

Development of the Basic Concept Assessment of SD/MI Mathematics Based KKN Curriculum

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Development of the Basic Concept Assessment of SD/MI Mathematics Based KKNi Curriculum

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Abstract. The assessment of mathematics learning in college needs to be a concern for lecturers to avoid subjectivity in assessing students. So far, the assessment of mathematics learning in the PGMI Study Program is only dominant in the knowledge aspect. A good assessment should not only focus on the domain of knowledge but the three domains, namely, attitudes/values, knowledge, and general skills/special skills in accordance with learning outcomes in the KKNi curriculum. The purpose of this research was to develop basic concepts of SD/MI mathematics based on a valid and practical KKNi. This research was R & D (research and development) research using ADDIE method. The target of this research was PGMI Study Program of IAIN Palopo semester 1 of 2019/2020 Academic Year. The assessment instruments developed were in the form of performance assignments, product assignments, and project assignments. The results of this research indicated that: (1) The validity of the developed assessment instrument was on the very valid category with an average rating validators 93%; (2) The practicality of the developed assessment instruments is in a very practical category. From the lecturer's point of view, it shows that the instrument has a clear and integrated category in measuring three domains in Learning Outcomes. Whereas from the student's point of view it showed that the instruments developed was practically used and was able to reveal the understanding of the basic concepts of mathematics of SD/MI students.

Keywords: Assessment, basic mathematical concept, and KKNi

1. Introduction

The most important part that is inseparable from the learning process is assessment [1]. The learning process is closely related to data on attitudes, knowledge, and skills. The process of collecting data is called assessment. In the past, assessments were not considered part of the learning process; assessments were only part of the mechanism that determined how much students have learned without contributing to the process that must be followed to gain abilities, knowledge, and competencies [2]. So far, more specific learning assessments have received less attention from the government. This can be seen in the form of assessment that has been carried out so far. Modification of the curriculum do not change the focus of the assessment used in university which focuses on traditional assessments such as paper and pencil tests [3].



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Assessment is a general term that includes all the methods commonly used to assess the performance of individual or group students. Assessment includes gathering evidence that shows the learning achievement of students based on a number of facts to explain the characteristics of someone or something [4]. There are two general types of assessment namely traditional assessment and alternative assessment or better known as authentic assessment. In the special literature there are various terminology that defines authentic assessment as alternative assessment, informal assessment, performance assessment [5]. Muller put forward authentic assessment as a form of assessment that requires students to perform tasks in real situations (real world) that display skills application and essential knowledge. This assessment is often also referred to as worksheets/assignments [6].

The types of authentic assessments currently being developed include project assessments, performance and products [7]. Many researchers have examined the importance of learning assessments. Robert and Hery are one of them. They researched the development of mathematics learning assessment devices with the subject of geometry and conversion. The results of his research indicate that the assessment devices developed are oriented to aspects of knowledge, attitudes, and skills that have fulfill good qualifications suitable with 2013 curriculum for junior high school/MTs level [8]. This research focuses on development that must be adapted to the 2013 curriculum. The Assessment in the 2013 curriculum follows the principles of continuous and comprehensive assessment as an effort to make learners independent. In line with Shirley Miedijensky's research which shows that project assessment has a significant effect in accessing and developing students' skills [9]. Zainul Arifin, et al in their research also revealed that performance assessment that was developed practically measures the ability of students in linear programming [7].

Assessment should be considered as an integral part of the curriculum and instruction process [10]. The main purpose of the assessment is to model effective learning, increase student motivation, and support the actions needed in learning [11]. By assessment, it is expected that feedback is the key to making effective decisions and student learning outcomes [12]. From the above review, it is seen the importance of using assessments in learning.

Therefore, researchers feel the need to develop basic mathematics assessment concepts based on KKNI. Developed assessments must meet valid and practical categories so that the quality of learning process. This assessment is expected to be a standard reference for lecturers to make assessments, so that assessment results are no longer found that are subjective, inauthentic, and not accountable.

2. Research Method

The type of this research is R&D research (Research and Development) specifically in the field of education by applying the ADDIE development method (Analysis, Design, Development, Implementation, and Evaluation). This research was conducted at the State Islamic Institute (IAIN) Palopo, South Sulawesi, Indonesia. The research subjects were 68 students of the study program of Madrasah Ibtidaiyah Teacher Education (PGMI), Faculty of Tarbiyah and Teacher Training of Academic Year 2019/2020. The instruments developed are Learning Assessment Instrument Basic Concept of Elementary/MI Mathematics. The instrument contains project assignments, product assignments, and job assignments.

The validity test was developed by paying attention to material, assessment construction, and language used. Practicality test was developed by taking into account effective, creative, efficient, and attractive indicators. The data analysis technique used in this study was the analysis of the results of the product feasibility assessment and the practicality of developing learning assessment instruments that were analyzed in descriptive statistics.

3. Result and Discussion

The first stage in this study was the results of the analysis. The result of the analysis considers: (1) curriculum analysis in college by regarding the guidance of developing the PTKI Curriculum (Islamic

Religious College) refer to the KKNi and SN-Dikti 2018, guidelines for Graduate Competency Standards (SKL) and Graduate Learning Outcomes (CPL) Bachelor Study Program at Islamic religious colleges, especially in Madrasah Ibtidaiyah Teacher Education Study Program. The results of the analysis for SKL on PGMI study programs are educators/education practitioners, research assistants, and instructional material developers. The analysis for CPL covers domains of attitude / values as much as 18, 22 domains of knowledge, 15 general domains, and 9 special domains. (2) CPMK analysis of Basic Mathematical Concepts based on the Study Program CPL, namely domains of attitude / values as much as 11, 8 domains of knowledge, 11 domains of general skills and 3 domains of special skills; (3) The material analysis was used to determine the right assessment to be applied.

The second stage is the design stage (planning). The design stage (planning) considers: (1) preparing a Semester Learning Plan by paying attention to CPL in basic mathematical concepts subject, from CPL produces indicators, as well as learning objectives to be achieved then proceed with choosing the right assessment; (2)CPL mapping with assessment instruments that has developed; and (3) making instruments of validity and practicality.

The third stage is the development stage. At this stage the researcher developed (1) assessment instruments in the form of project assignments, product assignments, and performance assignments. Individual project assignments were developed for the Numbers Development History material along with the assessment rubric; the assignment of group products on Whole Number Operations along with the assessment rubric and individual work assignments operation on integers along with the assessment rubrics. After the instrument was developed (beginning prototype), the instruments were given to three experts for validity testing. The three experts consist of lecturers, the first (V1) is a learning evaluation, the second (V2) is a school mathematics learning, and the last (V3) is also a school mathematics learning. The following Table 1 summarizes the results of expert validity.

Table 1. Expert Validation Data

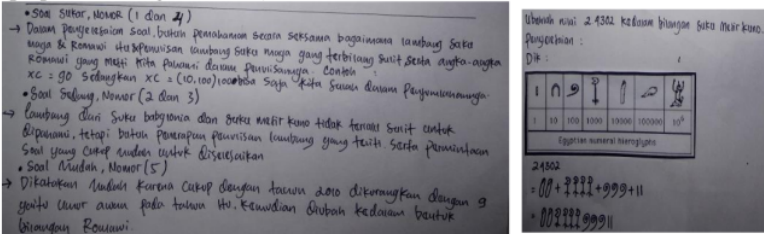
| No | Type of Question | Validator | | | Total | % | Note |
|----|-------------------------------|-----------|----|----|-------|------|------------|
| | | V1 | V2 | V3 | | | |
| A | Realm of Material | 16 | 13 | 16 | 45 | 92,5 | Very valid |
| B | Realm of construction | 19 | 19 | 20 | 58 | 96 | Very Valid |
| C | Realm of language | 20 | 17 | 17 | 54 | 89,2 | Very Valid |
| | Average ($\frac{A+B+C}{4}$) | 93 | | | | | Very Valid |

Based on the results of expert validity, researchers made repairs according to the suggestions of the validators. Among them are: (1) indicators should not use the word understand but explain or mention; (2) questions on assignment should not make it difficult for students who are not good at drawing on the number lines; (3) In the assessment rubric of term selection "most part, little part, effective or very effective" on scoring need to be more concrete, (4) the "neat" category in the assessment rubric also needs to be concrete in order to minimize the subjectivity of the assessment; (5) the category "there is a complicated props planning, simple props but not effective" needs to be concrete too with a choice of words that are more measurable. After the revision, the final prototype from instrument assessment of project assignments, product assignments, as well as an assessment rubric was obtained.

The fourth stage is the implementation, namely, product trials on 68 students. The results of this study: (1) In the form of individual project assignments on the numbers history material who Students work on project assignments in the form of making questions from various sources by analyzing the level of difficulty of the questions made from the easy level to the difficult level. Based on the results of the project report, the lecturer can assess the three domains of the CPMK at once based on the assessment rubric. Skill aspects can be measured from the skills of students working independently

and looking for other learning resources such as from books and the internet. Knowledge aspects are measured through the activities of arranging, analyzing, and solving problems. Meanwhile, the aspect of attitude is measured by the neatness of arrange and the timeliness of reporting. Examples of student project work can be seen in the picture below:

Table 2. Project Work Assessment

| Domain of learning Outcome | Example of Project Work Assessment | | | | | | |
|---------------------------------------|--|---------------------------------------|---------------------------------------|---------|-------------------|-------------------------------------|---------|
| Skill | <p>Buku/Sumber belajar: https://syarifalnujasa.blogspot.com / wikiwand.com https://www.nimucmatematika.com Brainy.com / https://ariefpadiansya.blogspot.com</p> | | | | | | |
| Knowledge | <p>(prepare learning resources)</p>  <p>(arrange and solving problems)</p> | | | | | | |
| Attitude | <table border="1"> <tr> <td>Files Turned in on Sep 17, 5:47 PM</td> <td><input type="checkbox"/> Elfira Nawir</td> <td>Missing</td> </tr> <tr> <td>HARIAWAN PGMI ...</td> <td><input type="checkbox"/> Rahma Wati</td> <td>Missing</td> </tr> </table> | Files Turned in on Sep 17, 5:47 PM | <input type="checkbox"/> Elfira Nawir | Missing | HARIAWAN PGMI ... | <input type="checkbox"/> Rahma Wati | Missing |
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| HARIAWAN PGMI ... | <input type="checkbox"/> Rahma Wati | Missing | | | | | |
| | (Discipline) | | | | | | |

Assignment of products as a group on working with whole numbers. CP that can be measured are: (a) the domain of skills in skilled activities in providing simple props with the use of secondhand as well as being creative in using ideas. (b) In the domain of knowledge shows the clarity concept of count operations of whole number and solve the problem of count operations of whole number, (c) In the domain of assessment attitude, the assessment was measured in the aspects of teamwork or cohesiveness and discipline in gathering reports. The example of Product Work Result is shown in Table 3.

Performance assignments were performed individually on counting operation on integers. CP in the domain of skills is measured through the skills of students drawing numbers and integer charge cards. The domain of knowledge is measured by the accuracy of the work on the problems and understanding of the concepts. While the domain of attitude is measured on the discipline and independence of students on work

Table 3. Product Work Assessment



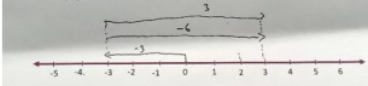
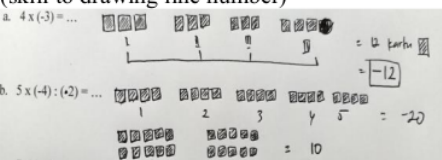
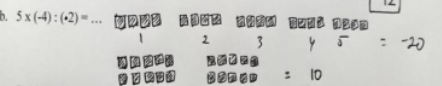
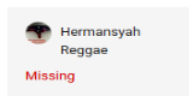
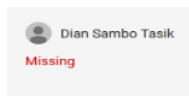
| Domain of learning outcome | Example Product Work Assessment |
|----------------------------|--|
| Skill |  <p>(Skilled in providing simple props, creative in using ideas, and effectively used in explaining the concept of counting operation)</p> |
| Knowledge | <p><i>Operasi Pembagian</i></p> <p>misalkan 15 : 3 ambil 10, hasil kemudian masukkan kebalikan 15 buah batu kemudian kita ambil 3 buah gelas plastik 3nya kemudian diisi 5 buah batu. untuk pembagian 15 : 5 kita ambil 10 salah satu gelas yang telah berisi batu kemudian hitunglah batu tersebut yang kemudian merupakan hasil dari pembagian 15 : 5 = 3</p> <p>(the clarity of the concept of counting operation)</p> |
| Attitude |  <p>(compactness and collaborate in their group)</p> |

Table 4. Performance of Assessment

| Domain of learning outcome | Example performance of assessment |
|----------------------------|---|
| Skill | <p><i>Penugasan:</i></p> <p>1. Tentukanlah hasil dari penjumlahan bilangan bulat berikut dengan menggunakan bonka pada garis bilangan.</p> <p>a. $-3 - (-6) = \dots$</p>  <p>(skill to drawing line number)</p> |
| Knowledge | <p>a. $4 \times (-3) = \dots$</p>  <p>b. $5 \times (-4) : (+2) = \dots$</p>  <p>(Problem solving, accusation accounting)</p> |
| Attitude | <p>Assigned <input type="checkbox"/></p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>Missing</p> </div> <div style="text-align: center;">  <p>Missing</p> </div> </div> <p>(Discipline and no plagiarism)</p> |

The fifth stage of developing the assessment made by the researcher is the evaluation stage. From product trials for students obtained information about the practicality of the assessment instruments developed. The practicality recap based on student assessment is shown in Table 5.

Table 5. Student Practicality Data

| Aspect | Student | Note |
|----------------|---------|---------------|
| Effective | 78% | Practice |
| Creative | 76% | Practice |
| Efficient | 78% | Practice |
| Attractiveness | 83 % | Very Practice |
| Conclusion | 79% | Practice |

The instrument was also given to the lecturer of PGMI IAIN Palopo to analyze its practicality. The practicality recap based on student assessments are shown in Table 6.

Table 6. Practicality Data of Mathematics Lecturers

| Aspect | Lecturer | Note |
|-------------------|------------|----------------------|
| Effective | 84% | Very Practice |
| Creative | 75% | Practice |
| Efficient | 93% | Very Practice |
| Attractiveness | 84% | Very Practice |
| Conclusion | 84% | Very Practice |

Based on the validity and practicality data obtained, it can be concluded that the mathematical assessment instruments developed were proper to use.

4. Conclusions

Instruments of basic mathematics concept assessment based on KKN curriculum developed is the project assignment instrument, product assignment, and performance assignment. Based on the evaluation of three expert validators, they gave an average of 93% for instrument development and were in a very valid category. Based on student ratings, they gave an average of 79% for the practicality of the use of instruments and were in a practical category. Based on the assessment of the Mathematics lecturer. She gave an 84% value for the practicality of using the instrument and was in a very practical category. So that the developed instruments are proper to use to assess the basic mathematical concepts of SD/MI.

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