No 7 Problem Based Learning Gender

by Kokom Komariah

Problem Based Learning: Gender Responsive Alternative Learning Models for Vocational High Schools

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Abstract--- *Many studies have addressed gender disparities in various fields, but specializing in solutions through learning activities has not been done much. This study aims to explore problem-based learning as alternative learning that is responsive to gender in Vocational High Schools. Data were collected with a technical survey and involved vocational teachers. Data analysis uses descriptive statistics. The results of the study revealed that the teacher did not understand well the concept of gender in learning. Male students dominate the utilization of learning facilities. Also, problem-based learning can be implemented through 6 stages, namely the introduction, organizing, investigating, developing the results of the investigation and presenting the work, analysis, and evaluation of the problem-solving process. Problem-based learning can encourage fair learning. Finally, the problem-based learning model can increase the active participation of students through interactive activities in apperception, asking questions, expressing opinions, answering questions, and completing assignments.*

Keywords--- *Problem-based learning, gender, vocational education, student-centered learning.*

I. INTRODUCTION

Gender is a social construction of the different roles and opportunities between men and women in family life [1]; [2]. The roles and opportunities contained in the construction can change according to differences in time, place, culture, or changes in values. Besides, gender is a social character as male and female as expected by a cultural society through socialization created by family and community, which is influenced by culture, religious interpretation, social structure, and politics. The social construction of gender is human-made, so the development is dynamic. Also, gender is an inherent trait of men and women socially and culturally constructed [3].

Gender issues arise in many fields, especially in education. Some gender issues in education, such as female students, have long been underrepresented in engineering, and many learning problems are found for female students [4]; [5]. Men are considered better in the fields of mathematics and science Dasgupta & Stout [6] if left to this condition will have an impact on the behavior and judgment of men and women in their scientific fields [7], self-identity [8], performance [9], individual confidence [10]. Besides, male school participation rates are higher than girls at the elementary and junior secondary levels [11]. This condition concludes that women are considered to have lower status than men because of the effects of this ongoing stereotype [12].

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Gender inequality in the field of education occurs because of the lack of knowledge of school residents about gender issues. For example, in general, learning material is still gender-biased. Besides, the learning process in the classroom has not fully encouraged equal active participation between male and female students. The physical environment of the school does not yet meet the specific needs of boys and girls. Also, the management of education has not been carried out according to the principle of gender equity or provides equal opportunities for men and women to participate in the decision-making process [13]. Understanding gender for school stakeholders can improve various components of education. Furthermore, this condition can eliminate gender inequality in education, encourage gender equality, and empower women.

The teacher's role can control gender problems in schools. Teachers have an essential role in succeeding in the implementation of education in schools. Therefore, teachers must have awareness, sensitivity, response, and skills in implementing gender mainstreaming through learning. Problem-based learning (PBL) has been considered one of the appropriate learning methods in solving gender problems [14]. PBL is considered as a method in preparing students for professional practice and for assisting in the development of discipline-specific knowledge and non-technical professional skills [15]. PBL is an active learning strategy that is highly recommended in the implementation of the curriculum in Indonesia. This learning strategy aims to train students to think critically and have skills in solving life problems. Problem-based learning is a learning approach that presents contextual challenges that encourage students to learn independently. The PBL concept emphasizes that education must be preceded by problems, questions, or puzzles that will be solved by students [16]. Duch et al [17] divide PBL learning skills into several things, namely: critical thinking, analytical, and complex and real problem solving; find, evaluate and use appropriate learning resources; work together in teams and small groups; demonstrate ideas and carry out effective communication through verbal or written, and use the content of intellectual knowledge and expertise required.

In the context of this study, the implementation of the PBL model in Vocational Schools is expected to be able to train students to learn independently and use real-world problems as a learning context in solving life problems. PBL aims to help students develop thinking skills and problem-solving skills, learn the role of adults and become independent students [18]. Based on that implementation of the learning model Problem based learning in learning is a solution to improve the output of vocational education. Although there have been many studies that discuss gender issues, it is still limited to discussing problem-based learning as an alternative solution in solving gender problems in schools. This study aims to explore problem-based learning as alternative learning that is responsive to gender in the vocational school. Specifically, this study aims:

- to know the teacher's conception of gender in school.
- to know the use of learning facilities in schools based on gender.
- to test the problem-based learning model in fostering gender-equitable learning.
- to test the method of learning problem based learning in increasing participation equally between men and women.

II. METHOD

This study is a descriptive study using mixed methods (qualitative and quantitative). This study has two stages of data collection, the first stage with a questionnaire to get an overview of the implementation of the problem-based learning model of learning in vocational high schools. While the second stage is intended to explore opinions in more detail through in-depth interviews, this study involved vocational school teachers in seven vocational schools in the Special Region of

Yogyakarta, Indonesia. The selection of respondents uses purposive sampling. Data collection uses survey and interview techniques.

Data analysis of this study uses quantitative and qualitative data analysis. Quantitative data collected using a questionnaire will be analyzed with descriptive statistics based on the Harvard Analytical Framework [19]. Qualitative data will be analyzed by interactive analysis techniques [20], which include data reduction steps, data display, conclusion drawing, and verification.

III. RESULT AND DISCUSSION

PROBLEM-BASED LEARNING IMPLEMENTATION IN THE VOCATIONAL SCHOOL

PBL is a form of learning implementation that is following the demands of the 2013 curriculum (Indonesian curriculum). The 2013 curriculum is a new curriculum that is currently still being improved in Indonesia—seeing the readiness of vocational school teachers in implementing the 2013 curriculum as a whole, including the above category average. The trends of each of these scores can be divided into four categories, which range from 35 to 140. A detailed description can be presented in Table 1.

Table 1. Teacher Readiness Vocational High Schools in the Implementation of the 2013 Curriculum

No	Interval			Category	Percentage (%)
1	113	-	140	Very high	15
2	99	-	112	High	45
3	77	-	98	Moderate	38
4	63	-	76	Low	2
5	35	-	62	Very low	-
	Amount				100

Based on the percentage of data trends in Table 1 it can be seen that the readiness of vocational teachers in implementing the 2013 curriculum, in general, tends to be included in the medium and high levels, this is in line with the average results of the research that have been analyzed. Descriptive analysis can also be known achievement of vocational teacher readiness scores in the implementation of the 2013 curriculum by comparing the total score achieved (empirically) with the highest whole score set [21]. For the variable of vocational high school teacher readiness in the implementation of the 2013 curriculum, a total score of 10067 was obtained and the highest score set was 14000 so that the variable score of vocational high school teacher readiness in implementing the 2013 curriculum reached 71.91% of the most top score set. Also, the willingness of teachers in the implementation of the 2013 Curriculum is high, and the teachers are comprehensively and comprehensively implemented, including being ready to apply the 2013 Curriculum (see Table 2).

Table 2. Ten Major Aspects of Implementation of Learning with High Scores

No	Aspect	Score (%)
1	Align the material with the learning objectives.	82
2	Encourage students to ask questions	82
3	Facilitating students to ask questions	82
4	Facilitating students to observe	82

5	Shows an open attitude towards students' responses.	82
6	Carry out learning following the competencies to be achieved.	81
7	Foster active participation of students	81
8	Respond positively to the active involvement of students	81
9	Shows conducive interpersonal relationships	81
10	Foster joy or enthusiasm of students in learning	81

ACCESS UTILIZATION TO LEARNING

Furthermore, through the implementation of problem-based learning, several indicators can be observed, among others, that there is no dominance in utilizing the access that schools have. Application of PBL through some subjects conducted by teachers, there is no domination of the use of school access between men and women. Except for specific study programs (culinary art), which are majority female, and specific study programs, which are majority male (Maritime). However, the use of access by male and female students is balanced based on the number of students who take the learning. The intended access is to use the school's room or facilities to use electronic and computer equipment, books, and practicum materials [22].

IMPLEMENTATION OF PROBLEM BASED LEARNING

Implementation of Problem Based Learning in Productive Subjects in Vocational Schools is applied in various subjects; in this case, it is tested in the fields of agriculture and processed products, maritime, tourism, and creative industries. Problem Based Learning can be implemented through 6 (six) stages, namely, the preliminary stage, organizing, conducting investigations, building the results of studies and presenting the work, analyzing and evaluating the problem-solving process, able to involve male and female students equally in the learning process.

Table 3. The stages of implementing PBL Models in Classes

Stages	Learning Activity	Teacher's Activity	Student Participation
Preliminary Stage	In this preliminary stage, the teacher gives triggers, in the form of cases, topics that can be solved or analyzed by students.	The teacher treats female and male students equally, impartial to certain gender groups.	Male and female students receive the same attention and treatment.
	Students identify various possible ways of solving it. Sort it out, look for multiple causes.	The teacher encourages male and female students to become leaders.	Male and female students are involved in participatory activities.
Identifying Stage	Students analyze the various possibilities of the identification made, make questions, look for alternative answers.	The teacher gives the signs that are studied in all male and female students.	Male and female students are all involved in participatory activities.
	Students do a variety of things, create small groups, divide assignments, do activities to find information by reading through social media, giving specific notes.	o The teacher encourages all students to participate in competitively. o The teacher gives equal opportunities for students to conduct investigations	Male and female students are all active and discuss together.
Stage of Organizing	Students conduct discussions to make a summary of the results of the investigation. Summarize systematically, create reports, presentations, and present them.	The teacher gives the same attention to female and male students.	
	The teacher and students analyze the problem-solving process, assess their strengths, and provide feedback.	o The teacher and students analyze the problem-solving process. o Teachers assess the advantages and disadvantages, from the aspect of the process and elements of the content. o The teacher gives feedback to improve and perfect the process and results.	Male and female students give the same attention.

Based on these stages, we can analyze that Problem Based Learning explicitly provides opportunities for male and female students to be actively involved in learning activities. This involvement starts at an early stage when the teacher gives triggers to the student.

INCREASING STUDENT PARTICIPATION IN PROBLEM BASED LEARNING

In the research conducted, there are several indicators in the implementation of Problem Based Learning. These indicators are aimed at the realm of gender equality. This result can be seen in Table 4.

Table 4. Participation of male and female students in learning

| No	Indicator	Percentage (%)
1	There is clear evidence of gender integration in learning materials.	60
2	The teacher treats female and male students	100
3	equally, fairly according to their needs	50
4	Reference books present examples that do not favor men or women	100
5	Male and female students are active in expressing ideas, asking questions, and criticizing other ideas without feeling inferior (superior) or superior (superior).	100
6	Teachers can encourage male and female students to progress competitively	100
7	The teacher encourages students to be leaders in the class, both male and female students.	100
8	Teachers provide equal opportunities for boys and girls to gain access / use the same resources	100
9	The teacher provides equal opportunities for boys and girls to participate in various opportunities activities.	100
10	The teacher pays equal attention to male and female students at the theoretical learning stage.	50
	Average	**86**

From the research conducted, some things are considered low in the implementation of Problem Based Learning, especially related to gender equality, namely gender integration in learning material, reference books that do not display gender equality, and student activities that do not pay attention to gender equality. The average value of participation was 86%.

IMPACT OF PROBLEM-BASED LEARNING ON IMPROVING LEARNING QUALITY

The application of Problem Based Learning as a form of gender-responsive models, is used as an effort to improve the quality of learning through increased motivation to learn, active and critical thinking skills, and competencies. These four things cannot be separated from the implementation of Problem Based Learning that was carried out. The results of this study support previous studies conducted by Barrows [23], he stated that the PBL curriculum was developed to motivate students, assist students in seeing the importance of learning for future roles, maintain a higher level of encouragement to learning, and to show students the importance responsible and skilled attitude. The results of PBL implementation through classroom action research showed positive changes in the improvement of learning motivation, student activeness, and student ability.

INCREASED LEARNING MOTIVATION

The results of the application of Problem Based Learning in increasing student learning motivation are measured including through diligently facing assignments, being tenacious in facing difficulties, interest in learning, happy working independently, perseverance in routine tasks, defending his opinion, not easily letting go of things he believes in and glad to find and solve problem problems. The results of research on the implementation of Problem Based Learning to increase student motivation in the vocational high school revitalization are shown in Figure 2 and Table 5.

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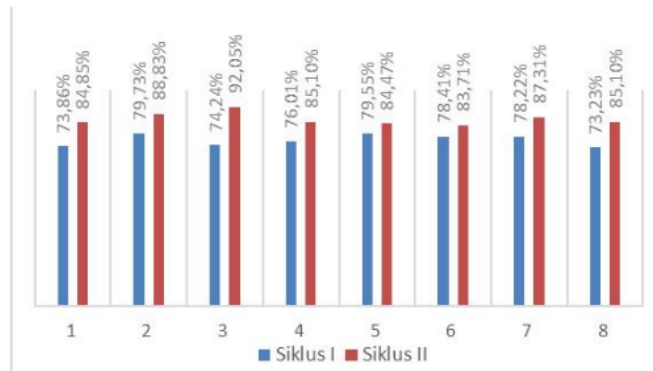
Note: siklus I= cycle 1; siklus II= cycle 2
Figure 2. Percentage of Increased Motivation

Table 5. Percentage of Increased Motivation

No	Motivation Component	Percentage (%)
1.	Diligently facing the task	10,99
2.	Tenacious faces difficulties	9,10
3.	Interest in lessons	17,8
4.	Happy to work independently	9,09
5.	Perseverance in routine tasks	4,92
6.	Defend his opinion	5,30
7.	It is not easy to let go of things that are believed	9,09
8.	Happy to find and solve problem problems	11,87
	Average	**9,77**

The application of the Problem Based Learning model increases aspects of student motivation to a mean of 9.77%, while the significant increase in the realm of interest in learning, happy to find and solve problems and diligently face the task. Problem Based Learning as one of the learning models has been proven to increase students' interest in following the learning process through a trigger or problem inducement so that students are moved to solve the problem through assignments given by the teacher.

IMPROVEMENT OF STUDENT LEARNING ACTIVITIES

The results of research on Problem Based Learning in the role of increasing students' activeness and critical thinking are seen from interactions in apperception, asking questions, expressing opinions, answering questions, and completing assignments (see Figure 3 and Table 6).

Note: siklus I= cycle 1; siklus II= cycle 2; siklus III= cycle 3
Figure 3. Increased Students' Active and Critical Thinking

Table 6. Increased Students' Active and Critical Thinking

NO	CYCLE	Observation of student learning activities (%)					
		1	2	3	4	5	
		Interaction in apperception	Asking question	Express opinions	Answer the question	Completing the task	Average
1	I	24	29	29	41	50	**35**
2	II	53	35	35	53	50	**45**
3	III	65	47	59	82	100	**71**

Problem Based Learning can increase the activeness and critical thinking of students with an average increase of 36%. The activeness and critical thinking of students during the treatment of Problem Based Learning has increased every cycle. The most significant improvement was in the aspect of apperception interaction, answering questions, and completing tasks. The application of the Problem Based Learning model in improving competency can be seen from the results of the implementation of Problem Based Learning that has been implemented in vocational high school revitalization. The results of the study show that Problem Based Learning can improve student learning outcomes in the ability to make clothing, can improve learning outcomes of plantation production, can improve the ability to process food, and can improve the ability to embroider. This learning outcome is shown by increasing the average value obtained by students in each cycle.

The results of this study indicate that the PBL model is very effectively applied to train students in identifying, asking questions, gathering information, building and organizing the results of their investigations, and communicating them. Students are trained independently, learn by critical thinking and skills in solving life problems. Furthermore, seen from the learning process, the Problem Based Learning model shows various paradigms in learning activities. Some of the events that always occur in learning activities carried out through Problem Based Learning while being applied to the Revitalization Vocational School are shown in Table 7.

Table 7. Student Activities in Learning Problem-Based Learning

No	Aspect
1.	Students are hooked to find out
2.	Students can act as problem solvers
3.	Students are allowed to observe/explore
4.	Students to submit "hypotheses" or ask questions
5.	Students are allowed to gather information related to the problem being solved
4.	Students are given the opportunity to reason/associate
5.	Students are allowed to submit/communicate their findings
8.	Students are trained in making decisions
9.	There is creativity in finding solutions.

Table 7 above shows that the PBL model can improve the quality of learning, as evidenced by the activeness of students during the learning process. This is in line with what Muhson [24] said that Problem Based Learning is a method of learning to use problems as a first step in gathering and integrating new knowledge, focusing on the activeness of students who are expected to develop their understanding. In line with the paradigm shift in the learning process from teacher-oriented, to student-oriented learning, the Problem Based Learning model can answer these problems.

The results of this study indicate that Problem Based Learning is a form of learning model with the concept of gender responsiveness. In terms of participation, the idea of problem-based learning has a gender equality participatory rate of 86%. Also, another domain is an increase in motivation of 9.7% and an increase in students' creativity and thinking 36%. Competency improvement also experienced a significant increase after this learning model was carried out.

THE IMPACT OF PROBLEM-BASED LEARNING IN DEVELOPING STUDENT ABILITY

The results of research on the implementation of Problem Based Learning in Revitalization Vocational Schools have an impact on students' abilities. The effect of implementing the Problem Based Learning model is divided into three domains, namely, cognitive, affective, and psychomotor (see Table 8).

Table 8. The Impact of Problem-Based Learning in Developing Student Ability

No	Aspect	Impact
1	Cognitive	a. Students can analyze, compare, evaluate the material learned. b. Students can solve problems encountered in learning. c. Increased high-level thinking ability (high order thinking skills). d. Students get new knowledge.
2.	Affective	a. Increased collaboration between friends. b. Fulfill curiosity. c. Students learn to respect the opinions of others. d. Learn to express opinions. e. Learn to ask questions with the right attitude. f. Tolerance is formed. g. The ability to cooperate is trained. h. Increased accuracy skills i. A sense of responsibility honed. j. The nature of independence is formed. k. Confidence is formed.
3.	Psychomotor	a. Critical thinking skills. b. Problem-solving skills. c. Analysis skills. d. Their ability to apply the knowledge they have in their daily lives. e. Able to take action to overcome problems that arise during practice, following the material that has been taught.

The results of this study are relevant to previous studies which state that the implementation of PBL has a positive impact on the application of student knowledge [25]. Gijbels et al [26] also revealed the effects of PBL on improving students' cognition. Also, they stated that PBL had an impact on three levels of knowledge (understanding concepts, understanding principles that link ideas, and connecting concepts and principles with conditions and procedures for application). They also found that the most positive effect was at the level of knowledge concerning the understanding of principles that connect concepts.

The Problem Based Learning Model is one of the models that is considered new in learning in Vocational Schools in particular so that in its implementation, it certainly experiences several obstacles that occur both in the preparation process and in the learning process. The barriers to implementing Problem Based Learning are summarized in Table 9.

Table 9. Barriers in Implementing Problem-Based Learning

No	Barriers
1.	The mindset about teaching, teachers, feel less than optimal if teaching activities are not through the process of providing information.
2.	Difficulties in creating triggers, teachers must formulate and look for problems that demand high holistic abilities, while these are accustomed to conveying what is written in the book.
3.	Teachers are required to know the abilities of students individually, while the number of students who must be served is enormous.
4.	Concern that Basic Competence cannot be completed, because of the possibility of student answers out of context.
5.	Students sometimes lack the courage to present new findings, if the answers to their problems are not found in textbooks.

Based on table 9, the first obstacle in implementing PBL is the Mindset about teaching, and teachers feel less satisfied if teaching activities do not go through the process of providing information. Therefore, repeated explanations or socialization related to the paradigm of learning activities in the implementation of the 2013 curriculum from educators tell students to become students, so there is a change in mindset from educators.

Teachers need longer teaching preparation to adjust the diversity of problems and solutions faced by students. in this context, the teacher needs to understand the structure of student learning problems and how to solve them without questioning gender differences. This is as explained in the opinion of Jonassen [27] that in developing problems in PBL can be seen based on four things, namely the structure of the problem, its complexity, dynamics, and its specifications or challenging to understand. Obstacles in recognizing the ability of students can be done through problem-solving in small groups. Therefore teachers who commit to paying attention to the skills of each student are needed.

IV. CONCLUSION

Problem-based learning is one of the essential learning models in solving gender problems in vocational high school. Although teachers do not understand the concept of gender well in education, they apply problem-based learning quite well in vocational schools. Also, male students dominate the use of learning facilities in schools. Implementation of problem-based learning in Vocational Schools includes the preliminary, organizing, investigating, developing the results of the investigation, and presenting the work, analysis, and evaluation of the problem-solving process. Problem-based learning in vocational high school can encourage equitable education on gender issues. Problem-based learning can increase students' active participation through interaction activities in apperception, asking questions, expressing opinions, answering questions, and completing assignments.

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36   "Problem-Based Learning in Health and Social
      Care", Wiley, 2010   <1%
      Publication

No 7 Problem Based Learning Gender

FINAL GRADE

/100

GENERAL COMMENTS

Instructor