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“ Professional Learning Community through  
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**“Professional Learning Community Trough Lesson Study for Promoting Student  
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# **The Implementation of Project Based Learningon Database Practicum Class to Improve The Students' Motivation and Achievement in The Informatics Education Program Of Hamzanwadi University**

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## **Abstract**

This research aims at describing the implementation of Project Based Learning(PBL) model on Database Practicum class to improve the students' motivation and achievement of Informatics Education Program of Hamzanwadi University in the academic year 2016-2017, and to share some pedagogical practices that Indonesian lecturers can develop to help their students increase their achievement and motivation in classes. This research is an experimental research. The subject is all the fourth semester students of Informatics Education Program of Hamzanwadi University consisted of 47 students in 2 classes: 4A, 4B. The data used to measure the level of success of PBL model is obtained from the frequency of the students' final result and the result of the observation and the direct interview to the students in every season. The results of students' achievement is good. Out of 47 students, 32 students with an average score higher than 85, 8 students got score between 75-84.99, 0 students got 55-69.99, 2 students got score between 40-54.99, and 5 students got 39.99. Additionally, from the direct observation and evaluation, it is seen that the learning atmosphere is more active and alive due to the reward value given. Besides, the students become passionate and enthusiastic to get into the top 10 positions and get a high score. Surprisingly, the students want this method to be done at all meetings because the method is not boring, and the material is understood better.

**Keywords :** *project based learning, database practicum, motivation, achievement*

## A. INTRODUCTION

The education world especially vocational education in Indonesia deals constantly with uncertainty every year. This requires for the lecturers to have a more adequate soft skills. Informatics engineering education as one of the majors in vocational schools has the challenge to produce prospective lecturers with good skills. The biggest challenge for informatics education students is that besides facing the education field, they have to deal with the technology who constantly change. This requires students as prospective lecturers to have soft skills that fit with the development of the world of education and engineering.

Today's vocational engineering graduates need to have strong communication and teamwork skills, but in fact they don't. They need to have a broader perspective of the issues that concern their profession such as social, environmental and economic issues, but they haven't. Finally, they need to graduate with good knowledge of fundamental engineering science and computer literacy, but they don't know how to apply that in practice (Mills, 2003). If the industry studies, accreditation criteria and reviews of engineering education are examined it is clear that the profession, the industry employers and the students themselves are calling for significant changes to the current philosophy and delivery of engineering education. What are the critical issues that need to be addressed? These can be summarised as follows (Mills, 2003):

- 1) Engineering curricula are too focussed on engineering science and technical courses without providing sufficient integration of these topics or relating them to industrial practice. Programs are content driven.
- 2) Current programs don't provide sufficient design experiences to students.
- 3) Graduates still lack communication skills and teamwork experience and programs need to incorporate more opportunities for students to develop these.
- 4) Programs need to develop more awareness amongst students of the social, environmental, economic and legal issues that are part of the reality of modern engineering practice.
- 5) Existing faculty lack practical experience, hence are not able to adequately relate theory to practice or provide design experiences. Present promotion systems reward research activities and not practical experience or teaching expertise.
- 6) The existing teaching and learning strategies or culture in engineering programs is outdated and needs to become more student-centered.

Education in the field of engineering in addition to providing sufficient theories, should provide examples of solving real projects by utilizing learning

strategies that support education in engineering (Purnawan, 2007., Rais, M. 2010). This will provide an opportunity for students to experience the whole range of learning (cognitive, effective, and psychomotor), and develop all intelligence (emotional, spiritual, social, etc.). Database Practicum is one of engineering field in Informatics Education Program at Hamzanwadi University. As a field of engineering, Database Practicum requires a teaching method that can improve students motivation and achievement, because this course requires concentration and good perseverance to be mastered. This resulted in students often feel saturated because they have to deal with computers in the long term, so that absorption of lecture material is not maximal. Practicum itself should be done in a pleasant situation so that the material can be absorbed properly. One method that can be applied in this course is the method of Project Based Learning (PBL).

PBL is a social practice into which students are socialized through a series of group activities involving the simultaneous learning of language, content, and skills (Slater, Beckett, & Aufderhaar, 2006, Mali, Y.,C., G.2016). PBL is also “an approach to instruction that teaches curriculum concepts through a project” (Bell, 2010, Page.41). PBL is a model that organizes learning around project. To capture the uniqueness of PBL and to provide a way of screening out non-examples from this review, the following set of criteria are offered. These criteria do not constitute a definition of PBL. The five criteria (Thomas W.J., 2000) are centrality, driver question, constructive investigations, autonomy, and realism. 1) *PBL project are central, not peripheral to the curriculum.* This criterion has two corollaries. First, according to this defined feature, projects are the curriculum. In PBL, the project is the central teaching strategy; students encounter and learn the central concepts of the discipline via the project. There are instances where project work follows traditional instruction in such a way that the project serves to provide illustrations, examples, additional practice, or practical applications for material taught initially by other means. However, these “application” projects are not considered to be instances of PBL, according to this criterion. Second, the centrality criterion means that projects in which students learn things that are outside the curriculum (“enrichment” projects) are also not examples of PBL, no matter how appealing or engaging. 2) *PBL projects are focused on questions or problems that “drive” students to encounter (and struggle with) the central concepts and principles of a discipline.* This criterion is a subtle one. The definition of the project (for students) must “be crafted in order to make a connection between activities and the



underlying conceptual knowledge that one might hope to foster." (Barron, Schwartz, Vye, Moore, Petrosino, ZechBransford, & The Cognition and Technology Group at Vanderbilt, 1998, p. 274, Thomas W.J., 2000). This is usually done with a "driving question" (Blumenfeld et al., 1991, Thomas W.J., 2000) or an ill-defined problem (Stepien and Gallagher, 1993, Thomas W.J., 2000). PBL projects may be built around thematic units or the intersection of topics from two or more disciplines, but that is not sufficient to define a project.

3) *Projects involve students in a constructive investigation.* An investigation is a goal-directed process that involves inquiry, knowledge building, and resolution. Investigations may be design, decision-making, problem-finding, problem-solving, discovery, or model-building processes. But, in order to be considered as a PBL project, the central activities of the project must involve the transformation and construction of knowledge (by definition: new understandings, new skills) on the part of students (Bereiter & Scardamalia, 1999, Thomas W.J., 2000). If the central activities of the project represent no difficulty to the student or can be carried out with the application of already-learned information or skills, the project is an exercise, not a PBL project. This criterion means that straightforward service projects such as planting a garden or cleaning a stream bed are projects, but may not be PBL projects.

4) *Projects are student-driven to some significant degree.* PBL projects are not, in the main, lecturer-led, scripted, or packaged. Laboratory exercises and instructional booklets are not examples of PBL, even if they are problem-focused and central to the curriculum. PBL projects do not end up at a predetermined outcome or take predetermined paths. PBL projects incorporate a good deal more student autonomy, choice, unsupervised work time, and responsibility than traditional instruction and traditional projects.

5) *Projects are realistic, not school-like.* Projects embody characteristics that give them a feeling of authenticity to students. These characteristics can include the topic, the tasks, the roles that students play, the context within which the work of the project is carried out, the collaborators who work with students on the project, the products that are produced, the audience for the project's products, or the criteria by which the products or performances are judged. The distinction between academic challenges, scenario challenges, and real-life challenges (Gordon 1998, Thomas W.J., 2000). PBL incorporates real-life challenges where the focus is on authentic (not simulated) problems or questions and where solutions have the potential to be implemented.

This research reaffirms the benefits of PBL and ideas that “all program instructors in their PBL learning program are free to design their individual class project as long as they fit within the framework of the course” (Foss et al., 2007, p.6). With this in mind, the students learning activities were designed using PBL that would seem to help the students to increase their achievement and motivation. This research aims to explain the implementation of PBL in database practicum course, and to share some pedagogical practices that Indonesian lecturers can develop to help their students increase their achievement and motivation in classes.

## **B. Method**

This research was conducted on Informatics Education Program of Hamzanwadi University, and the subject of the research is the students of Practicum Database course at fourth semester, with total of participants is 47 students, divided into 2 classes in 2016.

The learning method used is the method of Project Based Learning (PBL). The steps in the PBL are as follows: 1) *Determination of fundamental or essential questions*. The PBL model emphasizes the constructivist principle, where the students are expected to build their own knowledge based on their personal experience in real life. Therefore, PBL is very important starting from a fundamental or essential question that will become a problem to be solved through a project made by the student. Lecturers will first provide a stimulus in the form of material explanations by giving examples in the form of real problems around the students presented at the beginning of learning. For example, a practicum to create a table of learning outcomes in the data base, the lecturer will provide an explanation by giving the example closest to the life of the students, the names of columns are required in the table of student learning outcomes, so that students have a reflection of the required columns. 2) *Design project planning*. At this stage, students are given independence and freedom to be creative. After the essential question can be formulated by the students, then the student will design the project planning that will be done. If usually in the PBL project is done in groups, but in this research try to developed into individuals project for more focus on understanding and mastered the project. 3) *Develop a schedule*. Although PBLs give students the flexibility to be creative in determining how projects are created and implemented, students still need to create a schedule that keeps the project well done with effective time. This

is where the ability of students trained to critical and clever estimate the things needed for preparation, manufacture, until the project can be completed in a right time. 4) *Monitor project progress*. In this step the progress of the project should be seen from the aspects of lecturers and students. So it can be known the project is in accordance with the plan or not, the obstacles are found and how to overcome them. 5) *Test the process and learning outcomes*. Lecturers in implementing the PBL model should test the learning process and outcomes as long as the students undertake the project and at the end of the project. Both of these are very important, so that the lecturer can provide feedback, reinforcement, assistance, facilities, and the like. In addition, the lecturer should also evaluate how the acquisition of student learning outcomes, both from aspects of attitude, skills, and knowledge. 6) *Evaluate the experience of making projects or executing projects*. Lecturers can make students to do self-reflection in the purpose of making students accustomed to always evaluate each project's learning.

Base on the six ways PBL method above, in this research developed several stages of application of PBL to measure individual ability of each student as follows: 1) Lecturer explains practicum material to see at that time, and give a real example to the student. 2) Students try to practice making project according to the material at the meeting. 3) Once the student understands the material, the lecturer will give the experiment project which must be decided by the student in a certain time. 4) Students will be rewarded by lecturers for those who can work on the project on time. For the first 10 people who can do it properly and correctly, will be awarded with 100 points by the lecturers, while the following will be given according to their ability to explain the project they made. 5) When the examination is done by the lecturer on the work of the students, the student will explain the project, followed by the questioning by the lecturer

### **C. Findings and Discussion**

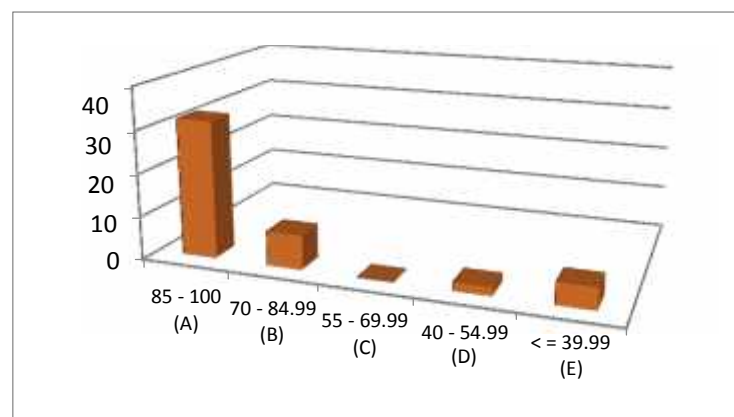
The results of this research can be concluded that the PBL model can improve students' motivation and achievement of Informatics Education Program in fourth semester at Hamzanwadi University on Database Practicum course. These results can be seen from the acquisition of the final score of semester and observation of individual development of students and the state of the class in each week directly. The acquisition from the value of students in the end of semester can be seen from the table below:



**Table 1.1** Frequency of students final semester score achievement using PBL method

No	Interval	In letters	Frequency
1	85 - 100	A	32
2	75 - 84.99	B	8
3	55 - 69.99	C	-
4	40 - 54.99	D	2
5	39.99	E	5
	<b>SUM</b>		<b>47</b>

For more details about the frequency of the final semester score data at table 1.1 can be seen in the form of histogram graphs as shown in the figure below:



**Figure 1.1** Frequency of students final semester score achievement using PBL method

Overall can be seen that the results of student achievement is good. Out of 47 students, there were 32 students with an average score above 85, 8 students got score between 75 - 84.99, 0 students got 55 - 69.99, 2 students got score between 40 - 54.99, and 5 students got 39.99.

From direct observation and evaluation it is seen that the learning atmosphere is more active and not boring, due to the reward value given. Students become passionate and enthusiastic to get into the top 10 positions, to get a high score. Even students want this method to be done at all meetings season. Students feel this method is not boring and understanding of the material is more achieved than the use of conventional methods.

#### **D. Conclusion**

Based on the results of the discussion above, it can be concluded that the application of PBS learning model can improve student motivation and

achievement in the course practicum database on Prodi Education Informatics, Hamzanwadi University. This can be seen from the acquisition of the value of the student, with the most value is 85 with the number of students as much as 32 students, the second diurutan as many as 8 people with a range of values between 75-85.99, while 2 students got the score between 40-55.99, and 5 students got a score of 39.99. It can be seen that there are 7 students who are not graduated in this course. This is not due to the failure of PBL model implementation, but more due to the absence of students in the lecture session and there is also due to not take the final exam. Student response at the time of learning activities look more enthusiastic and active. Students become passionate and enthusiastic to get into the top 10 positions, to get a high score. Even students want this method to be done at all meetings season. Students feel this method is not boring and understanding of the material is more achieved than the use of conventional methods.

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