

Student's Creative Zig-zag Book: Improving their Concepts Understanding by Using Project Based Learning

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Abstract

This study aims to describe the application of project-based learning in improving concept understanding through the creativity of making zigzag books. This type of research is a mixed method research with concurrent embedded designs. The sampling technique in this study was conducted by purposive sampling technique. Research instruments in data collection using tests, observation sheets, product assessment, questionnaires, and documentation. Data analysis techniques used the Normalized Gain test, Kruskal Walls Test and Simple Linear Regression test. The results showed an increase in understanding of the concept from the results of the pretest-posttest of students as much as 0.38 belonging to the medium category. The creativity profile of students resulted in the creativity of students in the category of quite creative. The magnitude of the influence between understanding the concept and creativity is indicated by the coefficient of determination of 0.320 which implies that the influence of the creativity variable on understanding the concept is 32%. One of the benefits of project-based learning can be used as an alternative model for learning the 2013 curriculum and zigzag books can be used as projects resulting from the implementation of project-based learning. In conclusion, this project-based learning can improve students' conceptual understanding and creativity by making zigzag books.

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INTRODUCTION

The government with the 2013 curriculum determination policy that is in accordance with Government Regulation Number 32 of 2013 seeks to improve the education system in Indonesia. Improving the quality of education in general, and the evaluation and assessment system of learning outcomes, in particular, will have a large impact on improving the quality of education (Rusilowati, 2009). According to Dyers, et al. 2/3 of a person's creative ability is obtained through education, the remaining 1/3 comes from genetics (Kemendikbud, 2014). Intelligence-based learning will not provide significant results (only a 50% increase) compared to creativity-based (up to 200%) (Kemendikbud, 2014).

Arikunto (2013) states that understanding is a way of how a person maintains, differentiates, suspects, explains, expands, concludes, generalizes, gives examples, rewrites and estimates from a concept that has been studied. Kustiono (2013) argues that the formation of knowledge itself is included in constructivism learning theory. Gintings (2008) states that constructional theory views each individual as having the ability to construct his own knowledge by interacting continuously with his environment. This theory emphasizes that learning must be developed with the creativity and activeness of students to understand their own understanding more deeply (Juriah, et al. 2016). Sagala (2010) stated that, the learning process is not just about memorizing but students must construct their own knowledge. The knowledge has existed and occurred continuously in an active process so as to form understanding (Barlia, 2011).

The formation of understanding is inseparable from the use of learning models conducted by the teacher. Hosnan (2016) argues that the learning model applied in the 2013 curriculum implementation is project-based learning. The model refers to learning that activates students in classroom learning. Efforts to achieve learning that actively involve students in accordance with the concept proposed by John

Dewey, known as learning by doing (Rostitawati, 2014). Garrison, et al. (2012) argued that Dewey's concept was applied by focusing on activities carried out that build habitual patterns in finding out solutions to existing problems by combining the students' understanding.

The learning-based project learning model is a learning model with the teacher assigning students to do activities that produce products from learning activities carried out in the classroom (Hosnan, 2016). From learning project-based learning, the student's knowledge is better in terms of remembering, applying knowledge and understanding of concepts that are better than the teacher using the lecture method in the class (Sari, et al. 2017). The climate that is felt when learning using project-based learning stimulates students to be active and creative which will gradually accumulate the positive attitude of students in developing creativity (Ismayani, 2016).

Project-based learning not only makes the product but also learning emphasizes the learning process, how students understand each concept by making the media they make, the students' understanding will be attached to memory (Munawaroh, et al. 2012). Students who are active in learning in the classroom will influence their creativity. Not only by activating the class but the creativity that students have, but also influenced the learning outcomes of students (Sulistyanto, et al. 2009).

The lowest level of creativity of Indonesian students among children aged from 8 other countries (Anggraeni, 2017). Improving the quality of learning in schools using a project-based learning model to create zigzag books as projects that will be made on the implementation of project-based learning is one idea that can improve the level of children's creativity in Indonesia. Zigzag books made by these students as a project in the implementation of project-based learning that contains a thematic learning summary of Theme 7 in grade 4 elementary school focuses on the Force material.

METHODS

This study uses a mixed method. Sugiyono (2016) explains that the mixed research method is

a research method that combines quantitative methods and qualitative methods. The mixed method model used is concurrent embedded design methods.

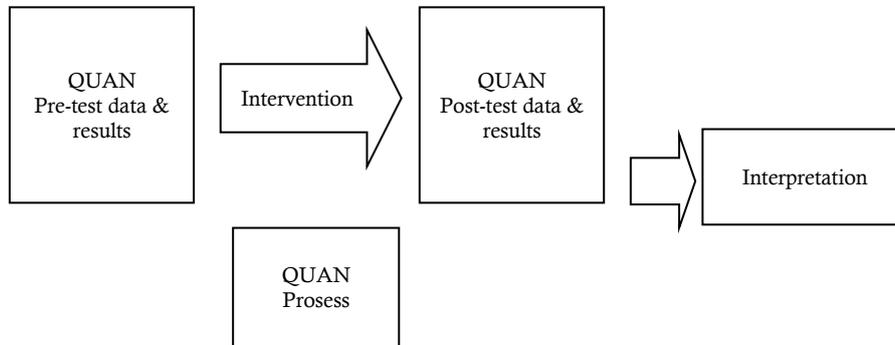


Figure 1. Mixed Method Design Concurrent Embedded Type

Source: Creswell, 2013

The embedded model mixed method is a research method that combines quantitative and qualitative methods together but with different weights (Creswell, 2013). Research conducted on the ability to understand concepts is analyzed quantitatively while the creativity of students will be analyzed using qualitative data obtained from quantitative and qualitative data.

The sampling technique in this study was carried out by purposive sampling technique, namely the sampling technique with certain considerations (Sugiyono, 2015). The consideration is by paying attention to the location of the region. Data collection techniques and instruments use tests (verbal understanding and creativity), observation, questionnaires, and documentation. Data analysis techniques used are Normalized Gain, Kruskal Walls Test, and simple linear regression test.

RESULTS AND DISCUSSION

Application of Project Based Learning

The material taught is in grade 4 Theme 7: The Beautiful Diversity in My Country, Subtitle 1: Ethnic Diversity and Religion in My Country in three schools using a project-based learning model with a zigzag book making project. Learning is divided into two sessions, the first session uses learning as usual by the teacher and

the second session uses the project-based learning model.

The project-based learning steps are as follows. The activity begins with praying together if the learning using project-based learning begins in the first session.

1. The first step, the teacher determines the basic questions that exist in the books of Class IV students in Theme 7.
2. The second step, the teacher began designing zigzag book projects. The teacher designs a design that will be made by students as an illustration in making zigzag books. The design created by the teacher looks like in Figure 2.

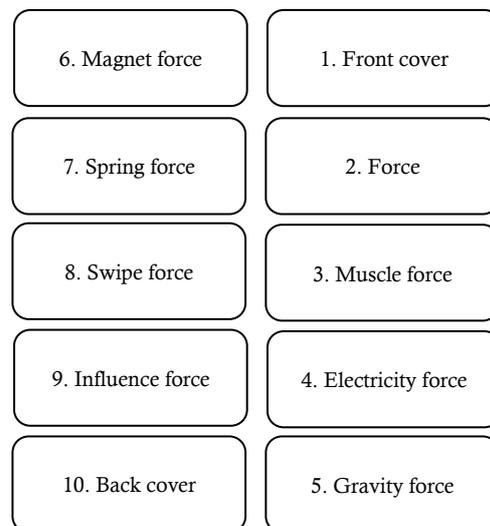


Figure 2. Design of Zigzag Books

3. The third step, prepare the project schedule.

The project schedule is the length of time for making zigzag books made by students. The time needed by students is approximately one month to the final stage of collecting zigzag books.

4. The fourth step, monitor students in the progress of the project.

At this stage, observers help to assess the process of making zigzag books that are assessed using an observation sheet. The observation sheet used by the teacher includes an assessment of aspects of each activity.

$$\text{Assessment} = \text{score}_{\text{max}} \times \text{students} \times 6$$

The maximum score at each meeting is 15. For the number of students depending on each school. This activity was carried out for six meetings. School A, with a total of 36 students, the maximum total score is 3290. School B with a total of 37 students, a maximum total of 3330. School C with a total of 21 students, a maximum total of 1890. The average score obtained students in each school are presented in Table 1.

Table 1. Average Process Activity

	School A	School B	School C
Total Score	1684	1851	862
Students	36	37	21
Average	8	8	7

The average student is determined based on the aspect of flexibility (enough to be able to gather information from various sources and quite capable of making new ideas), fluency (able to answer problems in detail and language easily understood) and originality (enough to be able to create unique and artistic products).

5. Step five, test the results.

The results of project-based learning are zigzag books. Zigzag books made by students are assessed based on product assessments assessed by the teacher. Zigzag book products made by students are assessed based on assessments conducted by the teacher by covering aspects of assessment of Content, Communication, and Design. Assessment of students based on the aspect of content, students are able to describe the

material in accordance with the subject matter (material title, understanding, examples, and benefits). Communication aspects, students are able to describe a cover that interests readers. Design aspects, students are able to make books according to the size of books, letters, and illustrations. The resulting zig-zag book product can are presented in Figure 3.

The products produced by students are in accordance with the initial design designs made by the teacher. The collected value is divided by the number of students in each school. The maximum results obtained by school A with 36 students amounted to 540, school B with the number 37 students 555 and school C with the number 21 students 315. The acquisition of zigzag book products is shown in Table 2.

Table 2. Average Product Assessment

	School A	School B	School C
Total Score	415	416	211
Students	36	37	21
Average*	12	11	10

*rounding decimal numbers

Students with the highest grades are able to make zigzag books according to the aspect of assessment. They are able to make attractive covers, the right size of the book, the use of clear and attractive letters and color illustrations so that they are able to understand the contents of the learning as outlined in the zigzag book.

6. The sixth step evaluates the experience.

In this step, the teacher provides the opportunity for students to give their responses during the process of making zigzag books. The results of this evaluation on the average state that they have difficulty making work by adjusting the writing and media which is quite large but they like to make zigzag books because they do not have to focus on the teacher who is lecturing in front of explaining the subject matter.

Research conducted by Fauzi (2016) and Marzuki, et al. (2017) explains that the application of project-based learning is able to make learning fun because students unknowingly learn to make products with their own work in the achievement of developing creativity and can improve understanding of the material being taught. So learning to use project-based learning

by producing zigzag books can be used as an alternative learning fun and in accordance with the 2013 curriculum implementation.

Concept Understanding

To determine the increase in acquisition between pretest-posttest scores from three schools was calculated using Normalized Gain (g). Test results for Normalized Gain (g) as in Table 3.

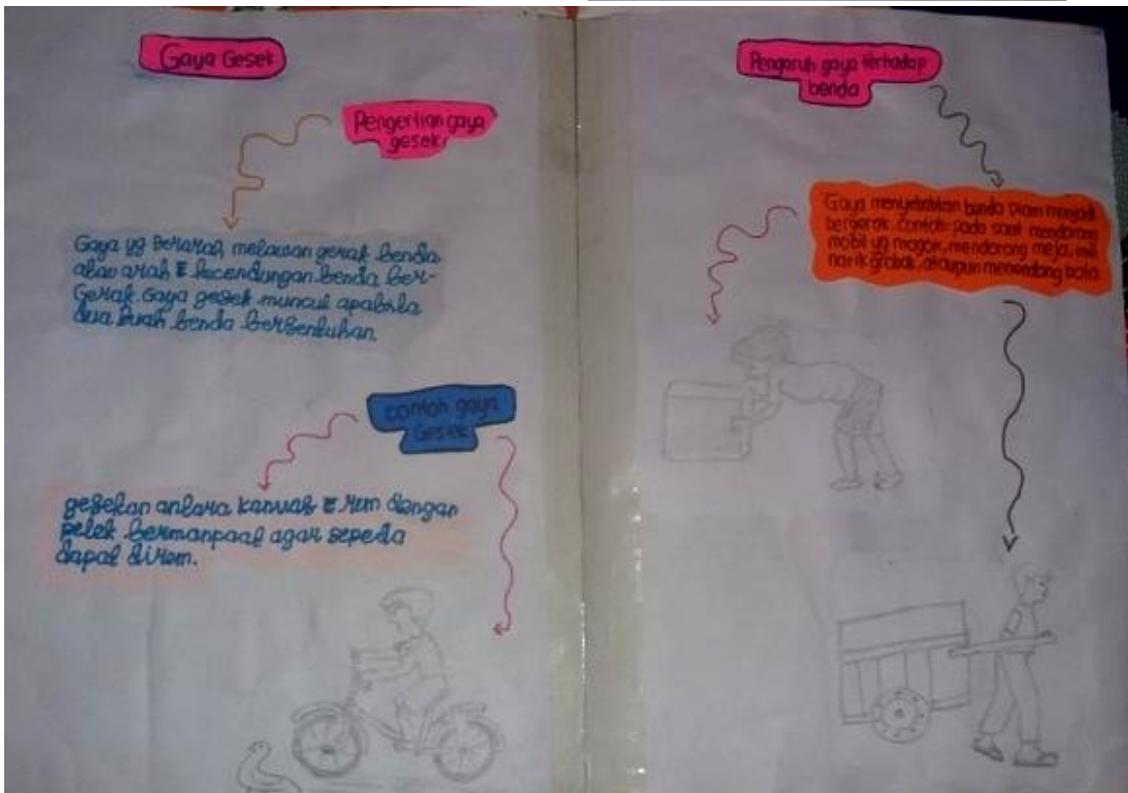
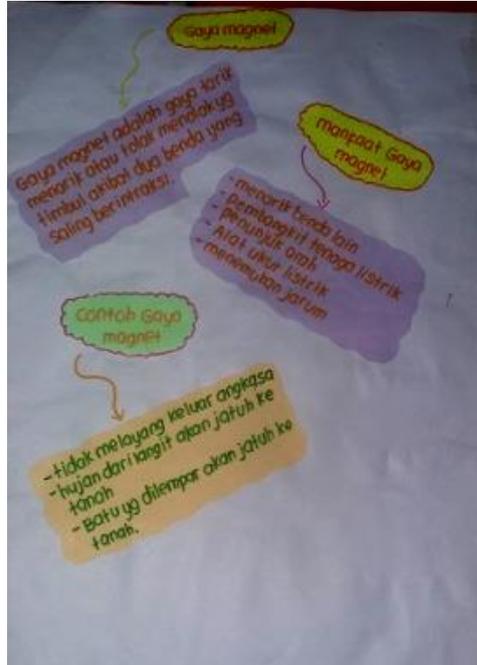


Figure 3. Zig-zag Book Product Desain by Student

Table 3. Normalized Gain Test Results

School	Average Value		N-Gain Score
	Pre-test	Post-test	
A	63	76	0.34
B	61	77	0.36
C	53	75	0.43
Average			0.38

Based on Table 3, the results of the acquisition increase between the pre-test – post-test value of 0.38 included in the medium category. Increased understanding of students refers to the achievement of aspects obtained by students. The aspect achieved is that students are able to: exemplify which includes encouragement or attraction, explain the meaning of force and measuring devices, explain kinds of styles, explain the influence of force on objects, describe examples of various force and describe the use of force in everyday life. Other opinions suggest that increasing understanding of concepts can also produce significant values compared to obtaining conventional learning (Rohim, et al. 2012; Ramdan, et al. 2015; & Efwinda, 2016).

Student Creativity

Data on creativity is taken based on the results of creativity data collection. This creativity data is data obtained from the results of collecting verbal creativity tests and questionnaires. The collected data was tested using the Kruskal Walls Test. The Kruskal Walls Test is conducted to determine the distribution of creativity profiles obtained by students. The results is presented in Table 4.

Table 4. Testing the Kruskal Walls Test

	Sum of square	df	Mean square	F	Sig.
Between group	39.605	2	19.802	0.135	0.874
Within group	13332.704	91	146.513		
Total	13372.309	93			

Based on Kruskal Walls Test, the significance value is 0.874 which shows the significance value is greater than the 0.05 probability, H_0 hypothesis is accepted that the average level of creativity of the three schools is the same.

Creativity Profile

Based on the test results in Table 4 which states that on average the three schools have the same level of creativity. In strengthening the evidence that the three schools are at the same level of creativity, the test proves the average value of the creativity of students as presented in Tabel 5.

Table 5. Average Creativity Score*

School	Average score
A	9
B	9
C	7

*based on gathering the value of creativity

The score is proof that the Kruskal Walls Test really proves that the level of creativity of students is at the same level. The score obtained refers to the collection of the average score of creativity gained by students. This profile distribution knows the number of students who have a creative level, are quite creative, less creative or not creative. The results of the distribution of students' creativity profiles from the three schools as presented in Figure 4.

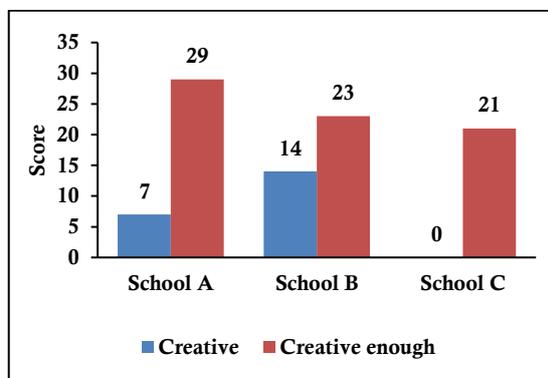


Figure 4. Distribution of Student Creativity Profiles

Based on the data distribution of creativity profiles in Figure 4, it can be seen that there are many students who occupy level 4 which are categorized as creative and level 3 which are quite creative. School A there are 7 students who get creative categories and 29 students who get quite creative categories. In school B there are 14 students who get creative categories and 23 categories that are quite creative. School C, there

are 21 students who are categorized as quite creative.

However, if the average is taken from the distribution of creativity profiles in making zigzag books, the average student is at level 3 which is quite creative. The quite creative categories that students get because students are quite capable of telling complete and detailed answers, are quite capable of telling activities in an easy-to-understand language, are quite capable of expressing examples force in everyday life with coherent sentences, enough to be able to decipher the material has been given in detail and is sufficiently able to exemplify the five types of force and activities correctly.

Determining the level of creativity of students refers to the profile of the level of creativity. The Creativity Level profile is explained as in Table 6.

Sriatun, et al. (2018) argue that making projects is one of the activities that can develop students' creative thinking. Rusilowati (2009) suggested that to be able to further enhance the creativity of students can make learning fun in the classroom. Based on the results obtained by students, making zigzag books is one of the projects that can develop the creativity of students.

Table 6. Profile of Creativity Level

Level	Score	Category	Information
4	11 - 15	Creative	Flexibility (telling activities in a language that is easy to understand
3	6 - 10	Creative enough	telling complete and detailed
2	1 - 5	Less creative	answers).
1	< 1	Not creative	Fluency (outlines the material that has been given in detail and exemplifies the five types of styles and activities correctly). Originality (presents examples of style in everyday life with coherent sentences)

The Influence of Students' Creativity and Concept Understanding

The magnitude of the correlation value is 0.565 while the determination coefficient value is 0.320 which contains the influence between the creativity variables with the conceptual understanding of 32%. Based on the calculation, it is known that the value of constant (a) is 33.098 while the concept coefficient value is 4.742. The

regression coefficient X of 4.742 states that each addition of 1% of the value of understanding the concept of creativity increases 4.742. The regression coefficient is positive so that it can be said that the influence between creativity and understanding of concepts and can be said to be the direction of influence of X on Y is positive can continue to increase if the value of creativity continues to increase. The influence of creativity is not only from understanding concepts. Research by Widiyanto (2012) and Supardi (2012) proves that learning activities, models used and learning outcomes can be influenced by creativity.

CONCLUSION

The implementation of Project Based Learning has proven to be effective in learning in class 4 in the subject matter in Theme 7 Subtitle 1 on Force material. The implementation is said to be effective based on the results of an increase in the concept of capable students: exemplifying which includes encouragement or attraction, explaining the meaning of force and measuring device, explaining the kinds of force, explaining the influence of force on objects, describing examples of various force and describing the use of force in everyday life.

There is not only an increase in understanding, but also the creativity of students was developed which marked by students ability to explain complete and detailed answers, enough to be able to tell activities in easy-to-understand language, sufficiently able to present examples of style in everyday life with solid sentences, enough to be able to outline the material that has been given in detail and sufficiently able to exemplify the five types of force and activities correctly. Based on the acquisition, project-based learning can be used as an alternative learning model in the implementation of the 2013 curriculum in elementary schools to improve student creativity and understanding concepts.

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