

Philosophical Harmony: Understanding the Influence of Pedagogical Philosophy in Mathematical Teaching

*Elfitra¹, Izwita Dewi², Faiz Ahyaningsih³
^{1, 2, 3} State University of Medan
*elfitra@unimed.ac.id

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ABSTRACT

This article investigates the profound implications of the application of pedagogical philosophy in mathematics teaching. Highlighting the key roles of constructivist philosophy, humanism, and ethics, the study discusses how these principles shape the way teachers approach mathematics teaching and influence student learning experiences. Through in-depth analysis, this article underlines the importance of philosophical harmony in creating an inspiring and effective learning environment. The integration of constructivist concepts emphasizes the active role of students in building their own knowledge, while the humanistic approach highlights aspects of creativity and personal development. In addition, this article explores how ethics can be integrated into mathematics learning, creating students who are not only technically skilled but also morally responsible. In conclusion, this article provides a deeper understanding of how pedagogical philosophy becomes a catalyst for positive transformation in mathematics teaching.

Keywords: pedagogical philosophy, mathematical teaching, constructivism, humanism, ethics.

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INTRODUCTION

Education serves as a foundation for the development of intelligent and competitive societies. In this context, teaching mathematics becomes a key element in providing a solid knowledge base for students. However, challenges arise when we not only consider the transfer of information but also the development of in-depth understanding and skills. Education plays an important role in preparing qualified human resources capable of competing in the advancement of science and technology (Mardhiyah, et.al. 2021; Tugiah, 202) In this context, teaching mathematics becomes a key element in providing a solid knowledge base for students. However, challenges arise when we consider not only the transfer of information but also the development of in-depth understanding and critical thinking skills. (Hidayah,2023)

Boaler (2016) and the National Council of Teachers of Mathematics (NCTM, 2000) affirm that education plays a central role in preparing qualified human resources. The challenges faced are not only limited to the transfer of information, but also involve the development of deeper understanding and critical thinking skills. In class realities, creating philosophical harmony becomes essential to formulating an effective teaching approach. The involvement of teachers in developing different concepts, methods, and strategies is key to creating learning, in the field of mathematics, which not only changes the student's perception of discomfort, but also gives deep meaning and excitement to critical thinking.

Based on recent research, pedagogical philosophy is considered the key to understanding and improving mathematics teaching (Ernest, 2018)). The main focus of this research is on

constructivist philosophical principles, humanism, and ethics, which together form the framework for achieving holistic and effective teaching. Other research by Thompson (2020) also highlights the importance of understanding how constructivist principles view students as active agents in building their own knowledge and how it changes the mathematics teaching landscape in the classroom. Overall, these studies confirm that pedagogical philosophy is not merely a remote theory, but rather an essential foundation in viewing and enhancing mathematical teaching.

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In exploring the concept of humanism, Mayasari (2017) suggests that the humanist approach emphasizes personal development, creativity, and human values. How teachers can create an environment that nurtures these aspects of mathematics learning is a very relevant question. Moreover, a study by Register, et al. (2022) has highlighted how ethics, as an integral element of pedagogical philosophy, can

be the basis for discussing how moral values can be integrated into the mathematical learning material, forming students who are not only technically competent, but also ethically responsible. It creates a paradigm where mathematical education is not only about achieving technical competence, but also about forming individuals who are conscious, creative, and morally responsible.

By detailing these principles, this article aims to provide a better insight into how teachers can use pedagogical philosophy to create an impactful mathematical learning experience. This research has profound implications not only for mathematics teachers but also for curriculum designers, policymakers, and all stakeholders in the world of education. By understanding the influence of this philosophical harmony, we can direct mathematics teaching in a direction that is more dynamic and relevant to the needs of the future.

METHOD

The research method used in this article is literary analysis. Literary analysis is a research approach carried out by investigating and analyzing various literary sources related to a particular research topic. In the context of this article, the researchers collected and evaluated literature related to the integration of ethical values in mathematical learning.

First, researchers identify and gather up-to-date sources of literature from home and abroad that address ethical concepts in the context of mathematical learning. These sources include scientific journals, books, articles, and possibly official documents or research reports.

Then the researchers conducted an in-depth analysis of the literature. Analysis involves the synthesis of

information, the understanding of different perspectives, and the identification of key findings that are relevant to the focus of research. Researchers may also identify trends, comparisons between different approaches or models, as well as knowledge gaps that may be filled through further research.

Using methods of literary analysis, this article can present a comprehensive understanding of the role of ethical values in mathematical learning. This approach allows researchers to dig insights from different perspectives and build a solid conceptual framework based on findings in the literature.

The advantages of the method of literary analysis include its ability to provide an in-depth overview of the topic without having to undertake primary research. However, this research is heavily dependent on the quality of the available literature and the accuracy of the information taken from the literature. Therefore, researchers should be selective in choosing the sources of literature to be analyzed to ensure the validity and reliability of the findings.

RESULTS AND DISCUSSION

In this section, the theoretical foundations that form the basis of the understanding of the influence of pedagogical philosophy in mathematics teaching will be outlined. Recent research, both from home and abroad, has made significant contributions to the understanding of philosophical concepts that support the development of better mathematics teaching practices.

A. Constructivist philosophy

Constructivist philosophy has proven itself to be an important foundation in

designing a more interactive and participatory approach to mathematics teaching. (Thompson, 2020). According to Voon, 2021 we understand that a constructive approach encourages students to be actively involved in the learning process. This concept encourages students to build their own knowledge through hands-on experience, transforming their roles from passive recipients into active constructors of their mathematical knowledge (sugrah, 2019). This approach is not just about transferring information from teacher to student, but more about guiding students towards a deeper and more relevant understanding.

Wadsworth 1996 and Rahman 2018 reinforce this view, the study highlighting how constructivism not only focuses on participatory aspects, but also helps shape a deeper and more relevant mathematical understanding for students. This concept sees students as individuals who are actively engaged in the construction of their own mathematical knowledge, appreciate differences in understanding and recognize the importance of hands-on experience in learning. Therefore, the constructivist approach is a strong foundation for creating a motivating, stimulating, and helpful learning environment for mathematics.

With these evidence, the use of constructivist philosophy in teaching mathematics is seen not only as an innovative trend or method, but also as an effective strategy for achieving understanding and mastery of mathematical concepts by students. Involving students actively in learning, leveraging hands-on experience, and understanding the important role of students in building knowledge are key points that strengthen the position of constructivism in the world of

mathematical education.

B. Philosophy of Humanism

Paulo Freire is a figure who promotes humanist education that is famous for the concept of education in the education philosophy of humanism, that is, education that liberates, where the educational process places man as one of the most important objects in education (Fadli, 2020). The humanistic approach in the context of teaching mathematics is gaining significant emphasis in recent research. In research purwaningrum (2016) describes the importance of the development of personal aspects and creativity of students in the learning process of mathematics. In the theoretical foundation of humanism, the study emphasizes that learning mathematics not only accumulates technical knowledge, but also emphasises the development of the emotional and creative dimensions of students as an integral part of the learning process.

In line with the findings, Egan (2011) states that humanism has significant relevance in the context of mathematical learning. Gardner highlighted that a humanistic approach can make a positive contribution to student motivation and reconcile the mathematical learning experience. By focusing on the development of personal aspects and creativity, the humanistic approach provides new insights into how mathematics teaching can create an environment that stimulates the full development of students' potential.

Therefore, this research provides a scientific basis for understanding and applying humanist approaches in the context of mathematical learning. By recognizing and appreciating the emotional and creative dimensions of students, a humanistic approach can be

a relevant and effective foundation in designing a more holistic and effective mathematics teaching strategy. It creates a new vision of mathematical education that not only focuses on mastering technical concepts, but also on the personal and creative development of students.

C. Ethics in the Context of Mathematical Learning

Along with recent research highlighting ethical aspects of mathematics teaching, the role of moral values in the context of education is increasingly emphasized. Maryati (2017) provides insight into the importance of ethical integration in mathematics as an attempt to shape the character of more responsible students. In its theoretical foundation, this study affirms that mathematical learning that encompasses the ethical dimension is not only a transfer of technical knowledge, but also a character-building effort involving moral values. (sari, 2021).

Meanwhile, research by Ernest (2012) added findings of ethical understanding in mathematics teaching. These findings emphasize that ethics creates the essential moral foundation for producing individuals who are not only technically intelligent, but also have a strong moral integrity. Thus, mathematical education is not only about teaching formulas and concepts, but also about forming individuals who have sustained ethical values.

Through the integration of these perspectives, this article seeks to lay down a solid conceptual framework. Constructivist philosophy, humanism, and ethics are identified as important foundations in understanding and designing a holistic approach to mathematical teaching. Considering the impact of these three philosophies, this

article is expected to be a practical guide to mathematical educators and educational stakeholders. Implementation of contextual, value-oriented learning approaches, and taking into account the ethical dimensions is expected to have a broader positive impact, not only in the mastery of mathematical material but also in the formation of a better student's character.

The influence of pedagogical philosophy in teaching mathematics plays a central role in improving the quality of learning. Philosophical harmony through constructive principles, humanism, and ethics form a holistic and effective framework. (Faulkenberry, 2006; Ernest, et al 2006).

Constructivist philosophy emphasizes the role of students as active agents in the development of knowledge. Teaching mathematics is no longer just about transferring information, but also enabling the student's thinking process for a deeper understanding of mathematical concepts. Constructivist principles provide guidance in designing a mathematical learning experience that encourages deep involvement and understanding (Masgumelar, 2021; Gazali 2016). The philosophy of humanistic psychology presented by humanist philosophers includes views on human rights, views of human freedom and autonomy, self-conceptions, as well as the individual self and self-actualization. (Manik, et.al, 2022). Teachers not only facilitate learning, but also guide students to explore their creative potential in understanding and solving mathematical problems. The humanist approach creates a learning environment that motivates and supports the full development of students' potential.

The ethical aspect of teaching

mathematics adds an important moral dimension. The integration of ethical values into the learning material helps shape the character of a responsible student (candra,20023). Mathematics teachers, through the cultivation of ethical values, not only teach mathematical concepts but also guide students to be ethical individuals in solving problems and making decisions

Through this research, we realize that philosophical harmony plays an important role in achieving better mathematical teaching. The integration of constructivism, humanism, and ethics creates a balanced learning environment, in which students not only gain an understanding of mathematical concepts, but also develop as critical, creative, and responsible individuals.

In its implementation, mathematics teachers need to have a deep understanding of the philosophy that they anchor and be able to integrate it into day-to-day practice in the classroom. In-depth professional training and development is the key to supporting teachers in applying this philosophical harmony effectively. Support from schools and policymakers is also vital to creating a learning environment that supports the application of pedagogical philosophy. Furthermore, there is a need for collaboration and exchange of experiences between mathematics teachers to inspire each other and improve their teaching practices such as discussion forums, joint training, and regular meetings can be effective means of building learning communities among mathematical teachers.

It is also important to continue to conduct research and evaluation related to the implementation of pedagogical philosophies in mathematics teaching and continue to understand their impact, identify potential challenges, and find

new innovations in integrating philosophical principles into mathematical learning. On a broader scale, philosophical approaches to mathematics teaching also need to be recognized by policymakers and discussed in educational curricula. (Muslich, 2022). It can create a strong foundation for integrating pedagogical philosophy into the development of national or local curricula, so that any mathematics teacher can see it as a valid guide to their daily practice.

The philosophical harmony in mathematics teaching is not only about combining the various principles of pedagogical philosophy, but also about creating a balanced and energetic learning environment. Teaching practices based on constructivism, humanism, and ethics have a positive impact on student understanding and development, forming a generation that is not only skilled in mathematics but also characterized and morally responsible.

The Role of Pedagogical Philosophy in Mathematical Teaching: Foundations and Implementations

The philosophy of education plays a central role in guiding and shaping the course of the mathematics teaching process. The influence of this philosophy extends to crucial aspects, such as curriculum design, teaching methods, and the formation of views on the purpose of learning mathematics. The principles of educational philosophy provide the basis for the development of teaching strategies that are not only technically effective, but also responsive to the cognitive and psychological developmental needs of students.

One striking example is the constructivist approach, which is based on the belief that students learn more

effectively through active involvement in building their own knowledge. (Bada,2015). In the context of mathematics, this approach reflects a paradigm shift from a traditional model that emphasizes the transfer of knowledge from teacher to student, to an approach that reflects the role of students as constructors of their own mathematical knowledge.

The application of constructivism in mathematics teaching involves the use of learning strategies that encourage students to develop understanding through exploration, discussion, and application of concepts in the context of reality. (Sugrah, 2019). In this context, teachers act as facilitators who guide students through the process of building their mathematical knowledge. As a result, students not only master mathematical concepts, but also develop critical thinking and problem-solving skills.

In addition to constructivism, the philosophy of humanism also makes significant contributions to the teaching of mathematics. Fedi et al. (2022) stated that the humanist approach focuses on the development of a student's personal aspects and sees mathematical education as a means of empowering students holistically. Mathematics teachers with a humanistic approach understand that each student has unique and creative potential that can be developed through learning mathematics. In this context, teaching mathematics is not just about understanding concepts, but also about cultivating positive values, motivation, and empowerment.

On the other hand, ethics in mathematics teaching refers to the integration of moral values and ethical behavior into the learning material. Chowdury (2018) and Ruiati, et al. (2022) describe that mathematics

teaching is not only limited to the transfer of knowledge and technical skills, but also involves the formation of student responsibility. Mathematics teachers, in this context, are expected to be character-forming agents, guiding students in applying mathematical concepts considering their moral and ethical implications.

Overall, the role of educational philosophy in mathematics teaching creates a solid foundation for the development of contextual curricula, innovative teaching methods, and holistic learning perspectives. Through the implementation of constructivist principles, humanism, and ethics, mathematics teachers can shape learning experiences that not only build a deep understanding of math but also develop students as critical, creative and ethical individuals.

The Influence of Humanist Philosophy in Mathematical Learning: Creating a Competitive Learning Environment

The philosophy of humanism, which emphasizes the development of personal aspects, creativity, and emotional understanding, has a significant impact in the context of learning mathematics. This approach describes an approach that not only involves students cognitively but also recognizes their uniqueness and creative potential in responding to complex mathematical concepts.

Mathematics teachers can integrate the principles of humanism in their teaching by understanding the individual needs of students and creating an environment that supports the full development of their potential (Bykov,2016; Tuan,1979). The humanistic approach to mathematics teaching focuses on the development of the student's creative aspects, which

have a positive impact on learning motivation and in-depth understanding of mathematical concepts.

The use of teaching methods that support the interaction of students and teachers, such as group discussions and collaborative projects, is an example of the implementation of the philosophy of humanism in mathematics classes. The humanistic approach to mathematical learning emphasizes the development of the concepts of psychological development of students and teaching methods appropriate to development, such as dialogic, reflective, and expressive approaches. (manik, et.al,2022) Teachers also act as facilitators who guide students to find their own mathematical solutions, encouraging independence and self-acceptance in the learning process.

The application of a humanistic approach to mathematical learning not only results in a better understanding of mathematics concepts but also enriches student learning experiences. Mathematical concepts are no longer seen as a rigid set of rules, but as tools that can be used to express students' creative ideas.

The challenges faced in implementing the philosophy of humanism in the context of mathematical learning show obstacles in curriculum adjustment and student performance assessment. As Arifin et al. (2021) pointed out, a curriculum that is too focused on standard examinations and evaluations can result in restrictions on student freedom and creativity. In this case, an evaluation paradigm that is centered on the measurement of test results can hinder the development of student personal aspects and creative.

Therefore, formative assessment emerges as a crucial element in supporting a humanistic approach to

mathematical learning (Umam, 2023). Formative assessments emphasize sustainable measurement and provide in-depth feedback on student personal development as well as creativity. This approach aims to provide a holistic understanding of student progress, not just standard test achievement.

Moreover, in response to the challenge of a curriculum that is too focused on the exam, there is a need for careful adjustment in the curricular design. The curriculum design that supports the philosophy of humanism must be able to provide space for the development of students' personal skills and creative potential. It requires an emphasis on a learning experience that builds, deepens, and evokes students' curiosity, not just an orientation on the fulfillment of examination requirements solely.

From a scientific perspective, the implementation of the philosophy of humanism in mathematical learning requires a holistic approach that not only describes the learning process of students from an academic point of view, but also recognizes and promotes their personal development and creativity.

Through the application of the philosophy of humanism in mathematics learning, teachers and students can create a competitive learning environment, support full potential development, and celebrate the uniqueness of each individual. This philosophy is not only about educating students to understand mathematics, but also about forming individuals who are emotionally intelligent, creative, and characteristic.

Integration of Ethics in Mathematical Learning: Shaping Character and Moral Responsibility

Pedagogical philosophy not only emphasizes the transfer of mathematical knowledge but also highlights the importance of student character formation and ethical awareness. The focus on ethical values in the context of mathematics teaching creates a broader learning dimension, which not only emphasizes technical expertise but also forms individuals who are morally responsible. Teachers have a central role in integrating ethical value in mathematical teaching. This process is not only limited to the introduction of ethical principles in the context of mathematics, but also includes guiding students in facing ethical dilemmas that may arise in solving everyday mathematical problems.

A study by Ernest (2019) underlined the importance of including ethical elements in the mathematics curriculum. The integration of ethical values not only opens up space for reflection on students' social responsibilities as mathematical problem solvers, but also motivates them to see mathematics as a tool that can be used to social justice and well-being.

The choice of learning material that creates a situation of ethical consideration in the use of mathematical concepts can also open up an important dialogue about the social implications of the mathematics decision. Using case studies or problems related to everyday life helps students develop the ability to associate mathematical concepts with ethical considerations (Ernest, 2019).

Practically speaking, teachers can use dialogue and collaborative learning approaches to build an atmosphere in the classroom that encourages ethical discussion. These discussions not only

involve students in a deeper understanding of mathematical concepts, but also train them to consider the social and ethical impact of the mathematics decisions taken. (Noddings, 1988; Cross, 2009).

The importance of the integration of ethics in mathematics learning not only forms students into critical-minded individuals towards mathematical concepts, but also opens up opportunities for character development and moral responsibility. With this approach, teaching mathematics is not only a means of transferring knowledge but also a medium that shapes the values underlying students' decisions and actions inside and outside the classroom.

CONCLUSION

In closing this research, it is essential to highlight that the effectiveness of teaching mathematics cannot be simplified only to the application of accurate teaching methods. In fact, teaching success requires a deep understanding of the philosophy of education as the foundation of every decision and strategy of teaching. Therefore, this article emphasizes the importance of developing philosophical harmony in the practice of teaching mathematics.

This research emphasizes that philosophical harmony, which involves the integration of the principles of various pedagogical philosophy currents such as constructivism, humanism, and ethics, has a positive impact on the learning experience of mathematics. Teachers who can incorporate these aspects into their teaching practice can create an inspiring and in-depth learning environment.

By applying constructivism, teachers encourage students to actively engage in the construction of their own

knowledge, creating a more lasting understanding. Meanwhile, the integration of ethics in mathematics teaching ensures that students not only understand technical concepts, but also are able to make responsible mathematical decisions.

By embracing philosophical harmony, teachers can create mathematics learning experiences that fit students' needs, identify individual learning styles, and motivate them to develop mathematical skills sustainably. Therefore, this article not only presents findings about the influence of pedagogical philosophy, but also provides a basis for educational practitioners to reflect and improve their teaching approaches.

Thus, in the face of the complexity of the world of education, an understanding of philosophical harmony is the key to building a solid foundation in mathematics teaching. This conclusion invites educators to do more than just apply teaching methods, but to reflect and integrate philosophical values in every step of their education, creating a mathematical learning experience that is not only effective but also satisfying and meaningful for each student.

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