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Use of Project-Based and Problem-Based Learning Models in Practicing Student Creativity

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ABSTRACT

The aim of this research is to discover the significance upon the use of project–based learning model and problem–based learning towards students' creativity. This experimental research is using one group pre–test design, and 10 students from food processing course will become the sample. The instrument used within this research is students' creativity exercise sheet, which has been developed by the researchers. Data extraction is done through a test, where such test is conducted before the course by implementing project–based and problem–based learning model. The analysis utilized is a students' creativity scale (which consist of low (1), moderate (2), high (3), and very high (4)). Later, in order to observe its significance, N-gain analysis will be employed. The research outcome of students' creativity, prior to the use of the aforementioned learning models, is included into moderate category. According to the analysis of performance indicator, there is an indicator that underwent an improvement, which is fluency indicator.

Keywords: Project-based, Problem-based, Creativity

INTRODUCTION

Education upon the lives of humanity embodies a crucial activity. Due to its pivotal position, education implementation might be carried both formally or informally. This education implementation should be adjusted with the advancement and demand of development, which requires sort of skills and aptitudes, as well as quality growth in accordance with the progress of science and technology. Education implementation is inseparable with the education goals to be attained (Utami, 2017). Government Regulation of 2010, Number 17 specified that education holds goals in developing aptitude, creative thinking, critical thinking and enabling innovation (Depdikbud, 2006).

Creativity within a particular students' learning process might be observed in aspect of how they are able to solve a problem in line with their own opinion or idea as well as generate a new opinion and idea from that result of thinking process (Abdurrozak & Jayadinata, 2016). Whereas, the characteristic of creative thinking is described by Munandar as follows: 1. Fluency, which is the ability to produce many relevant ideas/answers and fluid flows of thinking; 2. Flexibility, which is the capacity to produce uniformed ideas and able to shift a method or approach, and different directions of thinking; 3. Elaboration, where the ability to develop/add and enrich an idea in detailed as well as expand that idea exist; 4. Originality, which is an answer deliverance that is generally uncommon to many people, where that idea is the original way, uncliched, and rarely given by most people (Munandar, 2004).

Within the process of learning, basic education level to the highest college stage, are necessary in order to engage with education demand of 21st century. The level of college education for students, particularly students who are pursuing education that are obliged to perform or reflect a creative life in facing against all kinds of situations, which are employed in the process of educating. This becomes a morning provision for educators (students who will become teachers) in engaging the 21st century, when education becomes imperative to guarantee students in possessing the skills to learn and innovate. Learning and innovation skills comprise of creativity and innovation, communication and collaboration, as well as critical thinking and overcoming problems with the existence of education demands in the 21st century, which with that prospective educators ought to possess these skills first (Wulandari, 2017). According to the previous studies, creativity measurement by employing a project–based learning model unveiled that not all students own the aptitude of high creative thinking, rather the average of creative thinking ability while the lowest indicator upon elaboration thinking with a percentage of 57%. Where

students are yet to develop ideas that are acquired in detailed due to the problems that are employed within the learning process are not yet authentic.
With the absence of project–based learning, students are further invited to be able in discovering an authentic learning as for its meaningfulness. Sternberg argues that in attempt to maximize and develop creativity, a self–confidence that creativity without an accomplice of belief won't develop optimally is required. Individuals with high self–efficacy might able to grow their creativity and with self–efficacy as well, individuals will become more creative in problem solving processes (Amabile; Phelan and Young in Sweetman et al., in publishing) (Sweetman. Luthans, Avey, & Luthans, ed). One of the alternatives is to employ a combination of project–based learning models and problem–based learning models.

Margeston (1991) considered that problem-based learning puts emphasis onto what is needed, upon the capability to gain the required propositional knowledge, and to put it to the most valued usage in a given situation. Problem–based learning entails a way greater integration of 'knowing that' and 'knowing how'. According to him, problem–based learning is a learning that enables someone to acquire the proportional knowledge of problem solving and use a way to think creative students overcome a problem in a certain situation. However, defines that problem–based learning (PBL) is a constructivist, which arranges curriculum and instruction around carefully made, ill–structured, real–word issues. Also, problem–based learning is learning that possess an organized curriculum and learning that are based upon real problems (Utami, 2017).

In an outlined fashion, problem–based learning comprises and presents students with authentic and meaningful problem situations, which may simplify them to carry out investigations and inquiry. Problem–based learning is designed to assists teachers in providing as much information to the students as possible. Problem–based learning is developed mainly to supports students in developing cognitive, problem solving, and intellectual skills, learn regarding with various adult roles through students' involvement in real or simulated experiences, and become autonomous and independent learners (Utami, 2017).

RESEARCH METHOD

Type of Research, this research type is quantitative descriptive. Timing and Research Subjects, this was conducted for 4 months in 2019 at UMSIDA Science Education Department. Research subjects involves 10 UMSIDA Students in 2016. The object of this research was a project–based learning tool and a problem–based learning model to teach students creativity. Research Design, one group pre-test post-test. Student Creativity Analysis, based on the acquired data from creativity tests of science students, an analysis was carried out upon these following aspects:
The achieved results of creativity by each individual are then described according to the criteria:

Table 1. Individual Achievement Criteria on the Creativity Test

Score Interval %	Creativity
81-100	High
31-80	Moderate
<30	Low

Munandar (2012)

In quest to view the test upon the effect of learning by employing a project–based learning model and a problem–based learning model, an analysis using N-gain analysis is utilized.

RESULTS AND DISCUSSION

According to the data in Table 2, the result was acquired that the average outcomes of student creativity in the moderate category, where the level of students creativity in the value of creativity pre–test is in the medium category, while for the post-test is categorized into high and moderate category, where the high category from 10 students who were subjected to the research who possessed a high level of creativity with a percentage of 89 and 85, whereas 8 students possessed a moderate level of creativity, namely with creativity values range of 70 to 89.

To observe how the effect of the paired project–based learning model and the problem–based learning model, the N–gain formula was used to analyze and acquire an N–gain value of 0.4 with a moderate influence category.
According to the conducted research, the following outcome of creativity is obtained as follows:

Table 2. Results of Student Creativity.

No	Student	Pre-Test	Criteria	Post-Test	Criteria
1	001	56	Moderate	75	Moderate
2	002	57	Moderate	85	High
3	003	58	Moderate	70	Moderate
4	004	55	Moderate	70	Moderate
5	005	45	Moderate	75	Moderate
6	006	44	Moderate	76	Moderate
7	007	54	Moderate	77	Moderate
8	008	80	Moderate	89	High
9	009	56	Moderate	80	Moderate
10	010	56	Moderate	80	Moderate
Average Value		56,1		77,7	Moderate

According to the Table 3, indicators for students' creative thinking skills are acquired, which displayed fluency skills that earned high category values. Aafter the implementation of project–based and a problem–based learning model where the pre–test scores 65. Prior to being taught with a project-based and a problem–based learning model, creativity earned the results of 86 with a high category.

Table 3. Indicators of Creative Thinking

Creativity Indicator	Value	Information	Criteria	Information
Fluency	65	Moderate	86	High
Flexibility	71	Moderate	80	Moderate
Originality	66	Moderate	79	Moderate
Elaboration	56	Moderate	70	Moderate

Project–based learning models when paired with problem–based learning models, according to N-gain analysis, is categorized as possessing a moderate effect, this can be said that the application of well–designed and properly paired learning models might overcome problems that exist in student learning outcomes (Luthvitasari & Linuwih, 2012). In applying the project–based learning model, students are more motivated, since they are actively involved in their own learning, and generate high–quality complex work (Blumenfeld et al., 1991, in Bas, 2011). This research is in line with Corebima (2009), which explains that the project focuses towards product or performance development, overall students conduct activities; organizing their group learning agendas, carrying out studies or research, solving problems, and synthesizing information. As stated by Blank, 1997; Dickinson et al., 1998, in Bas (2011), students will earn creative abilities when engaged with various skills and competencies like collaboration, project planning, decision making, and time management through project learning (Bas, 2011). The use of a project–based learning model, which embodies of project–based learning steps that was adopted from the Buck Institute of Education comprises of the five stages, mentioned as follows: (1) Identifying Project Questions. During this stage, students are able to practice their creativity ability to determine the questions that is done by direct observation of authentic problems paired with problem–based learning models; (2) The formulation of a process framework strategy in a project; (3) Product design; (4) Product manufacturing process, and (5) Presentation and evaluation. (Buck Institute of Education, 2007)

While the problem–based learning model is oriented to problem solving and developed from John Dewey's theory. In quest to solve a problem, a thought process is required (Arends, 1997: 156) (Utami, 2011). Project–based learning is learning that incorporates students in knowledge and skills transfer through a process of discovery with a series of questions that arranged in tasks or projects (Buck Institute of Education, 2007). Whereas, problem–based learning gives students an authentic problem based upon the observation conducted by themselves, where the problem raised is an authentic issue that really exists around the students so that they might really be stimulated on how think fluidly.
Creative thinking is a high–level thinking skill (Baker & Rudd, 2001). Thus, with the existence of students who are able to think creatively by themselves, might invokes self-confidence that referred here as self-efficacy, where self-efficacy itself is a credence or, the belief that is meant in developing the creativity

itself, which covers an individual's beliefs regarding with his/her ability to organize, complete a task, attain a goal, generate something and implement actions to display skills (Bandura, 1997).

CONCLUSIONS
(centered, bold)

To sum up this research is the existence of influence upon student creativity after learning is done by utilizing a project–based learning model, which is paired with a problem-based learning model.

REFERENCES

Abdurrozak, R., & Jayadinata, A. K. (2016). Pengaruh Model Problem Based Learning terhadap Kemampuan Berpikir Kreatif Siswa. Jurnal Pena Ilmiah, 1(1), 871-880.

Munandar. Utari. (2004). Pengembangan Kreativitas Anak Berbakat. Jakarta: Rineka Cipta

Depdikbud (2006). Kurikulum Tingkat Satuan Pendidikan. Jakarta: Depdikbud.

Sweetman, D., Luthans, F., Avey, J. B., & Luthans, B. C. (dalam penerbitan). Relationship Between Positive Psychological Capital and Creative Performance. Canadian Journal of Administrative Science

Bandura, A. (1997). Self Efficacy: the Exercise of Control. New York:Freeman

Baş, G. (2011). Investigating the effects of project-based learning on students' academic achievement and attitudes towards English lesson. The online journal of New Horizons in Education, 1(4).

Utami, R. (2017). Model Pembelajaran Berbasis Masalah dengan Langkah Penyelesaian Berdasarkan Polya dan Krulik-Rudnick Ditinjau dari Kreativitas Siswa. Delta: Jurnal Ilmiah Pendidikan Matematika, 1(1), 82-98.

Utami, R. P. (2011). Pengaruh Model Pembelajaran Search Solve Create And Share (SSCS) dan Problem Based Instruction (PBI) Terhadap Prestasi Belajar dan Kreativitas Siswa. Bioedukasi, 4(2), 57-71.

Buck Institute of Education. 2007. How Does Project-Based Learning Work?Tersedia di http://www.edutopia.org/project-based-learning-guide-implementation [diakses 2-12-2011]

Baker, M & R. Rudd. 2001. Relationship between Critical and Creative Thinking. Journal of Southern Agricultural Education Research. 51(1): 173-188. Tersedia di http://pubs.aged.tamu.edu/jsaer/pdf/Vol51/51-00-173.pdf [diunduh 29-01-2012].

Luthvitasari, N., & Linuwih, S. (2012). Implementasi Pembelajaran Fisika Berbasis Proyek terhadap Keterampilan Berpikir Kritis, Berpikir Kreatif dan Kemahiran Generik Sains. Journal of Innovative Science Education, 1(2).

Wulandari, F. E. (2017). Profil Kreativitas Mahasiswa Pendidikan IPA Universitas Muhammadiyah Sidoarjo. Prosiding Seminar Nasional Pendidikan Berkemajuan dan Menggembirakan (The Progressive & Fun Education Seminar) ke-2.