

# Developing Thematic Teaching Materials: Their Implementation in Project-Based Learning at Elementary Level

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**Abstract :** The study was focused on the development of thematic teaching materials in the project-based learning for the elementary school students. The process of developing thematic teaching materials was conducted in collaborative activities among the lecturers, the university students and the teachers. The thematic learning that has been considered as one of the highly effective teaching models still suffer from several problems and one of the problems is related to the teaching material availability. The teachers' limited capacity in developing the teaching materials and the scope of available teaching materials in the national level became the background of the study on the teaching material development. Through the activities in the study, the researcher would like to expect that there would be relevant teaching materials in optimizing the contextual and meaningful learning process within the elementary school. The study was conducted by adopting the pattern of learning media development that included the stafes of analysis, design, development, implementation and evaluation. From the study, the researcher found that the project-based thematic teaching material development for the elementary students might encourage the students to practice observing and performing something in order to attain certain concepts. In addition, the implementation of thematic teaching materials might improve the elementary school students' capability in analyzing, inquiring and cooperating. The results of the study also strengthened the researcher's assumption regarding the process of adapting new curriculum (in this case, the 2013 Curriculum) in the learning process within the elementary school in which the teachers found several main problems from the implementation of 2013 Curriculum. These problems might be categorized as follows: teachers' creativity, students' independency and evaluation toward the learning process and results.

**Keyword :** Learning Materials, Thematic Learning, Project-Based Learning and Elementary School.

## 1. INTRODUCTION

According to Judith H. Cohen (Rohman, 2007), schools today are having increasing difficulty meeting even their traditional goals of educating children. The statement is interesting regarding the fact that the school operation has been an interest for many parties not only for the parents and the society but also for the state. Schools have been regarded by many parties as an important instrument in the educational implementation in order to generate the expected Indonesian personality, namely a personality who has faith and piety toward Lord the Almighty and who are healthy, knowledgeable, capable, creative, independent, democratic and responsible as having been formulated in the Article 3 of Law Number 20 Year 2003 regarding the National Education System.

However, there are many problems that schools encounter in manifesting the expected Indonesian personality namely the personality that has been formulated in the Article 3 of Law Number 20 Year 2003.

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Joy Dryfoos (Jones & Jones, 1998) mentions that one of the serious difficulties that the schools encounter is the school failures. The school failures might be defined as the difficulties in operating the effective teaching-learning process (Jones & Jones, 1998; Enguita, Martinez & Gomez, 2010). The results of a study by Mortimor & Sammons (Jones & Jones, 1998) show that the schools have difficulties in deciding the control upon the factors that influence the effective teaching-learning process in order to achieve the students' academic and social gains.

Teaching-learning process is a process of interaction between the teacher and the learner in understanding the meaning of world reality (Paulo Freire in Tjalla, 2010). The process demands a critical attitude from the teacher and the learner. Both of them, the teacher and the learner, are the cognitive subjects while the world reality is the cognizable object. The learning process demands the consciousness from both subjects to be involved in overall manner in understanding the world reality so that the learning process will not experience a distortion that merely gathers and memorizes the knowledge. The learning practice that only gathers and memorizes is a model that has been frequently identified with the "filling the empty bottle" or the banking concept of learning model (Tjalla, 2010).

In the theory of cognitive development (Hurley, 2011), each input that has been captured by the ideal senses will enrich the schemata (the cognitive structure) from each individual and the schemata itself will be the results of understanding the objects from certain environmental conditions. The understanding toward the object occurs through a process of assimilation (associating the object to the concepts that have already existed) and of accommodation (a process of benefitting the concepts in mind in order to interpret an object). Both processes occur continuously and eventually will produce a balance between the old and the new knowledge. By means of such manner, gradually the students will establish something known as knowledge through the interaction between the personality and its environment.

The elementary school students are in the stage of cognitive development that has been different from the students in the higher degree. In the theory of intellectual development that has been developed by Piaget, most of the elementary school students belong to the stage of concrete operation. Therefore, the learning process in the elementary schools should be started by presenting the problems related to the students' daily activities and materialities. According to the constructivism, knowledge is a construction or a formation that has been conducted by the people who know the cognitive structure (the schemata). Knowledge might not be transferred from the teachers to the other people because everyone has his or her own schemata about what he or she knows (Hadi, 2005).

The thematic teaching has been considered one of the highly effective teaching models. The effectiveness of the integrated thematic teaching model might be seen from its capability in accommodating and touching the emotional, the physical and the academic aspects integratively in the classrooms or in the school environment. Empirically, the thematic teaching model has also been proven to be able and to be successful in enhancing the acceleration and in increasing the long-term memory capabilities of learning participants for a longer period of time. The main premise of thematic learning is that the students demand additional opportunities in order to be able to benefit their interest and their talent and to provide shared time so that they will be quickly conceptualizing and synthesizing certain knowledge. On the other hand, the thematic learning is appropriate to accommodate the qualitative difference in relation to the learning environment nearby the students (Samsuri, 2013; Pomeroy, 2011; Griffith & Horton, 2001).

However, along with the development of learning process in the schools the implementation of thematic learning encounters several problems and two of the problems are related to the teachers' mastery toward the themes that have been determined and the teachers' creativity in managing the theme in order to generate knowledge that includes many lessons in accordance with the essential objectives of the integrated thematic learning. The poor teachers' mastery toward the themes that have been determined has been caused by the low teachers' knowledge and capability in exploring the themes that have been determined. Another problem that becomes the reason behind the poor teachers' mastery is the existence of teaching materials that tend to benefit the lesson approach (Sukini, 2012; Pudjiastuti, 2010).

Involving the project-based learning actually should not be focused on solving the problems caused by the low teachers' creativity; instead, it should be focused more on improving the students' independency within the framework of thematic learning. In addition, involving the project-based learning is expected to bridge the process of transforming knowledge from the concrete form into the abstract form by providing a clarity of results from a process (Funderstanding, 2011).

Project-based learning is a learning model that turns the project and the science for accomplishing the project into the core of learning model. The project-based learning might also be defined as an investigative assignment in the form of project that has been based on the challenging problems or that has been based on the involving-student problems within the creation of problem-solving design. The decisions and the final results are in the form of problem-solving products. Problems will provide the students with opportunities to work independently and collaboratively during a certain period of time. In other words, the project-based learning is an innovative learning approach that emphasizes the contextual learning by means of complex activities (Kamdi, 2008). In the project-based learning, the students learn in an actual problem situation so that they will generate permanent knowledge and will organize the projects in their learning process. The projects here are complex and inquiry-based or challenging problem-based assignments that involve the students actively from the planning until the evaluation. A project in the project-based learning focuses on the inquiries or the problems that encourage the students to live (with a hardwork) the core or the main concepts, principles or learning materials (Kamdi, 2008). The project based learning also focuses on the main concepts or principles of a discipline, involves the students in the problem-solving activities and other meaningful assignments, provides opportunities for the students to learn in the scheduled time and achieves the creation of meaningful, realistic and presentable products.

The steps of implementing the project-based learning include six stages as follows (National Science Foundation, 2012; Thomas, 2002):

- Start With the Essential Question
- The learning process starts with the essential questions namely the questions that might provide assignments for the students in performing an activity. The first stage takes a concept that should be in accordance with the reality in the actual world and should start with an in-depth investigation. The teachers should strive in such a way that the related the concept will be relevant for the students.
- Design a Plan for the Project
- The planning of a project should be conducted collaboratively between the teacher and the students. Thereby, the students are expected to have a sense of "belonging" toward the project that they work on. The planning contains rules of game, selection of activities that might support the efforts in answering the essential questions by integrating as many subjects as possible and identification toward tools and equipment that might be accessed for assisting the project accomplishment.
- Create a Schedule
- The teacher and the students collaboratively design a schedule of activities for the project accomplishment. The activities that should be designed in the stages are as follows:
  - Deciding the timeline for the project accomplishment;
  - Deciding the deadline for the project accomplishment;
  - Assisting the students in planning new ways;
  - Guiding the students when they design a way that is not related to the project; and
  - Asking the students to provide explanation in the forms of reasons regarding the selection of certain way.
- Monitor the Student and the Progress of the Project

- The teachers are responsible for monitoring the students' activities when they are working on the project. The monitoring is conducted by facilitating the students in each process. In other words, the teacher serves as the mentor for the students' activities. In order to ease the monitoring process, the teacher might design a rubric that will record the overall important activities.
- Assess the Outcome
- Assessment is conducted in order to help the teacher in measuring the achievement of the standard, in evaluating the progress of each student, in providing feedback regarding the level of understanding that the students achieve and in designing the next learning strategy.
- Evaluate the Experience
- At the end of the learning process, the teacher and the students perform a reflection toward the activities and the results of the project that has been accomplished. The process of reflection might be conducted individually and collaboratively. In this stage, the students are asked to share their feeling and experience when they are working on the project. The teacher and the students develop a discussion in order to improve their performance during the learning process so that eventually they will find something new in order to answer the problems that have been proposed in the first stage.

## 2. METHOD

The study entitled *Developing the Thematic Teaching Materials and Their Implementation in the Project-Based Learning within the Elementary School* was a research and development which in general included the following research stages: analysis, design, development, implementation and evaluation (ADDIE) (Forest, 2014).

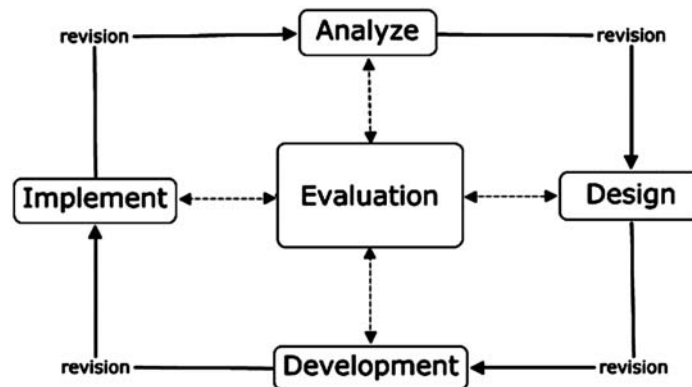


Figure 1

The teaching materials that had been developed in the study were used in the project-based thematic learning within the elementary schools. In the practice, the study made use of several instruments namely the field-study instrument, the teaching material-feasibility assessment instrument and the observation instrument for identifying the quality of the learning that had been conducted.

The observation instrument was designed by referring to the format of Classroom Teacher Evaluation that was developed by Hillsborough Country Public School FI in the Teacher Evaluation Handbook issued in 2011. The instrument consisted of 4 basic components namely the planning and preparation, the classroom environment, the instruction and the professional responsibilities. Then, the teaching media and materials feasibility instrument was designed by referring to the format of Learning Object Review Instrument (LORI) version 1.5 which assessment aspects consisted of content quality, learning goal alignment, feedback and adaptation, motivation, presentation design, interaction usability, accessibility, reusability and standard of compliance. The LORI instrument was developed by John Nesbit, Karen Belfer and Tracey Leacock from the E-Learning Research and Assessment Network (eLera) and the Portal for Online Object in Learning (POOL) (Leacock, T.L., & Nesbut, 2007).

In the practice, the subjects of the study were the elementary school teachers and the fourth and the fifth grade students in region nearby the Indonesian Education University. The data had been based on the results of consultation and discussion with the mathematic teachers of Lab School UPI Bumi Siliwangi Elementary School, Isola 1 Elementary School and Isola 2 Elementary School. The researcher also took similar approach for the application of experiment.

### 3. RESULTS AND DISCUSSION

The initial step for designing the thematic teaching materials in collaboration with several elementary teachers from the UPI Lab School Elementary school was performing a documentary review toward the curriculum of the elementary school. From the results of the review, the team of researchers developed the thematic teaching materials for the third grade of elementary schools with Environment as the theme and for the fourth grade of elementary schools with Energy as the theme. The development of thematic teaching materials was conducted in the limited-class setting in which the team of researchers were assisted by the teachers in designing the type of project that might be assigned to the elementary school students.

From the results of curriculum review, the team of researchers altogether with the teachers decided that the basic competencies that would be achieved for the third grade of elementary school were telling the natural and the human-made environment (Social Science), classifying and categorizing plants (Natural Science) and writing the natural events through pictorial observation (Bahasa Indonesia or Indonesian Language). After discussing the determination of basic competencies, the next step would be deciding the project that should be worked on by the elementary school students. In the limited-class setting that took place in the Microteaching Laboratory of Elementary School Teacher Education, Faculty of Teaching Knowledge, Indonesian Education University, the team of researchers assisted by several elementary school teacher-candidate students tried to design a replica of natural environment and human-made environment. From these activities, the researcher created three replicas. The first replica was a forest and several animals, the second replica was a school environment and the third replica was garden of fruit plants. The media that had been used were styrofoams, origami papers, model pictures of tree, animals, cars, toothpicks, twigs and glue.

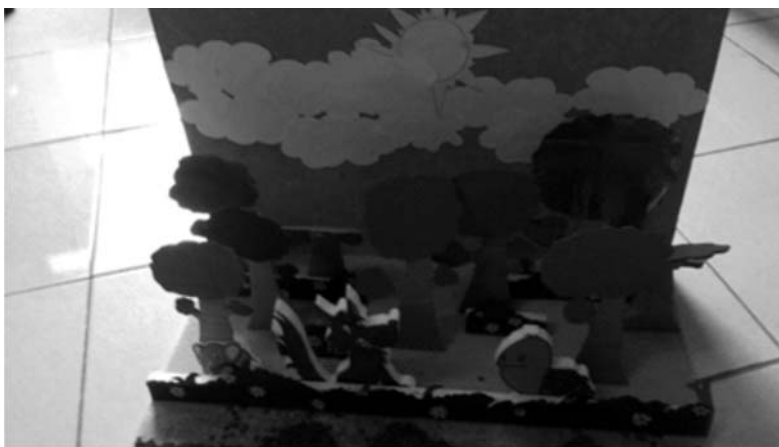


Figure 2

After following up the results of curriculum review toward and designing the thematic teaching materials for the third grade of elementary school, the team of researchers held a meeting for discussing and performing another curriculum review toward the fourth grade of elementary schools. From the curriculum review toward the fourth grade of elementary schools, the team of researchers decided that the basic competencies that would be achieved for the fourth grade students of elementary schools were differentiating multiple forms of energy by means of observation and describing the use of energy in the daily life (Natural Science), understanding the rights and the duties of a citizen in the daily life within the family, the school and the society (Citizenship Education) and finding information from texts of

observational reports regarding the heat energy with the peer and teacher assistance (Bahasa Indonesia or Indonesian Language). After discussing the determination of basic competencies, the next step would be deciding the project that would be worked on by the fourth grade students of elementary school. In the limited-class setting that took place in the Microteaching Laboratory of Elementary School Teacher Education, Faculty of Teaching Science, Indonesian Education University, the team of researchers assisted by several elementary school teacher-candidate students tried to create the replicas of natural environment and human-made environment. The result of these activities were a replica of sun as the learning medium in the school. Then, the students would be asked to perform observational activities and to compose a written report based on the results of their observation.

After developing the teaching material development, the team of researchers performed an experiment toward the teaching materials that had been designed in the elementary school. The first experiment was conducted to the third grade of elementary school with Environment as the theme. In accordance with the learning scenario that had been designed, the students were situated to learn in groups. The objective of learning in group was to develop the cooperative attitude among the students. After the students had been ready to study, the teacher introduced the materials of Environment to the students. The teachers asked the students to describe their surrounding environment in an A3 paper. The objective of describing the surrounding environment was to ease the students in designing the a more concrete/actual replica of environment.



Figure 3

After the students finished creating the replicas of natural and human-made environment, they wrote down their experience into a composition consisting of several paragraphs. The objective of composing their experience was to encourage the students to learn writing the experiences that they had with their friends and to explain the story behind the replicas that they had made.

The next activity was implementing the project-based learning in the fourth grade of elementary school with Energy as the theme. The project based that had been done in the theme emphasized the process of observing multiple forms of energy and their change. In the learning process, the students were asked to observe the changes that occurred when wet papers or wet handkerchieves were dried under the sunheat. After that, the students were asked to form groups and to perform in-class observation regarding the reaction that occurred when a spiral-form paper was put closer to a burning candle.

In order to see the evaluation of learning activities in the classroom, the team of researchers made use of Classroom Teacher Evaluation Instrument Guidelines that had been developed by Hillsborough Country Public School FI from the Teacher Evaluation Handbook Issued in 2011. The instrument consisted of 4 main components namely the Planning and Preparation, the Classroom Environment, the Instruction and the Professional Responsibilities. From the results of the instrument, the team of researchers found that the learning process that included the 4 aspects in overall had been well implemented.



Figure 4

On the other hand, in order to measure the feasibility of the teaching materials that had been developed the team of researchers performed a feasibility test toward the product which had been called as validation or, in a more popular term, expert judgement. The expert judgement was conducted by 3 people consisting of 2 lecturers and 1 elementary school principal. The aspects that had been assessed in the expert judgement were the Content Quality, the Learning Goal Alignment, the Feedback and Adaptation, the Motivation, the Presentation Design, the Interaction Usability, the Accessibility, the Reusability and the Standard of Compliance (Leacock, T.L., & Nesbit, J.C., 2007) based on the Learning Object Review Instrument (LORI). The detailed results in relation to the feasibility assessment were presented in Table 1.

From the results displayed in Table 1, it might be viewed from the expert judgement that had been conducted in order to find the multimedia feasibility the team of researchers gained 85.68% feasibility level and the percentage might be categorized into the “Very Good” level. The process of developing the thematic teaching materials at the beginning was conducted in the limited-class setting. The objective was to perform an initial experiment before the actual application in the selected elementary schools. The thematic teaching materials within the framework of project-based learning in the elementary schools were developed for two themes in which the team of researchers gained different process and output.

**Table 1**  
**Validity of Teaching Materials Feasibility**

<i>Aspects and Indicators</i>	<i>Number of Items</i>	<i>Criterion Score</i>	<i>Number of Testers</i>	<i>Score Achievement</i>	<i>%</i>
Content Quality	4	12	3	54	90.00%
Learning Goal Alignment	4	12	3	50	83.30%
Feedback and Adaptation	1	3	3	11	75.30%
Motivation	1	3	3	13	86.70%
Presentation Design	1	3	3	13	86.70%
Interaction Usability	3	9	3	37	82.20%
Accessibility	2	6	3	26	86.60%
Reusability	1	3	3	14	93.30%
Standard of compliance	1	3	3	12	80.00%
Mean					85.68%

In order to strengthen the result of the study, the team of researchers interviewed the students. The interview was related to the fact whether actually the implementation of thematic teaching materials by means of project-based learning might be used in the learning process. Specifically, the interview was related to the fact whether actually the implementation of thematic teaching materials by means of project-based learning might provide positive impacts for the students. The reason was that such learning process might be newly applied. In general, the learning process that had been conducted most of the times emphasized more on the process of taking notes and memorizing. The responses that the students provided showed positive impacts. The positive impacts might be seen from the students' opinion; they said that they liked the learning process in which they were invited to do something or to observe something. In addition, the students gained more experiences and multiple new knowledge.

The thematic teaching materials that had been developed definitely were not away from weaknesses. One of the weaknesses was that there should be better classroom management so that all students might be facilitated maximally. In addition, the period in performing the learning process was relative longer because the project-based learning emphasized the learning process and the students' reasoning capability.

#### **4. CONCLUSION**

For the students, the influence of project-based thematic teaching materials implementation might cause the students to observe and to do something in order to gain certain concepts. In addition, the implementation of such teaching materials might increase the students' capability in performing analysis, inquiry and cooperation.

The study has also strengthened the researchers' assumption in relation to the process of adapting the new curriculum (in this case, the 2013 Curriculum) within the elementary school learning process where the researchers have found several main problems from the implementation of 2013 Curriculum. These problems might be categorized into several parts namely the teachers' creativity, the students' independency and the evaluation toward learning process and results.

From the point of view in the teachers' creativity, several obstacles that the team of researchers have found are as follows: (1) the teachers have difficulties in deciding the Basic Competencies that should be in accordance with the recommended themes; (2) in designing the lesson plans, the teachers have difficulties in deciding the activities that combine several lessons into one theme; (3) in the thematic learning activities, the teachers have difficulties in developing the thematic teaching materials in order to combine several lessons into one theme; (4) the learning process emphasizes more on the cognitive aspects than on the affective and the psychomotoric aspects and, as a result, the students are less motivated; and (5) the thematic teaching materials are still nationally available and, as a result, several materials might be less appropriate to the condition of students' learning environment.

From the point of view in the students' independency, ideally the thematic learning should be an enjoyable learning process because the thematic learning departs from the students' interests and needs. The learning results will be better because the learning process is more impressive and meaningful. In addition, the thematic learning ideally might develop the social skills such as cooperation, tolerance, communication and responsiveness toward the ideas of other people. However, in the practice it has been very difficult to develop the students' independency in executing the results of a thematic learning process. As a result, within the implementation the teachers are encouraged to intervene the process by providing explanations. In other words, the learning process is dominated again by the teachers in constructing the students' knowledge.

Meanwhile, the problems related to the evaluation toward the learning process and results are as follows: (1) the implemented learning process tends to use the integrative thematic approach but the evaluation process is conducted in the form of separated lessons and the reason is that there have not been any assessment references that accommodate the assessment pattern in the integrated thematic learning; (2) the teachers tend to not performing process assessment in the implemented learning process due to



being concentrated on the implementability of thematic learning process; and (3) most of the teachers do not perform final assessment because they sense that the group assignments that have been given to the students in the form of student's worksheets has already served as the final assessment.

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