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BASED PORTFOLIO ASSESSMENT DEVELOPMENT PROBLEM BASED LEARNING ON CLASS V MATHEMATICAL LEARNING

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Abstract: The problem of this research is that the portfolio assessment instruments have not been implemented in Mathematics subject appropriately. The research objective is to develop a learning model of portfolio assessment on Mathematics subject based on an effective problem-based learning. This research was carried out at SDN 01 Tanjung Rejo and SDN 02 Tanjung Rejo sub-district of Negeri Agung, Way Kanan regency. This research applied Research and Developmet (R & D) method with stages adopted from Borg & Gall. The population and sample size are taken from 30 respondents. The data collection techniques were carried out with questionnaires and tests. The product results are validated by experts of media, material and language. The instrument is being analyzed by item validity and reliability. The results of the research showed that based on the validity by experts of media, material and language, the developed instruments have been proven 'excellent' and 'good' so that it is suitable for use. The results of the large-scale trial of the developed product and the testing showed that the instrument has a good quality so that it can be used to measure the cognitive abilities of fifth grade students of elementary school.
Keywords: assessment, mathematics, problem based learning

INTRODUCTION

Changes in the standard elements of 2013 Curriculum (K13) have required teachers to shift from conventional assessment to authentic assesment based on curriculum demands. Authentic assessment is a comprehensive assessment to assess learning inputs, processes, and outputs. Mulyasa (2013: 135) states that authentic assessment of K13 is focused on knowledge, shifting from output-based assessment to skill-based assessment through a complete and comprehensive process of assessment, portfolios and output evaluations. According to (Black and Wiliam, 2004) in "Working Inside the Black Box: Assessment for Learning in the Classroom", Paul Black and Dylan Wiliam interpret that learning assessment is the process of finding and interpreting evidence of student performance to be used by students and their teachers to identify the extent where students absorb the learning process, their next goal, and what needs to be done to achieve them. According to Minister of Education and Culture No. 81A in 2016, portfolio evaluation is a continuous assessment based on a collection of information showing the development of students' abilities in a given period. The regulation of Minister of Education and Culture (Permendikbud) No. 23 of 2016 states that Educational Assessment Standards consists of some criteria based on scope, objectives, benefits, principles, mechanisms, procedures, and instruments to evaluate students' learning outcome as a basis of evaluation in primary and secondary education. Pearson Education (2006) defines that learning assessment is a collaborative process between teacher and pupil, and with pupils engaging with each other in structuring their own learning. It is built on a shared learning foundation objectives and shared criteria for success. Pupils are given the criteria for success and the support they need to achieve that success. Feedback, either during completion of the task, is essential if pupils are to know what else is done to ensure further learning. Pupils are provided with opportunities to participate in self-assessment as this develops an understanding of personal responsibility in learning.

Portfolio assessment basically assesses the work of students individually in one period of time for one particular subject. At the end of a period, the results of students' work are collected and assessed by both teachers and students. Using the information on students' progress, the teachers and students can by themselves score the improvement of students' abilities. In addition, K13 also uses a scientific approach which is the organization of learning experiences through the process of observing, asking questions, gathering information/trying, associating, and communicating. Learning models that support the application of scientific approaches include discovery-based learning model, problem solving based learning model, and project-based learning model.

Today the demands of the curriculum in Mathematics learning has provided a direct learning experience, greatly emphasized on the use and development of process skills and scientific attitudes with the aim of understanding concepts and being able to solve problems. Thus, it is necessary to formulate an appropriate effort to improve students' learning outcomes, such as through problem-based learning model (PBL).

According to Barrett & Moore (in Karami, 2013: 38), PBL is a learning model that helps students to perform tasks independently so that they can continue learning to solve their factual problems throughout their lives. Tekkaya (in Fatade. 2013: 29), advocates the use of PBL as a learning strategy to improve students performance both in cognitive, affective or psychomotor results. According to Arends (2008: 41), Problem Based Learning is a learning model that uses an authentic problem approach so that students can develop their own knowledge, grow higher skills and inquiry, empower students, and increase self-confidence. The research results of Tan (2008) state that PBL encourages students to solve life problems through the process of finding, learning and thinking independently. This model is characterized by the use of real life problems as learning materials that must be learned by students to train and improve critical thinking skills to solve problems and gain knowledge about important concepts. PBL trains students to solve problems through a process of creative thinking (Bilgin. 2009). From the analysis of portfolio files, teacher can determine students' potential, characters, strengths and weaknesses. This file can be the basis for correcting and improving oversight and shortcomings in the learning process and mastery of a basic competency or subject matter. The process of feedback is very applicable because in the system of portfolio assessment, the data recorded in the file are not only collected and completed, but also reflected and analyzed collaboratively by involving teachers, students and guardians of students. The researcher obtained the data based on the needs analysis taken from the results of Ki Hajar Dewantara III KKG meeting on August 9, 2017 and January 21, 2018 conducted to fifth grade students of elementary school in Negeri Agung sub-district in which as many as 10 teachers participated with the following results: (a) 80% of teachers have participated in the 2013 Curriculum training, (b) 70% of schools have applied the 2013 Curriculum (c) 40% teachers have lesson planned the 2013 Curriculum (d) 70% teachers found the difficulties in preparing lesson plans of the 2013 Curriculum, (e) 10% of teachers who provided grid before making an instrument, (f) 40% schools have prepared guidelines for assessing portfolios in the 2013 Curriculum, (g) 20% of teachers have used assessment instruments in product class from the government, (h) 10% of the application of students portfolio assessments have met the prescribed guidelines, (i) 100% of teachers found difficulties in applying students portfolio assessment on Mathematics subject in the classroom setting, (j) 100% of teachers were in need of portfolio assessment instruments which was easy to follow. Based on the relevant data and the needs analysis, it shows that 80% of teachers at Elementary School of Negeri Agung sub-district have not applied any portfolio assessment yet. The teachers explained that they do not master and understand the procedure to conduct portfolio assessments. Further, the teachers explain that there are lack of socialization about portfolio assessment and also lack of an easy-to-follow guidebook of portfolio assessment since the manual book from the government was hard to understand. Therefore, elementary school teachers expect that they are able to develop a portfolio assessment instrument which is clear, simple, and easy to understand. The application of the learning model will be more effective if the portfolio assessment is applied. According to Abosalem (2016: 3) assessment is the collection of information to make evaluative decisions, and used in relation to the test. Portfolios are works or results of works that are created and arranged in such a way that shows the progress of students and leads to a goal. According to Berryman, Russell & Richard (Santrock, 2008: 591) the role of portfolio assessment in learning is to provide an opportunity to encourage students to make decisions and self-reflection.

Palomba and Banta (1999: 4) states that assessment is the collection, review, and systematic use of information about educational programs with the aim of improving students learning and development. The portfolio motivates students to think critically and deeply so that the portfolio provides a good mechanism to evaluate the progress and improvement of learners' learning. Assessment Reform Group (2002), states that: *Assessment for learning is the process of seeking and interpreting evidence for use by learners and their teachers to decide where the learners are in their learning, where they need to go and how best to get there.*

Portfolio assessment can guide students in carrying out investigation or problem solving activities in accordance with the problem based learning model. Based on the description above, the researcher is interested in conducting a study of developing mathematical portfolio assessment with problem based learning model for grade V students of elementary school. The aim of this study is to conduct mathematical portfolio assessment with problem based learning model for grade V students and to produce a valid and reliable learning model.

RESEARCH METHODOLOGY

This research is a Research and Development (R & D) type. R&D research aims to produce an instructional product. The product would be tested for validity and reliability. The products were developed based on the needs analysis in the field. The needs analysis was carried out by researchers at the pre-research stage. The

product was validated prior to the testing. The product was then revised to produce a good quality and appropriate product. The final revision of the product can be disseminated and implemented.

The product developed in this research is a problem based learning portfolio for grade V of elementary school. The learning instruments consisted of lesson plans (RPP), teaching materials, and assessment instruments. The characteristics of this model is that it is a problem based learning model and it is applied in integrated learning of 2013 Curriculum.

The Research and Development model applied the research design by Borg & Gall (1983: 775-776) consisting of 10 stages as follows: (1) research and information collecting, (2) planning, (3) developing preliminary form of product, (4) preliminary field testing, (5) main product revision, (6) playing field testing, (7) operational product revision, (8) operational fields, (9) final product revision, and (10) dessimination and implementation. The population in this study were all fifth grade students of SDN 01 Tanjung Rejo and SDN 02 Tanjung Rejo as many as 64 students of this population were only targeted for product testing. The sample in this study was taken from the fifth grade students of SDN 01 Tanjung Rejo, 10 students were participating in a small-scale trials (random sampling), fifth grade students of SDN 01 Tanjung Rejo, 34 students were participating in a large-scale trials (random sampling) and fifth grade students of SDN 02 Tanjung Rejo, 30 students were participating for product testing.

The data analysis technique was carried out using instrument testing to determine the level of validity and readability of each item. The results of the trial showed that there were a number of items that must be discarded and replaced with new items, after receiving input from the test subjects. There were several questionnaires that would later be distributed to support research data, one of which was the questionnaires of teachers' response. This study consists of several indicators that are measured during the initial study (observation), the stage of validity, product testing, and usage testing. The next stage after going through the process of expert validity is: the data from the initial test results were validated by experts, teachers, and also the instruments of feasibility filled in by the users (teachers). The results of the second test were shown in form of assessment instruments involving teachers. The data analysis on the assessment in this mathematical thematic learning was done by conducting a validity test analysis. The collected data through various studies were then being analyzed. The data analysis is the most important part of the scientific research process. A good data analysis would give important effort to solve research problems.

The validity testing in this study was carried out by means of Content Validity. The reliability test in this study was done in form of inter-rater reliability method using the Cohens Kappa coefficient formula. The Kappa coefficient was used to measure the agreement of two observers regarding the characteristics that are of concern to the researchers.

RESULTS AND DISCUSSION

Results of the Study

Results on Potential and Problems

In this research, the researcher began with potential and problems, then analyzing the teachers' needs. The results of the data analysis then become the consideration of researchers to conduct the design research. The researcher used observation and questionnaire techniques. At the time of observation, the researcher identified the learning process in the classroom. The questionnaire's items were analyzed and used as material for consideration and the basis for developing portfolio assessment instruments. The researcher chose SDN 01 Tanjung Rejo and SDN 02 Tanjung Rejo sub-district of Negeri Agung Way Kanan regency as a place of research. The reason is because the two schools are in the same sub-district line area. This research began with the potential and problems to see the existing conditions of both schools.

Results on Data Collection

The results of the analysis on the importance of the use of portfolio assessment instruments made by the teacher are as follows. a) the teachers have not yet developed a portfolio assessment instrument, so that portfolio assessments cannot be carried out optimally. b) the teachers are still having difficulties to scale portfolio assessment. c) the portfolio assessment has not been applied in the classroom setting. d) the teachers have only used standardized instruments in the textbook. e) the teachers only required students to memorize all the information conveyed by the teacher. f) the assessment process was carried out to emphasize the mastery of concepts (knowledge) that are captured by objective and subjective paper and pencil tests as a measure. g) the assessment of learning outcomes has never been portfolio so that it cannot be used to inform parents about the

development of students in mastering skills. h) the assessment of students' learning outcomes focused on results not on the learning process so that students became passive learners. Based on the collection of data, the researcher concluded that the development of portfolio assessment instruments in grade V of elementary schools at Negeri Agung sub-district of Way Kanan regencg is very necessary to be done, so that the portfolio assessment instrument can help teachers improve students' learning outcomes, help teachers to make students become more active, and assist teachers in scoring portfolio assessment instruments.

Results on Product Design

Portfolio assessment basically assesses the work of students individually in one period of time for one particular subject. At the end of a period, the results of the work are collected and assessed by both the teachers and students. Based on the information on these learning developments, teachers and students themselves can assess the development of students' abilities. In addition, K13 also uses a scientific approach which is the organization of learning experiences through the process of observing, asking questions, gathering information/trying, associating, and communicating. Learning models that support the application of scientific approaches include discovery-based learning model, problem-based learning model (problem solving based learning), and project-based learning model.

Results on Validation Design

Before conducting the trial, the portfolio assessment was validated in advance by experts. Material validation was carried out by Dr. Undang Rosidin, M.Pd., Validation of linguists was conducted by Dr. Mulyanto Widodo, M.Pd., and media validation was validated by Dr. Alben Ambarita, M.Pd. There were several parts of the product that must be repaired and the results has produced instruments for each indicator by creating the aspects that would be assessed was good, the writing based on Perfected Spelling System (EYD) was correct, the images were in focus and the image names matched with the image.

Results on Product Testing

The tests of measuring instruments to investigate feasibility were carried out on limited trials at SDN 01 Tanjung Rejo with 3 classroom teachers whose competents were classified as high, medium, and low. The extension trials at SDN 02 Tanjung Rejo were conducted with 6 classroom teachers whose competent were classified as high, medium, and low. The implementation of empirical measurements was carried out by two elementary schools on July 22, 2018, and on July 29, 2018 at SDN 01 Tanjung Rejo, and SDN 02 Tanjung Rejo sub-district of Negeri Agung Way Kanan Regency. The expanded trial was carried out at SDN 02 Tanjung Rejo with 6 teachers to investigate the reliability of portfolio assessment. The results of using conventional assessment responses showed that the three teachers gave more 'no' responses to the questionnaire statements, as seen from the results of the questionnaire obtained an average of 30.55 with negative criteria; so it can be concluded that there are still many teachers who do not understand how to use the assessment instruments. The results of using the developed assessment instruments showed that the three teachers gave more 'yes' responses to the questionnaire statements, as seen from the results of the questionnaire obtained an average of 90.67 with positive criteria which means that the developed assessment instruments were feasible.

Results on Validity and Reliability Test

The validity test in this research was calculated using product moment correlation. The results of the validity test calculation was done with Microsoft Excel program. It can be concluded that the instrument of validity test which consisted of 14 statements with 30 respondents has r-count > r-table, with the value of rtable at the 0.05 significance level of 0.361, meaning that there were 13 valid statements and 1 invalid, it can be seen from table 18, that the validity of the instruments for 'average' criteria was item number 10, 'good' criteria for items numbers 1, 2, 11 and 12, and 'excellent' criteria for items number 3, 4, 5, 6, 7, 8, 9, 13, and 14. Based on the results of validity test using rp biserial and calculation of Cohens Kappa reality with SPSS 23, the results was 0.651. With a significant value of 0.00, it showed that the coefficient value indicated a correlation. It is expected that the Kappa value would gain to 'one' value as an indicator that the appraisers 'a' with assessors 'b' are mutually consistent. For more details see the table of calculation results of Cohens Kappa below.

Table 1 Results on Cohen's Kappa Realibility Test

	Measure of Agree	
	Kappa	N of Valid Casees
Value	.651	30
Assymp.Std Error	.321	
Approx T[b]	3.806	
Approx.Sig	0	

DISCUSSION

The Development of Portfolio Assessment Instruments

The development of portfolio assessment instruments is based on the theory of portfolio assessment instruments so that the resulting of portfolio assessment instrument products are more meaningful for both students and teachers in terms of understanding portfolio assessment instruments because it consists of activities, observations, experiments, and students' work results which can be used as a guidance for teachers in terms of understanding the portfolio assessment.

This is in accordance with the advantages of portfolio assessment instruments that can increase the participation of students and teachers actively in learning activities and in accordance with the results of the study. Mangiante (2013: 222) states that assessment is a tool to measure the extent to which students have improved their learning based on standards. According to Catherine (2013), the process assessment requires students to be able to perform more skillfully, where practical assessment has a greater influence on the formation of students' character. The validation sheet from validator 1, validator 2, and validator 3 showed that the portfolio assessment instruments in mathematics learning is feasible to be used as an instrument in learning with revision, so it must be revised according to the suggestions and recommendation from each validator before going to the next stage. The validity of portfolio assessment instruments can be seen from each validator with scores of material experts and linguists assessment scores of 84.38% and 86.97, the score of expert media assessment scores is 82.50%. The results of the instrument validity test which have 14 item statements with 30 respondents using product moment correlation, is r-count > r-table, thus it can be concluded that 1 item statement is declared invalid and 13 items are valid statements.

Results on Field Testing

After conducting the class trials, the researchers immediately carried out field trials, namely at SD N 02 to determine the effectiveness of the assessment which was tested with the average calculation of the normalized gain. There is an increase before and after treatment. The data analysis showed that the portfolio assessment instruments developed in this study have a good reliability criteria. The validity and reliability test results are meeting the testing criteria, and that they are valid and reliable. Assessment was described by Roger (2002: 6) assessment is collecting information about the quality and quantity of change in a student, group, teacher, or administrator. The sentence explains that assessment is the collection of information about the quality and quantity of changes in students, groups, teachers, or organizers.

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