The Development Of Learning-Based Guided Inquiry On Waste Materials To Enhance Students Learning Results students of SMK

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Abstract: This study aims to develop proper learning material theoretically on the lesson plan, student worksheet, student handbook and pretest and posttest on the subject of waste management matter with student respond supporting science learning. This research uses part of Dick and Carey model and trial design using one group pretest-posttest design with quantitative descriptive, qualitative descriptive analysis techniques. The research conducted at the Critical Thinking, Creativity Nurul Huda Situbondo. Measured research parameter cover validity teaching material, the implementation of teaching material, The result of learning and student of response. The result of research showed that the developed teaching materials fall in average of validity suitable criteria, the learning mastery of students showed high value, the student's response were included in excellent category, and the obstacles during learning process were caused by the student were never involved in learning process using guided inquiry so they felt as a new experience. Based on the result of data analysis, it can be concluded that learning material with guided inquiry used in course of study of IPA (biology) to increase the result of learning waste items.

Keywords: *Learning Material, Waste Items, Guided Inquiry and learning outcomes.*

INTRODUCTION

According to: 1) Law No. 14 Year 2005 Article 10 on teachers and lecturers, which states that in performing the tasks of professionalism, teachers are obliged to make lesson plans, performing the learning process, as well as assess and evaluate the outcomes; 2) Ministerial Regulation of National Education No. 41 year 2007, which states that every teacher in the educational unit, obliged to prepare complete and systematic lesson plans. Lesson plans are compiled for each indicator that can be implemented in one meeting or more. Based on the statement above, a professional teacher will be able to become a facilitator in providing the

required skills of learners, thus the quality of teachers is the central point of education which is based on the learning process [1].

Various efforts have been made by the government to improve the professionalism of teachers through various activities, both regional and national. The results are often cannot be directly applied in the field, for various reasons, for example, the lack of supporting infrastructure.

In attempting to improve student achievement, researchers have conducted pre-study to collect and assess the three Lesson Plans of the science teachers in Situbondo. These aspects are examined in creating Lesson plans, namely: (1) the clarity of learning objectives (not ambiguous and contains one behavioral learning outcomes), (2) Suitable with the basic competencies indicators, (3) the suitability of the indicators with the objective of learning they represent, (4) the selection of teaching materials (in accordance with the purposes and characteristics of learners), (5) the selection of teaching methods according to the learning objectives, (6) source selection / learning media (in accordance with the objectives, materials, and characteristics of learners), (7) the clarity of learning scenarios (the steps of learning activities: introduction or initial activity, core and closing), (8) suitable evaluation instruments with the objective of learning / indicators, and (9) completeness of the evaluation instruments (question, keys, scoring guidelines) (Directorate General of Higher Education Ministry of National Education, 2009).

The results of all three Lesson Plans assessment by an expert can be concluded that the average skills of chemistry teachers in Situbondo in planning Lesson Plans can be categorized not good enough, so they should be given a coaching or training on creating and implementing the Lesson plans. A model of training used to make better-prepared teachers in performing professional teaching is *guided inquiry*. *Guided inquiry* is teaching strategies designed to guide students how to research issues and questions based on facts.

GOAL OF STUDY

The general objective of this study is to produce developed learning media based on *guided inquiry* on the subject of "waste" to improve vocational students' learning process.

[1] Departemen Pendidikan Nasional Direktorat Jenderal Manajemen Pendidikan Dasar dan Menengah Direktorat Pembinaan Sekolah Menengah Kejuruan. 2013. Standar Kelulusan. Jakarta: Depdiknas

METHOD

There is two data collecting method used in this study:

Observation Method, collecting data about components/aspects of Lesson Plans and its implementation.

Test, the outcomes of student learning were collected by the test method. This data is used to determine if there were any improvements.

Technical Analysis of the data is using descriptive qualitative and quantitative descriptive. Data analysis was performed after the researcher had obtained all the necessary data to determine the completeness of learning objectives, the completeness of the individual, and the classical completeness.

RESEARCH RESULT AND DISCUSSION

Guided Inquiry

Learning media developed by researcher consist of Lesson Plan implementation, Student Worksheet, and Learning Outcomes Sheet, Students Teaching Materials. Such media have been reviewed and validated by experts. Lesson plans assessment results include (1) the purpose teaching, learning phase, timing, and method of presentation with decent ratings; (2) Student worksheets assessment results, which includes instructions, eligibility contents, procedures, and questions, shows that the worksheet is feasible to use. Reliability assessment of Lesson Plans and student worksheet is reliable and after a revised had been done, Lesson Plans and student worksheet are proper to be used by the researcher. The assessment of content, language along with written question of student test and learning outcomes are categorized well, and with a little revision. The result of reliability calculation of the instrument for content validity and reliability of the instrument for language and writing question shows the two instruments is reliable.

In managing the study, the researcher conducted the stages well. In the beginning of activity, researcher delivers the learning objectives; attract the attention and interest of the students through a series of initial motivation and knowledge, linking students with the material to be taught. At main activities, the researcher has delivered the material well, demonstrating knowledge step by step. By the time students do activities, researcher toured around to observe and guide students who are having trouble, checking the understanding of the individual or group through question and answer. If students make a mistake, immediate feedback is given so that the same mistake will not happen again. Material consolidation is done through giving tasks as well as advanced training. At the end of the activity, researcher guided students to make

conclusions and reminded the material that will be studied at the next meeting. The test results showed student learning achievement indicators for 94.44% of the 36 students who follow the study.

Lesson Plan (RPP)

Assessment of Lesson plan and student worksheets by experts, after a revised, declared eligible to be carried out in class. The results of the Lesson plan and student worksheet reliability assessment shows that the instruments used were reliable. Validity of the content, language, written question are categorized good enough, and after a revised, student achievement test sheets can be used. The calculation reliability of the instrument for content, language validity, and written question shows that the two instruments are reliable.

Results of the Lesson Plan assessment by an expert, after revised, declared eligible to be carried out in class. Lesson plans and student worksheets assessment are reliable. The validation of student achievement test sheets assessment indicates that the content, language and written question are categorized quite valid, after a revised, student achievement test sheets can be used. Instrument for content, language and written question is valid. From the calculations, the average coefficient reliability of Lesson plans is 77%.

The assessment results of the Lesson plan and student worksheets developed by a researcher showed that, after a revised, Lesson plan and student worksheet are feasible in the classroom. Content, language validity, and written question are categorized quite valid. After a revised, learning outcome sheet can be used. The result of instrument reliability assessment for content, language, and written question is reliable [2].

Students Teaching Materials

Students teaching material in this study is a handbook for the student as reading the material and as a learning guide for learning process in the classroom or self-study. Developed students teaching material used by students to do their tasks during the learning process and deepen their understanding. The result of student textbook reliability calculation showed a high

[2] Dick, W., Carey, L., & Carey, J. O. 2009. The Systematic Design of Introduction 7th ed. New Jersey: Pearson Education.

level of reliability, that is 87%. It means that students handbook can be used in the learning process because Borrich (1994) stated that student handbook is categorized good and can be used for learning activities because it has reliability coefficient more than 75%.

Students Worksheet (LKS)

Developed students worksheet is guidance for the student to build their knowledge and to give a chance for the student to do or plan their activities, and also giving them a chance in behaving and communicating with their study lesson. The result of student textbook reliability calculation showed a high level of reliability, that is 75%. It means that students handbook can be used in the learning process because Borrich (1994) stated that student handbook is categorized good and can be used for learning activities because it has reliability coefficient more than 75%.

The result of student test

Developed test is in the form of 9 multiple choices and 3 fill-in question compiled based on indicator and learning objective in order to obtain information about student's mastery on the subject: Waste. The result of test validation, generally the rater declared that the test is usable after a few revisions. The assessment from the two raters declared that the test is valid with a few revisions, the suggestion to improve the test, writing refinement and in cognitive aspect had been done so the test can be used and in accordance with the suggestion of the two raters.

Tryout Result

Implement ability Lesson Plan

Lesson plan based on *guided inquiry* was categorized good, as well as the result of implementation lesson plan in classroom revealed that the researcher was able to carry out *guided inquiry* based learning, and to achieve classical and individual minimum completeness i.e. for each criterion by 75% and 85%. The improvement of students learning result reached indicator 82%, from 36 students that followed the lesson. The result of the reliability of lesson plan instruments is reliable[3].

Description of learning process using guided inquiry method can be seen as a whole. The average score of every tryout II in the first meeting is 3,13, a second meeting is 3,25 and a third meeting is 3,25, all of the meetings included in the good category. The ability to manage the learning process using guided inquiry in the second meeting had increased if we compare it with

[3] Clifford Edwards,. H. 1997."Promoting Student Inquiry". ProQuest Educational Jurnal, Hal 18.

the first meeting. The analysis result showed that the average score of the two raters is 3,8 which is good.

The result of a learning process based on guided inquiry was categorized good, and the researcher can conduct learning process based on guided inquiry in the classroom well enough. Assessment instrument of lesson plan at the first, second and third meeting is reliable, completeness indicator reached 81,25%, 87,5%, 81,25%. Based on individual and classical minimum completeness criteria i.e. each criterion by 75% and 85% showed that 36 students followed the learning process.

The Result Of Student Test

Student mastery of the subject material in handling waste is tested by the resulted of paper study. The mastery test of the subject does twice, that are a first test (pretest) and last test (postest). The resulted of cognitive tests showed completeness learning indicator on the first test and the last test have a clear difference, that is at the beginning of test all grain of indicator didn't complete because of the percentage value less of 75%. The completeness of learning indicator after the learning process is categorized 100% completed because the value reached or more than 75%.

Pretest or first test didn't complete 100% because of the average of value under 75%. At posttest or last test from 36 students are categorized completely with value percentage more or same with 0,75 or 75% in learning waste issue.

The individual completeness right answer of student 75% and a class said completely in learning (classical completeness) if in the class there are 85% students who have completed studies. Appropriate with subject of KKM (IPA) biology in SMK Nurul Huda Paowan Situbondo, so the individual completeness is 75 and the completeness in classical is 85%

The completeness indicator of learning at first and last test have a clear difference that is at the beginning of test all grain of indicator didn't complete because of the percentage value less of 75% or only 31,02%. The completeness indicator of learning after learning process is categorized 100% completed because the value reached or more than 75% or with value 90,28%.

All students have completed in learning with individual completeness and effective resulted of classical completeness with result 100% and complete in classical.

All students have Individual completeness and classical Psychomotor Learning Outcomes Students learn individually with the results between 75-92%, and thoroughly classical with a value of 89%.

Based on completeness which got from learning device development and guided inquiry method on cognitive individual completeness, effective individual completeness student, and individual psychomotor student completeness is categorized completely. The thing can be seen from increasing of student ability which is counted by using analysis with a normal gain average of pretest and posttest obtained.

The normal gain of resulting student's ability showed 0,8 means that increasing which is reached by a student getting treatment with the use of guided inquiry method of learning device are high categorized. This achievement concerned with the implementation of lesson plan with using guided inquiry which is done as well.

The resulted of sensitivity analysis pretest and posttest gain matter showed an average of sensitivity pretest and posttest gain matter categorized well and according to Arikunto (2009), gain matter said sensitive to learning when has sensitive's index ≥ 0,30.

Questionnaire student's response which is used to know student's response to learning with *Guide Inquiry* method and tools got by students fill in instruments of questionnaire 6a on 268 pages, as an individual in earnest by their own assessment without influence the result of learning. In filling in the questionnaire didn't need an observation, it only needs opinion and comment from students about the learning process and learning device. It showed the average of all students said happily on the material subject, student book, learning situation, the way of the teacher in teaching and guided inquiry method used. The average of all students said new on paper of student's activity and the way of the teacher in teaching while interested in following learning process with experiment activity. Student's response to LKS said, new model.

There are some problems which are encountered in learning process on experiment I. first, there is a group didn't compact in working so that disturb the workgroup but the researcher has found the solution to the problem by reminding that the work group is important; second, there are some groups disturbed others group because they didn't read the practical guide and the researcher gave solution by reminding to the groups to read the practical guide; third, students unfamiliar in arranging trial procedure, so that needed a long time for experiment and finished with teacher's solution in helping the way to arrange experiment procedure.

CLOSING

Conclusion

On the basis of these findings, can be concluded that learning device with guided inquiry approach suitable to use and can increase the resulted of student learning on biology subject especially on waste matter.

Suggestion

Based on resulted of research which has done, suggested to need more comprehensive guidance to students with good preparation from teacher's ability side in organizing a learning and if the valuable matter can be used by using guided inquiry method.

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