

Effectiveness of Project Learning Model Based on Local Wisdom in Improving Creativity to Develop Environment Learning Media

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Abstract—The purpose of this research is to determine the effectiveness model development of Project Based Learning (PjBL) based on local wisdom in improving the creativity of the students of Educational Biology Department, Faculty of Teacher Training and Education, Pakuan University. This research applies Research and Method and Development Model ADDIE, consisting of Analysis, Design, Development, Implementation and Evaluation. The data are obtained from validation of three experts namely learning material expert, learning media expert, and learning model expert. The model effectivity testing is done by assessing the students' creativity and assessing their multimedia products. The steps model development are as follows: analysing the needs, designing learning model, developing learning model, validating learning model done by the experts, applying the learning model in classes and evaluating the model. The product created by the students from the learning model PjBL based on local wisdom is a multimedia video about local wisdom. Based data analysis, it can be concluded that the combination of developing learning model Project Based Learning based on local wisdom can improve student creativity in developing environmental learning media. The creativity average score in model experiment class is 74.44 and in implementation class it is 75.12 (scales 1 – 100), and the average score for multimedia product in experiment class is 2.5 and in model implementation class 2.77 (scales 1 – 3).

Keywords—Project Based Learning; local wisdom; student creativity

I. INTRODUCTION

The problem of natural environment nowadays is indeed a problem with most frequent occurrence in Indonesia. This environmental problem might happen because of the human characteristics as economic being in many respects, starting from natural factors to the factors deriving from the people themselves. Most of these problems do not have the proper solutions yet. So that environmental damages keep happening [1]. Environmental problems are not the problems of just certain countries, they should be the responsibility of all countries and nations in the world. Therefore, various efforts are made to prevent further deterioration of the natural environment. The examples of the efforts are the Earth Summit, Kyoto Protocol, and many others. Even some

countries that still make use of fossil fuels, are struggling to reduce greenhouse effects by using natural gas which is economically more competitive compared to using oil or coal. However, actually natural gas also produces CO₂, but in less amount compared to oil and coal. Besides that, natural gas also produces methane in its production process; which all together can result in environmental damages [2].

Environmental education is one important factor to minimize environmental damages and is an important way to create human resources that implement the principles of sustainable development. Environmental education is done as an effort to improve society's understanding and concern for finding the solutions to and the preventions of environmental problems.

Environmental education might not change the situations and conditions of the damaged environment to become good in a short time – this needs a long time, process, and resources. For that reason, there should be efforts to give environmental education as early as possible in order to minimize environmental deterioration. As an example, natural disasters like uncontrollable forest fires that occur from year to year are the results of development that does not give sufficient considerations on environmental impacts. Environmental education is an effort to introduce students to the real (immediate) environment that has already existed in 5K-program; Keindahan, Kerapian, Kebersihan, Kepribadian dan Kemanan [3] (Beauty, Tidiness, Cleanliness, Personality and Safety).

The degree of balanced understanding of active role people of development in the living environment, can develop optimally, is related especially to the ways school subject matters are presented and the class atmosphere [4]. It is urgently needed that environmental education should be applied to solve the problems related to the environment that arise. It is crucial that innovative learning method be implemented to improve the ability to solve the environmental problems that exist.

In order for the environmental education to be greatly successful, the students should be actively interacting with the object, and the activities should be such things as observing

and then conceptualizing. The learning process like this is called constructivism approach. One learning method in constructivism approach is project-based learning.

Project based learning is an effective learning in facing today's challenges. Based on research results conducted in Spain the use of PjBL combined with the use digital technology can increase students' involvement (participation) up to 95%, increasing learning motivation as high as 96% and can help students to acquire curricular skills up to 90% [5].

According to Douladell Efstratia, PjBL is a modern learning method which in essence is a learning which relates learning students' experience with school life, and also is able to elaborate serious thinking when students gets a new experience. Through PjBL, connection with the real world can be achieved [6].

Jolanta Lasauskiene, Asta Rauduvaite states that learning in college is defined as an active comprehension process and meaning building and also skill that is very suitable with PjBL [7]. For students of teacher training college, the experience to join PjBL is very important to get direct experience which is related to the development of educational project.

Local wisdoms can be understood as ideas local to a certain society that are wise, judicious, righteous, established in the society and are embraced by its members. Later Chusorn, Ariratana, Prayuthc have an opinion that local wisdom is the way people behave and act in response to changes in physical surrounding and culture [8]. A conceptual opinion that exists in society, grows and develop continuously in the awareness of the society related to sacred matters even to profane affairs (parts of common daily life). Local wisdom can be comprehended as ideas local to a certain society that are wise, judicious, righteous, established in the society and are embraced by its members. The combination between PjBL and local wisdom will result in meaningful learning for the students. PjBL is an innovative learning that requires students to make a "bridge" that connect various subject matters. Meanwhile, local wisdom is a set of ideas local that are wise, judicious, righteous, established in the society and are followed faithfully by its members.

The making of a film about environmental destruction is a project that will be carried out by the students in groups. The product will be a film about environmental damage that will be presented. The plus points in the film production processes and the final products themselves will make the students interested in learning about the environment and its conservation. PjBL through film making will activate the psychomotor and affective aspects of the students. Meanwhile the local wisdom will create a way of thinking that will help to guide the students to be creative in solving the environmental problems.

The result of Fezile Ozdamly's research shows that project learning in designing and developing the multimedia-based learning for students of teacher training program requires more time and energy in the planning, preparation of supporting facilities, the design and appearance making and the use of operational resources [9].

II. METHOD

The process of model making of Project Based Learning based on Local Wisdom for the subject matter Environment and Bio conservation Sciences as a whole went through several research stages:

Need and condition analysis was focused on the real condition of subject matter Environment and Bio conservation Sciences at Educational Biology Major, Faculty of Teacher Training and Education, Pakuan University which needs a breakthrough for learning experiences that create products based on the real problems in the field. Viewed from the environmental conditions in general, in Bogor city the behaviors of the students and the society in general disregard the environmental aspects. Viewed from the micro environment of campus itself, the surroundings need to be rearranged because right now ignore the environmental needs.

Besides that, the students' low creativity in developing learning media related to natural environment is an important factor to be improved. Biology major students as prospective teachers need very much experience in developing learning media, especially those related to natural environment. The local wisdom found in Bogor should be implanted in the students in order that they have concerns to preserve sustainable environment. For that purpose, a learning model that can improve the students concerns about their natural surroundings is needed so that the students are able to understand the existing problems and are able to give the solutions.

The first step taken was literature study and observation whose purpose was to collect information and the theories related to the problems to be researched, especially concerning general picture of environmental problems in the Bogor city (municipality) and Bogor regency. The second step was developing learning model that require the students to be able to create a product that make them creative in developing learning media that are based on natural environment and local wisdom of Bogor.

A. Literature Study and Feasibility Study

Literature study is source of knowledge about this research which is done through searching from several experts (educational practitioners and academicians) and also experts in natural environment especially about PjBL learning model based on local wisdom and literature in various documents.

B. Data Collection

Field Observations are essential to collect information and documentation that relate to local wisdom in Bogor, especially that concerning wisdom about natural environments.

C. Model Design

The designing technique applied is model ADDIE. ADDIE is an abbreviation of Analysis, Design, Development or Production, Implementation or Delivery and Execution. Model ADDIE was chosen because this model is categorized as flexible because it can be used for various kinds of product developments, for example learning model, learning strategy,

learning method, learning and material method. This model was developed by Dick and Carry to design a learning system [10].

Here are the steps in ADDIE model:

1) *Analysis*: Analysis is one stage with the purpose of finding out whether a new model/method needs to be developed, whether the existing media and technology support that and whether the teachers will be able to apply it easily or not. This is because the developed model/method should be suitable with student's needs, environment, technology limitation and students characteristics.

2) *Design*: The design of a learning method is done systematically starting from deciding the learning objectives, designing learning aids, and providing the materials and making evaluation tools.

The development stage is done after analysis and design stages are completed. At this stage the development of product design is begun which was already formulated. The product can be in the forms of learning aid, model, method and materials.

3) *Implementation*: This stage was done after the design and the development are already completed so the product can be applied in a real class situations. After the implementation step is done, initial evaluation is then carried out to get feedback and notes for correction for the next activities.

4) *Evaluation*: Evaluation is the final activity at the stages of this model development, it can be in the form of formative or summative evaluation. The next step is revising discrepancies that are found in the evaluation process.

III. RESULTS AND DISCUSSION

The results of model development of PjBL based on local wisdom using ADDIE mode are as follows:

A. Analysis

This step was taken to determine the problems and the appropriate solutions and decide the capabilities that need be obtained both by the students and the lecturers to improve their creativity in developing environmental leaning media.

Analysis was done through literature study / reviewing the theories related to PjBL model and observation result in the field done to the lecturers, learning facilities, student's backgrounds and characteristics. The literature study was done to the learning model used as reference in developing learning model PjBL based on Local Wisdom that is library studies to learning model PjBL and the development of video media. The literature studies showed suitability between the learning model and the characteristics of subject matter Bio-conservation and Environmental Sciences.

Field observation was done to lecturers of subject matter Bio-conservation and Environmental Sciences, facilities, students' characteristics to find out the real conditions and needs in the field. The combination of literature and field observation results in learning model draft of PjBL based on Local Wisdom.

B. Design

Design is the second step of the learning model design of ADDIE. At this stage clarification of the designed learning program should be clarified so that the program can reach the expected learning objectives. This design stage produced learning model draft, which will be validated later by learning model expert, multimedia expert and environmental expert. The result of the testing is as follows:

TABLE I. EVALUATION RESULT OF MODEL DRAFT BY THE EXPERTS

No.	Expert	Input
1.	Environmental problem material	1. The material elaboration was complete enough and comprehensive, however there should be correction on deciding the environmental problem that would be put forward in the project making. 2. The instrument that could measure creativity in developing the learning media should be made in accordance with the indicators that had been set.
2.	Learning Model	1. Syntax (Structure) / the steps of learning model PjBL based on local wisdom should be made more effective. 2. The use of learning media should be varied. 3. The schedule should be revised / reviewed so that it would be suitable with the syllabus. 4. The planning for the video making should be optimized to facilitate (to make easy) the project making process.
3.	Multimedia	1. Worksheet video media making should be clarified by using concept mapping. 2. The concept of local wisdom in video media needs to be clarified by stating the video taking location.

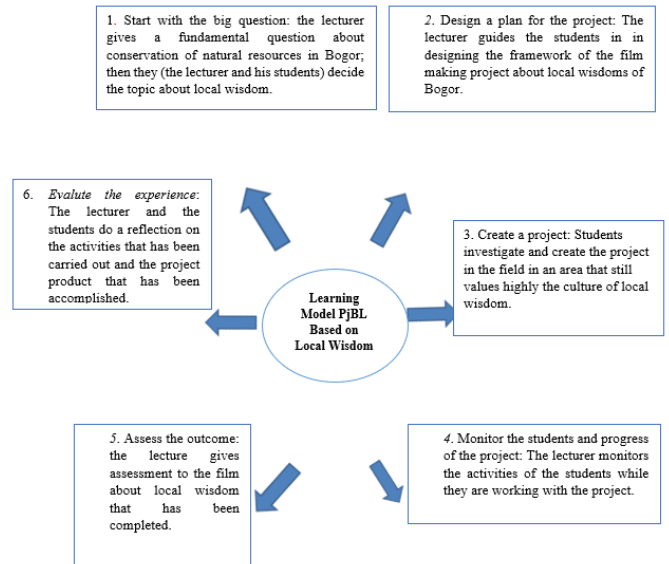


Fig. 1. Conceptual model of learning model PjBL based on local wisdom.

C. Development

The developed learning model PjBL based on Local Wisdom is one learning model based on project gives a chance to the students to cooperate in groups and gives a chance to the

lecturer to manage the learning process in class by adopting project work featuring Local Wisdom of Bogor City. Project work by making a learning video that brings up local wisdom about the efforts to conserve natural resources based on questions and problems of the natural resources in Bogor today, and at the same time require the students to design, solve problems, make decisions by carrying out investigations in the field.

D. Implementation

Implementation is the third step in executing ADDIE model. Implementation stage consists of activities to try out model draft that has been made and has been validated by the experts in the actual learning process. From the implementation process, feedback from the lecturer and the students about the learning implementation PjBL based on local wisdom were obtained.

TABLE II. THE LECTURER’S FEEDBACK AFTER CARRYING OUT LEARNING PjBL BASED ON LOCAL WISDOM

No	Questions	Yes	No
1	Do you think learning model PjBL based on local wisdom is easier to comprehend by the students?	V	
2	Do you think learning model PjBL based on local wisdom can improve students’ creativity?	V	
3	Do you think PjBL based on local wisdom can improve collaboration among students?	V	
4	Do you think PjBL based on local wisdom can make students more active in their studies?	V	
5	Do you think PjBL based on local wisdom can make the students more active in their studies?	V	
6	Do you think PjBL based on local wisdom is successful in improving students’ understanding about natural resources?	V	
7	Do you think PjBL based on local wisdom is successful in improving students’ creativity in developing environmental learning media?	V	

The responses from the lecturer show that PjBL based on local wisdom influences very significantly towards improving motivation, activeness and creativity of the students in while developing environmental learning media. This is in line with the results of the research of Lapenienea and Dumciene who states that project-based learning enables students to be actively involved in analyzing certain projects and to search for solutions for the problems they face [11]. The proposed projects usually are connected to the environmental conditions around them. The media developed by the students are also able to improve their concerns towards the environment [12].

Besides the positive responses shown in the lecturer’s evaluation, the students also show similar responses, they consider PjBL gives advantages in improving their capability and their creative thinking. The following is the response from the students participating in PjBL based on local wisdom.

TABLE III. RESPONSES FROM THE STUDENTS JOINING PjBL BASED ON LOCAL WISDOM

No	Questions (Statements)	Percentage (%)
1	In general the way the lecturer lectures is different from it was before.	98
2	I am more interested in learning activities outside (direct observations in the field)	90
3	I am more motivated with the way the lecturer give lectures which is related to the environmental problems in Bogor.	100
4	I get more knowledge from learning which is connected to the phenomenon in daily life.	95
5	I can understand the materials better with the method applied by the lecturer.	96
6	Field observation burdens me.	23
7	Learning how to make a film (movie) generate my creativity.	100
8	I am reluctant to cooperate with my group members when I take pictures (make a movie) in the field.	15
9	Field observation can cultivate my concerns towards the environment.	92
10	The learning model like this can generate ideas in solving daily problems.	97

The data above show that PjBL based on local wisdom can improve creativity of the students in developing environmental learning media. This is in line with the result of the research of Zhou, Chen and Lingling Lou which states that learning that involves technology IT can increase students’ creativity [13].

E. Evaluation

The last step of the model design of learning system ADDIE is evaluation that is a process that is done to give scores to the learning model development that has been tried out in the field. The evaluation step that was carried out during the research was to find out whether the development of learning model PjBL based on local wisdom could improve the creativity of the students in developing environmental learning media.

The scoring done to the video product that the students made consisted of preparation stage, production stage, final stage, and cooperation. The scores given to the products in experiment class and implementation class can be seen in Figure 2 as follow.

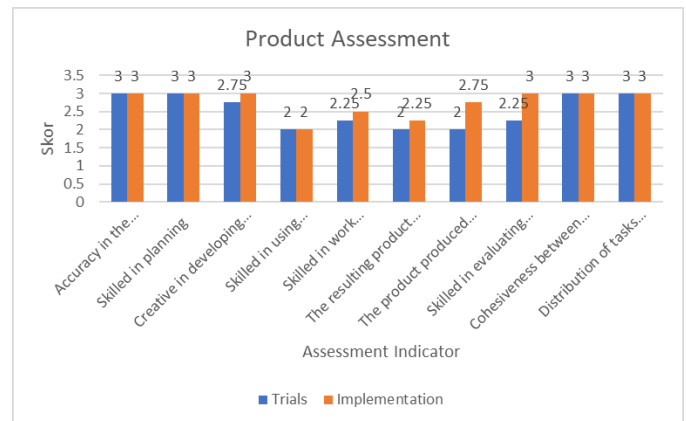


Fig. 2. Scores for product in experiment class and in implementation class.

Based on the assessment results, it can be seen that the average score for the product in experiment class is 2.5 while the average score for model implementation class is 2.77 (scales 1 – 3). The scores show that the video product created by the students has met the expected criteria set for the learning process. As seen from the scores of the product assessment in Figure 2 above, the significant differences are clearly seen in the production stage and in the final stage.

Production stage was clearly seen when in the implementation class the students were already capable of operating the instrument (camera) and also skillful in their work technique. In the final stage it can be seen that improvement happened because the outcome of the project was already highly aesthetic, and contained the information in line with the theme. The scores for the preparation stage and cooperation were similar both in trial class and implementation class. The research results also prove that PjBL enables the students to be actively involved in project analysis and look for other possible solutions and cultivate collaboration in contextual learning.

Besides scoring for the video product, scoring was also done for the creativity of the students. The scores for the student's creativity in developing environment learning media were as follows: the average score for student creativity in model experiment class was 74.44, while for the model implementation class was 75.12 (scales 1 – 100). The two average scores above show that the use learning model PjBL based on local wisdom is effective in improving student creativity in developing environment learning media. The research conducted by Bertonecelli, Mayer and Lynass [14] indicates that creativity can be improved if the learning process is more comprehensible and how strong is the learning and the creativity training connected [13]. The average student score on creativity in creating the product can be seen in Figure 3 as follow.

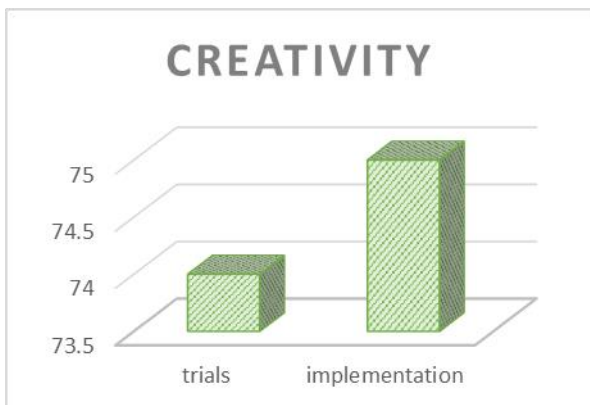


Fig. 3. Average scores of student creativity.

IV. CONCLUSION

Based on the research and learning model development PjBL based on local wisdom which apply ADDIE model, it can be concluded that the developed learning model is categorized as effective in improving student creativity in developing environment learning media. This is crucial because the students of major study of Educational Biology as prospective teachers need to have experience in making interesting learning media that motivate their future students to study further the materials that are given very well.

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