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IMPLEMENTATION OF DIFFERENTIATED INSTRUCTION FOR IMPROVEMENT OF MATHEMATICAL CRITICAL THINKING SKILLS BY PROFIL PELAJAR PANCASILA

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Abstract:

Differentiated Instruction (DI) is one of the New Paradigm Learning policies. New Paradigm Learning is a learning concept that prepares students to face era 4.0 and the 21st century. This learning concept aims to produce competent lifelong learners who have character and behave according to the values of Pancasila. Based on a review of some literature, the author obtained several principles in DI that provide opportunities to improve mathematical critical thinking skills. First, the uniqueness of DI is using the power of questioning. The meaningful questions stimulate a growth mindset and impact the students' mathematical critical thinking process. Second, DI incorporates metacognitive activities in learning. If these activities are combined in mathematics learning, it will increase the meaningfulness of learning. So that the critical thinking process can run well and as it should. Third, DI also provides opportunities for students to learn from their point of view, not only from the teacher's. Students are free to learn with different perspectives through their interests, talents and interests in developing concepts in mathematics learning. This condition provides opportunities for students to carry out critical thinking processes. Fourth, DI also provides space for teachers to provide feedback with a growth mindset. The questions in this feedback do not only invite "Yes" or "No" answers from students. Instead, they stimulate students' scientific answers. Students can provide a broader and more scientific explanation of their task. This process will require students to think critically in delivering answers to the feedback questions given by the teacher.

Keywords: *Differentiated Instruction, Profil pelajar Pancasila, mathematical critical thinking skills.*

INTRODUCTION

Students can apply mathematical concepts in solving a problem, when they have a conceptual understanding of mathematics to retain what they learn(Rohmah et al., 2022). When students have a conceptual structure that is mature and stored as knowledge in long-term memory, then students can apply what they have learned in mathematics to new learning situations. In order for students to have a long-term memory of what they have learned in mathematics, they need correct understanding(Algozzine & Anderson, 2007).

Teachers should differentiate learning for students to help them develop their conceptual understanding. All students gain knowledge when taught in groups that match their ability patterns, thus allowing students to benefit from their strengths and improve on their weaknesses(Lauria, 2010; Smets et al., 2022).Differentiated Instruction (DI) is something that needs to be understood as an extension of our educational best practices. However, when the curriculum requires learning that is tailored to the needs of diverse students, differentiation needs to be implemented(Sharp et al., 2020; Tomlinson et al., 2003).

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One effective differentiation is when learning is learner-centered. Its characteristics are focusing on learners' needs within the cognitive framework set by the teacher, building on the knowledge that learners bring to the task; continuous assessment of learners' understanding and ability to help the teacher teach and each learner learn more effectively; focusing on sense-making by learners; helping students see the relevance and usefulness of what they are learning; student choice is within the teacher's framework; shared management of learning; and students play an active role in learning(Tomlinson et al., 2003)In a student-centred classroom, teachers use a wide variety of instructional strategies and scaffolding learning approaches. Instructional strategies and scaffolding learning approaches are important to ensure that each student has a strong connection to important knowledge, which is necessary for achieving understanding and power(Tomlinson et al., 2003).

This learning pattern strongly supports students' critical thinking process. Critical thinking is an important element in learning, including math learning, for several reasons. First, students are able to generate creative initiatives and solve unexpected problems. Second, students become active in constructing arguments using accurate and logical evidence. Students can evaluate their thinking or the thinking of others and then make conclusions in the form of logical and critical arguments(Lang, 2006).

Students can also learn actively in math learning when they are curious, ask questions, discover new things, think about a topic and want to solve it, and apply prior knowledge to solve a problem. This process can be applied in different ways or perspectives, resulting in the development of critical thinking.(Kërënxhi & Gjoci, 2015).

Critical thinking is not only critical in negative terms, but thinking clearly and rationally through a reflective evaluation process(Ennis, 2016). A person will make arguments and conclusions by questioning and making reasoned judgments, then take action (Po & Sham, 2016).This concept shows that a person must have the skills to organize ideas, detect something inconsistent, analyze and evaluate various alternative possibilities in various stages of the thinking process and then solve problems systematically.

The activities seen in DI support the formation of Profil Pelajar Pancasila. The Profil Pelajar Pancasila is the main guideline or reference in determining various policies in the world of education. According to the Decree of the Head of the Education Standards, Curriculum and Assessment Agency Number 009/H/KR/2022 concerning Dimensions, Elements, and Subelements of the Pancasila Learner Profile in the Merdeka Curriculum, the Profil Pelajar Pancasila must be understood by all stakeholders in the education sector so that it can produce an educational concept that can realize the Indonesian Education Vision. This profile is the main guide in designing learning concepts that can meet student needs.

One of the dimensions of the Profil Pelajar Pancasila is critical reasoning. The direction of this dimension is to produce learners who are able to reason critically and objectively. The flow of development of this vital reasoning dimension will vary at each level, starting from the end of the PAUD Phase to the end of Phase F. This

flow can be seen from several activities, namely asking questions identifying, clarifying, and processing information and ideas, analyzing and evaluating reasoning and procedures, and reflecting and assess their thinking. (Kemendikdud-Ristek, 2022).

In order to see the relationship between DI, Critical thinking, and Profil Pelajar Pancasila, it is necessary to study in depth through a review of some literature regarding the implementation of DI in improving mathematical critical thinking skills in accordance with Profil Pelajar Pancasila.

RESEARCH METHODS

This qualitative study reviews literature related to Differentiated Instruction, Profil Pelajar Pancasila and Mathematical critical thinking skills. The literature study describes some of the main content based on information in journals and books. Then, the author connects some of the main content based on several studies from relevant journals.

This review summarises some of the main content, provides an assessment, and analyzes it in depth. This process provides a clear, specific and meaningful picture of Implementing Differentiated Instruction for improving Mathematical Critical Thinking Skills by Profil Pelajar Pancasila.

RESULTS AND DISCUSSION

One of the learning principles in Differentiated Instruction (DI) is to use the power of questioning using trigger questions or questions that can build meaningful understanding. This principle in mathematics learning can be done by presenting questions in the form of mathematical problems. Math problems are generally divided into two types. First, mathematical problems are routine problems which use ordinary or ready-to-use procedures to solve them. Second, in the form of non-routine math problems that cannot use standard or ready-to-use procedures in the solution process. Non-routine problems can be presented in the form of problems with contradictory information(Wulan & Ilmiyah, 2022). Problems like this are given so students can reflect on their mathematical understanding; when solving problems, students can face various contradictions that may not be by their understanding, and students are trained to modify their understanding in solving different problems(Rohmah et al., 2022). When experiencing problems like this, there will be a cognitive conflict, where an individual will be aware of contradictory information, which can affect ideas in their cognitive structure(Renatovna & Renatovna, 2020). Students will perform a mathematical critical thinking process to understand the problem. Using a growth mindset, the teacher and students will also build an interaction supporting the mathematical critical thinking process. The students' thinking process is also supported by motivation and appreciation, thus providing a sense of security for students when carrying out the mathematical thinking process.

Mathematical critical thinking skills, by Profil Pelajar Pancasila, are unique and distinctive. This ability is built to support the Indonesian Education Vision to form lifelong learners. This ability will be formed if supported by a learning process that raises critical thinking activities. Learning principles and some adjustments to DI can support the formation of these activities.This learning process also emphasizes the development of the character of "reflecting and evaluating his thinking

(metacognition) and thinking about how the thinking process is going so that he concludes". This character is one of the supporters of forming the creative reasoning dimension, where students who reason creatively are critical thinkers.(Kemendikdud-Ristek, 2022). Regarding mathematics learning, it is essential to incorporate metacognitive activities into the learning process. These activities have the potential to increase the meaningfulness of learning.(Schneider & Artelt, 2010). Verschaffel (1999) also pointed out that metacognition is crucial in solving mathematical problems. It can foster critical thinking in students when solving math problems.(Schneider & Artelt, 2010). Differentiated learning is an approach to developing students' critical thinking processes in mathematics.

Students learn actively in mathematics when they are curious, ask questions, discover new things, think about a topic and want to solve it, and apply prior knowledge to solve a problem. This process can be applied in different ways or perspectives, resulting in the development of critical thinking(Kërënxhi & Gjoci, 2015). The principles and adjustments of differentiated learning also reveal some of these activities. Such learning supports procepts forming as composite mental objects consisting of processes and concepts. The same symbolization is used to denote both the process and the object produced by the process(Kërënxhi & Gjoci, 2015). Some people fail in math because they have not seen the process packaged as a procept. Students who see processes only as procedures tend to struggle from procedure to procedure to perform the current task successfully. Students who develop procepts are more flexible because they have mental objects that allow them to process and manipulate symbols understood as objects.(Gray & Tall, 1992).

DI also allows teachers to provide feedback with a growth mindset: clarification, value, attention, advice and appreciation(Kemendikdud-Ristek, 2021). The use of this mindset is to make feedback meaningful to students through appropriate and correct questions. Suppose the feedback question in the following example:

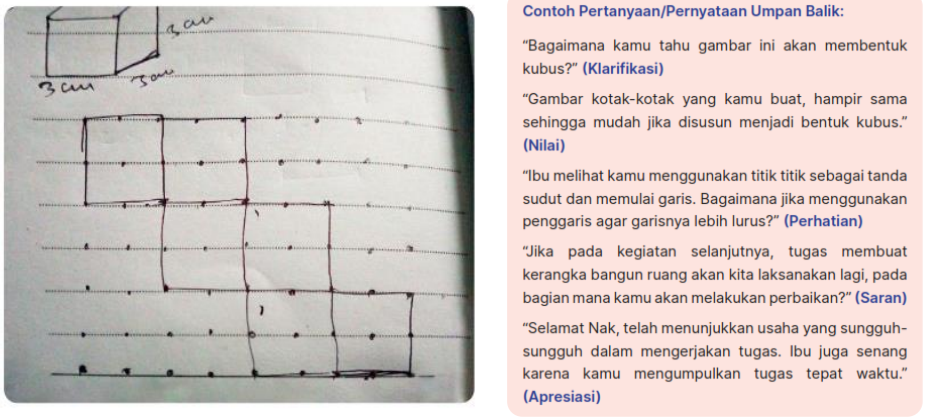

Figure 1
An example of using the concept of feedback with a growth mindset in DI
Source: (Kemendikdud-Ristek, 2021)

The question does not only invite "Yes" or "No" answers from students. However, it stimulates students' scientific answers, which begin with a clarification process. Students can provide a broader and more scientific explanation of their task. This process will require students to think critically when delivering answers to the

feedback questions given by the teacher. In addition, the feedback process with this mindset will also provide an overview of the strengths, weaknesses, suggestions and appreciation for students. Thus creating a comfortable atmosphere for students in the process of learning mathematics.

CONCLUSION

Differentiated Instruction (DI) is one of the New Paradigm Learning policies. *New Paradigm Learning* is a learning concept that prepares students to face era 4.0 and the 21st century. This learning concept aims to produce competent lifelong learners who have character and behave according to the values of Pancasila. The principles and adjustments in DI open up opportunities to improve mathematical critical thinking skills. First, the unique thing in DI is to use the power of questioning. The meaningful questions given stimulate a growth mindset, so it also has an impact on the student's mathematical critical thinking process. Second, another unique thing about DI is that it incorporates metacognitive activities in learning. If in mathematics learning, these activities are combined, it will increase the meaningfulness of learning. So that the critical thinking process can run well and as it should. Thirdly, DI also provides opportunities for students to learn from their point of view, not only from the teacher's point of view. Students are free to learn with different perspectives through their interests, talents and interests in developing concepts in mathematics learning. This condition provides an opportunity for students to carry out a critical thinking process. It can have an impact on the formation of concepts so that students see the process as more than just a procedure, where they tend to dwell on procedure after procedure with the aim of successfully performing the current task only. However, students are more flexible because they have mental objects that allow them to process and manipulate symbols that are understood as objects. Fourth, DI also will enable teachers to provide feedback with a growth mindset. The questions in this feedback do not only invite "Yes" or "No" answers from students. Instead, they stimulate students' scientific answers. Students can provide a broader and more scientific explanation of the task they have done. This process will require students to think critically in delivering answers to the feedback questions given by the teacher.

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