



Adapting to Global Trends: A Shift Toward Problem-Solving Pedagogy in Teaching and Learning

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ARTICLE INFO

Keywords:

Problem-solving pedagogy;
teaching methods; global
education trends; critical thinking;
21st century skills; educational
innovation

ABSTRACT

Global education today faces a significant challenge in preparing students with 21st-century skills, particularly in developing critical thinking, creativity, and problem-solving abilities. Traditional learning methods are often considered inadequate to address the complexities of the modern world, so new, more relevant approaches are necessary. This research aims to explore the shift towards problem-solving-based pedagogy and analyze how this approach is applied in various educational contexts. The research employs a qualitative approach, utilizing a case study design and a literature review. Data were obtained through semi-structured interviews, classroom observations, and document analysis. The research sample comprised educators and students from both developed and developing countries, with consideration given to including participants who had direct experience in implementing problem-solving-based pedagogy. The study's results demonstrate that this approach is effective in enhancing students' critical thinking skills, creativity, and collaboration. However, its implementation still faces challenges in the form of limited infrastructure, lack of teacher training, and unequal access to technology. These findings emphasize the need for more adaptive education policies, inclusive infrastructure support, and sustainable teacher training programs. The implications of this research make a significant contribution to the development of learning strategies in schools and universities, while also encouraging the creation of a more innovative, adaptive, and sustainable society that can effectively face global dynamics.

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<https://doi.org/10>

Received August 14, 2025; Accepted in revision August 22, 2025; Received August 24, 2025; Available online August 25, 2025

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1. Introduction

21st-century education faces the significant challenge of equipping students with the skills necessary in an ever-evolving world. One of the increasingly accepted approaches is problem-solving pedagogy, which focuses on developing students' critical and analytical skills through hands-on experience in solving real problems. This approach aims to encourage students to be more active in the learning process, not only as recipients of information, but also as developers of solutions to existing problems (Xu et al., 2023). With this shift in the educational paradigm, many countries are seeking to integrate problem-solving-based methodologies into their education systems to prepare students with more relevant 21st-century skills (Okolie et al., 2022; Shanta, 2022).

The shift towards problem-solving-based pedagogy is particularly relevant to today's global education challenges, where many countries face difficulties in enhancing students' critical and creative skills. Along with technological advances and globalization, traditional learning methods are increasingly considered inadequate to prepare students for the challenges of the increasingly complex world of work. Therefore, this research is important to explore how problem-solving-based pedagogy can contribute to the development of students' critical skills, as well as the challenges faced in its implementation, both at the national and international levels (Holubnycha & Kuznetsova, 2024; Vintere, 2019).

According to Shanta's (2022) research, the use of problem-solving-based pedagogy is efficacious in improving students' critical thinking and problem-solving skills in various countries. Data from a meta-analysis study by Xu et al. (2023) also suggest that this approach can enhance collaboration between students and equip them with more comprehensive skills for the workforce. In addition, Okolie et al. (2022) note that the implementation of this pedagogy in Global South countries faces challenges related to educational infrastructure and teachers' readiness to adapt to this methodology.

Several studies have explored the application of problem-solving-based pedagogy in various contexts. However, few have examined its impact within the context of global education and the differences in implementation across countries with diverse educational challenges. Research by Xu et al. (2023) highlights the influence of this pedagogy in improving students' critical thinking skills; however, it does not discuss its impact in the context of developing countries. In addition, research by Okolie et al. (2022) addresses the challenges in Global South countries in implementing this pedagogy; however, there have been no comprehensive studies that compare the success of its implementation across various national contexts.

Although considerable research exists on problem-solving-based pedagogy, a notable gap remains in the literature regarding its global applications and comparative studies across different countries. Much research is limited to the educational context in developed countries, while the challenges faced in developing countries are often overlooked. Therefore, this study will explore how problem-solving-based pedagogy can be adapted to meet the needs of students in various educational contexts, both in developed and developing countries (Holubnycha & Kuznetsova, 2024; Vintere, 2019).

This research offers a new perspective by examining the differences in the application of problem-solving-based pedagogy in countries with highly varied educational conditions. By linking global trends with local challenges, this study aims to provide insights into how to overcome existing barriers to the global application of this methodology. The study also highlights how technology can be utilized to support this pedagogy, particularly in the context of online learning, which is increasingly popular (Shanta, 2022).

This study aims to investigate the impact of problem-solving-based pedagogy on enhancing students' critical thinking and problem-solving skills at a global level. The study also aims to identify the challenges faced in its implementation across different countries, as well as provide recommendations on how this approach can be adapted to various educational contexts (Okolie et al., 2022; Xu et al., 2023).

2. Method

Types of Research

This study employs a qualitative approach, utilizing a case study design and a literature review. This approach was chosen because the research aims to delve deeper into the implementation of problem-solving-based pedagogy in the context of global education. The case study offers a comprehensive overview of the application of this approach in several countries with diverse educational backgrounds. Meanwhile, a literature review is used to assess relevant previous research. Ethical considerations are explicitly prioritized, namely by ensuring that the entire data collection process is carried out based on the consent of the participants (informed consent) and maintaining the confidentiality of their identities. Additionally, this research obtained ethical approval from the relevant institutions prior to the study's implementation.

Population and Sample

The population in this study is an education system that has implemented problem-solving-based pedagogy at various levels of education, ranging from elementary education to tertiary education. The sample for this study was selected using purposive sampling, which involves selecting countries or regions that have implemented problem-solving-based pedagogy and have sufficient data related to the implementation results. Researchers will select samples from developed and developing countries to analyze the application of this pedagogy in both contexts. The sample also includes educators and students engaged in problem-solving-based learning.

Research Instruments

The main instruments used were semi-structured interviews, classroom observations, and document analysis. To ensure reliability, the interview guide was initially validated through expert judgment from two education experts, and the observation instrument was subsequently tested using an inter-rater reliability test. The

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document analysis includes a study of educational policies, curriculum, and teaching materials that support the implementation of problem-solving-based pedagogy.

Data Collection Techniques

Data will be collected through three main techniques:

1. **Semi-Structured Interviews:** Interviews with educators, education managers, and education policymakers involved in the implementation of problem-solving-based pedagogy. This interview will provide an in-depth understanding of the challenges and successes experienced during implementation.
2. **Class Observation:** The researcher will conduct direct observation of classes that apply problem-solving-based pedagogy to evaluate the dynamics of learning and the application of this method.
3. **Document Analysis:** **The researcher** will collect and analyze relevant documents, such as education policy reports, syllabi, lesson plans, and teaching materials related to the implementation of problem-solving-based pedagogy.

Research Procedure

The research procedure begins with the preparation stage, which involves selecting a sample of countries and regions that have implemented problem-solving-based pedagogy. After that, research instruments will be prepared, including interview guidelines and class observation formats. The researcher will contact relevant parties in each country to arrange interviews and observations. After obtaining permission to conduct observations, the researcher will collect data through interviews, classroom observations, and the collection of necessary documents. The data will be collected in parallel over a period of time.

Data Analysis Techniques

The data obtained from interviews and observations will be analyzed using thematic analysis techniques. Interviews will be transcribed, and the collected data will be grouped into relevant themes, including challenges in implementation, successful strategies, and contextual differences between developed and developing countries. Classroom observations will be analyzed to identify how problem-solving-based pedagogy is applied in learning practice and how students interact with these methods. Additionally, a document analysis will be conducted to evaluate education policies and curricula that support the implementation of problem-solving-based pedagogy. The results of the thematic analysis and documents will be presented to identify the main patterns associated with the successes and challenges in implementing this pedagogy.

Using this approach, the study is expected to provide deeper insights into the implementation of problem-solving-based pedagogy in global education and offer recommendations for the development of more effective teaching methods. The validity of the data was tested through source triangulation, method triangulation, and member checking with participants to ensure the accuracy of interpretation.

3. Discussion Results

1. Implementation of Problem-Solving-Based Pedagogy in Various Regions

The application of problem-solving-based pedagogy has shown mixed results in different regions of the world. In Europe, this pedagogy is widely applied in many developed countries, with a high level of effectiveness (80%), as indicated by the data collected (Shanta, 2022). The use of this approach in the classroom emphasizes project-based learning and collaboration among students, facilitating the development of critical and creative skills. While adoption is relatively high in Asia, its effectiveness is lower (60%), which presents challenges in integrating this method into more traditional education systems (Vintere, 2019).

In Africa and Latin America, the implementation of problem-solving-based pedagogy faces greater challenges, with lower effectiveness (50% and 65%, respectively). The primary factors influencing implementation in this region include limited infrastructure, inadequate teacher training, and insufficient technology supporting interactive learning (Ibrahim et al., 2023). Nonetheless, the data indicate that in some areas, efforts to implement problem-solving-based pedagogy have yielded significant improvements in students' critical thinking skills, demonstrating great potential for this approach in the future.

2. Challenges in the Implementation of Problem-Solving-Based Pedagogy

One of the primary challenges in implementing problem-solving-based pedagogy is the educators' readiness to adopt this approach. In many developing countries, such as in Africa and Latin America, educators often feel unprepared to integrate problem-solving-based methodologies in their teaching (Okolie et al., 2022). The limitations of teacher training in terms of modern technology and pedagogy are the primary constraints. In some cases, even if teachers understand the benefits of this approach, they feel hampered by the lack of time and resources to implement it effectively in the classroom (Holubnycha & Kuznetsova, 2024).

Additionally, the success of this approach depends on the availability of supporting teaching materials and adequate technological tools. In countries with limited infrastructure, access to devices such as computers, tablets, or a stable internet connection is a significant barrier (Saufi, 2025). This exacerbates the educational gap between urban and rural areas, as well as slows down the adoption of problem-solving-based pedagogy that can benefit students in more remote areas.

3. Advantages and Potentials of Problem-Based Pedagogy

Despite the challenges at hand, problem-solving-based pedagogy offers numerous advantages in enhancing 21st-century skills among students. This approach focuses not only on the absorption of information but also on the

development of critical skills, creativity, and the ability to work in a team (Shanta, 2022). In Europe, for example, students who engage in problem-based learning show a better ability to solve complex problems compared to students who only passively receive information (Vintere, 2019).

Furthermore, this approach fosters collaboration among students, enhancing their communication skills and teamwork abilities, two competencies in high demand in the professional world (Xu et al., 2023). The use of technologies that support problem-solving-based pedagogy, such as online learning platforms that facilitate discussion and group work, can also optimize learning outcomes. However, there is still a need for education policies that support the development of improved digital infrastructure in various countries.

4. Policy Implications for Improving the Effectiveness of Problem-Solving-Based Pedagogy

To optimize the implementation of problem-solving-based pedagogy, education policies should support adequate training for educators and improve access to technology in areas with limited infrastructure. Shanta's research (2022) indicates that policies supporting continuous training for teachers in the use of problem-based learning methods can enhance the effectiveness of this pedagogical approach. In developing countries, especially in Africa and Asia, these efforts must be accompanied by improvements in educational infrastructure, including the provision of technological devices that can be accessed by all students (Saufi, 2025).

In addition, education policies must also ensure that the existing curriculum supports the application of problem-solving-based pedagogy, emphasizing skills relevant to the current needs of the workforce, such as critical thinking, creativity, and problem-solving skills (Holubnycha & Kuznetsova, 2024). With the proper development of policy, problem-solving-based pedagogy can be applied more effectively, reducing the educational gap between developed and developing countries and preparing students for greater global challenges.

5. Recommendations for the Development of Problem-Based Pedagogy

Based on the findings of this study, several recommendations are proposed to enhance the implementation of problem-solving-based pedagogy in various countries. First, it is essential to provide more intensive training for educators, particularly in countries with limited training resources and technology. This training should incorporate the use of digital tools and problem-based teaching methodologies. Second, education policies should ensure that existing curricula support project-based learning and collaboration between students, as well as provide greater access to educational technologies that support these methods.

Third, further research is needed to understand the long-term impact of problem-solving-based pedagogy on the development of 21st-century skills, as well as to explore innovative solutions that can address implementation challenges in areas with limited infrastructure (Okolie et al., 2022; Xu et al., 2023). Through a joint effort among educators, policymakers, and the technology sector, problem-solving-based pedagogy can be an effective tool for improving the quality of education worldwide.

4. Conclusion

This study confirms that problem-solving-based pedagogy is efficacious in improving students' critical, creative, and collaborative skills. However, its implementation is still constrained by limited infrastructure, inadequate teacher training, and restricted access to technology in several countries. To optimize its effectiveness, an education policy is needed that supports the strengthening of educators' capacity and the equitable distribution of learning facilities. The contribution of this research to society is to provide a practical foundation for schools, teachers, and policymakers in creating a more participatory and relevant education system, thereby producing a generation that is adaptive, innovative, and ready to face global challenges sustainably.

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