

## **Development of Portfolio Assessment Instrument Subtheme Alternative Energy in Participans Fourth Grade Elementary School**

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### **Abstract:**

*This research and development aims to develop a portfolio assessment instrument that is feasible, valid and reliable. Research and development (R&D) refers to the theory of Borg and Gall. The research subjects included material experts, evaluation experts, linguists, teachers, and fourth grade students of SD Negeri 11 Metro Pusat. The instrument used was a questionnaire to measure the response to the appropriateness of the portfolio assessment. The final product of this research is a portfolio assessment instrument that has been validated by material experts, evaluation experts, linguists, and classroom teachers. The results showed that all items in the portfolio assessment instrument developed were feasible, valid and reliable.*

**Key Word:** *instrument, portfolio assessment, subtheme alternative energy*

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### **I. Introduction**

The success of a country to be able to compete in this globalization era is determined by the success of managing its human resources (HR). The demands of the industrial revolution in the 4.0 era in the 21st century need to be handled very wisely, because the challenges are getting tougher. One of the efforts to manage quality human resources is through education. In accordance with RI Law no. 20 of 2003 concerning the National Education System, article 1 which states that education is a conscious and planned effort to create an atmosphere of learning and the learning process so that students actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble character, and skills needed by himself, society, the nation and the State. It is clear that education is carried out with the aim that students can develop their potential.

The National Education Association (2002: 215) states that one of the 21st century skills is Learning and Innovation Skills which consists of 4 aspects, namely Critical thinking, Communication, Collaboration, and Creativity. Students are required to develop skills that focus on developing higher order thinking skills. So that all educational components starting from the curriculum, facilities and infrastructure will be meaningless if they are not supported by quality in managing learning activities. Learning activities are generally carried out by the presence of two interacting parties in the classroom, namely educators and students. The role of educators is very important for the formation of the personality, ideals, and vision and mission that become the life dreams of students in the future. Behind the success of students, there are always professional educators who provide great inspiration and motivation to themselves as a source of stamina and energy to always learn and move to catch up, achieve progress, make spectacular achievements in the history of human life.

Educator professionalism can mean professional educators, namely an educator who is able to plan teaching and learning programs, carry out and lead teaching and learning activities, assess the progress of the teaching and learning process and utilize the results of assessments of teaching and learning progress and other information in improving the teaching and learning process (Sahabuddin in Rahman et al, 2014: 191). This means that broadly educators are required to master 3 aspects of ability, namely planning learning, carrying out learning, and evaluating learning or carrying out assessments (assessments).

The assessment is carried out by the teacher in accordance with the planning and implementation of learning. The assessment system must be developed in accordance with the development of the curriculum. The purpose of the assessment is to determine the student's ability to master the learning objectives that have been set and to find out which parts of the teaching program are weak that need improvement. One way that can be used in the assessment is to use data collection techniques in the form of tests, but they only emphasize the

concept (cognitive). In the implementation of the 2013 curriculum, an assessment is needed that can be used to assess all aspects as a whole (comprehensively) in learning.

The assessment is carried out starting from the input, process, to the output of students in learning or known as authentic assessment (Kemendikbud, 2013: 3). One form of authentic assessment in learning that is supportive and appropriate for assessing and the learning process of students is portfolio assessment. According to Hamzah B Uno (2014: 26) a portfolio is a continuous assessment based on a collection of information that shows the development of students' abilities in a certain period. The function of portfolio assessment according to Budimansyah (2012: 4) is (a) the development of student responsibility in learning, (b) expansion of the learning dimension, (c) renewal of the teaching-learning process, (d) emphasis on developing student views in learning.

Portfolio assessment provides opportunities for students to be more actively involved and students can easily control the development of the abilities they have acquired. Students are able to plan improvements, find their own strengths and weaknesses, and the ability to use these strengths in overcoming the weaknesses that exist in students. The data collected is then used by educators to assess and see the development of the abilities and academic achievements of students in that period. For educators, a file containing the development of students will provide input for the assessment process in improving learning methods, methods, and management in the classroom. Through the analysis of portfolio files, the teacher can find out the potential, character, strengths, and weaknesses of the students themselves. This file can be a basis for correcting and correcting the strengths and weaknesses in the learning process and mastery of a basic competency or subject.

The learning approach according to Komalasari (2010: 54) states that the learning approach can be interpreted as a starting point or our point of view towards the learning process, which refers to the view that the process occurs which is still very general. According to the Ministry of Education and Culture (2013: 59) in accordance with the 2013 Curriculum, classroom learning activities use a scientific approach and various learning models that involve students actively developing competency in knowledge, attitudes, and skills. Implementation of 2013 Curriculum according to Permendikbud No. 81A Year 2013 general guidelines for learning state that portfolio assessment is a continuous assessment based on a collection of information that shows the development of learners' abilities in a certain period.

The information obtained can be in the form of students' work, observations, student work that is devoted to portfolios, and individual work results from a learning process that is considered the best. Portfolio assessment basically assesses the work of individual students in one period for a subject, then collected and assessed by educators with students at the end of the period. Based on this development information, educators and students themselves can assess the development of their own abilities and make continuous assessment improvements based on a collection of information that shows the development of their abilities within a certain period. Portfolio assessment provides opportunities for students to be more actively involved and students can easily control the development of abilities that have been obtained based on a collection of portfolios. Students are able to plan improvements, find their own strengths and weaknesses.

The results of interviews globally with grade IV educators at SD Negeri 11 Metro Pusat who are also one of the respondents obtained information that educators have used a project model in the learning process in the classroom, namely students carry out analysis tasks on problems, then explore, collect information, and etc. Educators have given assignments to students which are done in groups. Some educators have implemented a portfolio assessment (assessment) but it is not optimal. Educators also consider it necessary to make a portfolio that is in accordance with school conditions and for the benefit of feedback for the educator concerned so that it can improve the quality of learning.

The various descriptions above have very much illustrated how the condition of educators in measuring the achievement of competence in students. So it is necessary to develop instruments that are more effective and easy to apply in thematic learning. The realization is in the form of "development of alternative energy sub-theme portfolio assessment instruments for grade IV elementary school students".

## **II. Methods**

Method of the research that used in this study is research and development. The steps used in this research and development, the researcher carried out five steps due to limited time, energy and costs as well as the covid 19 pandemic which had an impact on learning in schools. The steps are initial data collection, planning, product draft development as well as expert validation and revision, small group trials, and product trial revisions.

The population in this study were all teachers and students fourth grade elementary school in Metro city. In this study, the sampling technique used was cluster random sampling technique. The selected sample was 4<sup>th</sup> grade teachers elementary school teachers who included in Metro Pusat district. The research instruments used were questionnaires. The questionnaire was used to obtain data about the feasible, validity and

reliability of the instrument. Validation tests conducted by material expert lecturers, evaluation experts, and linguists. Instrument validation uses the product moment formula with the formula

$$N = \frac{k}{Nk} \times 100\%$$

Information:

N = Percentage

kii = Acquisition score

Nkj= Score maximum

The results of the percentage of educator response questionnaire data were converted based on the criteria in the table as follows:

Presentase	Kreteria Kelayakan
84% -- 100%	Very feasible
67% -- 83%	Feasible
50% -- 66%	Feasible enough
33% -- 49%	Not feasible

Source : Arikunto (2013: 251)

Validity is a measure that shows the level of validity or validity of an instrument (Arikunto, 2010: 168). An instrument is said to be valid if it is able to measure what is desired and can reveal data from the variables being studied appropriately. This validity test has the aim of knowing the valid instrument items. This study uses a validity test with product moment correlation with rough numbers. The formula used is:

$$r_{xy} = \frac{N\sum XY - (\sum X)(\sum Y)}{\sqrt{\{N\sum X^2 - (\sum X)^2\}\{N\sum Y^2 - (\sum Y)^2\}}}$$

Information:

N = Correlation coefficient between item scores and total score

X = Item score

Y = total score

$r_{xy}$  = The correlation coefficient between variable X and variable Y

The criteria test is if  $r_{count} > r_{table}$  with  $\alpha = 0.05$  then the measuring instrument is declared valid, otherwise if  $r_{count} < r_{table}$  then the measuring instrument is declared invalid. The portfolio assessment instrument reliability test was conducted using the Cronbach Alpha method. To interpret the value of reliability with a correlation index using criteria:

**Table 1.** List of Interpretation "r" Coefficient

Koefisien r	Reliabilitas
0,80 – 1,00	Extremely Strong
0,60 – 0,79	Strong
0,40 – 0,59	Medium
0,20 – 0,39	Weak
0,00 – 0,19	Extremely Weak

Source: Sugiyono (2009: 257).

The level of reliability is indicated by a number called the reliability coefficient value. High reliability is indicated by a value close to number 1. Reliability is considered satisfactory if  $\geq 0.60$ .

### III. Result

#### Research Results

The results of the research and developments a product portfolio assessment instrument on learning theme 2 "Selalu Berhemat Energi", sub-theme 3 "Energi Alternatif" in grade 4<sup>th</sup> Elementary School.

The initial stage of the research was carried out by collecting data in the form of interviews and questionnaires for teachers of Elementary School. Data obtained that most teachers have not used portfolio assessment for classroom learning assessment, the assessment instrument used does not include clear

instructions for them. The teacher has never developed a portfolio assessment instrument, the teacher has only used an assessment instrument from the teacher's book, the teacher says it is necessary to conduct a portfolio assessment, and there is a need to develop a portfolio assessment instrument.

Based on the results of the preliminary research, the researchers concluded that it is necessary to develop portfolio assessment instrument subtheme alternative energy so that the development of this assessment instrument can be an alternative assessment instrument used to assess the skills of students.

### **Planning**

The results of the planning stage that has been carried out by researchers are the preparation of an instrument framework, preparation of an assessment rubric, preparation of assessment instruments, assessment of development instruments.

### **Development of a performance assessment instrument**

The development of the initial product format was carried out in accordance with the prepared instrument framework.

### **Product Trial**

Initial product trials were conducted to test the validity of the evaluation, material, and language aspects. Product validation tests were carried out using questionnaires by material experts, evaluation experts, and linguists, as well as teachers. The evaluation validation got a score of 77 which is included in the good category. Material validation got 84.4 points with the very good category. Language validation has a value of 90.4 in the very good category and validation by field practitioners, namely grade IV teachers, has a valid category for every aspect. The validator also provides suggestions and input on portfolio assessment instrument proces and products.

### **Product Revisions**

Based on the advice of the validator, the researcher refined the portfolio assessment instrument according to the suggestions that had been given. Based on the advice of the linguist, several revisions were made, namely improving word choice, sentence structure and sentence effectiveness and the use of punctuation marks. Based on the recommendation of the material expert, several revisions were made, namely improving the mapping of core competencies and basic competencies, changing the word in the title, fixing tables and figures. On the advice of the evaluation expert, several revisions were made, namely add an introduction to the instrument, add a table of contents, and correct the sentence in the usage guidelines.

## **IV. Discussion**

### **1. Development of portofolio assessment instrument subtheme alternative energy**

Development of portfolio assessment instrument subtheme alternative energy adapts five steps of ten steps R & D by Borg & Gall (1983: 781), with the following steps: 1) Initial information gathering 2) Planning 3) Product development 4) Material expert testing 5) Revision initial product. The R & D research steps used in this study were completed in the fifth stage, namely revising the initial product based on the results of field trials through expert and practitioner validation tests. This is due to time and cost limitations and is adjusted to the current situation and conditions that make it impossible to carry out tests on a large scale due to the application of social distancing. Based on these reasons, the researcher adjusted it to the actual research objectives and conditions.

The first stage is research and preliminary information gathering. The preliminary study in this research was conducted by observing, interviewing, and questionnaire to 6 grade 4<sup>th</sup> teachers at public elementary schools who were members of the Metro Pusat district. A preliminary study was conducted to examine the assessment tools used by teachers. Then an interview was conducted to find out how the teachers carried out the learning so far, whether the educator had done it conduct portfolio appraisals in learning. After researchers knowing the problems that occur, the researcher plans to develop a portfolio assessment instrument that will be used by educators as an alternative to learning assessment of students. Furthermore, the researcher arranges the initial product development of the portfolio assessment instrument, in this step the researcher sets out the development pattern that will be carried out in the portfolio assessment instrument.

Portfolio assessment instrument are structured into 6 lessons where each learning consists of several interrelated subjects. The development of the portfolio assessment instruments consists of several parts, are: (a) Cover, (b) Foreword, (c) Table of contents, (d) Instructions for use, (e) Mapping learning, (f) learning materials, (g) Portfolio assessment tasks, (h) Process assessment instruments, and (i) Process scoring rubric.

Furthermore, the resulting instrument was tested on the validator through expert validation and limited trials with the teacher to find out whether the instrument made was valid and reliable. According to Fraenkel,

Wallen, and Hyun's opinion in Yusup (2018: 18), the instrument is declared valid depending on the expert. Experts are free to give an assessment whether this instrument is valid or not.

In general, the results of the validation by evaluation experts, linguists, material experts, and practitioners stated that the instrument was good. This development product is suitable for use as a learning assessment tool for grade 4<sup>th</sup> students in Elementary School in Metro Pusat District because it is valid and reliable, and can be implemented for the benefit of learning assessments actually.

The development of the portfolio assessment instrument according to Erman (2011: 3) is (a) as a tool to determine the progress of competencies that students have achieved, (b) diagnosing student learning difficulties, (c) providing feedback for the benefit of improving and perfecting learning. This is in line with the results of Awang et.al (2013: 6) showed that the portfolio was more attractive to students. While the average learning achievement is better with a portfolio, students with low achievement do not use a portfolio. The average achievement of students doing portfolio assignments is better than ordinary assignments, and finding portfolio assignments is easier than traditional learning. And the results of Yurdabakan dan Erdogan (2013: 532) showed that portfolio assessment had a significant effect on writing, reading, and listening skills. Portfolio assessment can increase student responsibility, motivation, self-evaluate students, and improve student work from time to time difficulties.

## **2. The Advantages of developing Performance Assessment Instrument based on Discovery Learning**

Based on the results of developing a performance assessment instrument discovery learning based has several advantages are:

- a. Make it easy for teachers to assess objectively, especially the cognitive and psychomotor aspects overall of students listed on the portfolio assessment instrument.
- b. This product is student-centered, making it easier to hone processes and products by analyzing through a series of learning scenarios.
- c. Educators are easy to assess the contribution of each student in mastery of the learning process using the assessment guidelines that have been provided.
- d. The portfolio assessment instrument is made up of material concepts based on scientific approach that will be directing students to build and find knowledge independently.
- e. This portfolio assessment instrument can be used to assess cognitive and psychomotor skills of students, both individually or in groups.

## **3. The Limitations of the developing Performance Assessment Instrument based on Discovery Learning**

Based on the research results, the development of portfolio assessment instruments has several limitations are:

- a. This product development includes only one sub-theme, from three sub-theme
- b. Limitations in compiling research instruments and research instruments that are tested only once so there is a possibility of errors in responding to the instrument.
- c. Limitations in the distribution of instruments to this research sample
- d. R & D research steps are not completed only in the fifth step due to the existence of policies regarding social distancing.

## **V. Conclusion**

Based on the data analysis of the research and development results that have been carried out, it can be concluded that the product of the portfolio assessment instrument subtheme alternative energy developed is valid and reliable in terms of evaluation, material and language, with a reliability level of 0.87 with very good criteria, so it is feasible to be implemented in learning assessments for 4<sup>th</sup> grade elementary school students.

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