The development of performance assessment based on integrated model on static electrical in elemenry school

R Amini and Y Fitria
Universitas Negeri Padang, Jl. Prof. Dr. Hamka Air Tawar, Padang, Indonesia

*risdamini@yahoo.com

Abstract. One of the teacher's demands in the curriculum is being able to develop the performance assessment. The preliminary study shows the unavailability of performance assessment based on integrated model in elementary school students learning, especially in static electricity materials. The purpose of this research is to develop the performance assessment and works sheet based on integrated model that valid and practical in the learning science. The subject of research is fifth grade students at Elementary School in Padang Timur, Padang Barat, Koto Tangah and Kuranj (sub-districts in Padang). The students works sheet was required in the performance assessment. This research used research and development of 4D model. The research instrument were observation format, interview guide, and questionnaire. The results showed that the performance assessment sheet and students works sheet include valid category based on expert judgment. The performance assessment sheet and works sheet include practical category based on teacher and students response.

1. Introduction
Natural Science is a basic science that plays an important role in shaping the mindset of students. In addition, Natural Sciences also plays a role in the development of other sciences such as social sciences, physics, chemistry, biology, and others. Given the very broad role of Natural Sciences, the government has sought to improve the quality of education through curriculum changes from content-based curriculum to competency-based curriculum (education unit level curriculum and 2013 curriculum). In the curriculum content-based assessment learning focused on cognitive aspects measured through paper and pencil tests while in the education unit level curriculum (KTSP) requires the implementation of class-based assessment.

The implication of KTSP requires a paradigm shift in the learning process, that is from what must be taught to be what students must master. Students are no longer as objects, but as subjects in learning. The curriculum change also has implications for the assessment system; the change in question is from an assessment with an assessment norm approach that uses criteria and standard references, namely aspects that show how competent students master the material being taught. Not only answer or choose answers from a series of possible answers that are already available, but are able to master the concepts and performance [1]. The importance of assessment in learning is not only seen in the KTSP curriculum, but also seen in the Minister of Education Regulation number 20 of 2004 concerning assessment standards.

The assessment continued as an assessment is one of the activities carried out to measure and assess the level of curriculum achievement and the success or failure of the learning process
undertaken. The assessment is also an inseparable part of the basic objectives and the implementation of learning activities [2]. Changes in the form of assessment are also demanded by a paradigm shift about the function of teaching. This change in function has been illustrated in the Natural Sciences Knowledge learning objectives listed in SBC, namely: (1) Train ways of thinking and reasoning scientifically, (2) Develop creative activities that involve imagination, intuition, and discovery, with the development of divergent thinking, original, curiosity, making predictions, predictions of trying errors, (3) Developing problem solving abilities, (4) Developing the ability to convey information or ideas through oral conversation, chart notes, map diagrams in clear explanation [3, 4].

Based on the learning objectives of the Natural Sciences above, then the paper and pencil test is felt not once to determine the achievement of curriculum objectives so that it is needed various forms of assessment so that the learning outcomes obtained by students describe actual abilities [5]. In line with this, KTSP demands the implementation of class-based assessment as an alternative form of assessment used. Class-based assessment is carried out throughout the learning process, where the assessment of students is carried out comprehensively and continuously covering three domains: cognitive, affective and psychomotor so that the information obtained from assessment is accurate information about achievement, ability and progress of student learning.

Class-based assessments are then called assessments as an integral part of learning activities. Assessment is not only related to the final results but more importantly is an integral part of the learning process [6]. There are various forms of assessment that can be done including: written tests (paper and pencil tests), assignments, performance assessments, journals, project appraisal, work assessment, attitude assessment, student work collection, self assessment and so. Lecturers are required to determine criteria, success, method and type of assessment, lecturers are also required to design and prepare various assessment techniques so that all competencies that students have can be measured appropriately [5]. From the results of observations made in several PGSD in Padang City (Azkia PGSD, Bung Hatta University, Muhammadiyah University of West Sumatra) it was seen that the lecturers had not applied the assessment as desired by the curriculum. This happens because of the lack of socialization and knowledge of lecturers about various assessment techniques and the way they are implemented, so that the assessment using this technique has not been fully implemented [7]. Learning science requires students to be active in learning, so that the learning process or learning outcomes become maximum. For this reason, a suitable model is needed that can improve student learning outcomes, as well as integrated, Integrated Model is a model that can help students to master concepts through practical activities in learning. Integrated models when used in learning can provide high learning outcomes [8]. Integrated learning model improves students' critical thinking skills so that student learning outcomes are high [9].

Research on instrument development has been carried out by several researchers, namely the development of performance assessments for Newton's legal material. [10] Development of inquiry-based assessments for force and magnetic materials. The results of both research developments are equivalent and feasible to use.

But until now, the assessment to assess the learning process using an integrated approach has not been developed. For this reason it is necessary to develop assessments that are able to assess processes and products, one of which is performance assessment based on integrated on force and magnetic material. Integrated learning should be tailored to the characteristics of elementary school age children who are at a holistic development stage [11]. The aim of the research is to develop performance assessments based on integrated models.

2. Research Method
Research uses method research and development. In this study a performance assessment based on an integrated model was developed on the material of style and energy in the learning of PEA. The stages of the research are: (1) define stage which consists of curriculum analysis, concept analysis, and analysis of students, (2) design stage which includes the preparation of assessment prototypes and instruments, (3) develop stage consisting of validation and practicality stages, (4) disseminate [7].
The subject of the study was a performance assessment based on an integrated model. The respondents were students of Primary School Teacher Education, Padang State University who attended the Science IPA lecture. The research instruments were questionnaires and interview guides regarding the suitability, ease, and usefulness of performance assessment instruments. Data were analyzed using percentage techniques and categories.

3. Result And Discussion

3.1. Defining stage
The defining phase is done to get an overview of the conditions in the field. This stage consists of curriculum analysis, concept analysis and student analysis [13]. In the curriculum analysis stage, KD analysis is carried out which will be translated into indicators for elementary science material. This is done to compile the RPP, Performance Assessment Sheet (LAK), and Student Worksheet (LKPD), and indicators are used to formulate learning objectives at each meeting. From the results of curriculum analysis that is very important to note are: syllabus, RPP, identification of the form of performance sheets, and selecting performance sheets that are relevant to KD. Based on the syllabus analysis, the appropriate instruments used are performance models based on Integrated models. Assessment prototypes are designed for Style and Energy material for 8 meetings.

3.2. Design phase
The design of Integrated based performance assessment prototypes based on the results of needs analysis and field observations. This performance assessment is designed comprehensively to produce valid and practical performance assessments [2]. The design of the device made consists of: RPP (Learning Implementation Plan) which is a guide for teachers to do learning, homework (homework), investigation sheets, project assignments, presentations and discussions, performance and written tests.

Based on the defining stage, performance assessments are designed according to the conditions of students. Prototype of performance assessment is expected to be in accordance with learning and correct in terms of implementation. Performance assessments are designed and developed referring to standard assessment rules.

3.3. Develop phase
At this stage RPP was developed and prototype revisions of Integrated-based performance assessments. RPP is prepared using an integrated performance-based model. RPP contains units of education, subjects, classes / semesters, competency standards, basic competencies, indicators, learning objectives, student character, teaching materials, learning methods, learning activities accompanied by time allocation, assessment, learning resource tools / materials. The drafted RPP is adapted to the suitability of the material, indicators and learning objectives. Based on the SDA curriculum there are 6 indicators of learning, then researchers classify these indicators so that they are ordered properly by taking into account the material preconditions in designing RPP Assessment Device Validation Results. Recapitulation of the results of validation for language aspects and readability of assessment can be seen in Table 1.

Table 1. The Results of Validation

| No | Aspect Assessed                                      | Mean | Note          |
|----|------------------------------------------------------|------|---------------|
| 1  | sentence easily understood                          | 4.00 | Fairly valid  |
| 2  | Sentences are only required statements               | 3.60 | Valid         |
| 3  | Sentences used in accordance with the Indonesian     | 4.00 | Valid         |

In Table 1 it is seen that the validation results for the aspects of language and readability that are formulated are classified as valid and the demands contained therein are very clear. Based on language
validation and readability aspects, it can be concluded that the sentence used in accordance with Indonesian language rules, involves the ability of students to think logically, in accordance with student intellectuals, communicative.

Presentation Project Validation Results Validation process Project Presentation is also carried out to three design, construct and content experts. The design of the presentation project is revised according to comments and suggestions from experts. The design becomes the initial prototype. Recapitulation of material aspect validation results can be seen in Table 2.

| No | Aspect Assessed                                                          | Mean | Note             |
|----|--------------------------------------------------------------------------|------|------------------|
| 1  | Compliance with basic competencies and indicators                        | 4.00 | Valid            |
| 2  | Supporting achievement of basic competencies and indicators              | 3.60 | Valid            |
| 3  | Enables detailed retrieval                                              | 3.30 | Fairly Valid     |
| 4  | Allows students to answer questions and present                          | 3.30 | Fairly Valid     |
| 5  | Contains assessment aspects (concept understanding and communication skills) | 3.30 | Fairly Valid     |
| 6  | The questions given lead students to develop skills and thinking skills | 3.30 | Fairly Valid     |

The results presented in Table 2 illustrate that the results of the Investigation validation for the material aspects formulated are classified as valid. Performance Validation Results Validation process Investigations are also carried out on three design, construction and education experts. Design of the Show is revised according to comments and suggestions from design and advisor experts. The design became the initial prototype. Recapitulation of validation results for material aspects of the work performance can be seen in Table 3.

| No | Aspect Assessed                                                          | Mean     | Note             |
|----|--------------------------------------------------------------------------|----------|------------------|
| 1  | Compliance with basic competencies and indicators                        | 4.00     | Valid            |
| 2  | Supporting achievement of basic competencies and indicators              | 3.60     | Valid            |
| 3  | Successful work procedures and clear                                     | 3.30     | Valid enough     |
| 4  | Enables detailed conclusions                                             | 3.00     | Valid enough     |
| 5  | Allows students to answer questions and present                          | 3.00     | Valid enough     |
| 6  | Loading assessment aspects (concept understanding, communication skills and problem solving) | 3.30     | Valid enough     |
| 7  | The questions given lead students to develop skills and thinking skills | 3.30     | Valid enough     |

The results presented in Table 3 illustrate that the results of the performance validation for the material aspects formulated are classified as valid. Test Validation Results. Validation process The Writing Test from the daily exam is also carried out to three design / construct experts and Sain experts / IPAs. The draft written test was revised according to comments and suggestions from the design expert. The design becomes the initial prototype. Recapitulation of validation results for the material aspects Test can be seen in Table 4.

| No | Aspect Assessed                                                          | Mean     | Note   |
|----|--------------------------------------------------------------------------|----------|--------|
| 1  | Compliance with basic competencies and indicators                        | 4.00     | Valid  |
2 Supporting achievement of basic competencies and Valid
3 Contains assessment aspects (concept understanding, communication skills and problem solving) Valid enough
4 Contains contextual questions Valid enough
5 The questions given lead students to develop skills and thinking skills Valid enough

The results presented in Table 4 illustrate that the results of the Written Test validation for the material aspects formulated are classified as valid. Recapitulation of validation results for aspects of language and readability of Written Test can be seen in Table 5.

Table 5. Results of Validation of Language Aspects of Written Tests

| No | Aspect Assessed | Mean | Note          |
|----|-----------------|------|---------------|
| 1  | sentence easily understood | 3.60 | Valid |
| 2  | Sentence questions are only required statements | 3.30 | Valid enough |
| 3  | Sentences used in accordance with Indonesian rules | 3.30 | Valid enough |

In Table 5 it is seen that the results of the validation of the Written Test for aspects of language and readability formulated are classified as valid and the demands contained therein are very clear. Based on language validation and readability aspects, it can be concluded that the sentence used in the Written Test (UH) in accordance with the Indonesian language rules, involves the ability of students to think logically, intellectually, and communicatively. This is in line with [6] which states that tests that are tested on students should be guided by the standard of assessment, the grid that is prepared in a planned manner.

The results of the validation explained that the Integrated performance assessment device that was designed was valid, after making improvements according to the advice of the validator, which means that the device can measure student performance in accordance with the competencies of the Natural Sciences field.

Practicality of Learning Devices After the validation process and expert discussions are complete, then the Integrated-based performance assessment prototype is revised according to the validator's suggestions. To see the practicality of the performance assessment tool based on Integrated model, limited trials were conducted in one school, namely the PGAI UIN Batu Sangkar students. Learning tools and performance assessments based on Integrated models for the subject of style and energy are allocated 20 hours of lessons. Before the research was conducted, the lecturer who served as an observer discussed and equated perceptions about the implementation of research activities. The responses of students and lecturers to the Integrated Model-based Performance Assessment can be seen in Table 6.

Table 6. Response of students and lecturers to questionnaires

| Statement | Student score | Max score | Teacher score | Category        |
|-----------|---------------|-----------|---------------|-----------------|
| 1. Instructions for use are clear and easy to understand | 15 | 100 | 15 | practical |
| 2. Language questions difficult to understand | 17 | 100 | 15 | practical |
| 3. The performance assessment does not need much guidance from the teacher so that the teacher can take advantage of the time to assess the individual abilities of students | 15 | 100 | 17 | Very practical |
4. The expected assessment is not clear in PBK

5. Easily assess student competencies expected with performance assessment

6. Can implement PBK in accordance with syllabus, RPP and expected competencies

7. Scoring guidelines are available as a guide to assessing performance assessment devices

8. Filled with the assessment of the Natural Science to be achieved

9. Presenting images, tables, illustrations / stories that support the completion of problem

10. There is no working time limit on the performance assessment sheet 18 100 19 Very practical

Average score of practicality 84.08 85 Very practical

In table 6 it can be seen that the assessment tools used by the teacher are practical. The performance bill is very practical, because the time provided in one week in groups and it turns out this task is interesting for students. On the student response sheet there is a place for students to write suggestions and ask questions. Table 9 shows that the suitability of the performance assessment with the available time is practical. This means that the performance assessment devices developed are in practical categories (85).

3.3.1. Disseminate stage

The results of the dissemination of research data were carried out during 3 meetings, 1 time of observation and interviews obtained data such as table 7.

Table 7. Psychomotor Competency Score Learning Outcomes

| No | Indicator                          | Meeting 1 | Meeting 2 | Meeting 3 | Average Category |
|----|-----------------------------------|-----------|-----------|-----------|-----------------|
| 1  | Psychomotor                       | 75.8      | 82.0      | 8.0       | 81.0 Good       |
|    | 1. Preparing the tool             | 76.8      | 82.4      | 86.0      | Good            |
|    | 2. Conducting experiments         | 77.5      | 81.2      | 87.6      | Good            |
|    | 3. concluded the results          | 75.0      | 80.8      | 84.6      | Good            |
|    | 4. prepare a report               | 77.2      | 78.5      | 83.5      | Good            |
|    | 5. Presentation                   | 74.5      | 81.4      | 84.7      | Good            |
|    | 6 applying new knowledge          | 68.8      | 81.1      | 86.2      | Good            |
| 2  | Cognitive                         | 77.8      | 82.7      | 85.5      | 82.0 Good       |
|    | 3. Affective                       | 75.8      | 81.7      | 82.5      | 80.0 Good       |

4. Conclusion
• Test results show that Integrated model-based performance assessments for style and energy materials are valid and practical. Learning tools used can increase student interest in learning.
• Development of assessment tools refers to the principle of performance assessment not only based on written test assessments only. Assessment uses performance assessments, requiring student independence and group cooperation in accordance with the type of assessment used.

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