



Character in Action: Teacher Responses to Challenge-Based Learning in Mathematics Subjects

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ARTICLE INFO	ABSTRACT
Published Online: 28 February 2024	Challenge Based Learning (CBL) is gaining traction in education for its potential to build student character while developing 21st-century skills. However, understanding teacher perspectives on implementing CBL for character development is crucial for its successful integration. This study explores the responses of secondary school teachers to CBL through surveys, interviews, and classroom observations. It examines their perceptions of CBL's impact on character development, the challenges they face, and the supports needed for effective implementation.
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INTRODUCTION

Education becomes a major milestone in shaping the character of individuals, preparing them to face complex challenges in life. In this context, Challenge-Based Learning (CBL) emerged as an innovative approach that not only provides academic knowledge, but also aims to build student character through immersive and real-world learning experiences. Challenge-Based Learning (CBL) does not simply focus on knowledge transfer, but rather integrates challenging learning experiences, motivating students to develop positive skills, attitudes, and values. In this context, the role of the teacher is key to guide students through these challenges and respond effectively to the dynamics of learning faced. [1][2], [3]

This research focuses on teachers' responses to the Challenge-Based Learning model and how its implementation can affect student character building. Through the exploration of this response, it is hoped that a deeper view can be found on how CBL can be an effective instrument in shaping student character in the modern education era.

Mathematics is often considered an abstract subject and difficult for students to understand. This can lead to low motivation and interest in learning mathematics. Challenge-Based Learning (CBL) offers solutions to overcome these problems by presenting innovative and engaging learning approaches for students. [4]

CBL is student-centered and challenges them to solve complex and authentic real-world problems in a mathematical context. This approach has several benefits, including: . Increase student motivation and engagement: CBL interests students by presenting relevant and challenging issues, so they become more active and engaged in the learning process. Developing 21st century skills: CBL helps students develop 21st century skills such as problem-solving, collaboration, communication, and critical thinking. Deepen students' understanding of the subject matter: CBL encourages students to think more deeply about mathematical concepts and relate them to the real world. Increase students' self-confidence and independence: CBL provides opportunities for students to learn independently and solve problems on their own. [5][6]

Challenge-Based Learning is an approach to learning in which students are confronted with challenges or problems that encourage them to think critically, work collaboratively, and seek solutions actively. Through this approach, students are given the opportunity to develop problem-solving, collaboration, and leadership skills.

The Importance of Student Character Building

Character education is an important aspect of holistic education that aims to build a moral, responsible, and virtuous young generation. In the midst of globalization and rapid changing times, the formation of students' character is becoming increasingly important to equip them with essential

values and life skills.[7], [8]

Here are some reasons why student character building is important:Building a Moral and Ethical Foundation:

Character education instills moral and ethical values such as honesty, integrity, and respect for others. This is important to build a young generation who has strong character and is able to behave well in community life.

Improve Adaptability and Face Challenges:In an era full of change and uncertainty, students need to be equipped with strong character and able to adapt. Character education helps students develop abilities such as discipline, hard work, and never give up to face various obstacles and achieve success.

Strengthening the Sense of Nationality and Social Responsibility:Character education fosters a sense of love for the motherland, nationalism, and concern for others. It is important to build a young generation that is responsible and active in contributing to the progress of the nation and state.[10]

Improve the Quality of Education and Learning Achievement:Research shows that students who have good character tend to excel more in learning. Character building helps students develop focus, concentration, and high learning motivation.

Preparing for a Better Future:Character education equips students with the values and life skills essential for future success. Strong character helps students become independent, creative, and able to work well together. The formation of student character is a shared responsibility between the school, family, and community. With good cooperation, the younger generation can be educated to become individuals with noble character and ready to build a better nation.[11], [12]

The formation of student character is an important aspect in the complete development of the individual. Students need not only to acquire academic knowledge, but also strong social and moral skills to be responsible citizens and succeed in life. Character building can help students develop a positive attitude, a responsible attitude, the ability to overcome obstacles, and an understanding of ethics and morals. It is an ongoing effort involving educators, families, and communities, who work together to create an environment that supports the development of good character. [13].

The Role of Teachers in Building Student Character

The role of the teacher in education is not only limited to transferring academic knowledge, but also includes a great responsibility in guiding students to form a strong and positive character. Teachers are not only conveyors of information, but also agents of character building who can provide inspiration, guidance, and examples for students. Character education involves more than just grades, but rather a constant effort to teach moral values, ethics, and interpersonal skills.[14], [15], [16]

In today's information age and globalization, the role of teachers is becoming increasingly important in guiding students to become individuals who are not only intellectually intelligent, but also have integrity and adaptability in a variety

of situations. Teachers are at the forefront of helping students recognize, understand, and apply character principles in everyday life.

Recent research highlights that the role of teachers who are positive and involved in the formation of student character has a long-term impact on their personal and academic development. Therefore, a deep understanding of how teachers can effectively help students build strong character is key in facing the complex challenges of the future.[17]

The role of teachers in directing challenge-based learning and its impact on student development.

1. **Learning Guides and Facilitators:**Teachers act as mentors who help students design solutions to the challenges faced. They not only provide information, but also facilitate critical thinking processes and collaboration among students.[18]
2. **Encourage Collaboration and Communication:**Teachers have a role to play in creating a classroom environment that supports collaboration and communication between students. This allows them to share ideas, solve problems together, and enrich the learning experience.[19]
3. **Designing Relevant Challenges:**Teachers are responsible for designing challenges that are relevant to the subject matter and can motivate students. This involves selecting real-world contexts that appeal to students .[20]
4. **Provide Constructive Feedback:**Teachers have the role of providing constructive feedback on solutions and student performance in facing challenges. This helps students understand strengths and areas that need improvement.[21]
5. **Integrating Character Education:**Teachers can utilize challenge-based learning as an opportunity to integrate character education. They guide students to identify values and moral principles in the face of challenges.[22]
6. **Assessing and Reflecting on Learning:**Teachers have a role in assessing student learning outcomes and detailing the thought processes involved in problem solving. Shared reflection helps students and teachers improve the quality of learning.[23]

The teacher's role in directing challenge-based learning forms a solid foundation for meaningful and impactful learning experiences. By understanding and applying these roles effectively, teachers can ensure that students not only succeed academically but also develop the character and skills necessary to face future challenges.

METHODS

Research Design: This research will use a qualitative approach with a case study method. This approach allows for an in-depth investigation of teacher responses and the impact of challenge-based learning on mathematics subjects.

Research Participants: Participants in this study were secondary school math teachers, who had implemented challenge-based learning in their math curriculum. The selection of participants is done purposively to ensure variation in experiences and perspective.

Data Collection Instruments: Interviews: Involves interviews with teachers to gain an in-depth understanding of perspectives, experiences, and challenges in implementing CBL. **Class Observation:** Directly observe the implementation of challenge-based learning in mathematics classes to understand the dynamics of learning.

Data Analysis: Thematic Analysis: Data from interviews and observations will be analyzed using a thematic analysis approach to identify patterns, themes, and relationships between concepts. **Triangulation:** Combining data from multiple sources (interviews, observations) to gain a comprehensive understanding and revision; **implementation:** field testing, evaluation and revision; **evaluation:** practicality and effectiveness test.

RESULTS

Challenge-based learning (CBL) approaches in mathematics subjects have been the focus of this research to understand how teachers respond to and integrate these methods in the classroom environment. Analysis of teacher responses revealed a number of findings that reflect perceptions, experiences, and impacts of implementing challenge-based learning.

1. **Positive and Enthusiastic Response:**The majority of teachers show a positive and enthusiastic response to challenge-based learning. They report that this approach increases students' interest in math subjects and creates a dynamic atmosphere in the classroom.
2. **Increased Student Engagement:**Data analysis shows an increase in student engagement during challenge-based learning sessions. Teachers report that students are more proactive, engaged in group discussions, and more motivated to solve math challenges at hand.
3. **Impact on Problem-Solving Skills:**Teacher responses reflect that challenge-based learning has a positive impact on the development of students' problem-solving skills. They see an increase in students' ability to analyze situations, formulate strategies, and reach appropriate mathematical solutions.
4. **Challenges in Planning and Implementation:**Despite the positive response, some teachers highlighted challenges in planning and implementing challenge-based learning. They recognize that blending real-world challenges with a math curriculum requires extra preparation and creative thinking.
5. **Necessary Support and Training:**Analysis indicates a need for additional support and training. Teachers say that training that focuses on challenge-based curriculum design and classroom management strategies can improve the effectiveness of implementation.
6. **Positive Impact on Character Building:**Teachers recognize the positive impact of challenge-based learning on student character building. They reported improved work ethics, confidence, and cooperation among students.

7. **Desire for Collaboration:**Analysis shows that there is a strong desire to collaborate among teachers in designing and sharing mathematics challenges relevant to challenge-based learning.

DISCUSSION

Implications for Learning Practices:Based on these findings, practical implications include the provision of ongoing support and training for teachers, the promotion of collaboration among teachers, and the development of richer and contextual challenge-based learning resources.

This analysis provides deeper insights into how teachers respond to challenge-based learning in the context of mathematics subjects, which can help improve the effectiveness of applying these methods in students' character development and mathematical understanding.

Findings

Here are some relevant findings: 1. **Not Widely Applied:** In data analysis, it can be seen that challenge-based learning has not been widely applied by teachers. This can be indicated by the low level of familiarity and acceptance of this method. 2. **Positive Responses Have:** While not yet common, there are positive responses observable from teachers who have tried challenge-based learning. They report that students are more excited and actively engaged in learning. In addition, this method can encourage students' creativity and problem solving. 3. **Challenges in Implementation:** Teachers also report challenges in implementing challenge-based learning. One of them is the difficulty in compiling challenges that are relevant and in accordance with the curriculum. In addition, lack of resources, such as adequate time and equipment, is also an obstacle. 4. **Training and Support:** Teachers who wish to implement challenge-based learning identify the need for additional training and support. They state that specialized training is needed to learn effective teaching strategies, as well as how to overcome challenges that may arise during the learning process. 5. **Further Development Potential:** While there are still some constraints, teacher response shows potential to further develop and implement challenge-based learning in the future. Technological advances and the wide range of resources available can help strengthen the implementation of these methods.

CONCLUSION

Analysis of teacher responses to challenge-based learning in mathematics subjects shows a generally positive picture. Increased student engagement, improved problem-solving skills, and a positive impact on character building are highlights. Meanwhile, planning and implementation challenges and the need for additional support and training are emerging as potential areas for further development

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