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DEVELOPMENT OF STUDENTS INQUIRY LABORATORY ACTIVITIES WORKSHEET FOR TRAINING SKILL PROCESS ON CHOLOID MATERIAL

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Abstract

The purpose of this research are to figure the theoretical feasibility the development of student laboratory activity LKS in terms of content construct validity aspects and empirical feasibility of student activity LKS developed in terms of practical aspects (aspects of student activities) and aspects of effectiveness covering aspects of process skills and student responses. This type of research isdevelopment research (research and design). The target of this research is LKS based on inquiry is guided on colloidal material in class XI SMA. The development stage is done through expert validation and LKS test, revision validation result, and conducting limited test to LKS based on inquiry which have been developed. The result of the development LKS developed percentage on the content criteria obtained percentage of 86.14%, while the criterion of the construct obtained a percentage of 88.6%. From these results show that LKS based inquiry is guided to trained students science process skills declared valid as a medium of learning. The result of percentage of student activity in conducting LKS test developed overall get 100% percentage. Student learning outcomes consisting of multiple choice questions and skill component processes experienced an increase in the average of high and moderate n-gain. While the student response obtained percentage of 92.7%. From these results indicate that LKS based inquiry as guided to trained students' science process skills out as practical as a medium of learning. Students' learning outcomes consist of multiple choice questions and the components of science process skills in each student's average increase of 0.6 that can be categorized in the medium category indicating that the LKS is declared effective as a learning medium

Keywords: LKS, Guided Inquiry, Process Skills and Response

INTRODUCTION

Scientific process skills have a very important position in understanding science knowledge. In this case, science process skill to maintain the purity of knowledge and continuity in student development [1].. One of these skills in the science process is usually done through laboratory activities, where students are given the opportunity to megamati, analyze,membuktkan and draw conclusions.

Student Activity Sheet (*LKS*) is a guide in conducting every practicum or experiment activity. LKS is usually arange by teachers through a contextual approach to the situation and condition of the school [2]. Nevertheless, the results of field studies by researchers indicate that the *LKS* that has been owned by students has not been able to help in finding the concept, because it only contains the material and questions. *LKS* have not been able to develop science process skills to maintain the purity of knowledge and sustainability.

Chemistry as a part of natural is consist of product, process and attitude. Chemistry is a product of facts, concepts, principles, laws, and theories. As a process of science process, chemistry train methods, steps, ways of work or something done to gain knowledge or seek explanations. As an attitude chemistry able to develop scientific attitude or social attitude such as honest, responsibility, and communication. Chemistry take a big role in society because chemistry always in everyday life. In fact there are still many students who have difficulty in understanding the chemistry lesson.The experience faced by chemistry teachers in high school is most students consider chemistry lessons as abstract subjects, so students first feel dificult chemistry. This is caused by the presentation of *LKS* are less interesting and boring, finally seemed scary for students, consequently many students who lack the basic chemistry concept. As a result of the *LKS* dish the students find it difficult so the chemistry lesson becomes no longer interesting for the students. This is one of the factors causing low student learning outcomes.

Class XI IPA on the subject matter of the colloidal system in chemistry subjects in high school is one of the materials that can be used as a learning material by raising a problem. This is

because colloid is often found in everyday life. Meanwhile, the results of a pre-research questionnaire that has been done in state High School I PuriMojokertothere 52% of students from 25 students faced difficulty in studying colloid principal matter. The questionnaire results were also supported by interviews with chemistry subject teachers at Puri 1 State Senior High School who stated that most of the students had difficulties and got poor results in daily replication on colloidal subject matter, ie 65% of students still did not meet the *KKM*..

Basedon the description of the above background, it be formulated research questions (1) how the theoretical feasibility of *LKS* developed in terms of content validity aspects and aspects of construct validity ?, (2) how empirical feasibility *LKS* developed in terms of aspects of practicality that includes aspects of student activity And aspects of effectiveness that include aspects of process skills and student responses?

METHOD

This type of research is a research and development. The research target is guided inquiry based *LKS* on colloidal material, while for initial test of *LKS* based development inquiry of guided material of colloid is 12 students of class XI SMAN 1 PuriMojokerto. The research development procedure to be carried out is guided by the 4D Thiagarajaan model [3]. This study consists of 4 stages of define, design, develop, and desseminate. [4] Here's a detailed stage:

1. Definition

This stage consists of front end analysis, student analysis, task analysis, concept analysis, formulation of indicators.

2. Planning

This stage consists of designing laboratory activities, research studies of laboratory activities, initial design of LKS, preparation of learning tools and instruments, development

3. Development

This stage consists of expert validation and *LKS* testing and instrumentation, revision of instrument validation results, conducting limited trials of *LKS*.The *LKS* has been asses by 3 validato. The percentage of this validation result data is obtained based on the linkert scale in the table:

Table 1. Linkert Scale

Assessment	Scale Value
Very bad	1
Bad	2
Medium	3
Good	4
Very good	5

Riduwan [4]

The formula used in the calculation of validation results to obtain the percentage is:

$$\text{Persentase}(\%) = \frac{\text{The number of scores the results of data collection}}{\text{Criteria score}} \times 100\%$$

Score criteria = the highest score x number of aspects x number of reviewers

LKS is stated to meet the criteria if in each criterion percentage ≥ 61%, then the media can be said worthy [4].

Implementation of the initial trial conducted at SMAN 1 PuriMojokerto in class XI with a total of 12 students. In this phase, the effectiveness test and effectiveness of *LKS* are developed.

a. Practicality

Aspects of practicality in terms of student response results. The questionnaire data of the students' responses were analyzed descriptively quantitative ie giving description and explaining research about development of *LKS* based on table 2.

Table 2. Guttman Scale

Answer	score
Yes	1
No	0

Riduwan [5]

$$P(\%) = \frac{Totalofscore}{criteriascore} \times 100\%$$

Media is said to be practical if on each criterion percentage ≥ 61%, then the media can be said to be practical [5].

b. Effectiveness

Aspects of effectiveness in terms of student learning outcomes. Students are said to be complete in learning when received a predicate B or 2.66 obtained from posttest results of colloidal material. From the results of pretest and posttest this will be known whether students experience an

increase or decrease in learning outcomes. The obtained from the pretest and posttest results are used to calculate the gain value (N-gain). The formula used to calculate N-gain:

$$\text{N-gain} = \frac{S_{post} - S_{pre}}{S_{maks} - S_{pre}}$$

Keterangan:
S_{post} : score*posttest*
S_{pre} : score *pretest*
S_{maks} : maximum score [4]

Furthermore, the N-gain improvement criteria is shown on the Table 3:

Table 3. Category N-gain

Score N-gain	Category
g > 0,70	High
0,30 < g ≤ 0,70	Medium
g ≤ 0,30	Low

Hake [6]

RESULTS AND DISCUSSION

The following is a description of the research results and discussion:

1. Theoretical Feasibility of Student Laboratory Activity Sheet (*LKS*)

Validation on the criteria The contents of the *LKS* developed obtained the results of the assessment of *LKS* 1 with criteria very feasible in all aspects. Assessment of *LKS* 2 on all aspects of getting criteria is very feasible. *LKS* 3 get the criteria very feasible and feasible.

The result of *LKS* validation percentage developed on the content criteria obtained percentage of 86.14%, while the criterion of the construct obtained a percentage of 88.6%. Based on the validation results on the overall construction criteria on all aspects get a percentage of 86% - 62% with criteria very feasible and feasible.The validity of this construct consists of 3 aspects. The first contains aspects relating to the presentation of LKS. Aspects of this objective consisting of a logical and systematic LKS presentation, in LKS 1,2 and 3 get 62%, 80%, 80% percentage with eligible criteria.From these results indicate that *LKS* based inquiry is guided to trained students science process skills declared valid as a medium of learning [7].

2. Empirical Feasibility of Student Activity Sheet (*LKS*)

a. Practicality

The practicality of guided inquiry based LKS is obtained from student activities during the LKS pilot phase developed. The more dominant student activity at meeting 1 is on student activity conveying the pertinent variables about the experiments conducted obtaining the percentage of 9,23%.At the meeting the dominant activity 2 is on the student activity cooperate in his group to solve the problem of obtaining a percentage of 10.77%. At the meeting 3 obtained a percentage of 10.77% with the student activity convey the formulation of problems related to the phenomena presented in the LKSoriented process skills of students.

The practicality of guided inquiry based *LKS* is obtained from student activities during the *LKS* pilot phase developed.The result of percentage of student activity in conducting *LKS* test developed overall get 100% so it can be interpreted in very practical criteria (Riduwan, 2013). From these results show that *LKS* oriented inquiry is guided to trained students' science process skills otherwise practical as a medium of learning.

b. Effectiveness

Effectiveness results consist of student learning outcomes about multiple choice and component of science process skill and student response result. In the skill of determining the true solution, the suspension and colloid of the pretest result of the students in the experimental design have not been able to do so, whereas at posttest the learning outcomes in this component increased by 2.83 to obtain the n-gain value of 0.5 with the n-gain criterion Medium. Increased learning outcomes in the science-skills component components of true solvency, suspense and colloidal assignments showed 25% of high-gain n-gain categories, 67% obtaining moderate-gain n-gain, and 8% having low learning outcomes.Percentage effectiveness results consist of student learning outcomes about multiple choice and skill component of science process and student response result. For a multiple choice of 42% n-gain in the high category, 50% had moderate gain, and 8% had low n-gain gain. Then on the results of the learning component of the skill of the process of determining the true solution, the

suspension and colloids showed 25% of the acquisition of high category n-gain, 67% experienced a moderate improvement in learning outcomes, 8% experienced low learning outcomes.

The skill of proving one of the properties of colloids showed a 34% acquisition of high category n-gain, 58% obtaining moderate-gain n-gain, and 8% having low learning outcomes. While the improvement of learning outcomes in the skill component of the student colloid making process showed 33% high gain n-gain category, 50% obtained n-gain with moderate category, and 17% experienced a low learning result improvement. This happens because before conducting *LKS* trials, students able to perform the skill component of the process. This percentage includes interpreted in very valid criteria [4].

While student responses based on the student results, there are 5 aspects that get a percentage of 100% with criteria very feasible that is on aspects of this LKS make students feel curious and interesting to learn it. The overall response rate was 93%While the response of students earn a percentage of 92.7% in the response Yes while 7.2% get a response No. Based on these results so it can be interpreted in very practical criteria.

CLOSURE

Conclusion

Based on the appropriateness between the results of the analysis of research data with the formulation of the problem, it can be concluded that the feasibility of the developed *LKS* can be categorized as appropriate for use as a medium of learning with percentage of each criterion between ≤ 61% (Riduwan, 2013). Here is the elaboration of the feasibility of *LKS* developed:

1. Theoretical feasibility of *LKS* is obtained from the validation developed. The result of *LKS* validation percentage developed on the content criteria obtained percentage of 86.14%, while the criterion of the construct obtained a percentage of 88.6%. From these results indicate that *LKS* based inquiry is guided to trained students' science process skills is considered feasible theoretically as a medium of learning.
2. LKS empirical employability is obtained from the practicality and effectiveness of *LKS* The result of the percentage of practicality consists of student activities. The result of percentage of student activity in conducting *LKS* test developed overall get 100% percentage. While the effectiveness of *LKS* obtained based on Student Learning Results and Student Response. Student learning outcomes consisted of multiple choice questions with an average increase of 0.6 and a component of the science process skill consisting of the process of determining the true solution, suspension and colloid in each student and the Evidentiary Skill One of the Colloidal Properties of each increase in flat 0.6 that can be categorized in moderate category. From these results show that *LKS* oriented inquiry is guided to trained students science process skills declared as effective as a medium of learning. While the student response obtained percentage of 93%. From these results indicate that *LKS* based inquiry is guided to trained students' science process skills otherwise practical as a medium of learning.

Suggestion

1. The theoretical eligibility of *LKS* on the content criteria received the lowest percentage in *LKS* 1 does not reflect the aspect of the process skill, so it is suggested that further research should consider these aspects.
2. Empirical feasibility of *LKS* on the practicality of *LKS* on the lowest student activity is the conveying skill

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