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Issues of Soft skill-Based Mathematics Learning Innovation

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Abstrak

Inovasi dalam pembelajaran matematika menjadi hal yang krusial untuk meningkatkan kualitas pendidikan di era globalisasi. Pendekatan berbasis softskill menawarkan potensi besar dalam meningkatkan kemampuan peserta didik tidak hanya secara akademik tetapi juga dalam aspek keterampilan sosial, komunikasi, dan pemecahan masalah. Penelitian ini bertujuan untuk mengeksplorasi isu-isu inovasi dalam pembelajaran matematika berbasis softskill melalui metode kualitatif dengan pendekatan studi pustaka. Hasil penelitian menunjukkan bahwa pembelajaran berbasis softskill memerlukan desain yang holistik, pelatihan untuk pendidik, dan integrasi yang efektif dengan kurikulum yang ada. Implikasinya adalah perlunya dukungan kebijakan, penyediaan sumber daya, dan program pelatihan untuk mendorong implementasi inovasi ini di sekolah.

Kata Kunci: Inovasi, Pembelajaran Matematika, *Softskill*

Abstract

Innovation in mathematics learning is crucial to improve the quality of education in the era of globalization. Softskill-based approaches offer great potential in improving learners' abilities not only academically but also in aspects of social skills, communication, and problem solving. This research aims to explore issues of innovation in softskill-based mathematics learning through a qualitative method with a literature study approach. The results show that softskill-based learning requires holistic design, training for educators, and effective integration with the existing curriculum. The implication is the need for policy support, provision of resources, and training programs to encourage the implementation of this innovation in schools.

Keywords: Innovation, Mathematics Learning, Soft Skills

INTRODUCTION

Mathematics learning is often perceived as a technical and cognitive field of study. However, in an era that demands adaptability and collaboration, traditional approaches to teaching mathematics are inadequate. Soft skills-based approaches such as communication skills, cooperation, and creativity are increasingly relevant to be applied in mathematics learning.

Mathematics not only involves mastering abstract concepts but also has an important role in building critical thinking, analysis, and problem-solving skills. In an increasingly complex global environment, the need for individuals who have the ability to work in teams, communicate effectively, and produce innovative solutions is becoming increasingly important. Soft skills such as empathy, collaboration, and creativity are key elements in preparing students for the challenges of the 21st century (Johnson & Johnson, 2017).

Traditional approaches to teaching mathematics often focus on structured knowledge delivery and cognitive test-based evaluation. This neglects the development of students' affective and social aspects. For example, students who have high academic ability in mathematics do not necessarily have communication skills or the ability to work in teams. This creates a gap between the needs of the world of work and the outcomes of formal education.

In a study by Nurhasanah and Nida (2020), it was found that students exposed to learning approaches that focus only on academic outcomes tend to lack confidence in dealing with situations that require collaboration. In addition, this approach often limits students' creativity because the learning process is too rigid and oriented towards solving mechanical problems.

The integration of soft skills in mathematics learning is the answer to the above challenges. Soft skills allow students to connect mathematical concepts with real situations, increase the relevance of learning, and build skills that can be applied in various contexts. For example, critical thinking skills can be developed through project-based problem solving, while communication

skills can be improved through group discussions and presentations.

Studies conducted by Trilling and Fadel (2009) show that learning that integrates 21st century skills, including soft skills, is more effective in preparing students for future challenges. This approach not only improves academic outcomes but also builds adaptive and innovative student characters.

To effectively integrate soft skills in mathematics learning, adequate policy support is needed. Educational policies oriented towards developing students' holistic skills need to be implemented, including curriculum revision to accommodate this approach. In addition, the provision of infrastructure such as softskill-based learning modules, training for teachers, and relevant evaluation tools is essential.

In the global context, the OECD (2018) has recommended education reforms that emphasize the importance of social and emotional skills as part of learning. Developed countries such as Finland and Singapore have implemented this approach in their education systems, with results showing improved student engagement and overall quality of education.

In Indonesia, the implementation of softskill-based learning faces various challenges, such as limited resources, lack of teacher understanding and resistance to change. Most teachers in Indonesia have not received adequate training to implement this approach. In addition, the existing curriculum is still too dense and oriented towards achieving cognitive targets, making it difficult to provide space for soft skills development.

Research by Mulyani (2021) shows that teachers who have knowledge and skills in integrating soft skills into mathematics learning are able to create a more interactive and inclusive learning environment. However, without strong policy support and ongoing training programs, these efforts will be difficult to implement widely.

Despite the challenges, there are great opportunities to implement these innovations in

Indonesia. Education technology can be an effective tool to support softskill-based learning. Online learning platforms, Artificial Intelligence (AI)-based applications and digital evaluation tools can be used to provide a richer learning experience and support soft skills development.

In addition, collaboration between schools, government and the private sector can help provide the necessary resources. Programs such as partnerships between schools and technology companies or joint training between educational institutions and industry can increase the relevance and effectiveness of softskill-based learning.

By capitalizing on this opportunity, Indonesia has the potential to create an education system that is more inclusive and relevant to the needs of the 21st century. Reforms that focus on developing soft skills in mathematics learning can be a significant first step towards achieving this goal.

METHOD

This research uses a qualitative method with a literature study approach. Data were collected from various relevant literature sources, including scientific journals, books, research reports, education policy documents and conference articles related to educational innovation. Data analysis was conducted descriptively by highlighting key issues related to softskill-based mathematics learning innovations. The analysis process involved the following steps:

1. Review relevant literature to gain theoretical and empirical insights related to soft skills and mathematics learning.
2. Categorize information based on key themes such as learning design, teacher training and education policy.
3. Analyze findings to identify in-depth strategic challenges and recommendations.

RESULTS AND DISCUSSION

Innovation in softskill-based mathematics learning is a promising approach to improving student understanding. By developing soft skills, students not only acquire mathematical knowledge, but also skills that are important for everyday life. there are several results of innovations that can be done regarding soft skills-based learning, including:

1. Softskill-based Learning Design

Soft skills-based learning requires an integrated approach. An example is the development of learning activities that combine mathematical problem solving with real-life situations, such as financial case simulations or statistical data analysis. This approach can facilitate the development of collaboration and communication skills. Some models such as Problem-Based Learning (PBL) and Collaborative Learning have proven effective in improving students' soft skills.

Furthermore, technology integration such as the use of Artificial Intelligence (AI)-based applications for adaptive learning allows students to develop individualized abilities while enhancing soft skills through virtual interaction. Soft skills-based learning requires an integrated approach. An example is the development of learning activities that combine mathematical problem solving with real-life situations, such as financial case simulations or statistical data analysis. This approach can facilitate the development of collaboration and communication skills. Some models such as Problem-Based Learning (PBL) and Collaborative Learning have proven effective in improving students' soft skills.

Furthermore, technology integration such as the use of Artificial Intelligence (AI)-based applications for adaptive learning allows students to develop individualized abilities while enhancing soft skills through virtual interaction. Studies show that students who engage in project-based learning show an increase in critical thinking skills up to 25% better than traditional methods (Trilling & Fadel, 2009). The project facilitates students to analyze real problems, such as case studies related to financial management or

data-based decision making. In addition, the use of real data-based case studies in learning can also significantly increase student engagement, especially in the aspects of complex problem solving and team collaboration. These context-based activities not only increase students' motivation but also help them understand the relevance of mathematical concepts in everyday life.

2. Teacher Training

The training provided to teachers needs to cover both theoretical and practical aspects. For example, training can involve learning design workshops, softskill-based classroom simulations and constructive feedback to teachers. A study by Mulyani (2021) shows that trained teachers have higher confidence in implementing innovative learning. In addition, collaboration between teachers through professional learning communities can be a platform for sharing best practices in soft skills integration.

3. Curriculum Integration

Integrating soft skills into the mathematics curriculum requires a cross-disciplinary approach. For example, teaching geometry can involve the study of architecture, while the concept of probability can be linked to decision-making in business. These adjustments require a curriculum that is flexible and open to innovation. Project-based approaches across subjects are also effective for integrating soft skills. For example, students could be asked to design a data-driven solution to an environmental issue, incorporating math, science and social skills.

4. Obstacles and Challenges (Continued)

a. Limited Learning Time

One of the main obstacles in implementing softskill-based learning is the limited time provided in the curriculum. A dense curriculum often requires teachers to focus on completing the prescribed academic material. As a result, soft skill development that is not directly related to academic content is often neglected. Although soft skills development is important for character building and life readiness, many teachers feel

compelled to put more emphasis on exam results and material that must be taught in a short period of time. Therefore, there is an urgent need to design a curriculum that provides the flexibility to involve the development of social and emotional skills in the learning process.

b. Lack of Support from Policy Makers

Inadequate support from education policy makers, both at the school level and at the education office level, is a significant challenge in implementing softskill-based learning innovations. Without clear direction and supportive policies, initiatives taken by teachers are often hampered by limited resources or even resistance to change. In addition, principals who lack understanding of the urgency of softskill-based learning may not give sufficient priority to its development. This creates a gap between supposedly supportive policies and on-the-ground implementation, which ultimately hinders consistent and sustainable implementation.

c. Lack of Relevant Assessment

Assessment systems that focus more on academic outcomes or standardized test scores often fail to reflect students' soft skills development. Soft skills such as communication, teamwork and leadership abilities require a more holistic and process-based assessment approach. Unfortunately, current assessment methods, which tend to be structured and quantitative-based, do not sufficiently accommodate these non-academic aspects. Therefore, it is important to develop alternative assessments, such as portfolios, observation rubrics and interviews, that can measure the development of students' social, emotional and interpersonal skills more accurately and in-depth.

5. Strategies for Developing Softskill-Based Mathematics Learning

To overcome the obstacles mentioned above, here are some strategies that can be applied in developing softskill-based mathematics learning:

1. Development of Learning Modules and Media.

Module Development that Supports Soft Skills, Math learning modules need to be structured in such a way as to include activities that not only teach mathematical concepts, but also develop students' soft skills. For example, incorporating collaborative activities in mathematical problem solving, where students have to work together to find solutions. This can encourage the development of skills such as communication, problem solving and teamwork.

Use of Digital Technology: The use of technology, such as apps or digital learning platforms, can make learning mathematics more engaging and interactive. Math gamification, for example, can integrate real-world simulations that help students see the relevance of math in their lives. Technology also makes it easier to create learning spaces that stimulate creativity and exploration.

2. Continuous Teacher Training: Teachers need to be provided with training that focuses on project-based teaching approaches, discussion and collaboration that can encourage soft skills development. This training should provide teachers with the knowledge and skills to create an active and participatory learning environment. In addition to training, participation in workshops and seminars that educate teachers about the latest innovations in learning and provide a space for them to share experiences and best practices is needed. This will not only improve teachers' ability to teach mathematics but also motivate them to keep developing.
3. Curriculum Reform: The curriculum should be designed to make room for the development of students' soft skills. This can be done by adding learning units that emphasize social and emotional skills, or by making the curriculum more integrated and interdisciplinary. Furthermore, adding interdisciplinary subjects by integrating topics relevant to students' real lives into mathematics learning can increase their awareness of how mathematics is used in social and economic contexts. It also helps students to develop critical thinking and

problem-solving skills in everyday life situations.

4. Use of Alternative Assessment: Adopting process-based assessment methods, such as reflection journals, case studies and group assessments, can provide a more comprehensive picture of students' soft skills development. These assessments allow teachers to observe how students work in groups, how they solve challenges, and how they manage social interactions in learning. Furthermore, providing formative feedback, rather than just based on tests or exams, helps students to identify areas where they can improve their interpersonal and cooperation skills.
5. Interagency Collaboration: Engaging Sectors or partnerships with the private sector, universities, and community organizations can provide support in the form of resources, training, or technology to enrich softskill-based learning. In addition, this collaboration can also open up opportunities for students to gain practical experience in applying their math skills in the real world. Collaboration with international organizations that have more experience in soft skills development can provide guidance and best practices that can be applied in the local context. It can also open up access to funding needed to deliver training programs or purchase learning tools that support these innovations.

With the implementation of these strategies, softskill-based mathematics learning can be more effective, helping students not only master academic material but also be ready to face challenges in the professional and social world.

CLOSING

Softskill-based mathematics learning innovations have great potential in preparing students to face global challenges. However, the implementation of this innovation requires synergy between various stakeholders, including teachers, government and society. Strong policy support, adequate teacher training and curriculum

adjustments are key success factors for this approach. With integrated efforts, mathematics learning can become more relevant, inclusive and have a positive impact on holistic student development.

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