulation and processing of information (Kementerian Negara Riset dan Teknologi, 2006). In addition, the presence of information and communication systems is one component that cannot be separated from the activity in the world of education. Some of the components required running the operations of education, among others; students, facilities and infrastructure, organizational structures, processes, educators, and operating costs. Product information from a communication system and information is used to determine the constraints and success of an activity, which is in line with (Kementerian Negara Riset dan Teknologi, 2006). Communication and information systems consist of components supporting educational institutions to provide the information needed by decision-makers when educational activities. In addition, the utilization of the Internet in the field of education, especially for learning cannot be separated from some of the constraints that are difficult to avoid and become a consideration in its development. Some of these constraints are;

- The process of education requires a long time. A person is required to participate in education from elementary school through college.
- In education it applies the principle of irreversibly.
- The challenges we face in the future tend to develop increasingly complex, characterized by the rapid development of science and technology as a result of globalization increasingly open.

The term of information technology in education has known as educational information. Reference (Richard Andrews and Caroline Haythornthwaite, 2007) state that education is the application of information technology that is used for the communication of digital information in learning and education. The facts demonstrate that the utilization of information technology in education cannot be separated from the development of digital technology. Speed the development of digital technology should be followed by the user mastery in this case educators to understand and use various systems and software created to facilitate interaction in learning and instruction. In the other hand, using IT-based process-oriented modern work organization are moving competences and responsibilities directly to the production and service levels (BMBF, 2013). That condition needs reshaping qualification requirements of personal that has skill in the capability of using digital media.

3. Criteria Model of Design Instructional in E-Learning

Applying e learning as a learning model requires an understanding of selecting and determining the appropriate instructional design. To be in accordance with the choice and determination of learning objectives, we need a criterion. Criteria are the boundaries of an activity or system that can serve as guidelines and allow users to determine the extent to which the activity has been achieved. E-learning instructional design criteria cannot be separated from the development model of instructional that is commonly used.

3.1. Model development Dick and Carey in instructional design

Development of learning according to Dick and Carey is a systematic approach in designing, producing, evaluating, and using a complete learning system, including all the appropriate components and a management scheme for use to all this (AECT, 1977). Dick and Carey as the following diagram describe the development model of learning with instructional design approach for the system in education.

Dick and Carey Design Model

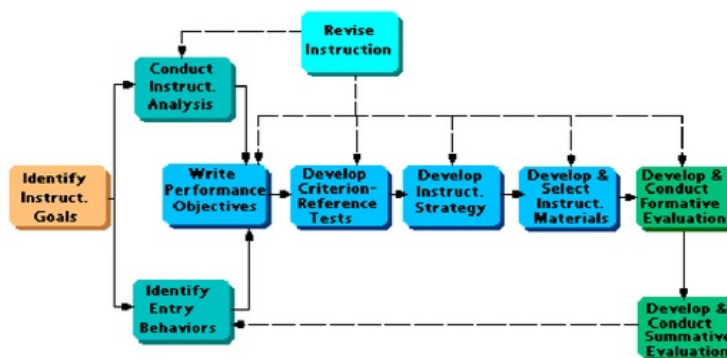


Fig. 1. The model of the instructional development design according to Dick and Carrey.

From the model of Dick and Carey's instructional development, can be taken several information used to develop criteria for instructional design models of e-learning VHS. Some aspects are taken into consideration is to identify

entry behavior, conduct instructional analysis and write performance objective, develop instructional strategy, develop and select instructional material, develop formative and summative evaluation.

3.2. Model development of Leshin, Pollock, and Reigeluth

Development of learning design in accordance with the vocational education in general practice leads to learning, while learning to be able to use instructional design theories used in the public schools. The approach was attempted based on the latest information on observations and interviews with experts in the field of vocational education and instructional media, industry experts in the fields of expertise of both manufacturing and services. According to (Leshin, Cynthia BJ Pollock, CM Reigeluth, 1992) there are seven activities in the instructional design of the system. Of the seven sub-activity, can be further grouped into four activities, namely; needs analysis, selection and sequence of the lesson content, lesson development, and instructional evaluation. Each activity will discuss the sub-activities implemented in stages in accordance with Figure 3.

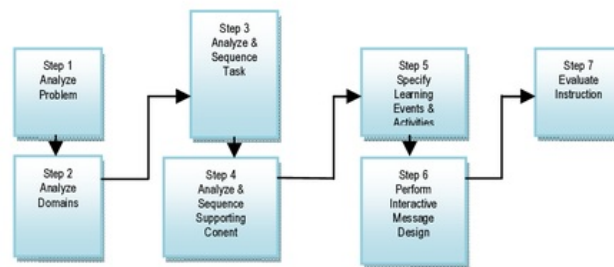


Fig.2. The model is based on the concept of learning design by Leshin, Pollock, Reigeluth

3.3. Model design development of multimedia products

Models of interactive multimedia product development include the development of a model includes process design, production, evaluation, and implementation and maintenance (Philips, Rob, 1997).

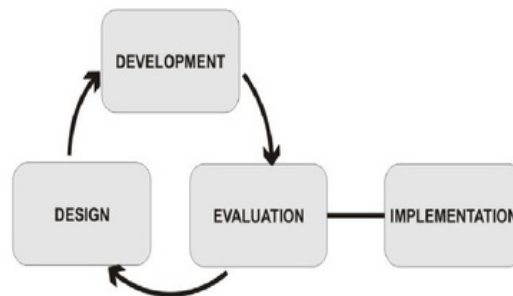


Fig.3. Models development of a multimedia product design, Rob Phillips

3.4. Model Development proposed by W. Lee and Owens

Other multimedia product development model proposed by (Lee, W.W. & Owen, D.L, 2004) includes five stages: analysis, design, development, implementation, and evaluation.

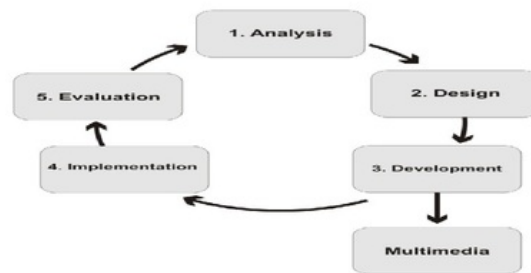


Fig.4. Model development of multimedia products according W.Lee& Owens

3.5. Model design and development instructional Trollip and Alesi

This study design has three aspects, standards, ongoing evaluation, and project management. The contents of these three aspects are namely sub-aspects of planning, design, and development (Alessi, Stephen M. & Trollip, Stanley R, 2001). Indicators including all three sub-aspects, among others; identification of student characteristics, determine the obstacles that may occur, the cost of implementation, product documents learning, competence after learning, the development of product ideas, preparation of models or products, testing, revision, dissemination.

3.6. Model development instructional design e-learning in VHS

Based on the study of various models of the instructional design as well as consideration;

- The nature of the subject in more vocational skills taught in the workshop and laboratory practice
- Technological developments in the IT industry that utilizes
- Availability of teaching materials on the Internet
- Utilization of simulation shows various job skills in the monitor computer

It can define that appropriate instructional design model to develop instructional with e-learning in VHS is a combination of design model Trollip and Leslin J Polock. Forms development of instructional design can be seen in Figure 5.

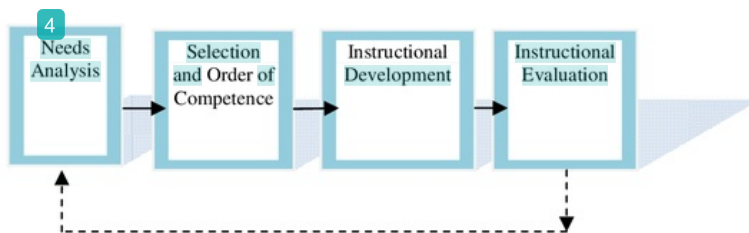


Fig.5. Criteria Model Developed - Combination of design model Trollip and Leslin

Data and result research as an information e-learning in VHS could be found through research include studies Research & Development (R & D) carried out to assess and develop e-learning models in VHS. Focus Group Discussion (FGD) held to discuss the draft of instructional design and revise the draft. Data collection methods of this study are the discussion interviews, questionnaire filling, and answering the instrument. The FGD participants are 5 experts' instructional media from universities, and 5 experts information and communication technology from

practitioners. During the discussion, the experts were given the draft of instructional design and instruments, then asked to discuss, while the researcher becomes the moderator. The participants in this forum (FGD) including graduate students from Vocational Technology Education concentration study on ICT will define indicators in each sub-aspect. Resulting indicators are closer to the needs of each key aspect in the design model of instructional e learning in VHS. Sum of indicators in each sub aspect is belong to key aspect has more than five indicators. There are 20 teachers and 165 students VHS that involved to determine the priority order of five indicators in each sub-aspect.

4. Research Result

Plan a variety of learning requires consideration of both internal and external review. Planning requires a concept that can be followed and implemented according to its purpose. The concept is to be developed as a reference refers to one of the models of learning design approach for the vocational education. One of the approaches to learning in vocational suitability in particular about the use of e learning is the concept of Leshin, Pollock, and Reigeluth.

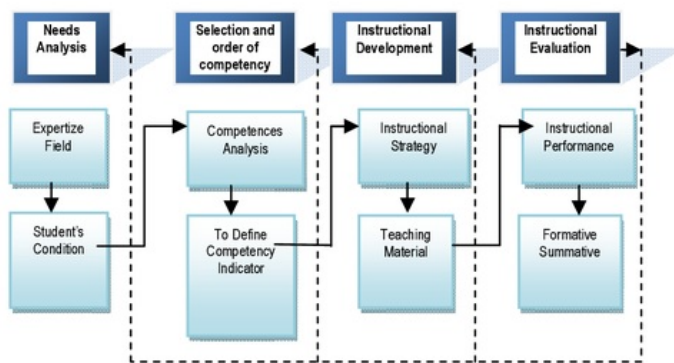


Fig.6. Model development for the instructional design of e-learning in VHS

Based on the four key aspects of instructional design models developed in e-learning, can be determined sub-aspects needed to meet the criteria of the fourth key aspect, so it looks completeness. Complete instructional design criteria require indicators that can facilitate implementation in the field or used. Below the result of determining indicators in each key aspect refer to the Figure 6.

Table 1. Key Aspects of Needs Analysis

No	Expertise Field Indicator	No	Students Condition Indicator
1.	The need comes from industrial field	1.	Students Background (Economy, Social, Culture)
2.	The development of ICT	2.	Infrastructure ICT availability at home
3.	Curriculum	3.	Ease of internet access
4.	School facilities	4.	Basic skills using ICT
5.	Prospects of ICT learning	5.	Interest in learning using ICT

Table 2. Key Aspects of Selection and Order of Competence

No	Competency Analysis Indicator	No	Determining Competence Indicator
1	Competence skill	1	Be able to identify a problem or symptom
2	Standard competency	2	Can define a process
3	Base Competence	3	Knowledge of the content of competence
4	Standard national graduation	4	Be able to use equipment
5	Learning Objective	5	Conformance with indicators of competence

Table 3. Key Aspects of Instructional Development

No	Indicators of Instructional Strategies	No	Indicators of Instructional Materials
1	Adequate infrastructure	1	The material is easily accessible
2	Access to intranet / internet in the learning environment	2	The material is easily updated / up to date
3	Learning model in accordance with the characteristics of students	3	Relevant to the learning objectives
4	Applying interactive learning	4	Available material from the internet are downloaded each time
5	The design of the interaction between students, teachers, and learning materials	5	Available in the hand book and a glossary of e-learning

Table 4. Key Aspects of Instructional Evaluation

No	Instructional Performance Indicators	No	Indicators of Formative Summative
1	The use of time according to plan learning programs	1	Midterms meet to MCC
2	Develop competence in accordance with the demands of the industrial world	2	Remedial those who have to meet the standards of MCC
3	Deliver materials in accordance with the time in the Planning Learning Program (PLP)	3	Implement final exams to assess the ability of learners in general
4	Doing discipline in all areas of competency skills	4	MCC refers to the achievement of competence
5	Responsibility in the learning process	5	Task structured and unstructured task independently of each BC

5. Discussion

In the key aspect of Needs Analysis shows that the sub-aspect Expertise Field requires school facilities. Through good school facilities and complete produce good learning relevant to their expertise. Facilities must be in accordance with the scope of his areas of expertise, including the availability of e-learning support facilities operational. An indicator of ICT development is secondary to the facility. E-learning may not work properly if the ICT developments relating to the use of computers and the internet network is not supported or not available ¹¹

The need for expertise related to the needs of learners are two different interests but form the basis of teaching and learning activities, the interest in learning ICT is a major requirement. Interest according to the theory of learning is one of the intrinsic variables necessary for the success of learners. No matter how good instructional design suggestions availability even if the infrastructure is complete lack of interest the students are not even interested in the teaching and learning process will not succeed.

The main aspects of the Selection and Order of Competence indicators show that the primary purpose of learning is the basis for analyzing the competence areas of expertise to use e-learning as an instructional media. Through clear objectives and measurable learning will allow students to know and master the skills taught competency areas. When linked with competence indicator, the indicator of be able to use the equipment is the most important indicator. Competence in vocational education mostly always associated with the realm of physical skills. Physical skills related to the use of the equipment. How to use the equipment properly is a key measure in evaluating performance, it does show that the learning objectives should be spelled out in the performance assessment.

Interests, access intranet / internet as the main thing that is needed in the main aspects of the instructional development is closely associated with the use of e-learning in instructional. Ease of access will facilitate the planning of instructional strategies that suit learners' conditions and competencies required to master. The primary key of e-learning is learning with intranet / internet is sufficient good quality and network capacity. Any sophisticated software and hardware available will not work for e-learning instructional if they are not available over the internet.

Instructional materials as a supplement to e-learning must be selected that can improve the interactive activities of educators and learners. Instructional materials that are information without involving activity learners will be boring and less attractive. Interactivity teaching materials and easy to update in accordance with the level of technological development will be easily absorbed by learners. Rapid changes in the virtual world of information will also be absorbed by the fast learners when given instructional materials give learners opportunities to respond and direct activity. Indicators are reflected in this key aspect is the interactive learning that is supported by the ease of learners to access the internet without any limitation of space and time.

Instructional performance evaluation aims to keep learning e learning design direction in accordance with the purpose of learning. All activities are planned in the learning design must be accounted for and executed with discipline. Moreover, in this evaluation the information needed school linkages with industry / services. As for the evaluation formative / summative main indicator of the most overlooked is carrying out remedial actions for students who do not meet the standards of MCC.

6. Conclusion

- Design appropriate instructional with vocational e-learning is a model of instructional design that has four main aspects, namely aspects of needs analysis, selection and order of competence, learning development, and evaluation of learning.
- Indicators related to sub instructional design aspects are determined by the order in the interests of the results of exploration, observation, focus group discussion and testing to determine the indicators that are most needed.
- The indicators have been identified as the basis for developing design guidelines vocational instructional in e-learning that will be implemented in the second year of this research series.

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