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THE DEVELOPMENT OF LESSON PLAN TO APPLY DIRECT INSTRUCTION MODEL AND MULTISIM SOFTWARE TO IMPROVE SCIENCE PROCESS SKILL OF VOCATIONAL SCHOOL STUDENTS

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Abstract

The aim of this research is to describe the validity of high-quality lesson plan to apply the direct instruction model equipped with Multisim software to improve the science process skill of Vocational School student. This research is development research where in the research design the development of lesson plan adapted from 4D models (four D models). Further, in order to get the validity of developed lesson plan, it needs to perform the validation by the experts. This research shows that validation results of the developed lesson plan are obtained final average scores as follows: score 3.75 categorized highly valid and percentage of agreement in the assessment that given by three validators is 96.82% for Syllabus. Score 3.72 categorized highly valid and percentage of agreement in the assessment given by three validators is 95.15% for the scenario of Lesson Plan. Score 3.79 categorized highly valid and percentage of agreement in the assessment that given by three validators is 95.33% for Work Sheet. Score 3.47 categorized valid and percentage of agreement in the assessment that given by three validators is 87.34% for Assessment Sheet, and score 3.67 categorized highly valid and percentage of agreement in the assessment that given by three validators is 94.26% for Text Book.

Keywords: *Learning lesson plan, Direct instruction model, and 4D Development model*

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INTRODUCTION

In order to improve education quality in Indonesia, it is need to be realized the life that smart, harmonious, open minded, democratic and construct awareness to compete among the student. Quality of education is determined by Curriculum and its implementation in the field. Therefore, teacher's role is very important and strategic in educates and implements curriculum as guidance to conduct their obligation as a teacher. Furthermore, to create national education graduates who have superiority in competitiveness and cooperativeness corresponding to the criteria and standard quality of national even international, then it is necessary to develop learning process with competence-base approach. It is need to be conducted in order to national education system can respond proactively within many progresses of information, science, art and technology (IPTEK).

Standard competence of Vocational School graduate according to Regulation of Minister of Education and Culture No. 20 Year 2016 commands Vocational School graduate to have competence in dimensions of attitude, knowledge, and skill. According to Salleh et al (2015), all academics and practitioner agree that competence plays important role for graduate when they are entering the workplace. Student who prepared to enter workplace have to match with the demand of workplace and have special skill. They are not trained with competences that needed in work place only, but they also trained with other competences as support like competences of logical thinking, critical, creative, and innovative which are the components of high order thinking skill. Beside those, skill of analysis and solve the problem are also the components of high order thinking skill. Furthermore, within vocational education, all the teachers expected to perform learning process that emphasized on the implementation of science approach or well known as science process skill. Process skill in the vocational instruction mentioned before, including: (1) basic science process skill. e.g. the activities of observing, measuring, interpreting, classifying, predicting, and communicate; (2) integrated science process skill. e.g. formulate hypothesis, determine variables, design and conduct experiment, analyze data, and make conclusion.

According to Ozgelen (2012), science process skill is skill of thinking that used by scientists to construct knowledge to solve the problem and formulate the results. Process skill has great effect on education, because help student to develop high order thinking skill like critical thinking, make decision, and able to solve the problem. According to Hanapi&Nordin (2013), the effective skill training will produce educated and skilled graduate before they entering work place. Besides that, it will produce graduate who have good work ethic, proactive, and able to solve the problem related with their job.

In line with the goals to create quality of education graduate, teachers expected to able to develop method of teaching and learning of method. All of lesson plan must be able to get learning implementation by learning system that are active and creative also fun for student. Thus, teacher should to develop instruction model and strategy used within learning process and the need of learning media present within learning process activity in the classroom in order to improve the student learning achievement. Moreover, to improve the quality of Vocational School graduate, it should be conducted by improves the learning quality. In order to improve learning quality, the lesson plan that used Curriculum 2013 is necessary. Refer to Regulation of Minister of Education and Culture No. 65 year 2013 about standard process, learning process on education unit are conducted interactively, inspiring, fun, challenging, efficient, motivate student to actively participated, and giving enough space for initiative creativity and independence appropriate to the talent, interest, also physical and psychological development of student. Based on above, lesson plan is the most important thing that must prepared by the teacher before performing the lesson.

Based on early observation result obtained in SMK PGRI 1 Mejayan there is less of lesson plan quality especially on lesson of Basic Electronic on expertise program of Audio-Video Engineering. Therefore, the expertise program of Audio-Video Engineering needs a high quality of lesson plan that consist of learning media, lesson plan, work sheet, assessment sheet, and text book as lesson material to deliver learning material. The availability of various qualified lesson plan is needed in order to create learning environment that are interactive, inspiring, fun, challenging, motivate student to participate actively, and helps student to achieve the determined competence. Those reasons were being background to conduct research of lesson plan development that can trained science process skill and to use Multisim software. Science process skill and way to use Multisim software are well-structured academic contents and procedural skill. Thereby, instructional model that used in this research was direct instruction model.

According to Nur (2011), direct instruction model is an approach that teaching basic skills where the lesson highly oriented on goals and strictly structured learning environment. Furthermore, according to Klahr (2004) stated that student who apply direct instruction model is better more in conducting experiment. Beside

those, according to Magliaro (2005) stated that for learning that based on instruction, direct instruction is the rightest learning model to be used in teaching and learning process.

This research aimed to develop a good and high quality of lesson plan by apply direct instruction to improve science process skill equipped with Multisim software. Based on those explained ideas on background and observation result at research location, it is need to be conducted a research that titled "The Development of Lesson plan by Apply Direct Instruction Model and Multisim Software to Improves Science Process Skill of Vocational School Student on Expertise Program of Audio-Video Engineering".

Based on above background, it will be developed lesson plan that apply direct instruction that meet criteria of high quality of lesson plan in order to improves science process skill of Vocational School student and skill to operates Multisim software. This common problem can be detailed to be a problem formulation: how the validity of lesson plan by direct instruction model equipped with Multisim software?

Based on problem formulation explained above, the research aims that would be achieved consist of two sections i.e. common goal and specific goal. (1) common goal: develop lesson plan by apply direct instruction equipped with Multisim software that meet the criteria of high-quality lesson plan to improves science process skill for student of Vocational School. (2) Specific goal: describes validity of high-quality lesson plan by apply direct instruction equipped with Multisim software to improve science process skill of Vocational School student.

The advantages that expected of this research are: (1) contribution to availability of lesson plan that apply Multisim software on lesson of basic electronic according to Curriculum 2013. That could ease the teacher to guide student to develop science process skill. (2) Being reference for the teachers of expertise program of Audio-Video Engineering on Vocational School in order to construct learning design on lesson of basic electronic that using direct instruction model.

METHOD

Realization of research is through developing lesson plan that applies direct instruction conducted in SMK PGRI 1 Mejayan at odd semester academic year 2017/2018. Research type that used in this research was development research. Design of lesson plan development in this research adapted from 4D models devices development by Thiagarajan et al (1974). The development steps consist of four steps development, those are defining, designing, developing, and disseminating. The development of lesson plan in this. You should use this model research according to Plomp&Nieveen (2007), consist of three phases, they are follows: (1) research phase, is necessity analysis and contextual analysis, literature review, development of conceptual frame or theoretical for research. (2) prototype phase is step of iterative design consist of iteration, respectively being research small cycle with formative evaluation as research activity aimed to improves and perfecting intervention. (3) Assessment phase, is semi summative evaluation to conclude whether solution or intervention meet the determined specification. This phase often recommends to obtained intervention correction, called semifinal summative phase. As for design of lesson plan were develop in this research explained by Figure 1.

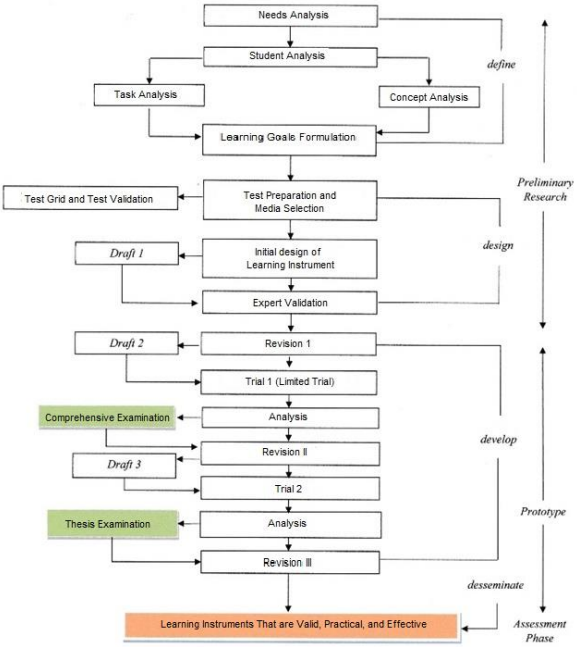

Figure 1. Diagram of 4D Models Lesson Development

Data analysis technique that used in this research was validation analysis of lesson plan which consist of Syllabus, Lesson Plan scenario, Work Sheet, Assessment Sheet, and Text Book. Validation is use to know the proper of lesson plan were developed before performing lesson. The instrument validation process was performed by three experts, namely linguists, materials experts, and learning lesson plan experts.

Data obtained is analyzed with average score for each aspect. The assessment reference of lesson plan validation sheet is adapted by using Likert scale 1-5 favorable score which then will be described qualitatively.

Table 1. Assessment scale of lesson plan validaton

Qualitative assessment	Score
Very Good	5
Good	4
Fairy Good	3
Not so Good	2
Not Good	1

Then, to analyze results of validation that conducted by validators, it will be analyzed using percentage that calculates by using following formula.

$$\text{Percentage (\%)} = \frac{\Sigma(answer\ x\ score\ each\ selection)}{n\ x\ highest\ score} \text{ x } 100\%$$

Explanation:
Σ = Sum
n = Total entire questionnaire item

The obtained assessments of validation result then transformed to be sentences that are qualitatively by using Table 2.

Table 2. The assessment criteria of lesson plan validation

Interval of average score	Category	Explanation
$1.0 \leq P \leq 1.5$	Not Valid	Cannot be used and need more consultation
$1.6 \leq P \leq 2.5$	Less Valid	Can be used with much revisions
$2.6 \leq P \leq 3.5$	Valid	Can be used with few revisions
$3.6 \leq P \leq 4$	Highly Valid	Can be used with no revision

Percentage of assessment agreement result were given by three validators toward basic electronic lesson plan that apply direct instruction model to train science process skill on student based on inter observer agreement obtained from percentage of agreement (R) statistic analysis result (Borich, 1994).

$$R=\left[1-\left\{\frac{A-B}{A+B}\right\}\right]\times 100\%$$

Explanation:
R = Percentage of agreement
A = highest score of 3 validators
B = lowest score of 3 validators

RESULTS AND DISCUSSION

The assessment results obtained through validation of lesson plan, they are: (1) syllabus; (2) lesson plan scenario; (3) Work Sheet; (4) Assessment Sheet; and (5) text book, was conducted by validators which consist of 3 Electrical Engineering lecturers of State University of Surabaya, shows on Table 3 below.

From Table 3 above known that validation results of lesson plan which apply direct instruction model used in research in SMK PGRI 1 Mejayan could be categorized in highly valid with obtaining results of final average score 3.75 and percentage of agreement in assessments were given by three validators is 96.82% for syllabus devices validation. Score 3.72 categorized in highly valid and percentage of agreement in assessments were given by three validators is 95.15% for validation devices of lesson plan scenario. Score 3.79 categorized in highly valid and percentage of agreement in assessments were given by three validators is 95.33% for validation devices of work sheet. Score 3.47 categorized valid and percentage of agreement in assessments were given by three validators is 87.34% for validation devices of assessment sheet. Score 3.67 categorized in highly valid and percentage of agreement in assessments were given by three validators is 94.26% for validation devices of text book.

Table 3. Result of lesson plan validation

No	Name	Validity Score	Category
1.	Syllabus	3.75	Highly Valid
2.	Lesson Plan Scenario	3.72	Highly Valid
3.	Work Sheet	3.79	Highly Valid
4.	Assessment Sheet	3.47	Valid
5.	Text Book	3.67	Highly Valid

CONCLUSION

Based on results of analysis and discussion toward results of the research, it could be concluded that validity of lesson plan with direct instruction model equipped with Multisim software have highly valid category. It is based on results of validation were conducted by three validators toward developed lesson plan.

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