

Learning Development Tools Based On Guided Inquiry To Improve The High School Students Skills On Critical Thinking Of Materials In Colloidal System

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Abstract. This study aims to produce a Guided Inquiry based instructional device that is feasible to apply in school. The development model used is a 4D development model that is limited to three stages: stage1) Define, aims to identify and develop an understanding of the needs of learners,2) Design stage (Design) aims to prepare a learning device based Guided Inquiry, 3) Development phase (Develop) aims to produce the development of learning devices based Guided Inquiry which has been revised based on input from validation experts by 4 validators on colloidal material system high school. The results showed that the development of Learning Tools based Guided Inquiry colloidal material system in high school this after a double revision of the validator, with a Percentage of content validation score of 87.22% with very reasonable criteria.

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I. Introduction

Education plays an important role in improving the quality of human resources. In order to have a high competitiveness, one of the steps taken by the government in improving the quality of human resources by making the Indonesian National Qualification Framework (KKNI). In the Indonesian National Qualification Framework consists of 9 (nine) levels of qualification, starting from qualification 1 as the lowest qualification and qualification 9 as the highest qualification. Where the achievement of learning in upper secondary education (SMA) at least on the qualification level 2 while for undergraduate level (S1) in college at least on level 6 qualifications.

Based on this level of qualification, learners in secondary education must have at least a minimum of basic knowledge and factual knowledge in the field of science, while education in college requires a minimum of students to be able to take a decision based on the results of information analysis in the field of science. Achievement of qualifications from the middle to the college level requires the improvement of students' thinking ability.

Therefore learning in upper secondary education needs to be trained to develop critical thinking skills to go to the college level at the 6th qualification level so that it will help learners to train to analyze a problem in their field of science ([1]).

Some competencies and skills that must be owned by XXI XXI human resources based on "21st Century Partnership Learning Framework", one of which is critical thinking (Critical-Thinking) able to think critically, laterally and systemically ([2]).

The findings in the field show that: (1) The absence of high school chemistry learning tools that facilitate the students maximally to train develop critical thinking skills, (2) Teachers also have difficulties in enabling learners to apply the 5M learning process, as well as directing learners to want to develop a high curiosity, even though the teacher has been trying to foster the curiosity of learners through pictures, videos, questions, but only some learners are interested, (3) In addition, the education process so far has not been directed to form human intelligent, creative, have the ability to solve problems in life faced, and not directed to form a creative and innovative human ([3]).

For that reason it is deemed very necessary a teacher in implementing the learning process in the classroom first prepare the learning model that poured in the learning device. In the preparation of curriculum learning tools 2013 learners should be actively involved in learning in the classroom and assessed simultaneously and interconnected between the realm of knowledge, attitude and skills.

One of the models suggested in the 2013 curriculum is guided inquiry model. In guided inquiry, the teacher no longer acts as the information giver and learners as the recipient of the information, but the teacher

makes a lesson plan or experimental steps. Learners experiment or investigate to find concepts that have been determined by the teacher ([4]).

With this inquiry learning is expected learners maximally involved directly in the process of learning activities, so as to improve critical thinking skills and develop a confident attitude. The objective of this research is to produce learning tools based on guidance inquiry that is valid, practical and effective in improving critical thinking skill of the learner.

II. Method

This research is a research development or research and development. The development model in this research is adapting to the development of 4-D model device (four D model) ([5]). This model consists of 4 development stages: Define, design, development, and disseminate. This 4-D model is chosen as a reference because it is more appropriate to develop learning tools, has a complete description, systematic, simple, easy to understand, and in its development involves expert judgment.

First, difine is done to apply and define learning requirements consisting of preliminary analysis of learners' analysis, conceptual analysis and objective learning analysis. Second, the design is done to prepare and design the tools such as: (1) the preparation of syllabus (Learning Program Plan) is done by referring to K-13 by inserting guided inquiry model.2) Preparation of RPP is guided by K-13 with guided inquiry model. 3) preparation of LKS with guided inquiry synthesis by including critical thinking indicator. (4) preparation of assessment of the instrument in the form of validation sheet, learning device implementation, teacher and teacher response questionnaire to learning tools and instruments about critical thinking skills.

Third, develop aims to produce a revised draft learning tool based on the input of experts and practitioners. The test subjects consisted of high school students of SMA / MA from 2 schools. Trials are divided into several stages. In the experimental validation phase of the experimental subjects conducted by 4 experts, at the trial stage of the user (practitioner) the subject of the experiment is the teacher, then in the test phase of effectiveness are the students of grade X1 IPA SMA.

The research instruments used to collect this data consist of: validation sheet, learning activity learning sheet, student response questionnaire to LKPD, teacher's response questionnaire to learning device and critical thinking skill test question. The variables observed and tested in this study are validity, practicality and product effectiveness and instrument feasibility. The analysis technique used in this research is quantitative descriptive analysis to determine the value of validity, effectiveness and practicality of the developed product.

III. Results And Discussion

The result of validity test and empirical grain about critical thinking skill in analysis with point-biserial correlation formula obtained result 30 valid question because $r_{tcount} > r_{tabel}$ ([6]). Furthermore the results of test reliability are calculated by using the formula K-R 21 in obtaining the result of 0.86 thereby the test has high reliability ([7]). Devices developed in validation by 4 validators and the results can be explained as follows. Device tool validation results are presented in Table 1 below.

Table 1. Device Validation Results Learning

No	Devices in The Validation	% Average Score	Category	Description
1	Syllabus	80,6%	Very Good	Proper to Use
2	RPP	77,8%		
3	LKPD	83,75%		
4	Instrument Assessment	83,3%		

From Table 1 shows the validation results of constructs and validation of instructional content in the form of syllabus, RPP, LKPD and assessment instruments conducted are in very good category and suitable for use as according to the preparation of guided inquiry based learning devices. The practicality and effectiveness of instructional tools can be identified from (1) the implementation of learning tools, (2) the response of learners and teachers. The device is said to be practical when the average is $> 80\%$.

The results of validation of learning tools in the form of syllabus, RPP, LKPD, assessment instruments conducted are in very good category and feasible to be used because in accordance with the guidance of the preparation of learning devices based on inquiry guided. The findings of this study are in line with previous research by Jaya ([3]) that the device developed with guided inquiry setting to improve the character and student learning outcomes is very valid. Practicality of the device can be known from the observation of the implementation of learning responses of learners and teachers with percentage $> 80\%$.

In addition, the results of the study also found that learning tools developed effectively improve critical thinking skills. This is supported by the results of research conducted by Jannah (2012) obtained the results of research development of value-oriented character tools through effective guided inquiry to improve the mastery of the concept of IPA. Effectiveness is due to the learning that is done with the guided inquiry activity of the

learner becomes more active and directly involved in the learning and trying to understand the concept of learning with the findings themselves.

IV. Conclusion

Based on the research design that has been done can be concluded that the development of guided inquiry based device developed using 4-D model to produce a valid product, effective and practical in increasing the ability of critical thinking.

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