Kepraktisan Lembar Kerja Peserta Didik Berorientasi *Guided Discovery* pada Materi Kimia Unsur Kelas XII SMA untuk Melatihkan Keterampilan Proses Sains

Practicability of Student Worksheet with Guided Discovery Oriented on Chemistry Elements Matter in XII Grade Senior High School to Train Science Proces Skill

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Abstrak. Penelitian ini bertujuan untuk mengetahui kepraktisan dari Lembar Kerja Peserta Didik Berorientasi *Guided Discovery* pada Materi Kimia Unsur Kelas XII SMA untuk Melatihkan Keterampilan Proses Sains. Penelitian ini menggunakan metode 4-D yang dibatasi sampai tahap pengembangan. Kepraktisan diperoleh dari hasil respon peserta didik yang didukung oleh hasil aktivitas peserta didik dan keterlaksanaan pembelajaran. Hasil respon peserta didik memperoleh rata-rata persentase keseluruhan sebesar 99,405% dengan kategori sangat praktis. Hasil persentase aktivitas peserta didik memperoleh persentase keseluruhan sebesar 100% dengan kategori sangat praktis. Hasil keterlaksanan pembelajaran, pada pertemuan I-III memperoleh persentase rata-rata secara berturut-turut sebesar 93,75%, 95,83%, dan 100% dengan kategori sangat praktis.

Kata-kata kunci: Kepraktisan LKPD, Guided Discovery, Keterampilan Proses Sains, Kimia Unsur

Abstract. The aim of this research is to determine the validity of Student Worksheets with Guided Discovery Oriented on Chemistry Elements Matter in XII Grade Senior High School to Train Science Process Skills (SPS). This research used 4-D method which is the preliminary development stage. Practicability is obtained from the results of student responses that are supported by the results of student activities and the implementation of learning. The response results of students obtain an overall average percentage of 99,405% with a very practical category. The results of the percentage of student activities get an overall percentage of 100% with a very practical category. The results of learning implementation, at the I-III meeting obtained an average percentage of 93,75%, 95,83% and 100% respectively in a very practical category.

Keywords: Worksheet practicability, Guided Discovery, Science process skill, Chemistry elements.

1. Introduction

Education in Indonesia has experienced significant changes. This can be seen from several learning principles which are determined based on regulation of the minister of education and culture number 22 of 2016 concerning the standards of primary and secondary education processes. It state that teachers are not only as source of learning, changes from students being told to students seeking out and the learning emphasized in multi-dimensional answers also several other principles. These principles certainly apply to various scientific disciplines including chemistry.

Chemistry is a branch of natural science that studies various things (composition, structure, properties, changes of matter and the energy that accompanies the material changes) was

developed with scientific methods and accompanied by a scientific attitude. While the products of science itself are facts, concepts, principles, laws, and theories. Two things related to chemistry, the first is chemistry as a product in the form of facts, concepts, principles, laws, and theories and the second chemistry as a process of scientific work [1].

As a branch of science, chemistry is taught by connecting interrelated concepts. Understanding a particular concept influences the understanding of other concepts. The process of learning in chemistry becomes complicated because each concept must be understood correctly before understanding the other concepts. Science process skills are adaptations of skills that scientists use to compile knowledge, think about problems and make decisions. The science process skills include observation, information, prediction, classification, modeling, communication, measurement, calculation, experimental design, asking questions, developing hypotheses, controlling variables, formulating operational definitions, interpreting data, drawing conclusions, making data tables and charting [2].

Based on the results of pre-research conducted at SMAN 1 Driyorejo Gresik on Tuesday, October 30, 2018 to students of class XII-IPA 1 showed results, about 76% of students stated that in learning rarely to practice science process skills because teachers are often focused on delivery material directly. Therefore, science process skills need to be trained to students through appropriate learning models or strategies.

One of the model that can be used to practice science process skills is Guided Discovery. This is in line with the Regulation of the Minister of Education and Culture No. 22 of 2016 which states that to strengthen the scientific approach it is necessary to apply discovery/inquiry learning. Aspects in the scientific approach are integrated with science process skills, in other words to strengthen science process skills can be done by implementing discovery/inquiry learning [1]. According to Abdisa and Getinet (2012) Guided Discovery is a series of learning activities that involve maximally all the abilities of students to search and investigate systematically, critically and logically, so that they can find their own knowledge, attitudes and skills, and learning not only centered to the teacher [3]. In addition, based on research conducted by Yusuf and Ana (2016) states that mastery of concepts and science process skills of students has increased through the application of discovery learning learning models [4].

In addition to the model needed also needed teaching materials that can be used by teachers in implementing learning to train science process skills. One of the teaching materials that can practice science process skills is the Student Worksheet. According to Prastowo (2011), Student Worksheets can be defined as printed teaching materials in the form of sheets of paper containing material, summaries, and instructions on the implementation of tasks that must be carried out by students who refer to the basic competencies to be achieved [5]. In addition, teaching materials in the form of LKPD can help students actively find concepts, develop concepts, train students in developing process skills, and develop students' critical thinking skills [6].

Research conducted by Puspitasari and Rusly (2016) in the form of developing guided discovery oriented student worksheets to train science process skills in electrolyte and non-electrolyte solution materials obtained results, namely students experienced an average increase in learning outcomes of 0.62 and 0.4 which can be categorized in the medium category [7]. In addition, Wibowo and Rusly (2016) in his study also mentioned the development of student activity sheets to practice science process skills in acid-base material is very effective because science process skills of students experience significant improvement seen from classical completeness of students when working on the pre test and post test with classical completeness at pre test of 0% and classical completeness at post test of 91.67%. Both of these studies have similarities which lie in teaching materials developed in the form of worksheet and skills that are trained namely science process skills [8]. While the difference from the two studies lies in the chemical material used. Even so, both studies obtained good results seen from the improvement in learning outcomes and trained skills. Based on the two studies, it needs to be

followed up by developing worksheet to train science process skills on different chemical materials, one of which is elemental chemicals.

Based on the results of pre-research science process skills states that 46% of students are able to identify important things in a phenomenon or data presented (observation). In the component of , 44% of students can determine the tools and materials and write down the steps of research work based on the description of the phenomenon given. In the component of collecting and recording data, 40% of students can write research data in the form of a data table. In analyzing components and interpreting the data, 41% of students were able to write the results of the analysis of the data obtained and relate it to existing theories. In the latter component concludes, 41% of students can write conclusions based on data from the results of the research conducted. The results above show that students' science process skills are still low.

Based on the description on the background above, it is necessary to do a research with the title "Practicability of Guided Discovery Student Worksheets in Chemistry Elements of Class XII High School to Train Science Process Skills".

2. Method

This research is using 4-D method refers to such as 1) Define, 2) Design, 3) Develop, and 4) Disseminate [9]. In this study limited to the develop stage which will be tested on 12 students of 12th grade at SMAN 1 Driyorejo, Gresik using the experimental method One Group Pre test and Post test design. This research conduct to know practicability of student worksheet, so the instrument that used are student activity observation sheet, student response sheet and implementation of learning model sheet.

The practicability of worksheet reviewed from the result of 12 student responses as trial subject that supported by the observation of student activity that reviewed by 3 observer and implementation of learning model that reviewed by 2 observer during the limited trial process. The percentage of student responses and student activities observation were analyzed using Guttman scale in Table 1:

Table 1. Guttman Scale

Statement/question	Score positive Statement/question	Score negative Statement/question
Response Positive (Yes)	1	0
Response Negative (No)	0	1

[10]

The formula used in calculation to get the percentage is:

$$\text{Statement/question positive (\%)} = \frac{\text{Response Positive (Yes)}}{\sum \text{respondent}} \text{x } 100\%$$

$$\text{Statement/question negative(\%)} = \frac{\text{Response Negative (No)}}{\sum \text{respondent}} \text{x } 100\%$$

Then, it is interpreted according to what is shown in Table 2.

Table 2. Score Interpretation Criteria

Percentage	**Criteria**
0% – 20%	Very less
21% - 40%	Less
41% - 60%	Enough

Percentage	Criteria
61% - 80%	Practical
81% - 100%	Very Practical

[10]

Based on the interpretation criteria of the score, the worksheet can be stated practice if it gets a percentage ≥ 61% in practice or very practice category.

Analysis of the implementation data of the learning model to determine the quality of implementation of the learning phase that has been carried out by the teacher in accordance with the planned time allocation. This study uses the assessment of "Yes" or "No" and the quality of implementation of this learning with the assessment aspects in the form of the scores found in Table 3 as follows:

Table 3. Learning Implementation Interval Scale

Score	Criteria
1	Less
2	Enough
3	Good
4	Very Good

[10]

Furthermore, the scores obtained were analyzed by calculating the percentage and to find out the quality of implementation of the learning phase the following formula was used:

$$\%\text{Implementation} = \frac{\sum \text{implemented phase score}}{\sum \text{maximum overall score}} \text{ x } 100\%$$

Percentage calculations are carried out in each learning phase and in all aspects of the assessment. Criteria for the implementation of learning can be seen in Table 2. This learning is said to be successful if the percentage obtained is ≥61%

3. Result

The practicability of worksheet is known through the result of the student responses questionnaire that supported by the observation of student activity and implementation of learning model during limited trial process of worksheet that developed. Student responses questionnaire were given to 12 students as limited trial subjects, observation of student activities were observed by three observers which one observer was observed one group and implementation of learning model were observed by two observers. The recapitulation result of student activity observation are given in Table 4:

Table 4. Observation of student activities result

Nu	Aspect	Percentage	Category
1	Observation of student activity in worksheet 1	100% (Yes)	Very Practice
2	Observation of student activity in worksheet 2	100% (Yes)	Very Practice
3.	Observation of student activity in worksheet 3	100% (Yes)	Very Practice

Based on Table 4, it can be obtained that all activities that observed in each worksheet were carried out with percentage of 100%. Activities in each worksheet were adapted to the Guided discovery to train science process skills to student.

The practicability of worksheet also reviewed from 12 student response as users of worksheet [11]. The recapitulation result of students' response questionnaires are given in Table 5:

Table 5. The result of students' response questionnaires

Nu.	Aspects	Percentage	Category
1.	Content criteria	100%	Very practice
2.	Linguistic criteria	91,67%	Very practice
3.	Presentation criteria	100%	Very practice
4.	Graphical criteria	100%	Very practice

Based on Table 5, it can be obtained that worksheet received responses from the students on content criteria of 100%. This shown the suitability of worksheet with indicators, material substance, science process skills and Guided discovery, making students interested in learning chemistry elements material. These result shown the same results as previous research that conducted by Puspitasari and Rusly (2016) which shown that as many as 95% of students are interested in learning chemistry after treatment with Guided discovery oriented learning to train science process skills in electrolyte and non-electrolyte solution [7]. This is also supported by the result of student activities observation which shown that in the worksheet 1-3, activities that observed 100% were carried out well. In linguistic, presentation and graphical criteria obtained percentage of 91,67%, 100%, and 100% in the very practice category. This shows that student as worksheet users feel facilitated regarding the demands of worksheet presentation.

The practicability of worksheet also supported by the implementation of learning model during limited trial process of worksheet that developed. The recapitulation result of implementation of learning model are given in Table 6:

Tabel 6. The quality of implementation of Guided Discovery learning model

Nu.	RATED ASPECT		MEETING I	MEETING II	MEETING III
1	Preliminary Activity	Preliminary	100%	100%	100,0%
2	Main Activity	First Phase	100%	100%	100,0%
		Second Phase	87,5%	87,5%	100,0%
		Third Phase	87,5%	87,5%	100,0%
		Fourth Phase	100%	100%	100,0%
3	Closure Activity	Closure	87,5%	100%	100,0%
Average			93,75%	95,83%	100,0%

Table 6 shows that the lowest average percentage was found in the trial at the first meeting. This is due to the lack of enthusiasm and focus of the students when conducting the trial activities. However, this can be resolved immediately so that it does not occur during the first meeting and subsequent meetings. Students who are less focused in learning can be overcome by providing meaningful motivation so as to increase students' interest in learning [12]. Based on Table 6, each activity and phase shows an increase in each meeting. The results of learning

difficulties, in meetings I, II, and III, obtained an average percentage of 93.75%, 95.83%, and 100% respectively in a very practical category.

Thus, it can be concluded that worksheet is stated to be practical because the result of observation of student activities, student response questionnaires and the implementation of learning model get a percentage of ≥ 61%.

4. Conclusion

The developed worksheet is stated to be very practical in terms of the results of student responses that are supported by the results of student activities and the implementation of learning. The response results of students obtain very practical category there are on the content criteria was 100%, language criteria was 91,67%, presentation criteria was 100%, graphic criteria was 100%. The results of the percentage of student activities get an overall percentage of 100% with a very practical category. While the results of learning learning, at the I-III meeting obtained an average percentage of 93.75%, 95.83% and 100% respectively in a very practical category.

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