International Journal on Advanced Science, Education, and Religion (IJoASER)
E-ISSN: 2614-8862 & P-ISSN: 2565-0836
Volume 7, Number 4, December 2024

The Obstacles in Implementing the Independent Curriculum in Mathematics Learning: A Review from the Perspective of Social Constructivism Philosophy and Progressive Educators

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ARTICLE INFO
Article history:
Received
September 23, 2024
Revised
December 03, 2024
Accepted
December 30, 2024

ABSTRACT

This article aims to review the various challenges that arise in implementing the Independent Curriculum in mathematics learning, and view it from the perspective of the philosophy of Mathematics Education. This study is based on an analysis of related literature to identify the main obstacles faced by teachers and students, such as limited resources, readiness of teaching staff, and resistance to changing methods. In addition, this article highlights how principles in educational philosophy, such as constructivism and progressive educators, can play a role in overcoming these obstacles. The results of this study show that a philosophical approach that emphasizes active and participatory learning experiences can be a solution in overcoming the challenges of implementing the Independent Curriculum. This article provides insights that can support efforts to design learning strategies that are more effective and in line with holistic educational goals.

Keywords: *Independent Curriculum, Constructivism, Progressivism*

Journal Homepage https://ojs.staialfurqan.ac.id/IJoASER/

INTRODUCTION

The Merdeka Curriculum is the newest education policy in Indonesia which emphasizes a competency-based learning approach and is oriented towards developing students' potential holistically. By providing flexibility to teachers in designing learning according to student needs, the Independent Curriculum is expected to be able to create a more contextual, inclusive and adaptive learning environment. In the context of mathematics learning, this curriculum encourages the exploration of concepts and real applications through project-based learning, so that students can understand mathematics more deeply and meaningfully. (Rizqiyani, 2022)

The philosophy of mathematics education plays an important role in understanding and developing effective learning approaches. For example, constructivism emphasizes that students construct their own knowledge through experience and interaction, rather than just passively receiving information (Hidayah & Hotifah, 2023). On the other hand, progressive education focuses on students' needs, interests, and experiences, encouraging active and collaborative learning. By applying these principles, it is hoped that the mathematics learning process will become more relevant and in line with current developments (Meliniasari et al., 2023).

However, the implementation of the Independent Curriculum in mathematics learning faces various obstacles in the field. Factors such as teacher readiness, facilities

and infrastructure, as well as adaptation to new paradigms are challenges in themselves. Therefore, it is important to examine these obstacles from the perspective of mathematics education philosophy in order to find appropriate and effective solutions.

Through this study, it is hoped that it can contribute to educators and policy makers in developing mathematics learning strategies that are more in line with modern educational philosophy and the needs of students in the Independent Curriculum era.

METHOD

The method used in writing this article is the literature study method (*library research*) by collecting reading material, recording and processing the reading results. The author collects a number of references regarding the obstacles to implementing an independent curriculum in mathematics learning: a review from the perspective of the philosophy of mathematics education. The data collection technique used is the documentation technique which is a record of events that have occurred. According to Saputri, documentation techniques are carried out by collecting data sourced from books in libraries and the internet, all articles and journals relating to various writings in research, then collecting and abstracting them, then connecting them to research studies for analysis. (Hakiky et al., 2023)

RESULTS AND DISCUSSION

Curriculum

Since Indonesia's independence, education has experienced various changes and improvements to curriculum policies (Iskandar, 2019). In the history of the curriculum in Indonesia, it has experienced at least eleven dynamic changes. Starting from the pre-independence period with a very simple form, and the independence period which was continuously refined, namely in 1947, 1952, 1964, 1968, 1975, 1984, 1994, 2004, 2006, and 2013 (Warits, 2019). These various curriculum change policies are based on the results of analysis, evaluation, predictions and various challenges faced both internally and externally which continue to change. In this context, the curriculum as a policy product is dynamic, contextual and relative (Jono, 2016). Dynamic because it continues to develop and adapt to current developments and is open to criticism. Contextual because it is really needed and based on the context of the time, and relative because the resulting curriculum policy is considered good or perfect in its time, and will become irrelevant in subsequent times. Therefore, the basic principles in curriculum policy are: *change and continuity* that is, changes are made continuously. (Firdaus et al., 2022)

Based on Minister of Education and Culture Regulation Number 21 of 2016 concerning Content Standards for Primary and Secondary Education, the government sets Content Standards to achieve Graduate Competency Standards in accordance with National education goals. These Content Standards serve as a reference for educational practitioners to determine the scope of materials or material that must be delivered. In addition, they serve as a benchmark for determining the level of competency of students to produce graduates who have competencies according to the level and type of education undertaken. Each competency expected in government regulations has implications for the expected learning and assessment process

Independent Curriculum

Merdeka Belajar is a policy program of the Ministry of Education and Culture of the Republic of Indonesia (Kemendikbud RI) launched by the Minister of Education and Culture Nadiem Anwar Makarim. Nadiem made the policy of freedom of learning not without reason. The reason is research *Programme for International Student Assesment*

(PISA) in 2019 showed that the assessment results for Indonesian students only ranked sixth from the bottom; for mathematics and literacy, Indonesia is in 74th position out of 79 countries. In response to this, Nadiem also made a breakthrough in assessing minimum abilities, including literacy, numeracy and character surveys. Literacy not only measures reading ability, but also the ability to analyze reading content and understand the concepts behind it.

Education with independence is a policy implemented to train students' independence in thinking. The independent curriculum is implemented by emphasizing students' talents and interests in developing students' potential. In implementing the independent curriculum, there are intracurriculars as well as strengthening the profile of Pancasila students and extracurriculars. The application of various things in the independent curriculum is the entire learning process carried out which is called new paradigm learning. This learning is defined as learning with one cycle which ensures that the learning is centered on the students. (Rizqiyani, 2022)

Implementation of the Merdeka Curriculum is an educational initiative that aims to develop students' creativity, critical thinking skills and collaboration skills. Through the implementation of this curriculum, it is hoped that it can have a comprehensive positive impact on student development. One of the positive impacts that can be achieved through implementing the Independent Curriculum is increasing students' critical thinking abilities. A more interactive learning approach encourages students to be proactive, investigate and analyze various learning topics. (Juliangkary et al., 2023)

The Merdeka Curriculum also encourages students to dare to express opinions, explore and analyze the topics studied, with the aim of understanding concepts in more depth. This approach allows students to develop analytical, evaluative and logical decision-making skills. This ultimately helps students to hone their critical thinking skills, preparing them to face and solve problems more effectively in the future.

Apart from that, implementing the Independent Curriculum also has the potential to increase students' creative abilities. Through this curriculum, students are given greater space to develop their creativity in expressing ideas and finding innovative solutions. In the learning process, students are encouraged to think "out of the box" and find unique solutions to the challenges they face. This can help improve students' ability to imagine, innovate and think divergently, skills that are very valuable for facing problems in the real world (Syahbana et al., 2023).

Success in implementing the Independent Learning Curriculum is not only seen from the learning planning, but also seen from the implementation of learning in accordance with the learning plans that have been made. Based on the results of interviews conducted by researchers, there are several problems experienced by teachers when carrying out learning, namely problems that occur due to the limited number of textbooks in the form of student books, lack of ability and readiness of teachers in using learning media and not being proficient in applying technology in learning, problems What teachers also experience is teaching materials that are too broad and the lack of learning methods used by teachers in teaching. (Holst et al., 2020)

In its application, the author, as a mathematics teacher, has experience in implementing the Merdeka curriculum, both in his own experience and in the environment around the author.

Some obstacles in implementing the Merdeka curriculum include:

1) Lack of teacher understanding in compiling and using independent learning teaching modules. Design lesson plans systematically so that learning can run in an inspiring, interactive, challenging, efficient, enjoyable manner, and can

motivate students to actively participate in the learning process. And educators must also provide sufficient space for students to develop creativity and independence. Apart from that, students' choices must be in accordance with the students' interests, talents and developments. This is a challenge in itself for a teacher, especially a mathematics teacher.

2) Teachers do not fully understand the learning model that is based on independent learning because not all learning modules are in accordance with the Merdeka curriculum concept.
3) Lack of teacher innovation in the learning process. Moreover, in this learning curriculum teachers are required to be able to innovate in the learning process so that it is not boring and increases students' interest in learning.
4) Teachers have not been able to develop students' creativity as expected. Because the development of creativity is important to optimize in everyday life.
5) Inadequate school facilities. In the learning process, there is a need for media or supporting tools that will help to achieve learning goals. Without adequate facilities, there will be difficulties in carrying out several activities that require supporting tools or media.

Philosophy of Mathematics

Philosophy of mathematics is a branch of philosophy that aims to reflect on and explain the nature of mathematics. Many questions arise in the philosophy of mathematics, such as: What is the basis for mathematical knowledge? What is the nature of mathematical truth? What are the characteristics of mathematical truth? What is the justification for a statement in mathematics? Why are mathematical truths considered necessary truths? The approach widely adopted by epistemology is to assume that knowledge in any field is represented by a set of propositions, together with procedures for verifying or providing justification for those statements. When mathematical proof is based on drawing conclusions alone without empirical data, then mathematical knowledge is understood as the knowledge that is most believed. Traditionally, the philosophy of mathematics aims to provide a basis for certainty in mathematical knowledge. That is, it provides a system into which mathematical knowledge can be incorporated to systematically establish its truth. This depends on the assumptions adopted, either implicitly or explicitly. (Ernest, 1991)

Constructivist Philosophy

Constructivism philosophy is a philosophical school which says that knowledge is a construction for oneself, where humans organize their knowledge through interactions with objects, phenomena, experiences and the environment. Constructivism is the compilation of knowledge from concrete experience, through collaborative activities, reflection and interpretation. So that students have different understandings of knowledge based on their experiences and the perspectives used in interpreting it. (Hidayah & Hotifah, 2023)

According to (Ernest, 1991) Social Constructivism views mathematics as a social construction. This refers to the traditional nature, in accepting the fact that human language, rules and conventions play a key role in developing and justifying mathematical truths. It also adopts Lakatos' philosophical thesis that mathematical knowledge grows through conjecture and refutation, utilizing logic in mathematical discovery.

The constructivist approach to learning emphasizes the active role of students in building understanding and giving meaning to the information or events experienced.

In simple terms, constructivism assumes that knowledge is a construction (formation) of us analyzing something. According to learning theory, knowledge construction cannot simply be transferred from teacher to student. This means that students must be mentally active in building knowledge structures based on their cognitive maturity. The constructivism approach means that knowledge will be obtained from direct experience with the objects being studied in the environment around students. From the experiences experienced by students, their thinking concepts will be formed. (Hakiky et al., 2023)

Constructivism according to Piaget is a system of explanation of how students as individuals adapt and improve their knowledge. According to Piaget and Vygotsky, changes in cognition only occur when previous conceptions experience an imbalance process in the light of new information. Cognitive structures will always have to be changed and adapted based on changing environmental and individual demands. Piaget stated that the construction of new knowledge goes through a process of assimilation and accommodation. For Vygotsky, children's cognitive development begins with interactions with their social environment. There are two focus concepts or theories of cognitive development, namely the zone of proximal development and scaffolding. Therefore, learning must be designed and managed in such a way as to encourage students to organize their own experiences into meaningful knowledge. (Umbara, 2017)

The Relevance of Constructivism in the Independent Curriculum

Freedom to learn is in line with constructivism which favors students' freedom to be able to seek and explore their own learning experiences. In this Merdeka curriculum, the teacher not only plays a role as a transfer of knowledge but is also a facilitator who provides freedom for students to have a more independent learning experience. The aim of education is to form character according to the Pancasila Student Profile, which is built and formed through a series of processes of scheme, adaptation, assimilation, accommodation, balance and organization, all of which go through a series of experiences without coercion so that children are more independent and happy.

Basically, learning from a constructivist perspective is presented to be more stimulating and provide opportunities for students to develop their potential optimally. Likewise, teachers are required to be able to innovate learning to suit current developments. Apart from that, the school also facilitates all forms of facilities and infrastructure that support the learning process which can form students with character. Basically, the concept of Independent Learning has relevance to constructivist learning theory. (Naufal, 2021)

Progressivism Educational Philosophy

The emergence of progressivism is based on dissatisfaction with educational practices which tend to be very traditional and authoritarian, which only use students as learning objects. This flow is rooted in the spirit of social reform of the early 20th century, namely the American political renewal movement. The progressive current in American education is related to educational reform in Western Europe. Another opinion states the flow of the early 20th century in the United States. Historically, the emergence of progressivism was influenced by figures from the pragmatism school, such as Charles S. Peirce, William James, John Dewey, and Francis Bacom as figures from the experimentalist school. (Arma & Ismail, 2023)

The ideas that influenced the development of progressivism were the thoughts of Johann Heinrich Pestalozzi, Sigmund Freud, and John Dewey. Johann Heinrich Pestalozzi said that education is not just learning from books, but must be able to develop students' skills and intelligence both inside and outside the educational

environment. Sigmund Freud said that there is no authoritarianism in education because it impacts the child's soul. John Dewey is the figure most relevant to progressivism which states that education must transform from authoritarianism to democracy. (Hasana, 2022)

Progressivism provides principles in the implementation of education, including: a) the educational process begins and ends with students, b) students are active objects, c) the role of teachers is only as a guide, facilitator and director, d) schools must be able to create a cooperative and democratic climate, and e) learning activities focused on problem solving (*problem solving*) not just to teach study material (Toenlioe, 2016). This principle emphasizes that education is expected to be able to require changes in students to become strong individuals who are able to face problems and adapt to social life in society. Therefore, progressivism really wants problem solving in the educational process, for progressivism everything looks to the future. (Meliniasari et al., 2023)

The Relevance of Progressivism Philosophy towards the Independent Curriculum

The relationship between the concept of Freedom of Learning and the philosophy of progressivism is very close. Progressivism is a modern educational philosophy approach that encourages fundamental changes in education towards progress and progressive development. This school advocates positive change in education, with a focus on a student-centered approach and the role of educators as facilitators, mentors, and directors for students. The aim of the Merdeka Belajar concept is to change the Indonesian education system which tends to be authoritarian. With Merdeka Belajar, this approach prioritizes freedom in learning, gives teachers and students space to innovate, and creates a happier learning atmosphere, giving students opportunities to develop according to their individual interests and abilities. Apart from that, it is hoped that Merdeka Belajar can also increase the application of Pancasila values. (Puspika Sari, 2023)

The progressivism view of the free learning curriculum is based on the view of students as creatures who have advantages compared to other creatures. Progressivism seeks to advance education by using flexible principles. This goal is more clearly achieved, according to John Dewey, if education is democratic. Education emphasizes freedom or independence for students according to their respective natures so that they can develop optimally. Students, as educational subjects, must be guided as a different social group. As a result, teachers must be able to identify various kinds of talents, interests, and intelligence.

The concept of Independent learning education with progressivism education is 1) Student-centered (child-centered). Progressivism curriculum and methods are developed based on needs and are developed based on children's needs, interests and initiatives. 2) Active students, namely students will learn if they are not frustrated by authorities who impose their will and goals. 3) Social class from a larger class. John Dewey in his book My Pedagogic Creed said: "Education is not preparation for life, education is life itself, and thus education is a process of life and not preparation for life." 4) Focus on problem solving This stage follows a pragmatic emphasis on experience and problem solving epistemology. The learning methods used by Progressivism are: *Learning by doing, problem solving, active teaching.* 5) Cooperative and democratic social construction of schools. Education is life itself and not preparation for life. Cooperative and democratic learning methods are more appropriate to everyday life. (Ramadani, 2022)

Example of applying the Progressive Education philosophy in mathematics learning for junior high school students

The progressive educational philosophy emphasizes learning that is student-centered, experience-oriented, and relevant to real life. The following is an example of applying this philosophy in mathematics learning for junior high school students

Material: Comparison and Scale.

Students will carry out a project to create a floor plan for a playground using the concepts of comparison and scale. This activity not only teaches mathematical material, but also involves creativity, collaboration, and real application.

Learning Steps

1. Early Learning

Lighter Discussion (15 minutes):

The teacher starts by showing a picture of a playground and asking questions:

"How do we make this playground plan smaller?"

"What is meant by scale in everyday life?"

Goal: Help students understand the relevance of scale concepts in real life.

2. Exploration and Experimentation (60 minutes)

Project Group:

Students are divided into small groups (3–4 people) and given tasks:

- Measure the dimensions of the classroom using a tape measure.
- Decide on an appropriate scale (e.g. 1 cm: 1 m).
- Draw a simple classroom plan using this scale.

Group Discussion:

Students discuss in groups to complete assignments, ask questions, or provide input to each other. The teacher acts as a facilitator who provides direction if necessary.

3. Problem Solving (30 minutes)

The teacher gives a challenge question:

"If the actual playground has an area of 100 m^2, what size will the park be on your plan?"

"If the distance between two points on the plan is 3 cm, what is the actual distance?"

This question encourages students to think critically and apply mathematical concepts independently.

4. Reflection and Discussion (15 minutes)

- Each group presented the results of their work, including calculation steps and floor plan design.
- Teachers and other students provide input.
- The teacher asks reflective questions:
    - "What did you learn from this activity?"
    - "How does the concept of scale help us in real life?"

5. Closing

The teacher reiterates the importance of scale and comparison in everyday life, such as on maps, house plans, and others. Teachers also appreciate students' creativity and cooperation.

Progressive Values in These Activities include 1)Student-Centered: Students become the center of learning activities through discussions and group projects, 2)Real Application: Activities are based on real-world situations, such as making a playground plan. 3) Collaboration: Students work together in groups to complete assignments. 4)Creativity and Problem Solving: Students are encouraged to think creatively in making plans and solving challenging problems.

CONCLUSION

Implementation of the Independent Curriculum in mathematics learning provides opportunities and challenges for teachers and students. From the perspective of mathematics education philosophy, the Merdeka Curriculum reflects the relevance of constructivism and progressivism theories, which emphasize experience-based learning, creativity and problem solving. This philosophy supports learning that is more interactive, participatory and student-centered. However, its implementation is not free from obstacles. Teachers face challenges such as a lack of understanding of teaching modules, limited facilities, and the ability to innovate learning. On the other hand, students are expected to be more independent in learning, although they still need direction in developing creativity and critical thinking. To ensure the successful implementation of the Independent Curriculum, collaboration is needed between teachers, students and the school in creating a conducive learning environment. With the support of appropriate policies, teacher training, and the provision of adequate facilities, the Independent Curriculum has the potential to create a generation that has literacy, numeracy and character competencies in accordance with the Pancasila Student Profile.

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