

Inclusive Teaching Practices in Mathematics Education: A Concept Paper

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Abstract

This concept paper discusses inclusive teaching practices in Mathematics education to ensure that all students, regardless of their abilities or background, can access and acquire Mathematics knowledge according to their individual needs. Inclusive teaching refers to students with special needs and includes those with different learning styles, diverse cultural backgrounds, and students who face difficulties understanding Mathematics concepts. This concept paper explores key challenges in implementing inclusive teaching, particularly the lack of context-specific instructional strategies and inadequate, ongoing professional training tailored to the needs of diverse classrooms. To address these challenges, several strategies are proposed, including differentiated instruction, the use of educational technology, co-teaching models, and culturally responsive pedagogy. These approaches are intended to create more engaging, flexible, and supportive learning environments that meet the needs of all students. Indirectly, integrating inclusive strategies can make Mathematics education more accessible and meaningful for all students. As a result, teaching becomes more effective and students become more actively engaged in their learning process. Overall, inclusive teaching benefits students with special needs and contributes to a more equitable and collaborative classroom environment for all students.

Keywords: Inclusive Teaching, Mathematics Education, Teaching Strategies, Differentiated Learning, Effective Teaching

Introduction

Inclusive education has emerged as a key priority in global education, reflecting a growing commitment to equitable learning opportunities for all students. In Mathematics education, inclusivity is critical due to the diverse range of learners who enter the classroom with different abilities, learning styles, and cultural backgrounds. Teaching Mathematics inclusively requires more than simply accommodating students with special needs. Globally, inclusive teaching in Mathematics is increasingly recognised as a critical pedagogical approach to support learner diversity (Sharma & Jacobs, 2017). This includes recognising the varied

challenges students face in understanding abstract mathematical concepts and the limitations of traditional instructional methods (Faragher, Hill, & Clarke, 2016). Therefore, the shift towards inclusive Mathematics teaching is both in addressing educational disparities.

In many classrooms, teachers encounter a wide spectrum of learners, including those with learning disabilities, language barriers, and differences in cultural context. Unfortunately, conventional teaching strategies often fail to address these differences, resulting in unequal learning outcomes (Dunn & Mulryan-Kyne, 2018). Thus, inclusive teaching practices aim to bridge this gap by adopting strategies that support differentiated learning and student engagement. These practices promote the use of varied teaching methods, flexible classroom arrangements, and culturally responsive pedagogy to cater to diverse student needs (Magee & Willey, 2024). Furthermore, inclusive teaching encourages the participation of all learners through collaborative and student-centred approaches (Averill, 2012). As a result, it helps build a supportive and equitable environment that fosters both academic and personal growth.

Therefore, studying inclusive teaching practices in Mathematics education is crucial to ensure that no student is left behind. In particular, inclusive approaches help teachers to address different learning needs and promote equal opportunities for academic success. Moreover, this study benefits teachers by enhancing their instructional skills, students by supporting their learning journey, and education policymakers by providing strategies for more diverse learner-oriented curricula. By focusing on inclusivity, Mathematics education can become more accessible, effective, and meaningful for all learners.

An Inclusive Teaching Approach in Mathematics Education

Inclusive teaching in Mathematics education represents a planned effort to provide equal learning access for all students regardless of their abilities or backgrounds. As highlighted by Büscher and Prediger (2024), Mathematics teachers who adopt inclusive practices frequently encounter two significant challenges: providing a common learning experience for all students while simultaneously addressing individual learning needs. Even though some teachers recognised the difficulty in achieving both shared and individual learning goals, others successfully combined both approaches in their classroom practices. This demonstrates that inclusive teaching in Mathematics education cannot rely on rigid methods but must be flexible and adaptive. Moreover, teaching approaches must be sensitive to the varying needs, abilities, and contexts of students. Consequently, educators must be equipped with strategies to navigate collective and personalised learning experiences simultaneously (Büscher & Prediger, 2024).

On the other hand, Faragher et al. (2016) asserted that utilising various instructional approaches is essential in addressing the different learning needs of students within inclusive Mathematics education. That is, recognising student diversity and designing teaching strategies that align with their individual needs is crucial for improving access to mathematical learning. Similarly, Magee and Willey (2024) highlighted the significance of culturally relevant pedagogy as a key component of inclusive teaching. This approach emphasises the value of students' cultural backgrounds, enhancing their engagement in Mathematics learning. It plays a vital role in helping students from diverse backgrounds connect mathematical concepts to their everyday experiences. Thus, culturally responsive teaching supports meaningful participation and deeper understanding among all learners by making learning more relatable.

Meanwhile, Höveler (2019) explored the significance of inclusive learning environments and how their design can accommodate students with a wide range of needs. The study emphasised that when classrooms are carefully structured, they can provide equal opportunities for all learners to participate meaningfully regardless of their abilities. Furthermore, a well-adapted learning environment enables students who require additional support to remain in the same classroom as their peers without feeling excluded. The inclusion of collaborative activities such as group work fosters peer interaction and mutual understanding among students. In addition, incorporating interactive learning tasks helps address different learning styles, making lessons more engaging and effective for diverse learners. Therefore, designing inclusive teaching is crucial in ensuring that Mathematics teaching supports students in reaching their full potential.

Challenges in Inclusive Teaching

While inclusive teaching offers many benefits, teachers still face several challenges, especially in classrooms with diverse student needs. According to Höveler (2019), in inclusive Mathematics classes, there is diversity in various dimensions of learning, which creates new teaching challenges. Nevertheless, the study revealed that a carefully designed learning environment can help coordinate individual and group learning, including those who need additional support to learn together. In particular, one of the main challenges in inclusive teaching is the lack of teaching resources and materials tailored to the needs of different students. For instance, Sharma et al. (2020) noted that many schools do not have physical facilities or teaching aids suitable for students with special needs. Hence, teaching materials such as manipulative cards, interactive whiteboards, and customised educational software can be helpful in inclusive Mathematics teaching.

Professional training in inclusive teaching is the key to success. However, many teachers do not receive sufficient training to teach students with special needs. Battey (2013) stated that many teachers are not trained with effective inclusive teaching strategies to address students with a wide range of needs in the classroom. Without proper training, teachers will find it challenging to adapt their teaching and manage heterogeneous classes. Adapting the curriculum to meet the diverse needs of students is also a challenge in inclusive Mathematics teaching. Nguyen and Tran (2021) noted that traditional Mathematics curriculum often does not provide equal access to students with different learning styles, especially students with special needs. Correspondingly, adapting the curriculum to meet these various needs requires more time, effort, and strategies to ensure that each student can thrive individually.

Classroom management in inclusive classrooms that incorporate students with diverse needs presents a significant challenge. According to Opoku, Tawiah, Agyei-Okyere, Osman, and Afriyie (2019), managing classrooms that include students with special needs becomes more demanding, as teachers must provide individualised support while ensuring that other students receive sufficient attention. In essence, learning disabilities often require a more structured and personalised teaching approach. This adds to the complexity of maintaining a balanced and effective learning environment for all learners. In addition to classroom-related challenges, parents and community support also play a crucial role in the success of inclusive teaching in Mathematics education. Nonetheless, many teachers struggle to involve parents in the learning process, especially when parents lack an understanding of inclusive teaching

to assist their children at home. Furthermore, Höveler (2019) highlighted that limited community participation in some areas further complicates the implementation of inclusive programs. Consequently, the success of inclusive education often depends on classroom strategies and strong collaboration between schools, families, and communities.

Recommended Inclusive Teaching Strategies in Mathematics Education

One of the key strategies for inclusive teaching in Mathematics is the use of a differentiated approach. This is attributable to the fact that it emphasises the need to adapt both the content and the delivery method to suit the varying needs, abilities, and learning styles of students. According to Faragher et al. (2016), differentiation allows teachers to provide multiple learning paths, ensuring that every student has an equitable opportunity to succeed. For example, this includes the use of diverse teaching techniques, flexible grouping, and varied assessment methods tailored to student readiness and preferences. As a result, teachers can create a more inclusive and supportive learning environment where all students are able to engage meaningfully with mathematical content.

Technology can be a highly effective tool in supporting inclusive teaching. According to Höveler (2019), the use of educational technology tools such as interactive Mathematics software, learning applications, and digital whiteboards can help students understand abstract and complex mathematical concepts. These tools provide engaging and visual learning experiences that cater to diverse learning styles. In addition, technology enables teachers to offer better-individualised support for students with special needs by delivering flexible and interactive materials. Consequently, inclusive classrooms become more dynamic and accessible for all learners.

Co-teaching is a strategy that can significantly contribute to the creation of inclusive classrooms. According to Gardesten (2023), this model enables two or more teachers to collaborate in delivering Mathematics instruction to students with diverse needs. As a result, students benefit from direct and simultaneous support from multiple educators. This is particularly important for students who require additional guidance or who struggle with mathematical concepts. Furthermore, co-teaching promotes shared expertise and allows for more flexible instructional planning to meet various learning needs.

Using a culturally relevant approach effectively ensures that students from diverse backgrounds feel engaged and recognised in learning Mathematics. According to Magee and Willey (2024), culturally relevant pedagogy connects mathematical concepts to students' cultural experiences and real-life contexts. As a result, students are more likely to find meaning in the subject matter and relate it to their daily lives. Building on this, this approach can enhance students' motivation and participation in classroom activities. Ultimately, it helps make Mathematics teaching more inclusive, meaningful, and responsive to the needs of a diverse student population.

Creating an inclusive learning environment is another crucial strategy in teaching Mathematics. Büscher and Prediger (2024) emphasised that classroom environments must be thoughtfully designed to prevent the marginalisation of students with special needs. For example, teachers can provide supportive spaces, such as designated learning corners for students who require additional assistance. In addition, offering alternative learning materials

can help accommodate students who need a more moderate pace of instruction. Accordingly, the classroom becomes a more balanced and accessible space for all learners.

Problem-Based Learning (PBL) is an effective strategy to stimulate critical thinking and enhance student engagement in inclusive Mathematics teaching. As highlighted by Averill (2017), PBL enables students to understand mathematical concepts within real-world contexts, making learning more practical and relatable. In line with this, this approach encourages collaboration, allowing students with special needs to work in groups, interact with peers, and engage in meaningful problem-solving. In addition, it provides opportunities for students to demonstrate their thinking skills in ways relevant to their personal experiences. Therefore, PBL supports a more personalised and inclusive learning environment that caters to diverse student needs.

Discussion

Inclusive teaching in Mathematics education plays a vital role in ensuring that all students, regardless of their ability or background, can access meaningful learning experiences. However, implementing inclusive practices still faces several challenges in today's classrooms. One of the major issues is the lack of proper training and knowledge among teachers to cater to diverse learners. As a result, students with different learning styles or special needs may feel left behind. This highlights the need for structured strategies that address these gaps effectively. Without proper planning and support, inclusive teaching remains a theoretical ideal rather than a practical reality.

To overcome these issues, several strategies have been proposed by researchers and educators. For instance, differentiated instruction, educational technology, and co-teaching models have demonstrated positive outcomes in inclusive settings. Notably, these approaches allow teachers to personalise learning experiences according to student needs. In addition, they help address the varied pace, abilities, and interests of students in one classroom. Each of these strategies contributes toward a more flexible and responsive teaching approach. Therefore, they can significantly improve student engagement and achievement when implemented effectively.

Despite the availability of effective strategies, professional development remains essential for ensuring successful implementation. Opoku et al. (2019) emphasised that many teachers are still not adequately trained to apply inclusive teaching methods in real classroom settings. Consequently, they may struggle to adjust instruction or manage diverse groups effectively. Hence, ongoing training tailored to inclusive practices is necessary. This training should include practical strategies, case studies, and simulations. With sufficient support, teachers can confidently adopt inclusive teaching methods and improve student outcomes.

Conclusion

In conclusion, inclusive teaching in Mathematics education is vital to ensure that all students, regardless of their ability or background, are given equal opportunities to succeed. Although implementing inclusive practices can be challenging, strategies such as differentiated instruction, the integration of technology, and co-teaching have proven effective in addressing these challenges and enhancing the quality of instruction. To maximise the impact of inclusive teaching, it is essential to provide continuous professional development for teachers and to

adopt a more flexible curriculum and pedagogical approach. When effectively implemented, inclusive strategies benefit students with special needs and the entire classroom by fostering a supportive and collaborative learning environment. This approach helps every student feel valued, promotes active participation, and encourages mutual respect and understanding among peers. Ultimately, inclusive teaching creates unbiased and holistic learning experience where all students can thrive together.

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