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Implementation of Guided Discovery Based Thematic Learning Modules to Improve Independence and Learning Achievement

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Abstract

This study aims to analyze the effect of integrative thematic modules based on the guided discovery in increasing independence and learning achievement. This study applied research and development (R & D) method which refers to the ten steps developed by Borg, and Gall. The test subjects were the fourth-grade students at SD N 1 Teluk and SD N 4 Teluk. The data collection was done using interviews, observation, questionnaires, and tests. The data analysis technique used in this study was descriptive analysis, ANOVA, and t-test. The results of the study showed that: guided discovery integrated thematic learning module that is produced effectively to improve independence and student independence and learning achievement. The students' independence and learning achievement increases significantly based on paired t-test at a 0.05 level of significance (sig. (2 tailed) = 0.000 < a = 0.05).

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INTRODUCTION

Curriculum 2013 is the latest curriculum designed by the Indonesian government to replace the previous curriculum, namely the unit level curriculum (KTSP). Curriculum 2013 uses integrative thematic learning which is learning that integrates or combines various competencies from various subjects into various themes (Majid, 2014). Teaching materials published by the government are teacher books and student books, but the materials in student books are not exhaustive. While other sources are still limited, these problems make students still dependent on the teacher as a source of learning. Students also still have not taken the initiative to find other learning resources.

Independence is essential for students since this trait provides the opportunity to practice consistently doing something on their own or getting used to doing tasks that are appropriate to their age. Ceylan (2015) explains that students who are independent in learning are students who monitor what has been learned, and evaluate what has been obtained. Similar to Febriastuti, Linuwih and Hartono (2013) that project-based inquiry learning can and is even better applied in learning to improve student learning independence.

The guided discovery model is one of the models suggested by the government to support Curriculum 2013 learning. However, in reality, the teacher explains that students still lack the attitude of independence shown by the fact that students do not study the material themselves if the teacher does not instruct it. Students also still lack the initiative to seek information themselves from other sources so that only relying on student books. Students are still dependent on the teacher when the class teacher makes students less self-sufficient. Learning achievement is an achievement of student learning outcomes. In certain themes, more than 50% of the students obtain a value of knowledge that is still unsatisfactory or below the minimum completeness criteria (KKM), so that the impact on the final science test scores it gets the lowest compared to other subjects. Based on the preliminary study, a learning resource is needed that can facilitate students to support student learning activities and the development of student competencies, especially learning independence and student learning achievement. Learning resources that can be used to improve student learning independence are modules. It is one of the teaching materials that students can use to maximize learning activities in the classroom or outside the classroom. This is by Cengizhan (2008) who stated that teaching materials using modules could improve student success. Modules can be used at any time and adjusted to the learning speed of students to learn independently so the learning process can run effectively. According to Dai, and Turgeon (2008), the purpose of the module is to help students to reach the desired competencies. Piaget (in Santrock 2011) states that children aged 7 to 11 years enter into the concrete operational stage. Karim, Utami, S., and Utami, F. R. (2012) stated that the application of the right learning model would produce the expected learning achievement. In this stage, the child will be interested and understand more about concrete or real things.

Based on the discussion it is important to find out the influence of guided discovery-based integrative thematic learning modules in increasing independence and learning achievement. By these objectives, there are two research benefits as follows: (1) the results of this study are expected to add references, particularly on the application of learning in elementary school, (2) the results of this study can help teachers in providing learning resources in the form of modules.

METHODS

This study applied (R & D) research model developed by Borg, and Gall (1983). The product trial development results in the form of modules in this study consisted of several stages, they were: (a) product validation by material experts and media experts (b) revisions according to expert advice, (c) initial field tests, (d) revised results initial field test, (e) main field test, (f) revision of the results of the main field test,

(g) operational field test, (h) revision of the results of the operational field test. Can be seen in the following picture:

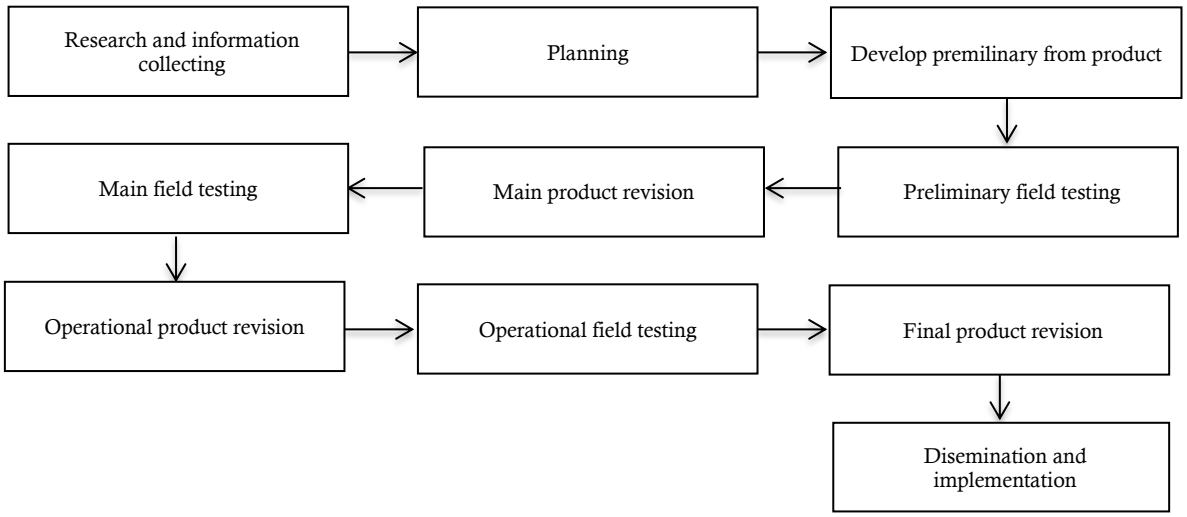

Figure 1. The Procedure of Development

The trial subjects in the initial trial were three fourth grade students of SD Negeri 1 Teluk 1 in the category of low, medium and high ability students. The trial subjects in the field trial were nine students from grade IV of SD Negeri 1 Teluk who had not been subjected to initial trials. The operational field trial involved 23 students of grade IV A SD Negeri 4 Teluk as a control class, 21 students of grade IV B, and 21 students of grade IV C SD Negeri 4 Teluk as the experimental class and randomized experimental and control groups. The research instrument in this study was divided into two parts. First, the instruments for measuring media validity include (1) media expert validation questionnaire, (2) material expert validation questionnaire, (3) teacher response questionnaire on the product developed, (4) student response questionnaire, on the product being developed. Second, the instrument to measure the effectiveness of the product being developed includes (1) independence questionnaire, and (2) pre-test and post-test test questions. The research data was in the form of validation data from media experts and material experts regarding the feasibility of products developed in the form of modules, teacher response questionnaire data on the developed modules and student response questionnaire data on the developed modules, data from the independence questionnaire, and data of the test results.

RESULTS AND DISCUSSION

The first stage of this study was needed assessment carried out in four ways, namely literature review, interviews with the teacher of grade IV, observation of teaching and learning activities in grade IV, and study of documents used by teachers and students. Based on the need analysis of the material chosen, the material in sub-theme 1 was "energy source" which is in theme 2 of grade IV SD. The next planning step was the preparation of modules, and then the modules were printed and validated by the media experts and material experts. Revisions were made based on input and advice from the experts. After the developed module was declared feasible by media experts and material experts, the next step was the initial field trial. Tests conducted with the trial subjects of 3 fourth grade students at SD N 1 Teluk and grade IV teachers at SD N 4 Teluk. SD N 1 Teluk was chosen as a place of testing since this SD has the same characteristics as SD 4 Teluk. The similarities between the two

primary schools are that both schools were the pioneer of Curriculum 2013.

The field trial stage is the second stage for product testing of guided discovery-based integrative thematic learning modules. At this stage, the product of the learning module has been revised according to the suggestions from the subjects tried in the initial trial. The revised learning module was then tested to 1 teacher of SD N 1 Teluk and nine students from SD N IV Teluk included in the ability category of 3 weak students, three moderate students, and three high students. Field trials aim to get scores and gather information about teacher responses and student responses to the learning module.

The next stage was testing the operational field. The operational field trial aims to determine the effectiveness of the module developed in fourth-grade elementary school students. The learning module used for operational trials is a revised module based on suggestions and input from the subjects tried in the initial trial and field trials. Crimmins, and Rupprecht (2010) explain that with modules that students can develop their abilities, without waiting for the teacher to start. With the module, students are given the opportunity to determine for themselves when he studies, and not only study in the classroom. Also, research by Sari, Rusilowati, and Linuwih (2015) explained that the development of teaching materials with the theme of heat transfer in decent life is used, which uses higher learning materials than students who use ordinary books since they are easy to understand. Operational trials were carried out in SD N 4 Teluk in grade IV A as a control class, grade IV B as experimental class 1 and grade IV C as experimental class 2. Based on the results of need analysis, then making the main product of guided discovery-based integrative thematic learning module was arranged. Similar to the research of Mufida, Linuwih, and Sugianto (2019) discovery learning is a learning theory that is defined as a learning process when students are not presented with lessons in the final form, but students are expected to organize themselves. The product validation stage by media experts and material experts was conducted to obtain module feasibility data developed to improve student independence and learning achievement.

Validation data analysis of media experts obtained a total score of 95 with a score presentation of 87.97% or in the category of "very good." The eligibility requirement is if the module developed gets a minimum value of sufficient category. If the category has reached enough or better than enough, then the module has been declared feasible. Furthermore, the data are validated by material experts.

Data validation analysis of material experts obtained a total score of 112 with a presentation score of 89.85% or included in the category of "very good." After revisions based on input and suggestions from media experts and material experts, and guided discovery-based integrative thematic modules have been declared feasible, the next stage was the initial trial and field trials. The initial trial was conducted to 3 fourth grade students of SD N 1 Teluk and the field trials were conducted to 9 fourth grade students. The trial aims to obtain information, input, and advice from students and teachers about the guided discovery-based integrative thematic modules.

The questionnaire score of the teacher's response in the initial trial was 35 with a percentage of 87.5% or in the category of "very good." In the field trials, the questionnaire scores of teacher responses increased by 39 percent by 97.22% or in the category of "very good.

The score on the response of students in the initial trial was 102 or with a percentage of 93.75% in the category of "very good." The results of the field trials scored 278 with a percentage of 96.53%. Field trials aim to get scores and gather information about teacher responses and student responses to the revised learning modules.

After the field trials, the next stage was the operational trial. Operational trials were carried out for one sub-theme. The method used in the operational trial was quasi-experimental with grade IV A as the control class (CC), grade IV B as experimental class 1 (EC1), and grade IV C as experimental class 2 (EC2). The operational field trial aims to determine the effectiveness of guided discovery-based integrative thematic learning

modules in elementary school fourth-grade students. The instruments used were the independence questionnaire, the pre-test, and the post-test question. The results of the data are student independence questionnaires and student learning achievement. The results data from operational trials are used to determine how the effectiveness of guided discovery-based learning modules to improve the independence and learning achievement of elementary school students in grade IV. Student independence questionnaire data in the form of scores on the results of filling the independence questionnaire by students, then the score obtained is converted to a scale of five.

The results of recapitulation on the independence questionnaire data before using guided discovery-based integrative thematic learning modules that have been converted into a scale of five can be seen in the following Table 1.

Table 1. The Result Students Independence in the Operational Trial Test

Class	Pre-test		Post-test	
	Score	Categories	Score	Categories
CC	29.78	CB	32.86	B
EC1	29.80	CB	41.42	SB
EC2	29.61	CB	41.76	SB

Table 1 shows the score obtained in the pre-test and post-test of the independence questionnaire from grade IV SD N 4 Teluk. At the pre-test, the control class was in the CB (moderate) category, the B (good) category. The experimental classes 1, and 2 at the time of the pre-test were in the category of CB (moderate) and increased after the post-test received the predicate of SB (very good). Learning that involves students actively have increase students independence. Students practice directly to make their own decisions in learning. Powell (2013) explains that learning independence can be influenced by learning activities and the level of available information sources. Data on student achievement test results in the form of student achievement scores before using the module and after using the module. To determine the quality of student learning achievement, the score obtained is converted to a scale of five. The results of the recapitulation of student learning achievement test data before using guided discovery-based integrative thematic learning modules that have been converted into a scale of five can be seen in the following Table 2.

Table 2. The Result of Students Learning Achievement in the Operational Trial Test

Class	Pre-test		Post-test	
	Score	Categories	Score	Categories
CC	70.40	B	72.09	B
EC1	72.48	B	93.15	SB
EC2	72.86	B	93.62	SB

Table 2 shows that the score of the standard deviation obtained in the control class at pre-test was 1.69. Experiment class 1 obtained standard deviation score of 20,83 in the category of SB (very good). The experimental class 2 obtained standard deviation score of 20.76 in the category of SB (very good). Pratama, Widiyatmoko, and Wusqo (2016) The use of modules affect the learning outcomes and the independence of students. The influence of the use of modules on independence is 60.22% based on observation data, and 47.61% based on questionnaire data. While the influence of the use of modules on cognitive learning outcomes is 82.81%, this module provides effective results to improve learning achievement. This module is based on discovery activities that involve students actively participating in producing an activity. By using this module students' learning achievements become better.

After the pre-requisite test is fulfilled, the next stage carried out was t-test consisting of independent t-test and paired t-test. The independent t-test was conducted with the aim of knowing whether there were differences in the independence and learning achievement in the experimental class using guided discovery-based integrative thematic modules and control classes that used teaching materials commonly used by students and teachers. Paired t-test was conducted with the aim to determine the differences in the independence and student learning achievement before and after using the guided discovery-based integrative thematic learning modules.

The result of independent t-test on independence and student learning achievement

in comparison 1 (control class and experimental class 1) and comparison 2 (control class and experimental class 2) showed that the calculation score has a significance value of 0,000 or smaller than the p_{value} of 0.05. Therefore, there is a significant difference between the data on the results of independence and student learning achievement in the control class and experimental class.

The results of the paired t-test of independence and learning achievement in the experimental class 1 and experimental class 2 showed the calculated score of 0.000 or smaller than the p_{value} of 0.05. The increase in students' independence can be seen in the following Figure 1. That is, there is a significant difference in the independence and learning achievement in the experimental class before and after learning using guided discovery-based integrative thematic modules.

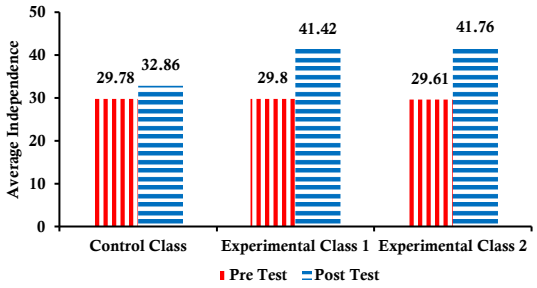

Figure 1. Result of Independence Questionnaire

Meanwhile, the result of the increase in students learning achievement in the operational trial test can be seen in Figure 2.

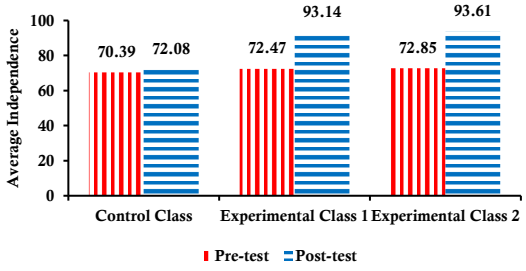

Figure 2. The result of the Students Learning Achievement

The increase in independence and learning achievement in the experimental class showed that the module was more effectively used to improve the independence and learning achievement in grade IV of elementary school. The guided discovery integrative thematic module developed in this study was suitable to be used in the learning of the fourth grade of elementary school. Modules have been declared feasible by material experts and media experts because of their complete and programme structure. This is by the statement of Donnelly and Fitzmaurice (2005) that the completeness of the module must be structured and programmed. After the module is declared feasible by the expert, the module can be tested. Research from Liu, and Wang (2010) revealed that in the learning process of students was emphasized to be active in each process, the application of the expected teaching process was the student center. This is due to that the focus of material discussion is not on subjects but themes.

Operational trials were conducted to determine the increase in independence and learning achievement of class IV students after using this guided discovery-based integrated thematic learning module. Leksana, Wibowo, and Tadjri (2013) Stated that there was an increase between before and after using a module of 10.22%. Operational trials in this research use quasi-experimental techniques with grade IV A as the control class, grade IV B as experimental class 1, and grade IV C as experimental class 2. After the pre-test was fulfilled, all data are normal and homogeneous, then independent t-test analysis was performed (independent sample t-test) and paired sample t-test. The results of the independent t-test of the independent questionnaire pre-test showed a significance score of comparison 1, that is between grade IV A, and grade IV B at 0.981 or more than 0.05, Whereas in comparison 2, between grade IV A grade IV C obtained a significance score of 0.857 or more than 0.05, which means that there is no difference between the independence data of the control class and the experimental class. Then the results of the independent t-test of post-test of the independence questionnaire showed a significance score of comparison 1, that is between grade IV A, and grade IV B at 0.000 or

less than 0.05, and in comparison 2 that is between grade IV A, and grade IV C obtained a significance score of 0.000 or less than 0.05, which means that there is a significant difference between the independence of the control class and the experimental class.

The results of the independent t-test on the pre-test of student learning achievement showed a significance score of comparison 1, that is between grade IV A, and grade IV B at 0.358 or more than 0.05, whereas in comparison 2, between grade IV A and grade IV C obtained a significance score of 0.308 or more than 0.05, which means that there is no significant difference between the data on the learning achievement of the control class students and the experimental class students. Then, the results of the independent t-test of the post-test of student learning achievement showed a significance score of comparison 1 that is between grade IV A, and grade IV B at 0.000 or less than 0.05, and in comparison 2 that is between grade IVA and grade IV C obtained a significance score of 0.000 or less than 0.05, which means that there is a significant difference between the learning achievement of the control class students and the experimental class students.

The results of the paired t-test of students' independence questionnaires in the control class before and after learning showed an increase but were not significant since the significance was 0.085 or more than 0.05. The results of paired t-test in the experimental class 1 and experimental class 2 showed a significant increase in the independence before, and after using integrative thematic learning modules based on guided discovery, this was indicated by a significance score of 0.000 or less than 0.05. In the student learning achievement, the results of paired t-test in the control class before and after learning showed an increase but not significant since the significance was 0.074 or more than 0.05. The results of paired t-test in the experimental class 1 and experimental class 2 showed a significant increase in the students' learning achievement before, and after using integrative thematic learning modules based on guided discovery, this is indicated by the significance score of 0.000 or less than 0.05.

From the trial, it can be seen that independence can be improved using integrative thematic learning modules based on guided discovery. This is due to that this module answers the needs of students for teaching materials that are by the development and characteristics of students who are active and like to do activities. Integrative thematic learning module based on guided discovery was made using interesting pictures and stories, easy-to-understand instructions and practical activities where students discover the concept of learning to improve independence. Alabi, and Nureni (2016) explained that guided discovery methods are student-centered teaching methods. Therefore, students can directly construct their abilities. Teaching materials that have interesting activities can increase independence. Similar research from Ong, and Tasir (2015) explained that modules are included in teaching materials that are used to facilitate student learning independence because they are equipped with the instruction that students themselves can learn. Anggraini and Sukardi (2016) explained that the module is also able to train students' independence in learning and be able to develop the ability to cooperate.

In this module, the activities in the module are many by practicing the students look very happy when receiving orders to do the activities in the module. Research from Fidiana, Subali, and Dwijanati (2012) revealed that teaching materials that can associate material with phenomena in everyday life could facilitate students in understanding the material independently.

An integrative thematic learning module based on guided discovery applied to learn based on discovery activities. This module gives more effective results to improve learning achievement because this module involves students actively participating. Gholamian (2013) stated that the guided discovery learning model helps students become independent and take responsibility for learning independently. Therefore, it can construct abilities in students.

Through the activities in the module, students are indirectly learning, and it will be easy to understand the material. For example, when students learn about wind material as an energy source, students are assigned to make a product in the form of a simple, unique and attractive windmill. Students will be happy to do this activity, in addition to the process of activities students get the concept of learning, especially the results of their activities are an interesting work of art. So that students can understand the concept of wind as a source of energy, and so do other activities. Na'im, Sopyan, and Linuwih (2015) explain the discovery inquiry model as a solution so that students are encouraged to be directly involved in the learning process that starts from orientation activities, designing investigative approaches in the form of experiments, synthesizing knowledge, and formulating conclusions and the latter having a scientific attitude. Putra, Setyowati, and Linuwih (2015) stated that by using the discovery learning models, students would be able to explore their knowledge, obtain knowledge in their entirety. Based on activities, students were learning while playing. They feel happy and encourage them to learn and mastery the learning materials more easily.

CONCLUSION

Based on the result of the analysis, therefore, it can be concluded of guided discovery-based integrative thematic learning module is used to increase the independence and learning achievement in the fourth grade of elementary school. The module was also shown to be effective in increasing the independence of grade IV elementary school students; there is a significant increase in the students' independence after learning using guided discovery-based integrative thematic learning modules. The effectiveness can also be seen in the improvement of the learning achievement.

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