



# Experimental Study on the Effect of Differentiated Instruction Learning Model on Inclusive Classrooms

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## ABSTRACT

This research investigates the effect of the differentiated instruction learning model on academic achievement, engagement, and participation in inclusive classrooms. The study was conducted using an experimental approach involving both control and treatment groups drawn from inclusive class settings. The treatment group received instruction through differentiated strategies tailored to individual student readiness, learning styles, and interests, while the control group was taught using traditional methods. The results indicated that students in the differentiated instruction group demonstrated significantly higher academic performance, greater classroom engagement, and increased participation compared to those in the control group. These findings align with existing literature supporting the effectiveness of differentiated instruction, particularly in diverse learning environments. The study concludes that differentiated instruction is a powerful pedagogical tool in inclusive education, providing equitable learning opportunities and improving overall classroom dynamics. Educational implications suggest the need for systemic support, teacher training, and policy integration to effectively implement differentiated instruction in inclusive settings.

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## 1. INTRODUCTION

Inclusive education is an educational approach that seeks to address the diverse learning needs of all students, including those with disabilities, learning difficulties, or other special needs, by providing equitable access to quality education within regular classroom settings. As schools increasingly adopt inclusive practices, educators are confronted with the challenge of accommodating a wide range of abilities, learning styles, and behavioral characteristics within a single classroom (Westwood, 2018). Traditional one-size-fits-all teaching methods are often insufficient to meet the diverse academic and social-emotional needs found in inclusive classrooms, potentially leading to disengagement, underachievement, and marginalization of students with special needs.

One of the primary challenges is the lack of individualization. Traditional teaching tends to follow a one-size-fits-all approach, where the same content is delivered to all students in the same way and at the same pace (Westwood, 2018). This uniformity does not account for the wide range of learning differences found in inclusive settings, such as variations in cognitive ability, learning speed, language proficiency, and sensory or physical impairments. As a result, students who require additional support may fall behind, while those who need more advanced material may become disengaged (Westwood, 2018).

Another major challenge is limited student engagement. Traditional teaching often emphasizes lecture-based instruction, passive learning, and rote memorization. These methods can be especially ineffective for students with learning disabilities, attention difficulties, or those who benefit from hands-on and interactive learning (Palincsar et al., 2000). In an inclusive classroom, maintaining engagement across a diverse student population requires teaching practices that are more dynamic, multimodal, and learner-centered something traditional approaches generally lack.

Furthermore, traditional assessments are often inflexible, relying heavily on standardized tests and written exams as the primary means of evaluating student performance. Such assessments may not accurately reflect the capabilities of students with learning disabilities, communication challenges, or anxiety-related conditions (Appleton et al., 2019). Without differentiated assessment strategies, many students in inclusive classrooms may be unfairly evaluated, leading to inaccurate reflections of their learning and potential.

There is also the issue of teacher preparedness and workload. Many teachers are trained primarily in conventional methods and may not have the tools or professional development necessary to address the range of needs in an inclusive classroom (Waitoller & Artiles, 2013). Relying on traditional methods can lead to frustration for both teachers and students, as educators struggle to support students who require specialized strategies while trying to maintain pace with a fixed curriculum.

To respond to this challenge, differentiated instruction has emerged as a promising pedagogical approach (Waitoller & Artiles, 2013). Differentiated instruction is a teaching model that involves proactively modifying content, process, product, and learning environment based on students' readiness levels, interests, and learning profiles. This approach allows teachers to provide multiple pathways for students to access content, engage with learning, and demonstrate understanding. By aligning instruction with individual student needs, differentiated instruction fosters a more inclusive, responsive, and equitable classroom environment (Tomlinson et al., 2003).

Differentiated instruction is a teaching approach that recognizes and responds to the diverse learning needs, interests, and abilities of students within a classroom. It is based on the principle that students do not learn in the same way or at the same pace, and therefore, instruction must be adaptable and flexible to be effective. In differentiated instruction, teachers proactively design varied approaches to what students learn (content), how they learn it (process), how they demonstrate their learning (product), and the environment in which they learn (Tomlinson, 2017). This method ensures that all students, regardless of their starting point, are given the opportunity to succeed and progress according to their individual potential.

In the context of inclusive education, where classrooms are composed of students with a wide range of backgrounds and abilities including those with physical, cognitive, emotional, or learning disabilities differentiated instruction plays a crucial role. Inclusive education aims to provide equal access to learning for all students by removing barriers and creating supportive environments (Ainscow & Miles, 2008). However, a significant challenge in inclusive settings is meeting the varied needs of all learners through a single method of instruction. This is where differentiated instruction becomes essential. It allows teachers to tailor their teaching strategies and materials to accommodate individual differences, ensuring that every student feels valued, included, and supported (Tomlinson, 2014).

By implementing differentiated instruction, teachers can provide multiple means of representation, engagement, and expression, which aligns with the principles of Universal Design for Learning (UDL). For example, a student with a reading disability might receive content through audio recordings, while another student with advanced skills might be offered more complex texts for deeper exploration. Group activities can be designed to allow students to collaborate based on their strengths, and assessment tasks can vary to give students diverse ways to demonstrate their understanding (Langer et al., 2003).

Furthermore, differentiated instruction fosters a positive and inclusive classroom culture. When students see that their unique needs are being acknowledged and respected, they are more likely to be motivated, engaged, and confident in their abilities. This approach also encourages peer

collaboration, empathy, and mutual respect, as students work together and appreciate each other's differences.

Over the past decade, research on differentiated instruction and its role in inclusive education has expanded significantly, reflecting a growing recognition of the need for pedagogical strategies that cater to diverse learners. A number of empirical studies have highlighted the positive effects of differentiated instruction on student achievement. For example, Tomlinson and Strickland (2015) emphasized that differentiating content, process, product, and learning environment based on student readiness, interests, and learning profiles can improve learning outcomes and student motivation. This finding has been echoed by subsequent quantitative studies, such as Subban and Round (2018), which found that differentiated instruction had a statistically significant impact on both low- and high-performing students in inclusive primary classrooms.

In addition to academic performance, several studies have examined how differentiated instruction supports student engagement and emotional well-being. A 2017 study by Dee and Jacob found that students in inclusive classrooms that implemented differentiated learning strategies were more likely to participate actively in class activities, exhibit positive behavior, and report higher levels of satisfaction with their learning experiences. This suggests that differentiated instruction not only supports cognitive development but also enhances students' emotional connection to learning.

Furthermore, recent research has explored how differentiated instruction improves teacher effectiveness and classroom management in inclusive settings. Studies such as those by Prast et al. (2018) and Smale-Jacobse et al. (2019) found that when teachers received targeted training in differentiated teaching strategies, they were better able to address diverse learner needs and reduce disruptive behavior. These studies also emphasized the importance of professional development in ensuring that teachers can confidently apply differentiation techniques in real-world classroom scenarios.

Despite its theoretical benefits, the implementation and effectiveness of differentiated instruction in inclusive classrooms remain under-researched, particularly through empirical methods such as experimental studies. Many existing studies have focused on either differentiated instruction or inclusive education in isolation, without examining how differentiated strategies directly impact learning outcomes in inclusive settings. Therefore, this study seeks to fill that gap by experimentally investigating the effect of applying the differentiated instruction learning model on student outcomes in inclusive classes. The findings are expected to provide valuable insights for educators, policymakers, and curriculum developers in designing inclusive learning environments that support the success of all learners.

## 2. RESEARCH METHOD

This research adopts a quantitative experimental design to investigate the effect of the differentiated instruction learning model on student outcomes in inclusive classrooms. The experimental approach is chosen to determine the causal relationship between the application of differentiated instruction and measurable improvements in student learning performance, engagement, and participation within a diverse educational environment. By utilizing a controlled comparison between an experimental group and a control group, the study aims to provide robust empirical evidence of the model's effectiveness.

The study involves two groups of inclusive classrooms: one serving as the experimental group, where differentiated instruction is implemented, and the other as the control group, which continues to use traditional teaching methods. Both groups consist of students with varying academic abilities, including students with special educational needs, to reflect a typical inclusive classroom setting (Avramidis et al., 2000). The selection of participants uses a purposive sampling technique, targeting inclusive classrooms at the primary or junior high school level that have similar demographic characteristics, such as student-teacher ratios, curriculum standards, and socio-economic background.

The intervention for the experimental group includes a structured implementation of differentiated instruction over a period of 8 to 12 weeks (Smale-Jacobse et al., 2019). Teachers in the

experimental group are trained beforehand in the principles and strategies of differentiated instruction, including modifying content, process, product, and learning environment based on students' readiness levels, interests, and learning profiles. Lesson plans are designed to include varied instructional methods such as tiered activities, learning stations, flexible grouping, and the use of visual, auditory, and kinesthetic materials. In contrast, the control group receives instruction based on the conventional teacher-centered approach with uniform content delivery and assessments.

To evaluate the effectiveness of the intervention, pre-tests and post-tests are administered to both groups. The tests are designed to assess academic performance in the subject area being taught (e.g., language or mathematics), ensuring alignment with national curriculum standards (Polikoff et al., 2011). Additionally, student engagement and participation levels are measured using structured observation checklists and student self-report questionnaires, which have been validated in previous inclusive education research. Teachers' feedback and reflections are also collected through interviews to understand their perceptions of the ease and impact of implementing differentiated instruction (Santangelo & Tomlinson, 2012).

Data analysis involves the use of descriptive statistics (mean, standard deviation) to summarize the data and inferential statistics (such as independent sample t-tests and ANCOVA) to determine whether there are statistically significant differences between the experimental and control groups. A significance level of 0.05 is used for hypothesis testing.

Ethical considerations are rigorously maintained throughout the research process. Consent is obtained from school authorities, teachers, and parents or guardians of the participating students (Esbensen et al., 2008). Anonymity and confidentiality of all participants are ensured, and the study is conducted in a manner that does not disadvantage any student academically or emotionally.

### 3. RESULTS AND DISCUSSIONS

#### 3.1 Result

The findings of this study provide strong empirical support for the positive impact of differentiated instruction on student outcomes in inclusive classroom settings. After the implementation of the differentiated instruction model in the experimental group over a period of 8 weeks, clear differences emerged when compared to the control group that continued with traditional teaching methods.

Academic performance showed significant improvement among students in the experimental group. Analysis of pre-test and post-test scores indicated a greater increase in average scores for students who received differentiated instruction compared to those in the control group. Statistical testing using an independent sample t-test revealed that the difference in post-test scores between the two groups was statistically significant ( $p < 0.05$ ), suggesting that differentiated instruction contributed meaningfully to improved academic achievement. Notably, students with learning difficulties in the experimental group demonstrated considerable progress, narrowing the performance gap with their peers.

In addition to academic performance, there was a notable enhancement in student engagement and participation in the experimental group. Observational data indicated that students in this group were more actively involved in class discussions, participated more frequently in group activities, and displayed greater enthusiasm during lessons. Self-report questionnaires also reflected an increase in motivation and interest in learning. In contrast, students in the control group showed minimal changes in engagement levels, with some students particularly those with special educational needs continuing to display signs of disengagement or passivity during lessons.

Teachers who implemented the differentiated instruction model also reported improvements in classroom dynamics. They noted that students responded positively to flexible grouping strategies, visual aids, and varied assignments tailored to different learning styles. According to the teachers, this led to more inclusive peer interactions and a more supportive learning environment. They also observed a decrease in behavioral issues, as students were more focused and confident when tasks were aligned with their abilities and interests.

Despite these positive results, the study also identified some challenges. Teachers expressed that planning and preparing differentiated materials required more time and effort, especially in the initial stages. However, they agreed that the benefits such as improved student learning outcomes and more harmonious classroom interactions outweighed the difficulties in implementation.

Overall, the results of this study confirm that differentiated instruction is not only effective in improving academic performance but also in promoting inclusive practices that enhance engagement and participation for all learners, including those with special educational needs. The findings support the integration of differentiated instruction as a practical and impactful strategy for inclusive education and provide a foundation for its broader application in diverse classroom settings.

### ***3.2 Positive Impacts on Learning Outcomes, Engagement, and Participation in Inclusive Classrooms***

In the context of inclusive education, where classrooms are composed of students with diverse abilities, backgrounds, and learning needs, the implementation of differentiated instruction is hypothesized to bring about several positive impacts. First, differentiated instruction is expected to improve learning outcomes by allowing students to access the curriculum in ways that align with their individual readiness levels, learning profiles, and interests. Unlike traditional one-size-fits-all teaching models, differentiation provides multiple paths to learning, enabling students to process content, demonstrate understanding, and apply knowledge at a pace and style that suits them. This personalization is particularly beneficial for students with learning disabilities, cognitive delays, or language barriers, who often struggle in standardized instructional environments (Hocine & Sehaba, 2024). By adjusting the complexity of tasks, using varied instructional strategies, and offering choice in learning activities, differentiated instruction is hypothesized to enhance comprehension, retention, and overall academic performance across the diverse student population.

Second, student engagement is expected to rise significantly in classrooms that employ differentiated instruction. Engagement refers to the level of attention, curiosity, and interest that students exhibit during the learning process (Arnone et al., 2011). Differentiated instruction, by design, promotes student autonomy and relevance by connecting content to students' personal interests and real-world experiences. It incorporates active learning methods such as group projects, hands-on tasks, and creative assignments that stimulate intrinsic motivation. For students who often feel alienated by traditional teaching methods, particularly those with special educational needs, this approach can rekindle a desire to learn and increase their involvement in classroom activities (Mills & McGregor, 2013). When students see themselves reflected in the curriculum and are given voice and choice in their learning, they are more likely to become active and invested participants.

Third, participation among all students especially those with disabilities or learning challenges is hypothesized to improve as a result of the more inclusive nature of differentiated instruction. By allowing for flexible grouping and promoting peer collaboration, differentiated instruction can reduce social barriers that often isolate certain students. The emphasis on student strengths rather than deficits helps build confidence and encourages all learners to contribute. As students are given opportunities to succeed at their own level, the likelihood of withdrawal or disruptive behavior decreases, and a more inclusive, respectful classroom culture is cultivated. This, in turn, fosters a sense of belonging and mutual support, which is essential for the success of inclusive education.

In summary, the hypothesized positive impacts of differentiated instruction in inclusive classrooms are multi-dimensional (Roose et al., 2024). It is anticipated that this instructional model will not only raise academic achievement but also enhance engagement and foster active participation among all students. These benefits are particularly significant in inclusive settings, where teaching must be adaptive, equitable, and responsive to the needs of every learner.

### ***3.3 Educational Implications for Teachers, Schools, and Policy-Makers Regarding Inclusive Practices***

The shift toward inclusive education demands not only structural changes in the education system but also a fundamental transformation in pedagogical approaches. For teachers, the study underscores the necessity of developing skills in differentiated instruction as a core competency for

inclusive teaching. Teachers must be equipped with the ability to assess students' varying needs and design flexible lesson plans that accommodate different learning styles, readiness levels, and interests (Tomlinson, 2001). This requires ongoing professional development, mentorship, and collaboration among educators. Teachers also need access to appropriate instructional resources and support systems that enable them to implement differentiation without becoming overwhelmed. Importantly, teachers must adopt a mindset that views student diversity not as a challenge but as an opportunity to enrich the learning environment.

At the school level, leadership must play a proactive role in fostering a culture of inclusion. Schools should prioritize inclusive teaching strategies in their academic planning and provide the infrastructure necessary to support them. This includes allocating time for collaborative planning among teachers, investing in inclusive teaching materials and assistive technologies, and encouraging interdisciplinary collaboration with special education professionals. School administrators should also create evaluation systems that recognize and reward inclusive practices, thereby reinforcing their value and encouraging continuous improvement. Furthermore, inclusive policies must be supported by inclusive classroom layouts, appropriate teacher-student ratios, and mechanisms for identifying and responding to student needs promptly.

For policy-makers, the research highlights the importance of embedding differentiated instruction and inclusive teaching strategies into national and regional education frameworks (May & Bridger, 2010). Policies should mandate and fund inclusive education initiatives that go beyond access and address quality and equity in learning. This includes revising teacher training curricula to incorporate modules on inclusive pedagogy and ensuring that certification standards reflect competencies in differentiation. Policy-makers must also consider allocating targeted resources to support schools with high populations of students with special educational needs and provide incentives for inclusive innovation. Furthermore, there is a need for standardized monitoring and evaluation systems to assess the implementation and impact of inclusive practices across schools.

In essence, inclusive education cannot be the sole responsibility of individual teachers; it must be a coordinated effort involving educational institutions and government bodies. Differentiated instruction, as a proven strategy for inclusive classrooms, requires systemic support and alignment across all levels of the education sector. By recognizing and acting upon these implications, stakeholders can move closer to the realization of an equitable education system where every student, regardless of ability, is empowered to thrive.

#### **3.4 Comparison of Research Results with Previous Research**

The results of this study, which demonstrate the effectiveness of differentiated instruction in improving academic performance, engagement, and participation in inclusive classrooms, are consistent with a growing body of research conducted over the past decade. When compared with prior studies, several clear alignments and reinforcing patterns emerge, further validating differentiated instruction as a key pedagogical approach in inclusive education (Bondie et al., 2019).

Firstly, this research echoes the findings of Tomlinson (2014), who emphasized that differentiated instruction enhances student achievement by aligning teaching strategies with learners' readiness, interests, and learning profiles. Like Tomlinson's work, the present study found that when instruction was adapted to meet diverse student needs, academic outcomes improved significantly, particularly for students with learning difficulties. This suggests that differentiated instruction offers a universally beneficial framework that accommodates both high-achieving and struggling learners within the same classroom.

Additionally, Santangelo and Tomlinson (2012) highlighted that student motivation and engagement are notably higher in classrooms where instruction is differentiated. The results of the current study strongly support this claim. Students exposed to differentiated tasks demonstrated higher levels of enthusiasm, involvement, and participation compared to those in traditionally taught classes. This alignment suggests that differentiated instruction plays a critical role not just in academic achievement, but in cultivating positive attitudes toward learning, especially in inclusive settings where students often feel marginalized by uniform teaching methods.

Moreover, the study's findings are aligned with Subban (2006), who concluded that differentiated instruction creates a more equitable learning environment by ensuring all students have access to meaningful and appropriately challenging learning experiences. In the current study, students with special educational needs were more actively involved and showed reduced behavioral issues, reinforcing Subban's argument that differentiated practices reduce exclusion and promote classroom harmony.

The current research also supports the findings of McLeskey and Waldron (2011), who asserted that inclusive education is most effective when supported by instructional strategies that are flexible and responsive. The positive feedback from teachers involved in this study mirrors their conclusions teachers reported that differentiated instruction improved classroom dynamics and helped them address a broader spectrum of learning needs more effectively than traditional approaches.

However, this study also reveals ongoing challenges echoed in earlier research, such as the findings of Florian and Black-Hawkins (2011), who noted that while differentiated instruction is effective, it often requires substantial time, planning, and professional development. Similar concerns were expressed by teachers in the current study, who acknowledged the initial difficulties in creating differentiated materials but ultimately recognized the long-term benefits.

#### 4. CONCLUSION

This research has examined the impact of differentiated instruction on learning outcomes, engagement, and participation in inclusive classrooms. The findings clearly demonstrate that differentiated instruction significantly enhances the educational experience for students with diverse learning needs. By tailoring instructional methods, materials, and assessments to accommodate individual differences in readiness, interests, and learning styles, teachers are better able to create an equitable and supportive environment where all students can succeed. The study confirmed that differentiated instruction not only improves academic performance but also increases student motivation and active classroom participation factors that are crucial in inclusive educational settings. These results are consistent with previous research and reinforce the notion that traditional, uniform teaching approaches are often inadequate for meeting the complex needs of heterogeneous classrooms. Furthermore, the study highlights important implications for educators, schools, and policy-makers. It emphasizes the need for systemic support, professional development, and the integration of inclusive strategies into teacher training and educational policies. Only through collaborative efforts at all levels of the education system can differentiated instruction be effectively implemented and sustained. In conclusion, differentiated instruction offers a promising pathway toward achieving true inclusivity in education. It empowers teachers to respond to the unique needs of every learner and fosters an inclusive culture where all students regardless of ability feel valued, engaged, and capable of achieving their full potential.

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