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Worksheet Performance Evaluation Oriented Scientific Approach

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Abstract Based on the findings in the field, those alternative examples of worksheet performance are rarely found, so a discussion about it is needed to increase examples and discussion materials on worksheet performance. In general, this article is to discuss theories within the framework of developing a worksheet performance evaluation oriented scientific approach. The method used in this article is a literature study, in which theories about performance work sheets are discussed. The theoretical references obtained by researching the study of literature are made as the basic foundation and the main tool for future research. Based on the literature study, several theories discussed include (1) the concept of learning assessment, included; Learning Assessment Concepts, Principles of Learning Assessment, Performance Rating, Steps for Implementing Performance assessment, Methods and ways of assessing assessment performance, Rubric. (2) The concept of student worksheet, included; Definition of Worksheets, Worksheet Principles, Worksheet Components, Worksheet Quality Criteria, Steps for preparing the Worksheet. (3) The concept of scientific approach (1) Definition of Scientific Approach and (2) Steps of a Scientific Approach. It is hoped that the theories discussed above can be a reference for other researchers in developing worksheet performance products in the learning process that are oriented towards scientific approaches or other approaches.

Keywords Worksheet, Performance Evaluation, Scientific Approach

1. Introduction

Changes in curriculum and age have resulted in students learning not only focused on the area of cognitive competence, but also re-emphasized on the affective and performance aspects. There is no meaning if students are

directed to be cognitively smart but have bad attitudes and are not skilled at communicating their knowledge.

As we all know that the application of learning in elementary schools has been provided by teacher books and student books by the government (in Indonesia), where all forms of learning design, content and assessment have been determined by the government, however, the concern is for the assessment aspects of the teacher's book, especially the availability of alternative performance assessment to measure the psychomotor aspects/ skills of students which are very rarely found. The teacher book only provides a few examples of performance assessment, and the teacher's task is to develop/ innovate further.

As a lecturer in the Elementary School Teacher Education study program and in charge of teaching evaluation courses in elementary school over the past four years, researchers found the tendency of problems from prospective elementary teacher students, related to performance assessment studies in this course, namely (1) students find it difficult to find examples/literacy design related to variations in performance assessment, (2) students need repeated time to accept the explanations of researchers (as instructors) to understand how to make / develop performance assessment, and (3) only under 30% of students can understand step by step development of performance assessment at the end of the meeting schedule which addresses the assessment of psychomotor. This is very worrying, because the final achievement of learning evaluation courses is that students can produce process and outcome assessment tools, where one of the process assessment tool is a performance assessment. Besides that, it is the job of prospective teachers to be able to master the making/ development of these performance assessments.

From the above problems, in the assignment of the same course in odd semester 2018/2019, the researchers took the initiative to draft a worksheet/ performance assessment to guide students to learn step by step to develop performance assessment, starting from the analysis of basic competencies, development of indicators/ learning

objectives, to make a rubric along with the criteria to learn. Based on this method, it turns out that it can improve student learning outcomes, especially in the development of performance assessment competencies (60% of students complete during three meetings discussing performance assessment).

In research by Kurt [1] using worksheets can make students find their own knowledge (constructivism). Other research also regarding the benefits of worksheets helping to simplify the concept of material to develop students' mindsets [2].

Through this article, the researcher seeks to study theories in order to make the most of the draft worksheet performance assessment that has been available so far. Then to enhance innovation, the researcher orientates to the scientific approach variable, meaning that the discussion does not only focus on the form of assignments making performance assessment, but this article also gives readers an overview of the components of a scientific approach that includes with activities of observing, questioning, reasoning, creating, presenting / communicating [3].

2. Materials and Methods

This research belongs to the type of literature study research by finding theoretical references related to predetermined goals. Literature study is a method used to collect data or sources relating to the topics raised in a study. The theoretical references obtained by researching the study of literature are made as the basic foundation and the main tool for future research.

The type of data used by the author in this study is primary data from journals and documentation books. Documentation is a method for finding documents or data that are considered important. Some of the concepts that were studied were (1) the concept of learning assessment, (2) the concept of student worksheet, and (3) the concept of scientific approach.

The concept of learning assessment based on the theory from William [4]; Cullogh [5]; Ministry of National Education [6]; the Ministry of Education and Culture [7]; Poerwanti [8]; and Hibbard [9]. Then, the concept of student worksheet based on theory from Trianto [10]; Widyantini [11]; Prastowo [12]. Then for the concept of scientific approach based on Akbar [3].

3. Discussion

3.1. Learning Assessment

3.1.1. Learning Assessment Concepts

Learning assessment is the application of various methods and test / non-test tools to obtain and process information about learning outcomes with certain criteria and considerations for the basis of evaluation. Assessment can also be interpreted as a tool to improve learning

activities in accordance with student needs [4], assessment is a way to determine learning priorities for students and the achievement of a learning program [5].

3.1.2. Principles of Learning Assessment

According to Ministry of National Education [6] and the Ministry of Education and Culture [7], among others: (1) Valid, valid means that the assessment tool must assess what should be assessed to measure competence; (2) Reliability, related to the consistency (constancy) of the results of the assessment, to ensure consistency, and reliability of the tools; (3) Objective, based on clear and not subjective procedures and criteria; (4) Fair, means the assessment is not favorable or detrimental to various conditions of students (due to physical, socio-economic, and *SARA* conditions); (5) Integrated, assessment is an integral part of learning; (6) Open, assessment procedures, assessment criteria, and basis for decision making can be known by interested parties; (7) Comprehensive and continuous, means that the assessment covers all aspects of competence to monitor and assess the development of students' abilities; (8) Systematic, means that the assessment is carried out in a planned and gradual manner by following standard steps; (9) Accountable, means that the assessment can be accounted for, both in terms of mechanisms, procedures, techniques, and the results.

3.1.3. Performance Rating

3.1.3.1. Definition of Performance Assessment

Performance assessment is carried out to assess the tasks performed by students, so the teacher can have complete information about students. Performance assessment is an assessment that emphasizes measuring psychomotor or student skills. This assessment is done to assess the tasks performed by students [8]. According to Hibbard [9], performance tasks require (1) the application of concepts and other important supporting information, (2) work culture that is important for scientific study or work, (3) scientific literacy (the appearance of scientific infertility). Performance assessment requires students to demonstrate their scientific inquiry activities, conduct reasoning and skills in completing various tasks [8].

3.1.3.2. Good Performance Assessment Design

The performance assessment criteria are as follows: (1) Focusing on the important teaching elements; (2) In accordance with the contents of the curriculum referred to; (3) Integrate information, concepts, skills and work habits; (4) Involving students; (5) Activating students' willingness to work; (6) Decent and appropriate for all students; (7) There is a balance between group work and individual work; (8) Well structured to facilitate understanding; (9) Having authentic (real-world) processes and products; (11) Incorporate self-assessment; and (12) Allows feedback and others [8].

3.1.3.3. Steps for Implementing Performance Assessment

In implementing performance assessment, several steps of implementation need to be considered, namely: (1) Identification of all important steps that are needed or that will influence the best outcome; (2) Write down the behavior of specific abilities that are important and needed to complete the task and produce the best outcome; (3) Try to make the capability criteria not too much so that all of the criteria can be observed as long as students carry out the task; (4) Clearly define the ability criteria to be measured based on students' abilities that must be observable or the

characteristics of the product produced; (5) Sort the ability criteria to be measured in the order that can be observed; (6) If there is, check again and compare with the ability criteria that have been made previously by others in the field [8].

3.1.3.4. Methods and Ways of Assessing Performance Assessment

To maximize the validity and reliability of performance assessment it is necessary to pay attention to the following figure 1 which will describe how to assess the performance assessment according to Hibbard [9].

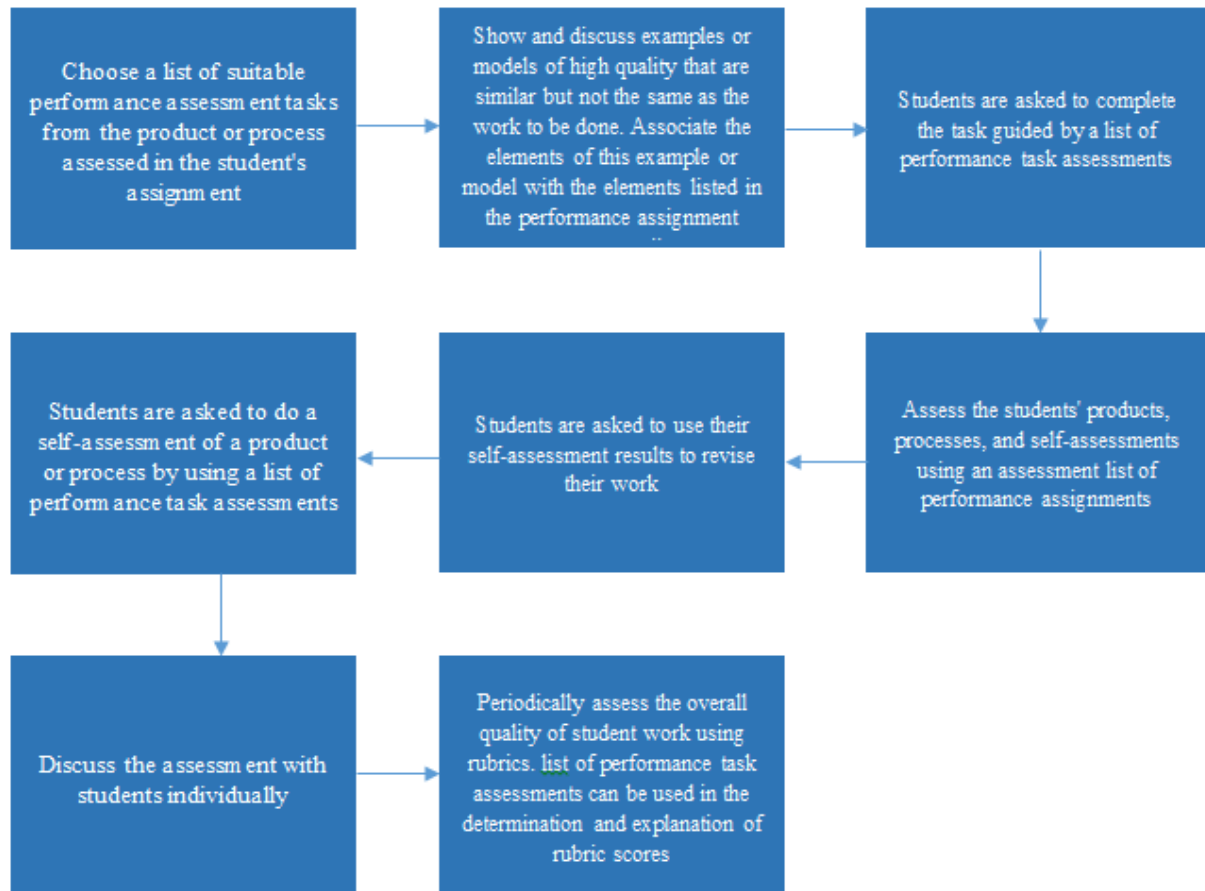


Figure 1. Methods and Ways to Assess Performance Assessment According to Hibbard (1995)

3.1.3.5. Rubric

To assess the overall quality of student work, rubrics are needed. Rubric is a scoring guideline used to determine the level of proficiency of students in doing assignments. As for the types of rubric that can be used, for example (1) rubric with checklist and (2) rubric with rating scale (numerical rating scale, graphic rating scale, and descriptive rating scale).

3.1.4. Problems in Designing and Using Performance Assessment

3.1.4.1. Validity

The complexity of performance assessment usually causes several problems related to the collection of valid data, unlike multiple choice tests, the complexity of the tasks and abilities to be measured in a performance assessment can cause problems in scoring and representing the domain to be measured. Therefore, it is absolutely necessary for a validation activity by the expert to actually state that the assignment points of this valuation already represent the indicators of the domain being measured.

In order to get a valid evaluation tool, performance tasks must have the following criteria [8]: (1) focusing on the important teaching elements, (2) in accordance with the contents of the curriculum being referred to, (3) integrating information, concepts, skills, and work habits, (3) involving students, (4) activating students' willingness to work, (5) decent and appropriate for all students, (6) there is a balance between group work and individual work, (7) is well structured to facilitate understanding, (8) has authentic processes and products, (9) includes self-assessment, (10) allows feedback from others.

3.1.4.2. Reliability

The problem in terms of reliability is the extent to which student scores can reflect true abilities and are not the result of measurement errors. This problem can be minimized if the scoring guidelines for performance assessment are made and defined as well as possible and also before the scoring beginning a user trial (rater) is conducted first.

3.1.4.3. Fairness

The next problem is related to fairness. Every test used to measure a student's ability must consider that each student has equal access to the opportunity to learn, practice, and use the tools needed to do the assignment in the test. It is intended that every score obtained by students is fair.

3.2. Student Worksheets

3.2.1. Definition of Worksheet

Worksheets is part of the learning device that is supporting the implementation of learning, in the form of sheets which contains a summary of the material,

guidelines that are inquiry and problem solving through an activity-performing and there are votes in it [10]; [11]; [12].

3.2.2. Worksheet Principles

Some Worksheet principles used in this study include: (1) Information should 'inspire' students to answer/ do assignments; (2) Statement of the problem should really require students to find ways/ strategies to solve the problem; (3) Questions/ commands should stimulate students to investigate, find, solve problems, and/ or imagine / create; (4) Questions may be open or lead (guide) [13].

3.2.3. Worksheet Components

Some of the components or parts of a Worksheet are (1) identity and achievement of competencies, (2) work instructions, (3) summary or supporting material, (4) assignments, (5) activity steps, (6) assessment [11]; [12].

3.3.4. Worksheet Quality Criteria

According to Hendro Darmodjo and Jenny RE [14] there are requirements (1) didactic (active students, inventions, scientific, varied, developing student competence as a whole, according to the evaluation principle), (2) construction requirements (grammar, completeness of components, conformity with the principles of workarounds, and their functions), and technical requirements (writing, drawing, appearance).

3.3.5. Steps for preparing the Worksheet

According to the Ministry of National Education [7] in Prastowo [12], steps for preparing the Worksheet are as follows: (1) Conduct curriculum analysis; (2) Prepare a map of the Worksheet needs; (3) Determine the titles; and (4) Compilation (in accordance with the completeness of Worksheet components (sub paragraph 3.2.3).

For this part of the assignment and activity steps (sub-paragraph 3.2.3), it can be used to be oriented towards various learning approaches or learning models, such as scientific approach, discovery or inquiry models, problem-based learning and so on. Regarding this article only discusses the scientific approach.

In the framework of embedding principles or steps from learning approach or learning models can be done by (1) determine the framework of worksheets and describing each syntax of various learning approach or learning models selected in the form of command/task sentences. One syntax, can be modified according into two or more commands / tasks.

3.3. Scientific Approach

3.3.1. Definition of Scientific Approach

The scientific approach (scientific) is also called the scientific approach, the search method is absolutely

necessary, this method must be based on evidence from objects that can be observed, empirical, and measured with specific principles of reasoning [15]. The scientific approach is a mindset that has the stage of the existence of a problem obtained through observation, then formulates the problem by questioning, then makes reasoning in the form of constructing hypotheses or giving answers that are tentative (maybe right or wrong), then try or try to create, then present/communicate the results of the test creation [3]. According to Akbar [3], the scientific mindset can occur not necessarily in order, because not all problems can be solved by a scientific approach.

3.3.2. Steps of a Scientific Approach (Scientific Approach)

The steps of the positive approach include the activities of observing, asking/questioning, reasoning, creating, presenting/communicating [3]. This stage does not have to be sequential.

According to Akbar [3], the scientific mindset can occur not necessarily in order, because not all problems can be solved by a scientific approach. Rational phenomena can be approached with scientific thinking patterns, but for non-rational phenomena (outside the ratio area) of course they cannot always be approached scientifically. These steps will be explained in more details in the table below. The competency column developed in the above table can be used as a reference in developing tasks or performance instructions in the worksheet.

Table 1. Learning steps, learning activities and competencies developed in the scientific approach

| Learning Steps | Learning Activities | Competencies are Developed |
|---------------------------|---|---|
| Observe | Read, hear, listen, and see (without or with a tool). | Train earnestness, patience, thoroughness and ability to distinguish between information that is general and specifically, the ability to think analytically, critically, deductive, and comprehensive. |
| Asking/Questioning | Asking questions about information that is not understood from what was observed or questions to get additional information about what was observed. (Starting from the question of factual until all questions that are hypothetical) Encourage the existence of investigation, research, in-depth study or exploration. | Develop creativity, sense of want to know, the ability to formulate questions to establish critical minds who need to live smart and learn throughout life. |
| Reasoning | Connecting things with the others to take the conclusions. Push to explore more distant (elaborate) exploration that has been carried out. Example <ul style="list-style-type: none"> • At location A like this, At location B like this, At location C how come this way. • So . . . The type can be inductive and deductive. | Develop the attitude of honest, conscientious, disciplined, obey rules, work hard, ability to apply the procedures and the ability to think inductively and deductively in concluding. |
| Create | Make something. (Hypothesis, the form of the work in writing or media other). The orientation is to answer the questioning stage. | Develop creativity and honesty and appreciation for the work of others. |
| Presenting | Delivering the results of observations/ideas/ experience in oral, written, or media more to others. | Develop the attitude of honest, conscientious, tolerance, the ability to think systematically, expressing opinions with brief and clear, and develop the ability to speak that is good and true. |

Sources: (Akbar, 2013: 14) and (Ministry of Education and Culture. Reconstruction of Learning Process, 2013: 12-14).

4. Conclusions

This research belongs to the type of literature study research by finding relevant theoretical references. Based on the literature study above, several concepts are found to be used as a basis in developing a performance assessment Worksheet. Some of these concepts are Learning Assessment which includes (1) Learning Assessment Concepts and (2) Principles of Learning Assessment. This concept will be used as a basis for developing validity instruments. The next concept is Performance Rating which includes (1) Definition of Performance assessment, (2) Good Performance assessment Design, (3) Steps for Implementing Performance assessment, (4) Methods and ways of assessing assessment performance, (5) Rubric. This concept is used as a design reference for the development and construction of Worksheet components. To be more in depth, the concept of Performance Rating will also be elaborated with the concept of Student Worksheets which include (1) Definition of Worksheets, (2) Worksheet Principles, (3) Worksheet Components, (4) Worksheet Quality Criteria, (5) Steps for preparing the Worksheet. Then to give the enhance of innovation, Worksheet is also elaborated using the concept of Scientific Approach which includes (1) Definition of Scientific Approach and (2) Steps of a Scientific Approach.

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