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CHAPTER 5
PROBLEM-BASED LEARNING: AN INNOVATIVE LEARNING MODEL IN THE ERA OF EDUCATIONAL DISRUPTION

Marthinus Marcel Lintong ***(marcellintong@gmail.com)***
STP "Don Bosco" - Tomohon, Sulawesi Utara, Indonesia

ABSTRACT

This article describes the "problem-based learning" model as an innovative model for learning strategies in the current era of educational disruption. The main problem to be discussed here is how the "problem-based learning" model can become an innovative model for learning in the era of educational disruption. The primary purpose of writing this article is to describe the substance of the "problem-based learning" model and to prove theoretically that this learning model can be an innovation for learning in the era of educational disruption. The main advantage of the "problem-based learning" model is that it prioritizes the development of cognitive and rational abilities of students to solve problems as one of the main demands of learning skills demanded in the 21st century. Meanwhile, the main weakness is that it often ignores other aspects of developing educational abilities, such as emotional, affective, and psycho-motor aspects. So it is difficult to apply this to students whose intellectual abilities are below average or to a school that needs to be adequately standardized or accredited.

KEYWORDS: *problem-based learning, innovation, educational disruption.*

INTRODUCTION

This article described a learning model and strategy called "problem-solving learning" as one of the core applications of the "problem-based learning" model and strategy. The main problem described in this article is how "problem-based learning" can be a better way to improve learning strategy and model in the current era of educational disruption. While the goal to be achieved through this article is to describe or explain the core understanding and the essence of the "problem-based learning" method as an innovative learning model to improve learning strategies and models in the current era of educational disruption.

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There are various learning models and strategies offered in the world of education, as have been developed in the world of education and learning in Indonesia today (Feida, 2020; Aidah, 2020). Each learning model presupposes a philosophical and psychological concept behind the ideas or ideas that aim to offer a model that is suitable for today's educational needs.

Problem-based learning is a learning method that comes from the model and theory of cognitive learning (Sanjaya, 2006: 213). From the point of view of philosophy and psychology, the model and strategy of "problem-based learning" can be seen as a learning model which is essentially rooted in the constructivist learning model as developed by Jean Piaget (1971). The problem-based learning model presupposes students' basic thinking skills or intellectual abilities in processing and analyzing a problem in the learning process to produce a solution that can be accounted for scientifically.

The concept and term "disruption" has only begun to emerge as public opinion in the context of technology, business, and financial investment after being popularized by Clayton M. Christensen and Francis Fukuyama (Ohoitimur, 2018; Kasali, 2017). Even though the two initiators of the concept of "disruption" have different backgrounds and perspectives, both of them have the same opinion about "disruption," namely as a "disruption" or "attack" to the order of human social life that occurs massively, quickly and is very influential through advances in modern information technology. Changes in social conditions that occur very quickly certainly affect all areas of human life, including the field of education and learning, significantly higher education, as explained in an article written by Christensen (Ohoitimur, 2018: 7). With the continuous and alternating changes in various dimensions of human life, including the world of education, the patterns and strategies of instruction and learning are naturally disrupted. The world of education and learning, especially the world of higher education, will experience changes rapidly along with the development of changes that occur in the world of science and information

technology (Christensen, 2008). Old patterns and strategies of instruction and learning must be changed into better education and learning innovations in line with society's changing needs and challenges in the 21st century, which are getting faster and more massive. So problem-based learning patterns and strategies can be seen as one of the innovations in the field of learning in the era of educational disruption.

LITERATURE REVIEW

The Influence of Cognitive Psychology on the Nature of "Problem Based-Learning"

The main ideas of the problem-based learning model and strategy emerge from the concept of cognitive learning psychology as developed by Jean Piaget, Jerome Bruner, and Ausubel (Warsita, 2008, pp. 69-74; Komarudin & Sukardjo, 2009, pp. 50-54). The main idea of cognitive learning theory is to emphasize that learning is a process of "change" that occurs or is experienced in each individual through changes in the way of thinking that occurs gradually and goes according to each individual's experience. Adherents of cognitive learning theory believe more that the authenticity and essence of "learning" are not merely determined by rigid and persistent external stimuli but by a change in mindset that gradually leads to cognitive and intellectual maturity.

The concept of cognitive learning psychology also emphasizes the ability of each individual to process and process the information received, whether descriptive or problematic, through cognitive stages as described by von Glassersveld and Piaget (Suparno, 1997) in the theory of cognitive development. By forming a "scheme" of thinking for each different person, each student can ultimately compile and process the data and information that he or she obtains, to where the "construction" of knowledge is created or built. That "construction" of knowledge might be an answer or a new way out of the problems offered in the scientific learning process.

Educational and cognitive psychology experts believe that humans have reasoning abilities or rational competencies that can be used to overcome or solve the problems of life they are facing. That is why this problem-based learning model and strategy was created to answer the needs of the world of education today through the ability to think creatively and analytically to produce learning innovations that continue to develop through science and technology. Therefore, Christensen (2008: 10-11) argues that every learning innovation is required to overcome the actual problems faced today and always improve and change each other along with the development and progress of science in a world that is changing more and more. Fast and global.

Three Main Perspectives in "Problem-Based Learning"

1. *Psychological Perspective*. This is the first perspective underlying the emergence of a "problem-based learning" model. Philosophers and psychologists with a cognitive psychology background generally believe that individuals have cognitive abilities to process data and information to produce new knowledge constructions and find symbolic representations in the learning process (Komarudin & Sukardjo, 2009, p. 50). These abilities can be used by students in solving various problems offered by teachers or those encountered outside the school environment.
2. *Educational perspective*. Educational institutions must be able to train and educate students to deal with problems found or encountered in concrete life. The provision of knowledge and skills that are taught or trained must be in line with or in line with the challenges and developments in society and the world to help find solutions or ways out of various life problems (Sanjaya, 2006, p. 214). Improving or developing learning patterns and strategies such as "problem-based learning" might be a better response to the needs of the world of education today, which tends to prefer instant solutions in overcoming obstacles or problems encountered.

3. *Restorative Perspective*. This means that problem-based learning strategies and models can be used to perfect or improve other learning strategies and models, especially in the context of the learning process in the post-covid-19 pandemic. Problem-based learning strategy and model can be used effectively to revive the rational and scientific intuitions of students who have decreased and seemed to "disappear" or "decrease" during the covid-19 pandemic in the last three years (Lintong, 2022: 2). The phenomenon known as "learning loss" during the covid-19 pandemic mainly decreased rational abilities. It eliminated the development of the personality characteristics of students who only studied from their own houses by using *online* learning.

Two Characteristics of "Problems" in the "Problem-Based Learning" Model

1. The characteristics of the "problem" understood in the context of problem-based learning are “opened problems.” The "problem" raised in this learning strategy and model is not precisely like mathematical problems as it is understood in inquiry-based learning. "Problems" in this problem-based learning are more abstract and analytic, requiring more flexible and creative reasoning and rational intuition from teachers and students (Trianto, 2017, p. 66). So the role of the teacher should be that of a facilitator and companion for students so that they are provoked to think creatively and innovative, so finally, they find ways and answers to the "problems" posed or faced in the learning and teaching process.
2. Another characteristic of "problem" is the notion of "problem," as it is often used in **research problems** or **scientific problems**. The "problem" in this case, referred to a kind of "**difference"** or "**gap”** that existentially occurs between what is ideally or theoretically expected and what happens in public society (Sanjaya, 2006, p. 216). In detail, the "gap" refers to various forms, such as discrepancies, turmoil, chaos, anxiety, uncertainty, and complaints in

education and learning. Therefore, educational institutions must prepare and select teaching materials containing “contextual or actual” problems.

Stages of the "Problem-Based Learning" Strategy

Theoretically, many educational experts explain the ways and forms of application of problem-based learning strategies. One of the experts that the author uses here is John Dewey (in Sanjaya, 2006: 2017), who defined six steps for implementing "problem-solving learning" as follows:

1. **Formulate the problem**. At this first stage, students are led to be able to distinguish between “matter” and "problem.” Students must be able to distinguish the situation or condition they are facing as a "matter" that is still open to the possibility of becoming a "problem" or not. So, teachers need to guide and help students to formulate what are categorized as "matters" and which are seen as "problems.”
2. **Analyze the problem**. In this second stage, students need the ability to find the source or root of a "problem" that occurs by asking causal, critical and analytical questions. In addition, students must begin to learn to see or dissect a "problem" using several viewpoints.
3. **Set the hypothesis.** In this third stage, students are expected to be able to construct a scientific "hypothesis" of the "problem" that has been formulated and analyzed together. Students must be able to make assumptions and predict possibilities that may occur in the future and formulate it into precise statements.
4. **Collect data.** At this stage, students are given the task of finding various scientific information that can support or answer the research hypotheses that have been proposed. The data referred to here can be either quantitative data or qualitative data. The data can be obtained through literature studies,

studies of sources of information via the Internet, interviews, field observations, and simple statistical processing.

5. **Test the hypothesis**. At this stage, students must be guided thoughtfully by teachers who at least understand the basics of scientific research methods or scientific ways of thinking through the methods of deduction and induction. The goal is for students to test the hypotheses they propose based on scientific method formulation.

6. **Formulate problem-solving recommendations**. In this last step, students must be able to compile or submit recommendations in the form of solutions or solutions for solving the problem under study. How to formulate recommendations for solving this problem depends on scientific research methods used previously.

RESULTS AND DISCUSSION

"Problem-Based Learning": Innovation Beyond Creativity

We all know that today many learning strategies and models are offered in education and learning. Of course, each learning strategy and model has its background, strengths, and weaknesses when applied in a concrete context and situation. Therefore, whenever a new learning strategy and model emerges, it will improve or perfect a previous learning model. This has long been explained by Jean Piaget, one of the developers of the "constructed" learning theory and model (Piaget, 1950, p. 15).

"Problem-based learning" appears as an innovation in education and learning by emphasizing students' central role as the subject of the learning process. In contrast, other learning models still emphasize the role of the teacher. Historically "problem-based learning" was introduced in the early 1970s at Mcmaster University at the Canadian Faculty of Medicine to find solutions to diagnosis by asking questions according to the conditions faced

(Rusman, 2012, p. 242). It turns out that such a learning model does not answer the needs of the world of work today, which prioritizes creativity and innovation in dealing with and responding to problems and challenges in the world of work.

In this case, the teacher is required to be able to intelligently and correctly choose a learning model that can stimulate the spirit of learning and the growth of students' curiosity in facing and answering the "problems" they face (Nurdyansyah, 2018: 5). So an alternative and innovative learning strategy and model that is capable of covering students' abilities and skills in reasoning, analyzing and solving "problems" using scientific research methods is the "problem-based learning" model.

Responding to the Need for Innovative Learning Model in the Era of Educational Disruption

As we understand nowadays, the current era of "educational disruption" has changed one of the social goals of education, which is not just looking for a job or social welfare, but also eliminating several types of old jobs and professions and being replaced with new jobs and professions based on digital technology. (Kasali, 2017). The success of an educational system or model is no longer measured by how many graduates are absorbed by the job market or companies but by how far it creates independent technological innovations that further reduce the absorption of human labour. This is marked by the spread of advances in information technology which results in applying "answering machines" to all human questions through "artificial intelligence" based robots. The reality of today's human ability to create various informative and robotic applications based on "artificial intelligence" has proven the answer to questions and problems in the past about whether humans can create robots with an intelligence level "beyond" the average human.

The "problem-based learning" model that underlies learning patterns using scientific research methods is proven to answer several problems and difficulties in information and data retrieval through innovations and breakthroughs in information technology that are increasingly sophisticated and practical. Thus, this "problem-based learning" can be seen as an opportunity for learning innovation and creativity that helps the world of higher education in the current era of educational disruption, as reviewed by Christensen (Ohoitimur, 2018). One of the entry points for the critical contribution of the "problem-based learning" model to higher education is to provide the basics of introduction and practice of applying scientific research patterns and methods in the learning process in secondary schools. In this way, the "problem-based learning model" applied in secondary schools trains students from an early age to recognize scientific ways of thinking, conduct research, and be more sensitive or open to the contextual problems surrounding them. The more students are accustomed to thinking and learning scientifically, the better the academic atmosphere and learning environment will be.

Problem-Based Learning Steps

The steps that the teacher must take in implementing the "problem-based learning" model as described by Rusman (2104:243) are as follows:

Table 3: Steps of "Problem Based-Learning" Implementation

Phase	Student Action Indicators	Teacher Actions
1	Orientation and introduction of students to the problems posed or faced	Explain the learning objectives, explain the logistics needed, and motivate students to be involved in problem-solving activities
2	Organizing students to learn to analyze problems	Helping students formulate and organize learning tasks related to problems
3	Guiding individual/group experience	Encourage students to collect appropriate data and information, carry out experiments to get explanations, and solve problems
4	Develop and present the	Assist students in planning and

Phase	Student Action Indicators	Teacher Actions
	results of scientific work	preparing appropriate works such as research reports or scientific data processing reports
5	Analyze and evaluate the problem-solving process	Helping or facilitating students to reflect or evaluate the results of the research and the research process carried out

Based on the steps of "problem-based learning" described above, we can analyze the role of teachers and student work indicators in implementing this problem-based learning model. The teacher's role is primarily to be a *facilitator* and mentor who accompany and guide students according to the steps set. In other words, the teacher should not dominate or instead provide problem-solving. The teacher facilitates students' efforts by serving or giving direction, instructions, and assistance as necessary according to the research method used to solve the problem posed. At the same time, students are required to follow scientific procedures or systematic steps offered.

Advantages and Limitations of "Problem-Based Learning"

1. Advantages:

- The problem-based learning model trains students to be active, creative, and even innovative through actual "problem" stimuli that are offered to be examined in a simple but critical and analytical manner.
- The problem-based learning model trains students' thinking and reflective skills through recognizing and processing "problems" and challenging their curiosity and scientific intuition to solve the "problems" offered in learning.
- Is one of the innovative learning models that improve other learning models, especially useful in facing the wave of "educational disruption" in the world of learning and education in general.

- ❖ Problem-solving models can also encourage or motivate students to carry out self-evaluations or self-reflection on the learning process and the results of their research.

2. Limitations:

- ✧ The problem-based learning model presupposes application to a school environment where students have a reasonable and selected basis of cognitive or intellectual abilities by default. Because of this, this learning model is more effectively applied to schools with higher and more advanced quality standards. The fact proves that equal distribution of quality and accessibility of schools in urban and rural areas is still far different.
- ✧ The problem-based learning model also requires quality and professional teaching staff to provide facilities and assistance that are truly effective and efficient to achieve the goals of problem-based learning itself. So schools that still use teachers who are not standardized and professional will experience many difficulties if they apply this learning method.
- ✧ Experience in education proves that most teachers are less interested in using problem-based learning methods because it takes longer and emphasizes mastery of standardized scientific procedures to achieve maximum and quality learning outcomes.

CONCLUSION

Based on the description in the literature review and supported by the results and discussion regarding "problem-based learning" as an innovative learning model in the era of educational disruption, the following conclusions can be drawn:

1. Problem-based learning is one of the innovative learning models offered in the era of educational disruption. This learning model requires well-established educational conditions and an atmosphere with quality teachers

and students certified and professionally selected as academic guarantees for applying problem-based learning models.

2. Problem-based learning bases its learning models and patterns on scientific approach procedures and methods through simple research. The goal is to find conclusions by solving problems offered or faced together in the learning process through measurable and evaluated stages or steps.
3. The main advantage of the problem-based learning model is that it prioritizes the development of students' cognitive and rational abilities to solve problems as one of the main demands of learning skills demanded in the 21st century.
4. The main weakness of the problem-based learning model is that it often ignores other aspects of developing abilities, such as emotional, affective, and psycho-motor dimensions, making it challenging to apply to students with below-average intellectual abilities.

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AUTHOR'S PROFILE



Dr Marthinus Marcel Lintong, SS., M.Pd, is a Catholic clergyman. He was born in Kuwil Village, District of Kalawat, North Minahasa Regency, North Celebes Province. He completed his Bachelor (S1) study of Philosophy of Religion at STF-Pineleng Seminary (1999). He continued his postgraduate studies at Manado State University and earned his Master's in Education (2011). He continued his doctoral studies at the Postgraduate Program at Manado State University and earned his Doctor of Educational Management Degree (2021). From 2008 until today, he has been a permanent lecturer at the "Don Bosco" Pastoral High School – Tomohon. He now teaches at the Postgraduate Program in Educational Management at Manado State University. Some of his articles that have been published in internationally reputable journals are as follows: *"Character Educational Management in Kakaskasen Seminary Catholic High School and St. Nikolaus Lokon High School - Tomohon"* (Asia Pacific Journal of Management and Education, Vol. 4 (2), 39-46, 2021) and *"The Meaning of "Eternal Life" and the Liturgy About Death at St.Antonius Padua Pangolombian Parish of St.Yosep Sarongsong in Tomohon City - North Sulawesi"* (European Multidisciplinary Journal of Modern Science, 298-310, 2022). In addition, the author has also written several books, including *Contemporary Educational Ideas* (Cahaya Pineleng, 2010), *17 Inspirational Stories With Educational Reflections* (Pohon Cahaya, 2016), *Christian Anthropology: Understanding Existential Nature of Human in the Perspective of Christian Faith* (Percikan Hati, 2021).

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