

Developing Integrated Thematic Learning Instruments based on Environment

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Abstract—This research aims at: (1) develop an integrated thematic learning instrument based on environment in the sub-theme "*Gaya dan Gerak*" (force and motion) for the fourth grade students in Sekolah Dasar Negeri (State Elementary School) – SD N Nogopuro, and (2) determine the effectiveness of the integrated thematic learning instruments based on environment in the sub-theme "*Gaya dan Gerak*" for the fourth grade students in SD N Nogopuro. The research method employed research and development with the suggested model from Dick & Carey consisting of 10 stages. The data was collected by interview, assessment sheet for the product of learning kit, observation sheet for the teacher, observation sheet for learners, learning outcomes tests and teachers' questionnaire responses. The research instruments and products were validated through expert judgment in case of material and evaluation. Data analysis techniques made use of both qualitative and quantitative techniques. Qualitative data analysis techniques were used to determine the predicate of product feasibility, while quantitative data analysis techniques were used to determine the effectiveness of the use of learning tools products that had been developed. The quantitative analysis techniques used paired sample t-test method to know the difference of pretest and posttest in one class, and independent sample t-test to know the difference result of posttest in the experiment and control class with the significance level of 0.05 with the assistance of SPSS program. The results indicated that the learning instruments consisting of syllabus, lesson plans, teaching materials, and test results of learning outcomes were feasible according to the validator, the elementary school teachers. Based on the paired sample t-test analysis, it was found that there were differences in learning outcomes in each class. The result of the independent sample of t-test with Sign. 0,000 indicated that there were outcomes differences in experimental and control class as the implementation result of integrative thematic learning instruments based on the environment in the sub-theme "*Gaya dan Gerak*". It means that learning with integrative thematic learning instruments is better than the conventional tools.

Keywords—*learning instruments, thematic-integrative, environment-based learning*

I. INTRODUCTION

The 2013 Curriculum applies an integrative thematic learning model to integrate the various subjects in a theme of inter-related subjects. The learning process is oriented towards a scientific approach and authentic assessment. The learning

process with a scientific approach emphasizes learning efforts that can encourage students to have the ability to actively seek, process, construct, and apply the gained knowledge. Therefore, the demand for learning with the 2013 Curriculum is that every teacher should be able to develop learning instruments that refer to the curriculum. Without a systematic curriculum, learning can fail so that learning results are not maximal. Thus, it is necessary to study and develop learning instruments in accordance with the 2013 Curriculum which can be used as a reference for teachers.

To identify problems that occur in the field, the researchers conducted interview and documentation studies in Sekolah Dasar Negeri (State Elementary School) - SD N Babarsari and SD N Nogopuro. It is revealed that the teacher cannot develop learning instruments which are appropriate to the 2013 Curriculum so that the quality of learning cannot be effectively measured. In the learning process, the teacher taught the material using a book without any learning media. It made the learning result was not maximum. Ideally, teachers use media in the learning process, but they found it difficult to provide it and the learning process was less attractive and dependent.

The other influencing factor is coming from the books used by students in learning. The book of the 2013 Curriculum contains some abstracts and difficult concepts to be understood by students. In addition, there is a mismatch on the Core competence and Basic competence between the teacher's book and student books.

Based on these problems, it is crucial to provide learning instruments supported by learning media. Learning media in this case is based on the surrounding environment. Thus, this research aims to develop integrated learning-products based on environment in the sub-theme "*Gaya dan Gerak*" (Force and Motion) for fourth-grade students in SD N Nogopuro and determine the effectiveness of the products. Integrative thematic learning instruments can be used to complement and expand teacher's knowledge in integrative thematic learning by optimizing the surrounding environment. It also enables the students to learn material independently as well as make the learning process more creative, innovative, and fun.

Many experts describe thematic learning based on the student's cognitive level. In addition, thematic

learning makes students understand the material holistically which is not fragmented into several branches of the subject [4,10,14,18]. The management of the learning process with thematic learning in the class must have particular strategies and instruments to guarantee its effectiveness and efficiency. The management is not limited to classroom management and control the students in the learning process, but more on the management before the learning implementation, such as learning tools that must be prepared by teachers. Learning tools are one indicator of a teacher's quality in learning planning [20,21,26]. Moreover, the learning process can be more effective with media. The media that relevant with thematic learning is the surrounding environment. The surrounding environment is the environment or something that is around the students. It is in the form of land, water, and things that are physical and nonphysical. It provides ease in the learning process to comprehend the learning concepts comprehensively. The topic of learning that appeals to students is the topic relevant to their lives, physical environment or social environment that they have. The physical environment is the place and the learning space while the social environment is an environment that can reflect the communication that exists among the school members based on sincerity, mutual support, and mutual trust [24].

II. RESEARCH METHOD

This research developed the product in the form of learning instruments covering syllabus, lesson plans, a module of teaching materials, and assessment. The procedure of the learning instruments development was adapted from the Dick and Carey model. This research development model was carried out through 10 stages. The stages were: (1) analyzing the need to identify objectives; (2) analyzing learning process; (3) analyzing learners and the context; (4) writing the purpose for the work; (5) developing assessment instruments; (6) developing learning strategies; (7) developing and selecting learning materials; (8) designing and conducting formative evaluation with 3 phases, i.e. one to one phase, small group evaluation, and limited trial; (9) revising, and (10) designing and executing summative evaluation [6]. The research descriptions on formative evaluation were One-Group Pretest-Posttest Design, while the research design on summative evaluation was nonequivalent control group design. The data were collected by interview, assessment sheet for the product of learning kit, observation sheet for teachers, observation sheet for learners, learning outcomes tests and teachers' questionnaire responses. The research instruments and products were validated through expert judgment in case of material and evaluation. Data analysis techniques made use of both qualitative and quantitative techniques. Qualitative data analysis techniques were used to determine the predicate of product feasibility, while quantitative data analysis techniques were used to determine the effectiveness of the use of learning tools products that had been developed. The quantitative analysis techniques used

paired sample t-test method to know the difference of pretest and posttest in one class, and independent sample t-test to know the difference result of posttest in the experiment and control class with the significance level of 0.05 with the assistance of SPSS program.

III. RESULTS AND DISCUSSION

A. Need Analysis

The thematic integrative learning instruments based on the surrounding environment for the sub-theme "*Gaya dan Gerak*" (Force and Motion) were developed for the fourth-grade student in SD N Nogopuro. Initially, the need analysis was done to collect information through library studies, the instruments analysis used by teachers, interviews and classroom observation. Based on needs analysis, it was revealed that that the teacher needs an integrative-thematic learning tool adapted from the 2013 Curriculum. The learning instruments should be also adapted to the student environment so that students to utilize any potential in the environment that can be used as the learning source.

B. Feasibility of the Learning Instruments

The obtained data from the needs analysis referred to the need for thematic integrative learning instruments based on the surrounding environment. The instruments were arranged based on the theoretical framework in developing some instructional tools products. The learning developed product included syllabus, lesson plans, learning media (module), and assessment based on the surrounding environment. The developed products were then validated by material expert judgment and previously examined by the instrument expert. The validation results showed that the developed products was feasible and very good with average score 4.4 – 4.75 for syllabus, lesson plan, module, and instrument test assessment respectively.

After the assessment product fulfilled its feasibility, the product was validated by the material and evaluation expert covering syllabus, lesson plan, module, and assessment. The validation result from the material and evaluation expert was very good with average score 4.22 for the syllabus, 4.21 for the lesson plan, 4.24 for the module, and good with average score 4.14 for the test assessment instrument respectively.

Based on the assessment of expert judgment, the developed instruments had been declared feasible to be used in the learning process. However, to clarify its effectiveness, it was necessary to test empirically in the field. The experiments were carried out through 2 evaluations. There were formative evaluation and summative evaluation. The formative trials were conducted in 3 stages starting from one to one phase, small group evaluation, and limited trial.

C. Effectiveness of learning Instruments

In the evaluations, both formative and summative tests were carried out, and the effectiveness or practical use of the developed instruments was also measured. Thus, the effectiveness of the use of learning

instruments can be reviewed based on four indicators, namely: 1) instruments implementation, 2) teacher's response, 3) students, and 4) test result between control class and previous learning.

1) The Learning Instruments Implementation

Based on these indicators from the obtained data, the implementation of learning in every learning can be done so well. This is consistent with the observations in all three trials in the formative and summative evaluation in the experimental and control class. It showed that learning can run well with the implementation score of 0.98-1. The success of the learning process cannot be separated from the plan that had been listed in the syllabus and lesson plan. In other words, the researchers were able to develop effective learning. Teachers who are able to create effective learning are teachers who are concerned with the quality of planning and preparation, such as preparing a positive learning environment, using certain learning techniques, and showing a professional attitude [16].

Effective learning has clear goals and plans. The goal and plan can be described on the syllabus and lesson plan. The syllabus describes an agreement between teachers and students, and this is an official document in a lesson [12]. It means the teacher must prepare the syllabus first so that all learning preparation can be organized systematically. Effective teachers are very systematic in preparing lesson plans in every learning process [2]. The syllabus can communicate not only what the teacher will do to help students learn to find objects but also what students can do to find objects [11]. Thus, the syllabus illustrates the activities that teachers and students can do in every learning process. The syllabus can provide information specifically and affect the effectiveness of learning [21].

The syllabus is arranged as the stock of lesson plan development. Learning plan contains a model and teachers' guide to implementing learning activities in the classroom [1]. The general and specific lesson plan developed in the classroom environment is an aspect that can be used to measure teacher's competence [7]. These opinions confirm that the lesson plan in every learning is very beneficial for teachers and students. The lesson plan can be archived so that it can be used for teachers to improve the learning process in the next year so the quality of teachers in the learning process can be well controlled. The lesson plan can also be used to measure the academic achievement and teacher will have time allocation to deliver material or subject well and interestingly [17]. Effective planning is the most fundamental element of a good teacher and prioritizes the student's achievement. The implementation of the lesson plan does not only serve as a teacher handbook during the learning process but also as a classroom management controller [23]. The use of lesson plan can manage the classroom in which (1) the students are deeply involved in the learning process since their roles are explained and the goals set out has been set; (2) students know what to expect which is contained in the learning objectives; (3) there will be no time wasted because learning is effectively

implemented; and (4) the classroom atmosphere will be oriented into the students' active participation, but it is fun reflected in good time management because of the effective implementation of a good lesson plan [24]. The good planning will produce good results as well [15]. The planning is not only forming students' knowledge but also building attitudes, values, and skills based on the exploration activities undertaken by students. Based on the findings, it is proven in the field that the learning instruments in the form of syllabus and lesson plan are very effective to be used for the learning process for both teachers and students.

2) The Teacher's Response in Using The Instruments

The second indicator to measure the effectiveness of learning by using thematic integrative learning instruments based on the surrounding environment is the teacher's response in using the instruments. Teacher's response during the use of thematic integrative learning instruments was very good. It can be seen from the average of questionnaire scores from 3.65 to 4.25 with good to very good category. This good response was caused by the role of a teacher as a facilitator and moderator during the learning process so that the learning activity was dominated by the student's activity. As a facilitator, the teacher assured that the students had a learning experience that can be developed after obtaining information during the lesson. The task of a facilitator was to ask students to build experiences when they learn together [17]. The role of a teacher was to encourage students to keep a high curiosity in the learning process. In addition, the other role of a teacher was to provide clear instructions. The clear instructions can make students know and understand what they should do during the learning process and actively involved in the learning process. The qualified instruction will deconstruct issues related to negative activities of the student in the learning process [5]. Due to the presence of appropriate and qualified instruction, it will make students more focused to actively participate in the learning process.

3) The Student's Response in Using The Instruments

The third indicator is the effective implementation of the developed learning instruments. The researcher can examine its effectiveness based on the student's response after using the learning instruments. In the learning process, generally the student activities both according to the formative and summative evaluation in the experimental class show a positive attitude because they can make observations, experiments and listen or pay attention to teacher's instructions during the learning process. They were also actively involved in cooperative skills such as working in groups to solve some problems in the exercises.

In the learning process, the modules are used as teaching materials. The module consists of material and worksheets that must be completed by students. The worksheet is a collection of images and exercises [8]. It becomes the most important part of a module and learning design. The modules can be used to independent or individual learning because it consists

of purpose, instruction, reading material, answer keys, and evaluation section. Besides, the developed module also affects the students' soft skills [19] [22].

With modules, the students can be more independent in learning and they can learn anywhere without the teacher's assistance. In this case, a teacher only acts as a facilitator. The module is one way for students to learn independently so that students can determine their own successful learning. There are 8 characteristics of learning using module that are based on self-instruction or self-study, such as acknowledging individual differences, having clear learning objectives, arranging with systematic knowledge, using instructional media as support, facilitating active learning, strengthening with direct response by and for students and completing with evaluation to support the material [19].

Learning with modules was a relatively new experience for students because they usually used the handbook from the government and they cannot learn independently because stimulus or instruction must be given from the teacher. The existence of new experience also affected the students' response in the learning process. It was shown from the average score of the observations i.e. 0.94-1. The score indicates that students feel happy and can easily follow the learning process with thematic integrative learning instruments based on the surrounding environment. The student's enthusiasm is also strengthened from the result of the questionnaire analysis. The questionnaire result from the student's responses to formative and summative evaluation in the experimental class was very high. Their responses to the teaching materials, the modules, the worksheets, the learning process, and the teachers teaching were 96%. They were interested and found it as a new learning experience.

The learning with developed instruments can help the students and they become more motivated to understand the concepts or material. The advantages of using modules in the learning process include making learning easier for the students, obtaining direct feedback, having more completed mastery, becoming more motivated to complete the module based on their ability, becoming more independent, and establishing cooperation between teachers and students. Some learning advantages by using modules, such as students have high motivation to learn because they have clear boundaries on the assigned tasks and their ability, the students can know their understanding level. It also enhances the student learning outcomes and minimizes the burden of the learning subjects so the learning process becomes more efficient [19]. The student learning outcomes improved significantly after learning by using modules. In addition, the modules can also enhance students' talents and abilities [9]. This is consistent with the opinions of Brown Ashland et.al (2012: 2) that gradually using modules on active learning can improve students' talents and abilities in their learning environment.

4) The Pretest and Posttest Result in the Experimental and Control Classes

The fourth indicator is the assessment result from the pretest or posttest in the experimental and control classes. In general, the formative evaluation shows a significant difference. It can be seen based on the results of data analysis that the obtained significance scores from pretest-posttest learning in the formative evaluation were <0.05 . It means that the learning with the developed thematic integrative learning instruments influences the students' learning outcomes. In the summative evaluation, the results of the experimental and control classes were significantly different. It can be seen from the result of 2 different tests, there were independent sample t-test and paired sample t-test. Based on the test value of Sig. and the obtained mean from SPSS analysis was 0.000. The significance value of was less than 0.05, therefore it can be declared that the learning with the developed thematic integrative learning instruments based on the environment was effective because there were differences before and after the use of the learning instruments. The instrument can provide a different experience to the students. To simplify the description of the obtained results, it can be seen in Figure 1 below:

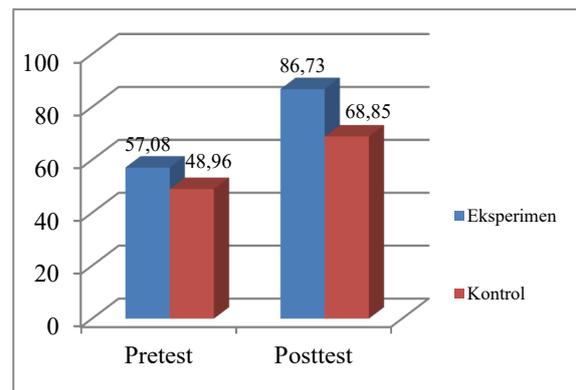


Fig. 1. The student achievement in *pretest-posttest* of the experiment and control class

The graph shows the effectiveness of the learning instruments in the experimental class compared to the control class. The advantages of using thematic integrative learning instruments can be explained as follows [13]:

1. The students find it easier to understand the concepts.
2. The students can have longer-term memorization.
3. The students can have a better understanding of the abstract concepts such as shape, energy, place, and time.
4. The thematic learning is beneficial for students who are tired of sitting activities (monotonous).
5. The students can learn to present information with their learning styles.

6. The assessment on thematic learning can facilitate the students' critical thinking than the traditional or regular tests

Based on the result and discussion above, it can be seen that the researcher is able to develop thematic integrative learning instruments based on the surrounding environment that is feasible and effective to be used in the learning process. The research results suggest that the teachers can develop other learning instruments so that the learning can be more meaningful. Meaningful learning can occur if there is an effort to connect the current concept that has been achieved with the concept to be achieved. The concepts are very difficult to learn if it is only verbal explanation without showing the real things. This corresponds to the nervous system in the human brain.

IV. CONCLUSION

Based on results and discussion, it can be concluded that the thematic integrative learning instruments developed by the researcher is feasible to be used for the learning process. The developed learning instruments include syllabus, lesson plan, module, and test assessment. In addition, the learning instruments are also effectively used in the learning process and can improve the student learning outcomes in the fourth grade, especially in the sub-theme of "Gaya dan Gerak". This learning instruments can be used as a reference to develop other learning instruments that is suited to the 2013 Curriculum.

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