Journal of Education and Practice
ISSN 2222-1735 (Paper) ISSN 2222-288X (Online)
Vol.9, No.11, 2018

Using Worksheets in Integrated Thematic Instruction at Elementary Schools

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Abstract
Integrated thematic instruction in Elementary Schools have not always offered promising results for elementary students in Indonesian context. Additional interventions could be an alternative that makes thematic instructions at elementary levels achieve better results. One way that could be applicable is by the use of students' worksheets which support learning for students. The purposes of study were (1) to test the use of worksheets in integrated thematic instructions in a scientific approach, and (2) to see the effectiveness of worksheets in integrated thematic instruction. This research was conducted by using research and development method in selected elementary schools in Metro, Lampung, Indonesia. The results showed that the students worksheets developed based on scientific approaches, validated by material experts, learning method experts, as well as teachers' classroom teachers, were found effective to be used in integrated thematic instructions. The students' achievement and the teaching learning process were found better.
Keywords: student worksheet, scientific approach, integrated thematic instruction

1. Introduction

Curriculum 2013 or known as K13 in Indonesia has driven Elementary Schools in Indonesia to be taught using integrated thematic instructions. A thematic instruction is an integrated learning model that uses a theme to link some subjects as this will be able to provide meaningful experiences for the students (Bergeron, B. S., & Rudenga, E. A., 1996; Min, K. C., Rashid, A. M., & Nazri, M. I., 2012; Prastowo, 2013:117). This instruction model is believed to have a positive effect on learning achievements and provides a framework for the students and to have interrelated concepts (Liu and Wang, 2010; MacNaughton, G., & Peter, D., 2015; Abdurrahman, W. T., & Kadaryanto, B., 2012). With this model, the students will easily understand the concepts that they learn through direct experience and connect it with other concepts that have been previously mastered. Furthermore, it is believed to be one effective learning model, as its capability of integrating and touching in an integrated emotional, physical, and academic dimension in the classrooms or school environment. They further assert that this learning model was originally developed for gifted and talented children, intelligent children, learning extension programs, and fast-learning learners (George, D., 2013).

An integrated thematic instruction serves to provide convenience for students in understanding and deepening the concept of material incorporated in a theme and can increase the spirit of learning, because the material being studied is the material that is real or contextual and meaningful for the students. While the thematic instruction process uses scientific approaches, it is intended to provide understanding for the students to understand various materials where the information can be from anywhere, anytime, does not depend on the teacher only. A scientific approach implemented in a learning process involves exploring information through observing, asking, information processing, concluding as well as communicating (Kementerian Pendidikan dan Kebudayaan, 2013). During the course of the learning activities, students are required to integrate their physical and mental activities to achieve the learning objectives that have been determined in the curriculum. In order for learning activities to take place in some active, innovative, creative, and fun atmospheres, they need a learning media which supports the well-being of a learning atmosphere. One of the learning medias that can be used is the Student Worksheet. A worksheet can be useful for a learning achievement (Lee, 2014: 96). For example, as a supplementary material, this sort of media can be additional information for the student to construct their knowledge. Students' worksheets can be more effective to make students more active in learning activities. In addition, individual's behaviour who learn by the use of worksheets can be better than just listening or looking at their teachers teaching (Toman, 2013: 173-183). Furthermore, worksheets can bring significant differences for their learning activities (Yildirim, 2011: 44-58).

The above-mentioned conditions can be achieved when integrated thematic instructions are well implemented well in Indonesian classrooms. However, not all classrooms implement this learning model very well, as found in a number of elementary schools in Metro, Lampung, Indonesia. From the results of interviews with the teachers, they are optimal in implementing integrated thematic instruction. In other words, most teachers only use student worksheets already provided in the textbook as a material of student work during learning activities. The student worksheets frequently used were actually not the ones that really assist the students to be active, creative, and innovative to pour their ideas and combine their physical and mental activities in the learning process, because they only present the exercise questions answered by the students and less

attractive. Students' worksheets are seldom designed by each teacher with the aim to collaborate the physical and mental activity of students in the learning process (Ryan, T. E., 2006; Brand-Gruwel, S., & Gerjets, P., 2008; Yildirim, N., Sevil, K. U. R. T., & Alipaþa, A. Y. A. S., 2011).

Without questions, there are still many people who complain that the student worksheets only offer exercise questions for the students to do during their free hours or as homework assignments done at home. However, the student worksheets should not only rely on what textbooks give them. Exercise problems presented the student worksheets found on textbooks are merely just a matter of measuring students' cognitive abilities in a limited form. This may cause students become during less active during the learning activities, the learning process may become monotonous, and the learning achievement may become low as well which may further result in ineffective classes. This has driven the researcher to be interested in developing teaching materials on the basis of a scientific approach, and to investigate the effectiveness of the student worksheets based on a scientific approach in some thematic instructions for elementary school students..

2. Research Method

This research uses research and development approach model adopted from Borg & Gall (1989: 784-785) where the research steps were carried out as follows: 1) Research and information, 2) Planning, 3) Develop preliminary form of product, 4) Preliminary field testing, 5) Operational field testing, 6) Main product revision, 9) Final product revision, 10) Dissemination and implementation. However, current research only employed eight steps. The design used was pre-experimental design, i.e. one group pre-test-post-test design. The restricted trial for the product, students' worksheets, was done in the IV.A class of Elementary School 1, West Metro, Lampung, Indonesia. The expanded trial was conducted in the IV.B of the same school, as well as the fourth grade at Elementary School 5, West Metro, Lampung Indonesia. Pre-tests and Post-tests were carried out in each trial when the students learn using student worksheets based on a scientific approach in an integrated thematic instruction. The result of Pre-tests and post-tests were analysed to determine the differences or the gap before and after taught using thematic worksheets on a scientific approach.

The population of this research was the fourth grade at Elementary School in Gugus Dr. Wahidin Sudirohusodo, Metro City, Lampung, Indonesia. Based on a purposive sampling technique, the researcher chose the fourth-grade students from two schools, that is Elementary School 1 West Metro and Elementary School 5 West Metro as the sample. The fourth-grade students in elementary schools chosen were considered as representatives from the fourth grade of elementary students in Metro City, Lampung, Indonesia.

The independent variable in this research was the student worksheet which is a type of printed materials covering learning materials, learning activities, exercises designed with the aim at facilitating students to understand concepts and as a guide for the students to carry out the given tasks, assisting them to interact with the materials, to train them to be more independent, to guide them to learn autonomously, as well as to provide them assistance in understanding the concepts for the basic competences of the learning to be achieved. The dependent variable in this study was the learning results or achievements. The student learning results were used to see the impact of the use of thematic worksheets based on the scientific approach (Sudjana, 2010: 22). The data collection technique was also by using a questionnaire which assessed the student worksheets validated by experts. Multiple choice test questions and descriptions were used to obtain data on the effectiveness of student worksheets, to be used as the instruments for the pre-tests and post-tests.

3. Result and Discussion

This research was initiated by conducting an observation on the facilities and the infrastructure for the students learning process as well as by interviewing with teachers and administrators about the school conditions in general. The school is among the least number of schools implementing the K-13 curriculum. However, the school teachers have not well-developed teaching materials yet that suits the student's situation and characteristics in the spirit of K-13 (Kementrian Pendidikan dan Kebudayaan, 2013). Based on the results of interviews with the school administrators, it turns out that some teachers in the school have not implemented integrated thematic instructions very well. Most of them only use the student worksheets provided in the textbooks as the materials for the student activities in the classroom. Therefore, it is believed that the student worksheets which function well to help the students to be active, creative, innovative pour their ideas and integrate their physical and mental activity in the learning process need to be developed. The student worksheets that are creatively designed by each teacher with the aim at collaborating the physical and mental activities of students in the learning process are essentials for integrated thematic instructions in K-13. Many students complain that the student worksheets provided by the textbooks only contain exercise questions for them to do during free hours or as assignments to do at home.

With the K-13 curriculum, teachers are given more authority to develop and to modify their instructions as long as still in the spirit of the scientific approach. However, the learning process that takes place in many elementary schools is considered less active and less interesting if related to the spirit of K-13 learning where it

has to be done in an integrated thematic instruction mode. When students only use worksheets provided in the textbook during the learning activities, their class becomes ineffective although the student worksheets actually are intended to help the students to be active, creative, innovative in the learning process. This is commonly because the worksheet they use mostly in a written form only. Therefore, it is necessary to prepare the students' worksheet that encourages students to learn in an integrated thematic instruction with K-13.

The data collection phase was initiated by identifying and analysing problems in the elementary schools being researched. Therefore, the design of the students' worksheets was based on the need analysis and oriented for the students' learning process in the integrated thematic instructions. The students need for their learning materials by the student worksheet was in accordance with the students' characteristics, ability, experience, students' cognitive and affective ability. The materials designed for the student teaching learning process were reformulated in accordance with the workbook-based scientific approach on the basis of learning indicators that should be achieved by students based on K13's content and process standards.

The design of student worksheets was developed by using Dick & Carey model with the following steps: (a) objective identification phase, (b) perform instructional analysis, (c) identify preliminary behavior/characteristics of students, (d) formulate performance objectives, (e) development of benchmark reference tests, (f) development of learning strategies, (g) development or selection of teaching, (h) designing formative evaluations, (i) writing tools, and (j) teaching revisions (Dick, W., Carey, L., & Carey, J. O., 2014). The validation of student worksheets based on a scientific approach was validated by expert judgement method, i.e. the expert for learning material design and the expert for student worksheet. The instructional materials as well as the student worksheets design based on the scientific approach was validated by the lecturers of Elementary Teacher Education Study Program. Based on the results of the validation conducted by the lecturers, in terms of learning materials, the value was 97.06, while the validation for the assessment worksheets design was valued for 99.38. This means that the images for the story focus on themes selected need to be revised. In addition, the students' scholarly appraisal based on the scientific approach was done by teachers of the Elementary Schools, West Metro. The results suggest that the materials selected in the student worksheets were good and interesting, providing experience for moral messages of students' daily life.

3.1 Required Data Input

The product of the student worksheets based on the scientific approach in an integrated thematic instruction was arranged in the following steps: observing, asking, reasoning, trying, and communicating. At the time of the implementation, the students could learn more actively by seeking information through resource sharing with their seniors and the teachers as well. When the learning took place, the students felt that there was something different from the learning process as they could come up with ideas even though there were still some obstacles in the trial of limited products such as their misunderstanding on how to solve problems with the stages specified. In this case, the teachers should provide more examples and directions during their presentations.

For the product trial, the students were still confused and asked about some information regarding the worksheet. Although the instruction could be understood by the students well, there were some technicalities that should be explained and repeated during the learning instructions such as time management in doing the worksheet, some unclear sentences, and the pictures used in the worksheet, etc. Limited product trials were conducted in Elementary School 1, West Metro, in IV.A class where the results of the normality and homogeneity test on the gained data were satisfied as indicated in table 1. This being normal and homogeneous were as the requirement to test the hypothesis proposed.

Table 1 The Results of Trial of Limited Product in IV.A Class in Elementary School 1, West Metro

Activity	N	Average	Student Completed	t-value	t-table	N gain	Student Responses
Pre-Test	21	56.00	1 (5%)	8.90	2.09	0.47	73,48
Post-Test	21	76.75	15 (71.43%)			(moderate)	

Table 1 also suggests that (1) the average value of the pre-test for the limited product trial (worksheet) was 56.00 and the mean post-test was 76.75. This indicates that the average scores for the pre-test and post-test were significantly different; before and after the student worksheets based on the scientific approaches in K13, integrated thematic instructions. (2) The percentage of the students completed the exercises in the pre-test was 5% (1 out of 20 students), and the percentage of the total number of students completed the exercises in the given worksheet was 71.43% (15 out of 20 students). (3) The t value in the limited product trial is 8.90, while the value of t table is 2.09 at the significance level of .05. the t value was found bigger that the t table. In other words, we can say that there was a significant difference between the students' learning achievement before and after the use of the student worksheets in integrated thematic learning in K-13. (4) The N-gain value at the time of limited product trial is .47 which is at a moderate level. (5) The result of questionnaire for the student responses regarding the student worksheet developed was at the average of 73.75, "good enough". It, therefore, can be concluded that using the worksheets in the integrated thematic instructions is found effective despite some shortcomings encountered during the implementation. These shortcomings were revised in the extended product

trials as explained in the following subsection.

3.2 Extended Product Trials

The students were found to perform better during the first extended product. They were more fluent in using the student worksheets where they were more active in conveying ideas, completing their tasks on time, and the class became less noise and unmanaged. They were also more confident when asking and answering activities, although there were still some students who had difficulties in understanding the problems that they had to solve. This condition was considered for further refinement of the product of the student worksheets in the integrated thematic instructions.

Furthermore, in the second extended trial, the students became more focused in understanding the learning materials. The discussion process in the classroom was found more active, the students shared arguments each other, and they were able to relate their learning experience to solve daily problems. During their presentation in the classroom, the other students listen to their friends by noting the important ideas, responding to their friends' questions even though some problems were not solved with reasonable answers. Based on the results of the second experiment, the students' worksheets based on the scientific approaches were better than the first, and they were more effective be used. This is in line with the results of the study.

The next stage, in the third experiment, the students improved better in the teaching learning process when they have to work with the student worksheets in the integrated thematic instructions. The complete descriptions of the three experiments are figured out in table 3.

Table 2. Result of the Product Implementation in 3 Experiments

Activity	N		Average	Completed Student	t-value	t table	N gain	Student Response
Treatment I	Pre-test	21	31,90	0 (0%)	27,09	2,09	0,71 (High)	77,17
	Post-test	21	80,00	16 (76,19%)				
Treatment II	*Pre-test*	21	40,71	0 (0%)	15,75	2,09	0,68 (Moderate)	80,06
	Post Test	21	80,48	18 (85,71%)				
Treatment III	*Pre-test*	14	47,50	1 (7,14%)	15,69	2,14	0,71 (High)	82,97
	Post Test	14	85,00	13 (92,86%)				

The extended product trials were conducted in two existing elementary schools in West Metro. The extended usage trial was conducted in the IV.B class in Elementary School 1, West Metro, IV.A class and IV.B class in elementary School 5, West Metro. The experimental results of the first extended experiment gained the average pre-test score of 31.90, and the average post-test score of 80. However, none of the students completed the pre-test (0% students completed the pre-test). While the number of students completed the post-test was 76.19% (16 out of 21 students 16 completed the worksheet). When the pre-test and post-test mean was compared by using t-test, the t-value was 15.69, and the value of the t-table was 2.09 at the significance level .05. This means that t value was higher than t-table. In other words, there is a significant difference between the students' learning achievement before and after the integrated thematic instructions using the student worksheet based on the scientific approach.

The N-gain value at the time of limited product trial is .70 where the questionnaire of student responses regarding the use of the students' worksheets based on scientific approach was 77.17, which was in a good category. The results of the second extended product trial average pre-test was 40.71 while the average score for the post-test was 80.48. The number of students completed in the pre-test was 0% (none of the students completed the worksheets) and the total number of students completing the worksheets in the post-test was 85.71% (18 out of 21 students completed the worksheet). In the meantime, the t value was 15.75 and while the t-table was 2.09 at the significance level of .05. This means that the t value was also found higher than the t-table, indicating the significant difference of the pre-test and the post-test mean scores. There is a significant difference between the students' achievements before and after learning results before using the student worksheets based on a scientific approach and after the implementation of integrated thematic instructions with the student worksheets based on scientific approach. The N-gain value was .68, which is considered at the medium level. While the questionnaire for student responses regarding the use of the student worksheets based on scientific approach model was equal to 79.33, considered in a good category.

In the third experiment using the worksheets, the average score for the pre-test was 47.50 and the average score for the post-test was 85. The total number of students completed in the pre-test was 7.14% (from 1 out of 14 students), and the total number of the students completed the post-test was 92.86% (13 out of 14 students completed the worksheets). The t-value was equal to 15.69 while the t-table was 2.14 at the level of

significance .05. The t-value was found higher than the t-table which means that there is a significant difference between the students learning achievements before and after the implementation of integrated thematic instructions using the student worksheets based on a scientific approach. The N-gain value was found .71 while the students' responses to the questionnaires regarding the use of the student worksheets in a thematic instruction based on a scientific model was 83.43, i.e. in the good category.

The result of the current research and development of the student worksheets based on the scientific approach taught in integrated thematic instructions suggests that this way is effective to be implemented with K-13 for elementary students. This is evidenced by the results of a limited product trial or extended product trial. This result is also in line with what has been researched by Lee (2014) who suggests that student worksheets can be useful in improving students learning outcomes (Lee, 2014: 96). As a supplementary material accompanying textbooks used in the classroom, worksheets can be used as advance students exercise in achieving the targeted competence. In addition, worksheets can be used by students to construct knowledge, making classroom management better, as well as building students certain characters, such as working in a group, sharing, being active, etc. This is based on the results of current research in teaching in thematic method with a scientific approach for elementary learners.

As we can see above that based on the results of the expert validation for the developed student worksheets, either in terms of material and design expert, the limited product trials or extended product trials of the student worksheets based on scientific approach in the integrated thematic instruction, this technique was found effective to be implemented in lower grade students. The result of current research is accordance with what Fibonacci (2014) suggested that developing teaching materials, such as with worksheets development, improves student learning achievement. Overall, the effectiveness of the use of the worksheets was indicated by the N-gain value which was .68 (medium), and higher than before using the teaching materials developed. In addition, the students also had positive responses regarding the development and implementation of teaching materials in the form of worksheets. The advantages of using the student worksheets can be seen by the improvement of the learning activities and achievement, and the worksheets used encourage students to work independently (Zhang, et.al., 2010; Reinders, 2010; Tassinari, 2015). Furthermore, this could also help them develop their concept about the learned materials. This is further strengthened by the use of scientific approach in the integrated thematic instructions which facilitate students' curiosity, interest, and attention in learning. This way could also encourage students' participation in discussing, arguing, developing thinking skills, and drawing conclusions, as well as training them to link cause-and-effect relationships; responsible for the findings they get, and being able to share their ideas about the findings.

4. Conclusion

Integrated thematic learning which is facilitated by the use of modified worksheets has been proved to be more effective to help students learn the material better in several ways. The student worksheets can help students improve their learning activities and achievement in general. The students are motivated to work independently in order for them to develop their concept about the learned materials. During the instructional process, they can be more curious by asking and answering, more interested and attention, as well as encouraging them to participate more in discussing, arguing, developing thinking skills, as well as being able to share their ideas about the findings. Based on the results of current research in selected elementary schools, it can be concluded that the student worksheets developed based on scientific approach implemented in integrated thematic instructions have been believed to be more effective as indicated in the results of the limited extended product trials in the research. Some technicalities issues, such as instructions and guidelines for using the worksheets need to be solved in advance for the better learning by using worksheets in integrated thematic instructions.

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