



Teacher Training For Making Higher Order Of Thinking Tests

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ABSTRACT

Higher Order Of Thinking (HOT) based tests are very necessary for students, because in addition to increasing student understanding, HOT-based learning instruments can also improve the abilities and skills possessed by students. Therefore, partners need debriefing to facilitate the preparation of the HOT-based test. The purpose of this training is to hone the teacher's skills in preparing HOT-based tests and find out the participants' responses to the activities carried out. The stages of community training activities are: coordination of the implementation team with partners and LPPM Unsyiah, preparation of materials, identification of problems by partners, training of teachers, data analysis and reporting of activities. The subject of this training is Physics Teacher at the state senior high school in Meulaboh. The target of this activity is to equip partner teachers with basic knowledge and experience in developing HOT-based tests, able to properly compile HOT-based physics questions. The outputs produced are (1) service report; (2) HOT question preparation module and (3) Articles that will be published in the Journal. The results of the training activities carried out went well, targets that had been set previously had been achieved well. Physics teachers already have the knowledge to develop HOT-based questions and will continue to develop further. Through the results of the questionnaire analysis the responses of the participants obtained good responses. Where the physics teacher at state senior high school in Meulaboh felt helped by the existence of this training activity and wanted to be applied in the learning process.

Keywords: teacher training, test making, physics education

INTRODUCTION

Teachers who are in the western part of Aceh province are generally the same as teachers in all Aceh provinces. Carrying out the duties of teaching students, each teacher is required to continue to develop the skills they have to improve the professionalism of the teacher. Therefore, the teacher must do things or activities that can improve the professionalism of the teacher. To be able to improve the professionalism of a teacher, one of them can be done through the existence of a teacher professionalism training program. This training program is rarely held specifically to improve teacher specific abilities. Therefore, the Service Team of the Department of Physics of teacher training and education faculty Universitas Syiah Kuala took the initiative to conduct teacher training in the western region of Aceh province to improve the ability of teachers in the western region of Aceh province.

Based on the results of the international study Program for International Student Assessment (PISA) shows the achievement of reading literacy (reading literacy), mathematical literacy (mathematical literacy), and scientific literacy (scientific literacy)

achieved by Indonesian students is very low. In general, the ability of Indonesian students is very low in: (1) understanding complex information; (2) theory, analysis, and problem solving; (3) use of tools, procedures and problem solving; and (4) conduct an investigation (Brookhart, 2010).

Higher Order of Thinking (HOT) or high-level thinking ability is one aspect that must be possessed by students. HOT is a way of thinking that no longer just memorizes subject matter, but analyzes, synthesizes, associates, and draws conclusions which ultimately create creative and productive ideas (Hidayati, 2018). Training students to apply HOT can help students solve problems both at school and the future of the student.

The HOTS concept has supported several developments and the factors that contribute to the development of HOTS in students have been the subject of study over the past few years (Rajendran, 2001; Magno, 2011; Fischer, Bol & Pribesh, 2011; Kondak & Ayden, 2013). There have been many studies on HOT, including, Shidiq (2015) analyzing HOT using two tier multiple choices, Gais dan Alfriansyah (2017) analyzed the students' initial ability to solve HOT, Rapih dan Sutaryadi (2018) questions about the teacher's perspective on HOT skills, Fanani (2018) examined the HOT problem development strategy in the 2013 curriculum, Kusuma (2017), regarding the development of HOT instruments), Usmaedi (2017) regarding the effect of HOT on student learning outcomes and many other studies on the HOT. From these studies it was found that HOT applications are needed for students. Because in addition to increasing student understanding, HOT-based teaching instruments can also improve the abilities and skills possessed by students. Therefore, HOT is very important to be applied in educating students.

Problem of Research

The formulation of the problem in community service is: (a) how to hone the skills of physics teachers in compiling HOT-based tests that are carried out? and (b) What is the response of the participants in this community service activity to the workshop that was held?.

Research Focus

High Level Thinking Ability

The Higher Order Thinking (HOTS) is a thought process that requires students to manipulate information and ideas in a certain way that gives them new insights and implications (Gunawan, 2012: 171). According to Hidayati (2018), thinking is high or Higher Order Thinking Skills (HOTS) is a way of thinking that no longer only verbally memorizes but also recognizes the nature of what is contained among them, to be able to mean the integralistic way of thinking needed by analysis, synthesis, association to draw conclusions towards creative and productive creation.

Based on some of these opinions, it can be concluded that HOTS is the ability to think that is not just remembering, restating, and also referring without processing, but the thinking ability to critically, creatively analyze information. creative and able to solve problems.

Taxonomy Thinking

The most commonly used taxonomy of learning in the cognitive domain is Bloom's taxonomy. Benjamin S Bloom divides the learning outcome taxonomy into six categories, namely: a. Knowledge, b. comprehension, c. application, d. analysis, e. Synthesis, and f. Evaluation. The level of understanding of students is considered to be tiered with the lowest level (C1): knowledge or remembering, to the highest level (C6): evaluation (Zohar dan Dori, 2003). Bloom's taxonomy after being used long enough to make instructional designs in the world of education, Anderson and Krathwohl (2000) reviewed the Bloom Taxonomy and made revisions as follows.

Table 1. Revision of Bloom's Taxonomy

Level	Bloom's level of taxonomy (1956)	Anderson dan Krathwohl (2000)
C1	Knowledge	Remembering
C2	Understanding	Understanding
C3	Applying	Application
C4	Analysis	Analyze
C5	Synthesis	Evaluates
C6	Evaluation	Creative

The taxonomic revision carried out by Krathwol and Anderson describes the difference between cognitive processes and knowledge dimensions (factual knowledge, conceptual knowledge, procedural knowledge and metagocnitive knowledge) (Zohar dan Dori, 2003). The taxonomic revision illustrates that those included in low-level thinking skills are remembering, understanding and applying. Whereas those included in high-level thinking skills are analyzing, evaluating and creating. This is in accordance with the dimensions of cognitive processes that are increasing from remembering to being creative.

Indicators of High Level Thinking Ability

Richland dan Simms (2015) states that indicators for measuring high-level thinking skills include:

1. Analyzing
 - a. Analyzing incoming information and dividing or structuring information in a smaller section to identify the process or its relationship
 - b. Being able to recognize the causes of factors and consequences of a complex scenario
 - c. Identify/formulate questions
2. Evaluate
 - a. Provide an assessment of solutions, ideas and methodologies using suitable criteria or existing standards to ensure the value of effectiveness or benefits
 - b. Make a hypothesis, criticize and do testing
 - c. Accepting or rejecting a statement based on established criteria

3. Creative

- a. Make a generalization of an idea or perspective on something
- b. Design a way to solve the problem
- c. Organizing elements or parts into new structures that have never been before.

Measuring High-Level Thinking Ability

High-level thinking skills include the ability to solve problems (problem solving), critical thinking skills (critical thinking), creative thinking (creative thinking), ability to reason (reasoning) and decision-making abilities (decisionmaking). The ability to think at a high level is one of the important competencies in the modern world, so that it must be owned by every student. Creativity in solving problems in HOTS consists of:

1. Ability to solve problems that are not familiar;
2. Ability to evaluate the strategies used to resolve problems from different points of view.
3. Find new completion models that are different from the previous one.

'Difficulty' is not the same as a higher order thinking. The level of difficulty in the item is not the same as the high level of thinking ability. For example, to know the meaning of a word that is not common may have a very high level of difficulty, but the ability to answer these problems does not include higherorder thinking skills. Thus, HOTS questions are not necessarily questions that have a high degree of difficulty.

METHODOLOGY OF RESEARCH**General Background of Research**

In this section, several stages of the community service process will be described, namely: (1) coordination of the implementation team with partners and LPPM Unsyiah, preparation of materials, (2) identification of problems by partners, training of teachers and reporting of activities.

The method used in this service activity is (a) lecture by displaying slides using Infokus; (b) discussion, question and answer about the preparation of HOT-based questions; (c) Workshop on the preparation of physics-based questions The questions made by the teacher were analyzed by the service team then suggested improvements in accordance with the procedure for preparing HOT questions.

This research was conducted at the West MGMP, namely state senior high school in Meulaboh, located at Jalan Imam Bonjol, Drien Rampak, Johan Pahlawan, West Aceh Regency. This service is held from December 20, 2018 to March 20, 2019.

Subject of Research

The subject in this research was Physics Teacher of state senior high school in Meulabohas many as 25 people.

Instrument and Procedures

The instrument used to collect data in this service is a closed and open questionnaire. Questionnaire for the response of community service participants consisting of two parts. The first part of the workshop in general consisted of 14 questions with four choices of answers and the second part about the suggestions of the father or mother for the perfection of this activity in the future. The questionnaire in the second part is open.

Data Analysis

Questionnaires are used to obtain information relating to the opinions of teachers about the implementation of workshops and suggestions for improving the next activities. The response data was analyzed using 4 choices consisting of 4 = yes, 3 = yes in part, 2 = same, and 1 = no (Sugiyono, 2011).

RESULTS AND DISCUSSION

To hone the teacher's skills in arranging HOT-based tests, partners need debriefing to facilitate the preparation of the HOT-based test. This briefing can be packaged in the form of HOT-based test making training. Through this training activity partners gain knowledge and experience about making HOT-based tests.

1. Analysis of the Results of the Average Assessment of trainees

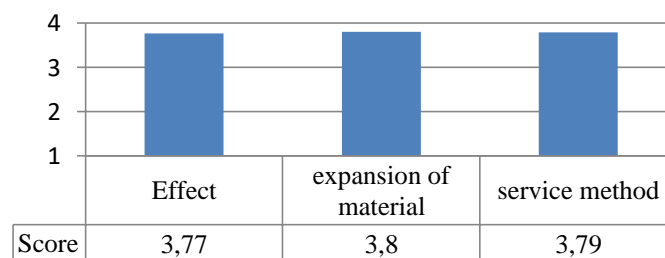


Figure 1. Results of the Average Response of Training Participants

Based on the results of the analysis of the participants' assessment of independent service activities, it was found that:

- Participants considered that this Training had an effect or impact on the overall participants with an average score of 3.77 including the answer category.
- Participants rate that the HOT Question Preparation Material can be expanded or continued at the next meeting with an average score of 3.87 including the answer category yes.
- Participants assessed that the method performed by service providers during the training was very good with an average score of 3.79 including the answer category yes.

2. Analysis of the participant's average assessment of the effects/effects of training.

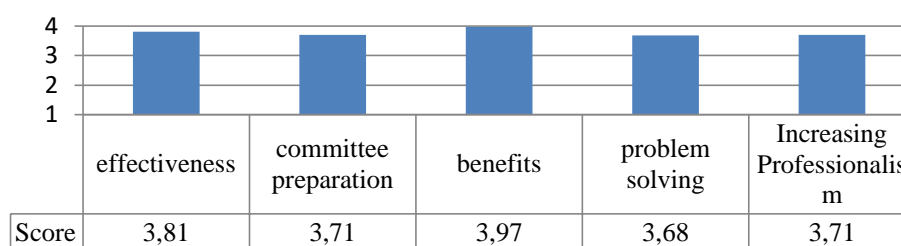


Figure 2. Average Results of Assessment of the effects / effects of Training

Based on the results of the analysis of the participant's assessment of the effects or effects of independent service activities, it was found that:

- Participants considered that participants attended the training smoothly with an average score of 3.81 including the answer category "yes".
- Participants considered that the preparation provided by the committee could help participants to participate in this activity smoothly with an average rating of 3.71 including the answer category.
- Participants considered that this workshop was useful for teachers in order to enrich teaching materials in schools with an average score of 3.97 including the answer category "yes".
- Participants considered that this workshop activity could overcome the difficulty of understanding Physics material in textbooks in Schools with an average rating of 3.68 including the category "yes".
- Participants considered that this workshop activity could improve participant professionalism with an average rating of 3.71 including the category.

3. Analysis of the average assessment of participants on HOT preparation material that is good to teach if this activity is expanded /continued

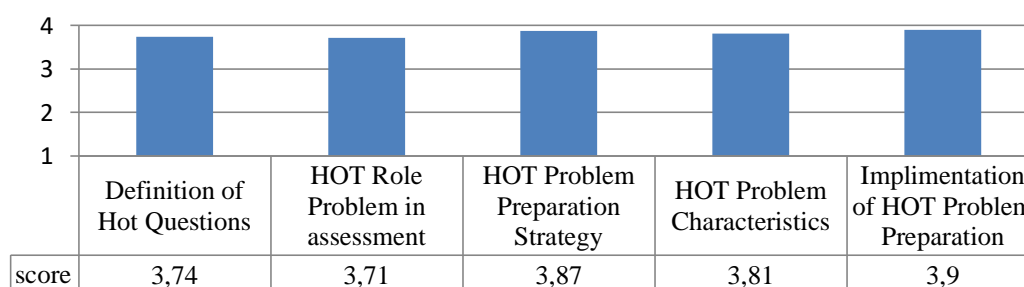


Figure 3. Results of Average Assessment of HOT Question Preparation material

Based on the results of the analysis of the participant's assessment of the HOT Question-preparation material to be taught if this activity was expanded / continued it was found that:

- Participants rate that understanding of HOT questions to be expanded / continued.

- b. Participants rate the role of HOT questions in the assessment to be expanded / continued.
- c. Participants assessed that the strategy for preparing HOT questions to be expanded/ continued.
- d. Participants assess that the characteristics of HOT questions are extended/continued.
- e. Pesrta assesses that the implementation of the soa arrangement; HOT that requires activities to be expanded/continued.

4. Analysis of the average participant's assessment of the method carried out by tutors (lecturers) during the training

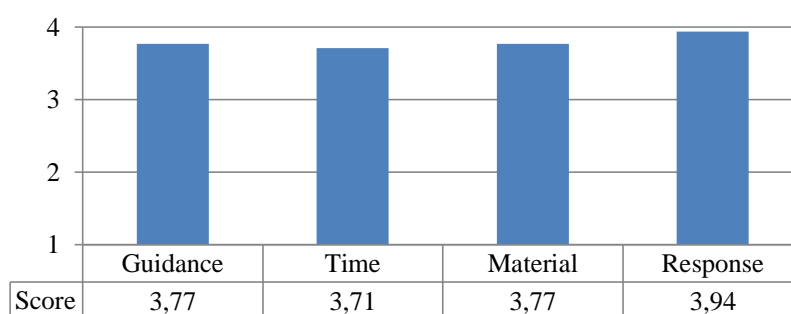


Figure 4. Average Results Assessment of methods carried out by tutors (lecturers) during training (lecturers)during training

Based on the results of the analysis of the participant's assessment of the method conducted by the tutor (lecturer) during the training it was found that:

- a. Participants assess that the guidance provided by the tutor is easy to understand
- b. Participants assess that the tutor provides sufficient time to discuss and answer questions
- c. Participants considered that the material provided by the tutor during the training was easy to understand and understand.
- d. Participants assess that the way the tutor listens, responds, explains the answers so that they can facilitate and understand the content of the training.

CONCLUSIONS

The conclusion that can be conveyed by the servant is that the service activities carried out by the servants go well. The previously set targets have been achieved well. Through the results of the participant espon questionnaire analysis, participants gave a good response. Where partners feel helped by this training activity. Suggestions that can be given by researchers are, the holding of a follow-up program to see the results of the performance carried out by partners after getting directions from partners. This will be very helpful for further developments.

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