



Implementation of Problem-Based Learning Model on Quantitative Research Method Courses

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Abstract

This study aimed to describe the implementation of problem-based learning models in quantitative research method courses. The method used a descriptive survey with a saturated sampling technique that took the entire population as a sample in the study, totaling 96 students of the Department of Economics Education, Faculty of Teacher Training and Education, Siliwangi University. Data was collected by distributing questionnaires through Google Forms consisting of 25 statement items from 6 indicators, namely aspects of student interaction with lecturers, being able to motivate student learning, effective, efficient and creative thinking competence, good time management competence, good student learning outcomes, and the suitability of the learning model with the characteristics of the course. Data analysis was performed by using descriptive statistics. Based on the results of the research that had been done, information was obtained that the problem-based learning model was a learning model that could improve the experience of learning outcomes. Problem-based learning model could also foster learning motivation, build student competencies in effective, efficient and creative thinking, build good time management competencies, and could improve learning outcomes, and could be implemented in research method courses.

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INTRODUCTION

21st Century Learning is a learning transition where the curriculum that previously used a teacher-centered learning approach became student-centered learning. 21st Century Learning has characteristics known as 4Cs, namely Communication, Cooperation, Critical Thinking and Problem Solving and Creativity and Innovation. The ability to think critically and think creatively are the two components needed in 21st century skills for the younger generation (Liu et al., 2021).

In the era of globalization and the rapid development of information technology, the ability to think is indispensable for solving problems in the real world (Chan, 2019). Creative thinking and critical thinking have a positive relationship. Creative thinking can bring up critical thinking skills (Akpur, 2020). In this case, creativity is considered as one of the most important skills in the 21st century (Chu et al., 2016). With the rapid development of technology and the emergence of a global economy, students are required to equip themselves with higher 21st century learning skills, such as critical thinking to be successful in future careers. (Keane et al., 2016; Roohr et al., 2019).

To support and improve thinking skills in welcoming 21st Century learning, the learning process used is a meaningful learning process (joyful learning) where the learning process must be focused on constructing knowledge. Constructivism has been considered a leading learning theory since the 1980s (Mayer, 1996). According to social constructivism theory, learning will be optimal when students identify problems, set and refine goals based on progress, collect information, review theories, design experiments, build models, monitor and evaluate progress. As revealed by Dewey that student involvement in the learning process will provide the best experience. Vigotsky (Chu et al., 2016) also emphasized that student involvement in the learning process can improve students' metacognitive abilities by exploring various experiences gained

from interactions and social situations. Such experiences enable students to build personal conceptualizations of the knowledge they construct individually or collaboratively. In line with that Pande & Bharathi (2020) revealed that constructivism learning is used to develop a curriculum that emphasizes the experiences of students in a varied learning process.

The social constructivism approach is a key approach in learning, especially in the field of problem-based learning. Problem-based learning is a learning strategy in which students learn the subject matter by solving problems in the real world. Students are given general problems and then facilitated to find various alternative knowledge in problem solving. The teacher's role in this learning process is as a facilitator who is directly involved in providing a stimulus in the form of information to students to discuss, and providing guidance to students in solving problems. (Reynolds & Hancock, 2010)

Problem-based learning is one of the learner-centered learning methods. Students are required to develop higher order thinking skills by conducting creative thinking investigations (Ersoy, 2014). The results of the study stated that problem-based learning had a significant impact on improving student attitudes and performance. With PBL students' critical thinking skills can be improved through conceptual understanding, problem solving that can be applied to the real world, development of attitudes that are consistent with lifelong learning experiences. However, the researchers found that problem-based learning did not always have a positive impact on learning. Sometimes PBL makes students frustrated, not confident in the process of finding solutions to problems without significant direction from the teacher (Reynolds & Hancock, 2010). In addition, sometimes teachers also feel a dilemma in carrying out the learning process.

Teachers find it easier to carry out the conventional learning process compared to using this PBL method (Reynolds & Hancock, 2010). Based on the findings of this study, the

authors are interested in conducting a descriptive analysis related to the implementation of problem-based learning in the quantitative research method course with the consideration that this course is a blend of various disciplines that can examine various problems from a research perspective so that it can foster students' interest in research.

METHODS

The research was conducted on 96 students of the 5th semester of the Department of Economics Education, Faculty of Teacher Training and Education. The sampling technique used a saturated sample which took all members of the population as the research sample. This research was a quantitative descriptive study using a survey method with the aim of knowing the description of the implementation of the problem-based learning model that was applied during lectures. Data collection was carried out by distributing questionnaires through Google forms related to the implementation of problem-based learning models which consisted of 25 statement items from 6 indicators, namely aspects of student interaction with lecturers, being able to motivate student learning, competence to think effectively, efficiently, and creatively. Good time management competence, good student learning outcomes, and the suitability of the application of the learning model with the characteristics of the course. Data analysis was performed by using descriptive statistics.

RESULTS AND DISCUSSION

Aspects of Student Interaction with Lecturers

Information on the trend indicators of the interaction aspect of lecturers and students is shown in Table 1. 41 people or 42.71% of students stated that the aspect of student-lecturer interaction was very good. The remaining 55 people or 52.29% of students said they

were good. That is, in the learning process carried out using a problem-based learning model could build aspects of student interaction with lecturers. This can be proven by the responses given by respondents regarding the statement: I feel more active in doing the task of making basic ideas and research proposals, most of the respondents (71.9%) answered strongly agree, and the remaining 19.8% stated strongly agree and 8.3% disagree; My lecturers always provide direction in each task of making basic ideas and research proposals. Most respondents (66.7%) strongly answered agree, 31.3% agree and the remaining 1% each disagree and strongly disagree; I dare to ask the lecturer every time I face difficulties in doing the task of making basic ideas and research proposals.

Most of the respondents (58.3%) answered agree, 13.5% strongly agree and the remaining 27.1% and 1% disagree and strongly disagree; I always consult with the lecturer in completing the task of making basic ideas and research proposals. Most respondents (54.2%) answered agree, the remaining 5.2% strongly agree and 39.6% and 1% disagree and strongly disagree; By using the problem-based learning model (PBL), I dare to express my opinion to my lecturers and friends in class about the learning material. Most of the respondents (71.1%) gave a agree response, and 10.4% gave a strongly agree response. The remaining 12.5% gave a disagree response. The results of this study were in line with the results of the study Zarita et al. (2015) who found that the interaction of students with teachers was higher when using the PBL approach.

Table 1. Trend Distribution of Lecturer and Student Interaction Indicators

No	Interval	F	F (%)	Criteria
1	$X > 15.5$	41	42.71	Very good
2	$9.5 < X \leq 15.5$	55	52.29	Good
3	$X < 9.5$	0	0	Very good

Source: Primary data processed, 2021

PBL Can Motivate Student Learning

Table 2. shows that the tendency of indicators capable of providing student motivation to learn was in the good category. This means that the application of problem-based learning models could foster student motivation. This was evidenced by the respondents' answers that most students or 62 respondents (64.58%) said they were good, and the remaining 34 respondents (35.42%) stated very well that the problem-based learning model (PBL) was able to motivate student learning. This could be proven by the respondents' answers of 67.7% stating strongly agree and 32.3% agree that the application of problem-based learning models can realize imagination to generate ideas or research topics.

Learning using problem-based learning models helped students find new ideas for research topics. This was evidenced by the answers of respondents 65.6% stated strongly agree and 32.3% agree. The remaining only 2.1% said they did not agree; the application of the PBL model could also foster student enthusiasm in research. 63.% of respondents stated strongly agree, 26% of respondents agree and the remaining 10.4% said they did not agree; Regarding the statement that I do not feel tired in doing any given task, most of the respondents (64.6%) and 2.1% stated that they strongly disagree. Only 27.1% and 6.3% stated strongly agree and agree, Rotgans & Schmidt (2019)stated that the existence of problem solving and interaction between tutors and students will increase students' learning motivation. This was in line with the research results Sari (2018) who found that PBL significantly increased students' motivation.

Table 2. Trend Distribution of Able to Motivate Student Learning Indicators

No	Interval	F	F(%)	Criteria
1	X > 15.5	34	35.42	Very good
2	9.5 < X 15.5	62	64.58	Good
3	X < 9.5	0	0	Very good

Source: Primary data processed, 2021

Ability to Think Effectively, Efficiently and Creatively

Table 3. provides information related to the tendency of the competence indicators for effective, efficient and creative thinking to be in the good and very good categories. This means that the problem-based learning model fostered student competence to have the competence to think effectively, efficiently and creatively. Indicators of competence to think effectively, efficiently and creatively were built by 4 statement items. Regarding the statement that problem-based learning models make students more creative in formulating basic ideas and research proposals, most students (57.29%) answered agree and 42.71% strongly agree.

The statement of the application of the problem-based learning model made me know the potential it had, most of the respondents 70.8% stated agree and 20.8% strongly agree. The remaining 8.3% said they did not agree; My statement became trained in making basic ideas and research proposals, most of the students, 67.7% and 30.2%, stated agree and strongly agree, and the remaining 2.1% disagree; The statement of basic ideas and research proposals that I did can be used to complete the final project, most of the students 60.4% stated agree and 27.1% strongly agree. The remaining 11.5% and 1% disagree and strongly disagree. (Maryani, 2011).

Table 3. Trend Distribution of Able to Think Effectively, Efficiently and Creatively Indicators

No	Interval	F	F(%)	Criteria
1	X > 12.5	41	42.71	Very good
2	8.5 ≤ X 12.5	55	57.29	Good
3	X < 8.5	0	0	Very good

Source: Primary data processed, 2021

Time Management Competence

Table 4. provides information related to time management competency indicators in the very good and good categories. This was

indicated by the large percentage of respondents' answers of 59.38% who stated strongly agree and 40.62% agree. This means that the problem-based learning model (PBL) could foster student competence in good time management. This was evidenced by the respondents' answers regarding my statement completing the basic idea task and research proposal on time as determined by the lecturer, most of the respondents or 60.4% and 38.5% stated agree and strongly agree. While the remaining 1% stated strongly disagree.

My statement fills my spare time at home by doing assignments to make basic ideas and research proposals, most of the students, namely 59.4% and 28.1%, stated agree and strongly agree. The remaining 12.5% said they did not agree; My study time statement became more meaningful with the problem-based learning model (PBL) most of the respondents, namely 77.1% and 15.6% stated agree and strongly agree, the remaining 7.3% disagree.

Table 4. Trend Distribution of Time Management Competency Indicators

No	Interval	F	F(%)	Criteria
1	X > 9	57	59.38	Very good
2	6 X 9	39	40.62	Good
3	X < 6	0	0	Very good

Source: Primary data processed, 2021

Student Learning Outcomes

The trend of student learning outcomes indicators showed very good and good categories which can be seen in Table 5. This means that the use of problem-based learning (PBL) models could improve student learning outcomes. This can be proven by the respondents' answers related to the statement that I am satisfied with the results of my scores showing that most of the students (52.08%) stated strongly agree and 47.92% agree.

The statement of the problem-based learning model can improve my learning outcomes. Most of the respondents (75%)

stated agree and 22.9% strongly agree. The remaining 2.1% disagree; My statement gained experience and made basic ideas and research proposals, 56.3% and 43.8% stated strongly agree and agree; Regarding the statement that I found it easy to do basic idea assignments and research proposals using a problem-based learning model, most students (66.7%) stated agree and 22.9% strongly agree. The remaining 10.4% said they did not agree. Learning with PBL, by using problems similar to the reality experienced by students, motivates students to identify and apply research concepts, (Shamsan & Syed, 2009; Sukri & Widjajanti, 2015). With good student interaction, it will increase students' motivation to achieve learning outcomes (Kodariyati & Astuti, 2016).

Table 5. Trend Distribution of Good Student Learning Outcome Indicators

No	Interval	F	F(%)	Criteria
1	X > 12	50	52.08	Very good
2	8 X 12	46	47.92	Good
3	X < 8	0	0	Very good

Source: Primary data processed, 2021

Suitability of Application of Learning Model with Characteristics of Courses

Table 6. shows the tendency of indicators of suitability to the application of learning models with course characteristics in the very good (50%) and good (50%) categories. This means that the problem-based learning model (PBL) could be used in the learning process of research methods because it was in accordance with the characteristics of the course. This was indicated by the answers of the respondents to the questions that built these indicators. The indicator of the suitability of the application of the learning model with the characteristics of the course was built by four statement items, namely the statement that the application of the problem-based learning model makes the research method course more attractive, most of the respondents or 68.8% said good and 29.2% said very good. The remaining 2.1% said they did not agree.

Table 6. Trend Distribution of the Suitability of the Application of Learning Models with Subject Characteristics

No	Interval	F	F(%)	Criteria
1	X > 12	48	50	Very good
2	8 X 12	48	50	Good
3	X < 8	0	0	Very good

Source: Primary data processed, 2021

The statement of basic ideas and research proposals that I worked on made the research method course assignments more real, most of the respondents or 66.7% stated agree and 32.3% stated strongly agree and the remaining 1% stated agree; The statement of the problem-based learning model makes research method courses more useful, most of the respondents, namely 68.8% and 31.3%, stated agree and strongly agree; The statement in my opinion that the problem-based learning model is appropriate to be applied to research methods courses, most students or 65.6% and 34.4% stated agree and strongly agree.

Based on pedagogic abilities, PBL is based on constructivist learning theory which states that: (1) understanding is obtained from interaction with problem scenarios and the learning environment; (2) engagement with problems and the problem-solving process creates cognitive dissonance that stimulates learning; (3) knowledge develops through a collaborative process of social negotiation and evaluation from one's point of view. The constructivism philosophy that underlies PBL is not new.

John Dewey in Chu et al. (2017) revealed that the most important thing in the learning process is the participation of students in achieving learning objectives. In addition to embedding problems in the learning process in the classroom, PBL also provides opportunities for students to build knowledge through active interaction and collaborative inquiry. (Seng Tan, 2003). This was in line with the results of the study which revealed that the problem-based learning model could build aspects

of student interaction with lecturers which can be proven by respondents' answers regarding the statement "I dare to ask the lecturer every time I face difficulties in doing the task of making basic ideas and research proposals", most of the respondents (58.3%) stated agree, 13.5% strongly agreed. Another statement that supports students in building knowledge through interaction is "I always consult with the lecturer in completing the task of making basic ideas and research proposals. Most of the respondents (54.2%) stated agree, the remaining 5.2% stated strongly agree.

The results of other studies stated that the problem-based learning model had the potential to foster creative thinking skills (Seng Tan, 2003). This was evidenced by the results of research showing that the indicators of effective, efficient and creative thinking competence were in the good and very good categories. This means that the problem-based learning model (PBL) fostered student competence to have the competence to think effectively, efficiently and creatively. Most of the respondents (68.8%) stated agree and 26% strongly agree that the problem-based learning model fosters students' effective, efficient and creative thinking competencies.

Another finding from this study was that by using a problem-based learning model, students gained experience in making basic ideas and research proposals as indicated by the answers to the statement "I have experience and make basic ideas and research proposals", by 56.3% and 43,8% stated strongly agree and agree that the problem-based learning model provides experiences in student learning. This was in line with the results of research which stated that students gain a lot of experience through the implementation of problem-based learning (PBL) models. Students can work together and take on multiple roles through a constructive learning process (Hmelo-Silver & Barrows, 2006).

Regarding the indicators of the suitability of the application of the learning model with the characteristics of the course, the results showed that the problem-based learning

model was compatible with the characteristics of the course. This was evidenced by the respondents' answers that 68.8% and 29.2% stated agree and strongly agree that the problem-based learning model made research method courses more attractive. 66.7% and 32.3% of respondents stated agree and strongly agree that the task of making research basic ideas and research proposals made the tasks of the research methods course more real. 68.8% and 31.3% stated agree and strongly agree that the problem-based learning model makes quantitative research methods courses more useful. 65.6% and 34.4% of respondents stated agree and strongly agree that the problem-based learning model was appropriate to be applied to quantitative research methods courses. In another perspective, Ainin (2017) mentioned that the use of PBL in Arabic research methods courses could create a conducive learning atmosphere that made students feel happy, feel belonging, feel valued, feel involved, feel appreciated, feel helped, feel treated egalitarian. Based on the two research results, it can be concluded that the problem-based learning model could be implemented in the learning process of research method courses.

CONCLUSION

Based on the results of the research that had been done, it can be concluded that the problem-based learning model was a learning model that could foster interaction between students and lecturers. The role of the lecturer in the learning process as a facilitator guided and directed students in the learning process in order to gain experience of learning outcomes. This problem-based learning model could also build student competencies in effective, efficient and creative thinking, undermine student learning motivation, improve learning outcomes and this problem-based learning model had characteristics that were relevant to use in quantitative research method courses.

The results of this study were limited to descriptive research related to the implementation of problem-based learning models.

Therefore, the researcher recommends that readers conduct further research to obtain and explore in-depth information about the impact of implementing problem-based learning models in learning using other research methods.

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