

PROBLEM-BASED LEARNING: 21ST CENTURY VOCATIONAL EDUCATION

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ABSTRACT

The development of creativity in the 21st century is a skill that requires students to master perseverance and problem solving combined with good teamwork. Creativity in the skill component of the 21st century is a much-needed new demand. Along with the rapid development of the era, education's role becomes essential in preparing students, especially vocational schools that emphasize the mastery of science, skills, attitudes, and values needed by the industrial world, to have 21st-century skills. This is done by changing teachers' roles from information providers and communicators to facilitators to share information and knowledge and train learners' problem-solving skills. Constructivism learning is one alternative to practising 21st-century skills. Meaningful problem-based learning is applied primarily to help thinking skills, problem-solving, and intellectual skills and learning to be an independent and creative learner.

Keywords: *Problem based learning, Vocational School, 21st Century Education*

INTRODUCTION

Vocational High School is one of the educational institutions responsible for producing human resources that have competence, skills, and expertise to develop their performance when diving into the world of work. The description of Law No. 20 on the National Education System (2003: 23) mentioned that Vocational Education is a secondary education that prepares students to work in specific fields.

The development of creativity in the 21st century is a skill that requires students to master perseverance and problem solving combined with good teamwork. Creativity in the skills component of the 21st century is a necessary new requirement (BSNP, 2010; Griffin & Care, 2015; Fajra, 2020). The invention in the 21st century is a skill that allows students to solve problems and do exceptional work. Therefore, creativity development is needed in school learning. The current century of knowledge wants a paradigm of project-oriented learning, questions, induction, discovery, and creation (Trianto, 2014). This means allowing students to explore the entire realm of education (cognitive, affective, and psychomotor) and develop all their intelligence (emotional, spiritual, social, etc.).

One alternative learning model that is seen as being able to facilitate 21st-century skills is a problem-based learning model or Problem Based Learning. Problem-based learning is a learning model that can help students develop the creativity that can help students shape scientific behavior, social behavior, and create a sense of student curiosity. In keeping with that, Anreassen & Nielsen (2013) states that Problem Based Learning is a learning model that uses problems to start learning. The questions used are usually unstructured real-world problems, demanding multiple perspective perspectives. It prioritizes self-directed learning and utilizes various knowledge sources; students work in groups, interact, peer learning, and present. Mayasari et al.'s research (2016); Wulandari (2013), that problem-based learning is a

learning model with a constructivist approach that can train the 21st-century skills, namely the digital literacy age, inventive thinking, effective communication, and high productivity.

DISCUSSIONS

Understanding Problem-Based Learning (PBL)

Problem-based learning is progressive active learning and an unstructured learning-centered approach used as a starting point in the learning process. PBL uses the variety of intelligence needed to face real-world challenges, the ability to deal with everything new and emerging problems (Wulandari, 2013). PBL is an approach that uses real-world problems as a context for students to learn about critical thinking and problem-solving skills and gain essential knowledge of the subject matter. Problem-based learning is developed primarily to help thinking skills, problem-solving, and intellectual skills and learn to become an autonomous learner (Erdogan & Senemoglu, 2014; Masril, 2019; Dakhi, 2019; Zagoto, 2019; Ferdiansyah, 2020).

The use of problems or social contexts as an initial unit of learning is characteristic of problem-based learning. PBL is the process of activating knowledge by presenting a problem in the real world and students trying to solve it. Students must solve complex and fundamental issues in life, all of which are used to motivate students to identify and discover concepts or principles in discussing a given problem (Nurtanto & Sofyan, 2015; Sani, 2014; Zagoto 2018).

The steps of implementing learning by applying the PBL method have been put forward by Sharma (2012) consisting of several stages including (a) directing students to the problem; (b) organize students to study; (c) assist with independent investigations and groups; (d) develop and present reports, videos, models, etc. and (e) analyze and evaluate the troubleshooting process. And they are equipped with PBL characteristics, namely problem discovery, until a solution is found from the problem faced. Problem-based learning steps for more details, as seen in table 1.

Tabel 1. Steps Of Problem-based learning

Stage	Teacher's Behavior
Stage 1 Student Orientation To Problems	Explain the learning objectives explain the logistics needed, motivate students to engage in problem solving activities and submit problems.
Stage 2 Organizing Students For Learning	Devide students into groups, helping students define and organize learning tasks related to problems.
Stage 3 Guiding Individual/Group Experiences	Encourage students to gather experimental and inquiry information to get explanations and problem solving.
Stage 4 Develop And Present The Work	Help students plan and prepare reports, documents and models and help them share assignment with their peers.
Stage 5 Analyze And Evaluate The Problem Solving Process	Helping students to reflect or evaluate their investigation and the process they use.

Problem Based Learning Objectives

The goal that PBL wants to achieve is the ability of students to think creatively, analytically, systematically, and logically to find problem-solving alternatives through

empirical data exploration to foster scientific attitudes. Sharma (2012), learning objectives using problem-based learning models:

1. Develop Thinking, Skills, And Problem Solving Skills.

Process-process think about abstract ideas differently from the processes used to think about real-world situations. Resnick emphasizes the importance of context and interconnectedness when thinking that although the thought process has some similarities between cases, that process varies depending on what a person feels in solving a problem.

2. Learn the Role of Adults.

Problem Based Learning "PBL" is also intended to help students perform in real-life situations and learn essential roles commonly performed by adults. Resnick argues that this form of learning is essential for bridging cooperation in completing tasks, having internship learning elements that encourage observation and dialogue with others to understand the role outside of school.

3. Skills For Self-Learning.

Teachers who continuously guide students by encouraging and directing students to ask questions and reward them for the weighty questions they ask, by encouraging students to find solutions to real problems formulated by the student themselves, then it is hoped that students can learn to handle the solution quest tasks independently in their lifetime.

Characteristics of Problem Based Learning

Based on the theory developed by Shoimin (2014) explains the characteristics of Problem Based Learning, namely:

1. Learning is student-centered.

The learning process in Problem Based Learning focuses more on students as learning people. Therefore, PBL is also supported by the theory of constructivism, where students are encouraged to develop their knowledge.

2. Authentic problems from the organizing focus for learning.

The problem presented to students is authentic so that students can easily understand the problem and can apply it in their professional life later.

3. New information is acquired through self-directed learning.

In the process of problem-solving may not know and understand all of its pre-knowledge, so students seek to search for themselves through the source, either from books or other information.

4. Learning occurs in a small group.

For scientific interactions and exchanges of thought to develop knowledge collaboratively, Problem Based Learning is implemented in small groups. The group created demands transparent task sharing and the application of clear objectives.

5. Teachers act as facilitators.

In the implementation of Problem Based Learning, teachers only act as facilitators. However, teachers should always monitor student activity progress and encourage the market to achieve their targets.

Problem-Based Learning And 21st Century Skills in Vocational Schools

Learning in vocational school is oriented towards the formation of life skills, namely training students to master the skills needed by the world of work (including the business and industrial worlds), providing education about entrepreneurship, and establishing life skills. The era of industrial revolution 4.0 influenced the development of knowledge. One of them is

the development of technology and changes in learning methods by improving educators' competence who support exploration and creation through self-learning. According to Griffin & Care (2015), Sudjimat (2014), the government's policy in education in industrial revolution 4.0 by implementing measures based on the strategic roadmap of Making Indonesia 4.0 in aligning the national curriculum with the needs of the industry in the future.

The 21st century is characterized by the industrial revolution era of 4.0 as a century of openness or a century of globalization, meaning human life in the 21st century underwent fundamental changes that differed from experience in the previous century. It is said that the 21st century is a century that demands quality in all human ideas and works. By itself, the 21st century requires quality human resources generated by professionally managed institutions to produce excellent results.

To realize 21st-century learning, the Ministry of Education and Culture implemented the 2013 Curriculum. Several indicators of 21st-century learning competency are implemented through the 2013 curriculum. Students must master them by applying 4C characteristics: Critical Thinking and Problem Solving, Communication, Collaboration, Creativity, and Innovation. Critical Thinking and Problem Solving are critical thinking and problem-solving skills (Griffin & Care, 2015; Zagoto, 2019). Communication is an oral or written communication skill to convey and receive messages correctly. Collaboration is a skill of working together and being responsible in groups. Creativity and Innovation are skills in understanding a problem, finding solutions, drawing hypotheses, testing, and evaluating (Wena, 2012; Azman, 2019).

Educators who are aware of the importance of education in answering the times in the global economic era will undoubtedly go to great lengths to equip their students with the skills needed in the 21st century. The next question is, how do educators package their learning so that students have 21st-century skills?

Problem-based learning is formed based on highly innovative learning theories (e.g., experience-based and constructive learning) by sending problems involving various disciplines to get the right solution (Erdogan & Senemoglu, 2014). PBL is one-way educators can use to empower students to solve the issues and face future challenges. By implementing this problem-based learning, students can improve their critical thinking skills and impassive classroom learning. The advantages of based problem learning methods include developing students' necessary thinking skills, developing students' interest in continuing to learn, and having the ability to solve problems in real situations (Erlina, 2017; Sarumaha, 2018; Mallisza, 2018)

Sudjimat (2014) suggested that problem-based learning can equip students with 21st-century skills. Researchers recognize that problem-based learning can develop the skills of 21st-century learners, as PBL can connect between theory and practice and develop competencies such as problem-solving, communication, and collaboration (Griffin & Care, 2015). Sharma's research (2012); Nafiah (2017) shows that through PBL, students have a positive perception of their learning environment, are more confident and skilled in problem-solving, have a positive attitude towards lifelong learning, have better process skills.

Research on Problem Based Learning PBL has been done a lot, such as Sadlo (2014) and Rahayu et al. (2016). Besides, the implementation of PBL models with the help of media has also been conducted in several studies, such as Surya (2016), stating that applying the PBL Model with visualization media can improve students' critical thinking skills in IPS learning. Similarly, according to Saehana (2015), the application of PBL with the help of the website

can significantly improve the mastery of the concept and science process skills of students (Khalidun, 2016). Besides, supporting research conducted by Hanum (2013) also states that problem-based learning can improve students' learning outcomes. Students' learning activities are expected to be optimal by being provided with methods that can support learning (Bektiarso, 2015; Azman 2020; Fajra, 2019; Novalinda, 2019).

CONCLUSION

Based on the discussion description, it can be concluded that PBL is an approach that uses the problem as a first step to gather and integrate new knowledge based on its experience in real activities. Learning that can train 21st-century skills must be student-centred learning, team collaboration, and learning related to the context of students' daily lives. Problem-based learning and project-based learning are models of learning with a constructivist approach and have reportedly trained 21st-century skills to students.

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