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Developing Entrepreneurship-Oriented Project-Based Learning Devices to Improve Elementary School Students' Collaboration Skills

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Abstract:- Collaboration skills are one of the four life skills (critical thinking, creativity and innovation, collaboration, and communication) that students need to master in the 21st century. Collaborative skills include aspects of contribution, problem- solving, working effectively in a diversity of members, and managing projects. The low collaboration skills in elementary school students encourage researchers to create a project-based and entrepreneurship-oriented learning device to improve these skills. The purpose of this study is to determine the feasibility (validity, practicality, and effectiveness) of project-based entrepreneurship-oriented learning devices. The research method used is descriptive quantitative, with the 4P development design (Definition, Design, Development, Dissemination) adapted from the 4D Model by Thiagarajan. Data analysis methods used were t-test and N-Gain analysis to find out if there was an improvement after learning. The results of the analysis using the t-test showed a significant increase in pre and post-test, with post-test values better than pre-test (negative t). The results of the N-Gain analysis showed the average increase in student scores in the high category. In general, the results of the study indicate that the learning devices are feasible (valid, practical, and effective) in improving the collaboration skills of elementary school students.

Keywords:- *Collaborative Skills; Project-Based Learning; Entrepreneurship; Learning Devices.*

I. INTRODUCTION

In the 21st Century, students are required to master a set of skills called 4C (critical thinking and problem solving, communication, creative thinking and innovation, and collaboration skills) to be able to compete and improve their thinking skills. Real education is not just accepting and learning something without processing it, but training one's brain to think (Einstein in Calaprice, 2010). Natural science, in particular, demands higher-order thinking skill and 4C skills set to solve its never-ending conundrums which are not getting more straightforward and more manageable throughout the ages. In order to enhance students' skill sets, Indonesia provided a new curriculum called K13 curricula.

The fact that this world undergoes industrial revolution 4.0 proved that having various soft skills is not enough to become successful in this era as the revolution has a scale of complexity and broader scope than its predecessors. An abundance of new digital technologies continues to grow as they replaced humans' roles in their professions and with the alarming numbers of unemployment, it becomes a crucial matter to find a solution to preserve a balanced world. One of its answers is entrepreneurship. According to Hassi (2016), age 11 is an excellent time to start learning about entrepreneurship.

Indonesia's students lack severely in both aspects, despite the government's and society's best efforts. The teacher-centered learning, which is recently replaced by K13, has shaped Indonesia's students to become somewhat complacent and passive.

Project-based learning offers an authentic experience in developing 4C skills set and its positive outcomes in natural science class such as active participate, increasing enthusiasm, and better grasping of new information have been observed by Frank and Barzilai (2004). Furthermore, Srinivas (2012) concluded several benefits of collaboration skills such as developing high-level thinking skills, enhancing more informal interactions between teacher and student, improving students' memory, and build self-confidence in students; making collaboration skills a significant part in ensuring a student to be a functioning society member. Thus, these findings motivate this study to create entrepreneurship-oriented project-based learning devices to brush up elementary students' collaborative skills and increasing their chance at competing world-wide.

II. METHOD

This study was conducted in Muhammadiyah 4 Elementary School, Surabaya, East Java, Indonesia, with the subject comprises 30 students in Grade 5. The research began in January 2019 and finalized in August 2019. The procedure of this study consists of two stages; the first stage is the development of project-based learning devices, and the second stage is the stage of application of learning devices. The built-up in this study follows the 4D development model proposed by Thiagarajan (1974) adapted into a 4-P model, namely defining, designing, developing, and disseminating (Trianto, 2007). There are three aspects to determine the feasibility of

entrepreneurship-oriented project-based learning devices, i.e., validity, practically, and effectivity of the devices.

A. The validity of Project-Based Learning Devices

The researcher designed the learning devices and gave them to experts to evaluate. Two experts assessed them in validation's sheets in the form of value and gave suggestions and criticism. The results of the validation questionnaire and suggestions from the validator are documented. The validator assessed by checking (√) in the appropriate value column. The column contains the assessment scores that have been determined, on each validation sheet there are four categories, namely: (a) not good (value 1), (b) quite good (value 2), (c) good (value 3), and (d) very good (value 4).

Analysis of data from the learning devices validation was obtained through the values on the expert validation questionnaire sheet. This analysis is done by averaging the scores of each component given by the validators. The data obtained were analyzed by the average score of each aspect. The results of the validation conducted by the validator indicate that the validated learning devices are valid to train students' collaboration skills.

B. Practically of Project-Based Learning Devices

Observers witnessed the implementation of the learning devices to improve student's collaboration skills. Each observer checks all of the aspects done in observation form. Observation is conducted during learning activities by 2 observers in each class. Assessment form (observation form) is divided into 2 criteria, those are implemented and not implemented.

Data analysis technique to analyze the practicality of the learning devices using percentage technique, as seen below:

$$P = \frac{A}{B} x\ 100\%$$

Explanation:
P: Percentage
A: Frequency of student's activity
B: Amount of aspect
(Trianto, 2009)

The instrument is reliable if it gets a percentage of ≥ 75%. Percentage criteria of practicality learning devices are given below:

P= 0% - 24% Not implemented
P= 25% - 49% Poor implemented
P= 50% - 74% Good implemented
P= 75% - 100% Excellent implemented
(adapted from Sugiyono, 2012)

C. Effectivity of Project-Based Learning Devices

Data collection methods used to measure collaboration skills in the form of pre-test and post-test with the same questions. The pre-test is given 30 minutes before learning at the first meeting, while post-test is 30 minutes after the third (last) meeting. There are 4 descriptive questions that each student worked on. The questions are arranged based on collaboration skills indicators. Calculation of test results using a scale of 0-3.

Significance of improving collaboration skills is obtained from hypothesis testing using t-tests with the condition that the analyzed n-gain data should be normally distributed. The formula is:

$$t - test = \frac{\frac{d}{sd}}{\sqrt{n}}$$ (Suharsimi, 2009)

With:
d: average value of the difference between paired observations
sd: standard deviation of differences between paired observations
n: number of samples

To find out the degree of improvement in collaboration skills, an inferential statistical analysis was done through the N-Gain analysis of pre-test and post-test scores. The formula is:

$$N - gain = \frac{skor\ posttest - skor\ pretest}{skor\ maksimal - skor\ pretest}$$ (Sundayana, 2015)

Range of Scores	Category
0,70 ≤ g ≤ 1,00	High
0,30 ≤ g < 0,70	Mid
0,00 < g < 0,30	Low

Table 1:-N-gain Category

III. RESULT

Data result of this research obtained from the feasibility using entrepreneurship-oriented project-based learning devices. Assessment of feasibility (practical, valid, effective) of the learning devices can be known by implementation during research.

A. The validity of Project-Based Learning Devices

Validation of learning devices aims to assess the feasibility of several aspects of teaching materials by experts before being used in learning. Then the learning device is revised according to the suggestions and input from experts and it is hoped that the improvement can produce a valid learning device. Validated learning devices are a syllabus, Learning Implementation Plan (RPP), Student Teaching Materials, and test instruments. The results of the learning device validation results are as follows:

Device	Score	Reliability	Category
Syllabus	4	0,85	Very valid & reliable
Learning implementation plan	4	0,88	Very valid & reliable
Student teaching materials	4	0,92	Very valid & reliable
Test instruments	4	0,83	Very valid & reliable

Table 2:- Validation Results

B. The practicality of Project-Based Learning Devices

The practicality of the learning device is assessed from the results of observations of the implementation of learning in the learning process in class V Muhammadiyah 4 Surabaya Elementary School using an entrepreneurship-oriented project-based learning device. The details of the observations of the practicality of the learning device are as follows.

Activity	**1st meeting**		**2nd meeting**		**3rd meeting**	
	O1	O2	O1	O2	O1	O2
Percentage of implementation	87,5	81,3	84,6	76,9	88,9	88,9
Average	84,4%		80,8%		88,9%	
Reliability	96%		95%		100%	

Table 3:- The Practicality of Learning Devices

Percentage criteria of practicality learning devices are indicated below: (adapted from Sugiyono, 2012)

P= 0% - 24% Not implemented
P= 25% - 49% Poor implemented
P= 50% - 74% Good implemented
P= 75% - 100% Excellent implemented

In reliance on the table 3 learning implementation using project-based learning devices, implementation of learning achieved range between 80,8% until 88,9%.

C. Effectivity of Project-Based Learning Devices

Analysis of the results of collaboration skills is based on data obtained from the fifth-grade collaboration skills test and analyzed using the t-test and N-Gain formula. The t-test was used to calculate the significance of the improvement in collaboration skills, while the N-Gain was to determine the degree of improvement in collaboration skills.

	Paired Differences		**t**	**df**	**p**
	95% Confidence Interval of the Difference				
	Lower	**Upper**			
PRE-TEST.A - POST-TEST.A	-48.37004	-37.87663	-16.810	29	.000

Table 4:- Paired T-Test Result

the p-value <0.05, it can be seen that there is a significant difference between the pre-test and post-test values, with a negative t value, means that the H_1 region is accepted on the left, where the post-test value is better than the pre-test value. The effectiveness of learning result can be analyzed using the N-Gain formula. The N-gain or improvement on the four indicators of VA class collaboration skills can be seen in Table 5.

Indicators	Pre-test	Post-test	*N-Gain*	Category
Contributions	44.17	89.17	0.81	High
Working effectively in diversity members	44.17	87.50	0.78	High
Contributions	42.50	87.50	0.78	High
Project management	45.83	85.83	0.74	High

Table 5:- N-Gain Result

The result shown in Table 5 shows that the degree of improvement of several indicators varies, with a range between 0.74 - 0.81 but all are high categorized.

IV. DISCUSSIONS

A. The validity of Project-Based Learning Devices

The development of learning devices in this study includes a syllabus, Learning Implementation Plan, Student Textbook, and collaboration skills tests. Learning devices developed based on entrepreneurship-oriented project-based learning to improve the collaboration skills of elementary students. All learning devices that have passed the validation stage is used in field trials. The purpose of the validity of this learning device is to find out how much the accuracy of the measuring instrument of the study of the actual content to be measured. The result shows that all devices are valid and reliable to be used in the learning process.

B. The practicality of Project-Based Learning Devices

Learning activities carried out during three meetings. The implementation of this learning is carried out referring to the Learning Implementation Plan that has been developed by integrating project-based learning and entrepreneurship and has three activities, namely introduction, core, and closing. Based on table 3, the average percentage obtained for the implementation of class V learning at SD Muhammadiyah 4 Surabaya at the first meeting was 84.4%, the second meeting was 80.8%, and the third meeting was 88.9%. These results indicate that learning at first to the third meeting was carried out well. The results of the implementation of learning in class V are said to be reliable because they have a reliability of 96% for the first meeting, 95% for the second meeting, and 100% for the third meeting.

The learning achievement sheet used refers to the lesson plan that has been through the validation process by the validator. The implementation of learning is said to be good if learning that is packaged in the lesson plan is done well by the teacher, including starting with fundamental questions/ gathering information, planning projects, preparing project implementation schedules, monitoring students and the process of carrying out project assignments, evaluating project results, and evaluating. In the core learning activities, students are invited to be actively involved in finding knowledge through several experimental activities that students do themselves. Students form heterogeneous groups, and together groups conduct experiments on the environment. The experiments include making a miniature water cycle in nature, conducting experiments related to erosion, decomposing organic and inorganic waste for use as compost, and the main project activity is to recycle waste that is difficult to decompose. The whole experiment was also directed to train students' collaboration and entrepreneurship skills. In this entrepreneurship-oriented project-based learning teacher facilitates students to work on projects collaboratively so that they will train their ability to contribute, solve problems, work effectively with a diversity of members, and manage projects. By the opinion of Davies in Anggriawan (2016) that one of the roles of the teacher's function is the top point, the teacher who designs learning from the beginning to the end and then the students reach the top point in the form of success in learning. From the discussion above, it is known that the lesson plans that are developed are reliable and appropriate to be used in learning to improve student collaboration skills.

C. Effectivity of Project-Based Learning Devices

The collaboration skills test developed by the researchers consisted of 4 problem descriptions, each of which represented indicators of collaboration skills and learning indicators. The analysis used to test the difference in sample mean is the t-test (Trijono, 2015). But before conducting the t-test, there are several requirements that must be met, namely the group to be tested must be normally distributed and homogeneous. In this study, the normality test was carried out using the Kolmogorov-Smirnov formula to find out whether the samples (pre-test and post-test) in class V were normally distributed. The results showed that all samples were normally distributed because of $p > 0.05$. Because the requirements have been met then the t-test is then performed. Based on paired t-test analysis conducted, it is known that there are differences between pre-test and post-test results before and after learning using entrepreneurship-oriented project-based learning, with a negative t value which means H1 is in the left area, where the post-test higher than pre-test. Based on the results of the t-test, it turns out that project-based learning can significantly enhance student collaboration skills (Table 4). Data on the significance of (p) improvement of collaboration skills are also by the results of N-Gain calculations. The difference in results before and after learning can be seen in Table 5 for the N-Gain of each indicator of collaboration skills. Based on the data in the table, it can be seen that the N-Gain of each indicator of the collaboration skills of fifth-grade students is categorized as high. In general, collaboration skills have increased significantly. It is consistent with research conducted by Marx, et al. (2016) that project-based science learning can foster collaboration skills. Collaboration is a significant component in project-based science learning because it can provide opportunities for students to share ideas, develop their thoughts, utilize the expertise of others, and experience the value of thinking intelligently.

V. CONCLUSIONS

By the results of research, data analysis, and discussion of research results related to the formulation of the problem and research objectives, it can be concluded that the entrepreneurship-oriented project-based learning devices are feasible (valid, practical, and useful) to be used in learning.

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