ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 18, Issue, 07, pp.37943-37950, July, 2026
DOI: https://doi.org/10.24941/ijcr.50853.07.2026

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

IMPACT OF DIFFERENTIATED INSTRUCTION ON GRADE 7 STUDENTS' MATHEMATICS ACHIEVEMENT: A STUDY OF A RURAL HIGH SCHOOL IN CLARENDON, JAMAICA

Byron A Campbell and Knola Oliphant

University of Technology, Jamaica

ARTICLE INFO

Article History:
Received 17th April, 2026
Received in revised form
20th May, 2026
Accepted 27th June, 2026
Published online 30th July, 2026

Keywords:
Differentiated Instruction, Mathematics Achievement, Peer-Touring, Scaffolding

**Corresponding author:*
Byron A Campbell

ABSTRACT

This study examined the experiences of Grade Seven Mathematics students at rural school with pseudonym SLA High in Clarendon, Jamaica, exploring the influence of using differentiated instruction on their academic achievement. The study leveraged a convenience sampling method to select six (n = 6) students. This action research sought to address three research questions, through data collection instruments: interviews, observations, and document analysis. The study analysed qualitative data using themes and codes, while quantitative data was presented using descriptive and inferential statistics to promote validity and credibility. The findings showed that differentiated instruction boosts students' engagement, motivation, and Mathematics achievement while simultaneously preserving data retention. Overall, the research offers insights for educators and stakeholders aiming to foster equity, participation, and improved learning outcomes in secondary Mathematics education.

Citation: **Byron A Campbell and Knola Oliphant.** ***2026.*** "Impact of Differentiated Instruction on Grade 7 Students' Mathematics Achievement: A Study of a Rural High School in Clarendon, Jamaica.". ***International Journal of Current Research, 18, (07), 37943-37950.***

INTRODUCTION

Currently, Mathematics performance is a global phenomenon, particularly with several research revealing low achievement amongst students, especially at the secondary level with implications fornational development, and its unresolved nature remains a concern worldwide (UNESCO, 2023). Borba (2005) pointed out that there are concerns about students' Mathematics underachievement for some time now, which needs immediate action because underperformance indirectly affects students' overall academic achievement. According to Leachman (2025), as cited in the *Jamaica Observer* (January 19, 2025), the Mathematics results in Jamaica, especially at the Caribbean Secondary Education Certificate (CSEC) level indicating a mathematics crisis which has called for a shift from a wait-to-fail approach toward early detection and intervention. Furthermore, Torres (2021) noted that in Jamaicathere is a marked decline in mathematics education based on the CSEC (Torres, 2021), leaving many students needing additional instructional support and widening existing learning gaps. The Ministry of Education, Skills, Youth and Information (MoESYI) has explored ways to provide targeted support to help students improve on their CSEC Mathematics examinations. These support include deploying Mathematics coaches, developed the National School Learning Improvement Plan (NSLIP) and provide study camps to help with preparation for exams (Ministry of Education, Skills, Youth and Information, 2025). While MoESYI has made attempts to address, the underperformance, there are additional deep underlying issues attributed to inadequate instruction and a shortage of Mathematics teachers, especially trained ones (Christina & Ming, 2022; Collins *et al.*, 2023). Moreover, with the ongoing discussions, educators and researchers are increasing exploring a number of approaches that can facilitate improvements in Mathematics performance. Aguhayon *et al.* (2023) noted that teachers are becoming more responsible in identifying and even developing teaching strategies that support students who perform poorly. One main strategy identified being used by almost all teachers is differentiated instruction that allows teachers to tailorlessons to deal with students varying abilities and needs. According to Santangelo & Tomlinson (2012), teachers have found differentiated instruction to be a very flexible, adaptive approach because it requires modification of teaching methods planned to deal with varying students' abilities, thus canfacilitate the improvement students' academic achievement in Mathematics. They further explained that teachers normally adjust the regular curriculum, assessment, and instructional methods to make them more geared towards each student's readiness, learning style, and interests. Aguhayon *et al.* (2023) and to Santangelo & Tomlinson (2012) further postulates that teachers have identified and are leveraging methods including flexible grouping, think-pair-share, flipped classrooms, scaffolded activities, and varied instructional materials that ensure inclusivity and responsiveness to diverse learner needs. In

doing so, this may help to address underachievement in Mathematics.

Background of the Study: Underachievement in Mathematics has long been a major concern, and differentiated instruction is a reliable strategy for addressing varied learning needs. It is an efficient approach for meeting the assorted learning needs of students in mixed-ability classrooms (Marks *et al.*, 2021), involving modifications to curriculum content, teaching strategies, and student responsibilities. When effectively implemented, it can significantly improve student engagement, understanding, and motivation, thereby improving Mathematics outcomes. Instructional strategies of this kind can significantly improve overall learning outcomes (Magableh & Abdullah, 2019), and differentiated instruction allows flexibility in learning progression, without an obligatory timeline for students to follow (Moon & Brighton, 2020). It is therefore crucial to understand the background of student achievement in relation to the role of differentiated instruction in resolving individual differences. This action research sought to implement and evaluate differentiated instruction and to explore students' and teachers' experiences of it.

Problem Statement: According to Bandura (1997), there are ongoing curriculum reforms and teaching initiatives globally especially with focus on the poor academic achievement in Mathematics. Furthermore, the researcher recognized that despite these efforts, underperformance remains a persistent issue among Grade Seven students at SLA High School in rural Clarendon, Jamaica. Not only are students struggling with obtaining good grades in Mathematics, the study points to possible adverse impact on their academic growth, problem-solving skills, and self-confidence, as a result of low achievement. Johnson (2023) also mentioned that many students who perform poorly are usually the ones that become disengaged when traditional, uniform teaching approaches fail to address diverse learning needs. However, with the characteristics of differentiated instruction addressing students' diverse abilities and need may be effective for improving Mathematics proficiency among low-achieving students. However, with many rural Jamaican classrooms being affected by insufficient resources, large class sizes (approximately thirty students to one teacher), and limited teacher preparation; differentiated instruction may be a challenge to effectively implement (UNESCO, 2023). Nonetheless, the research sought to explore this effectiveness through the engagement with one class at SLA High School, Rural Clarendon, Jamaica. The aims to contribute to the improvement of Mathematics education and to support Jamaica's Vision 2030 goal of improving student outcomes, through this investigation beginning with one class. The researcher recognizes that Grade Seven students at this school have consistently performed poorly in Mathematics, where based on observations students have been struggling to solve mathematical problems resulting from a lack of essential problem-solving skills. This study sought to examine the role of differentiated instruction in improving students' mathematical understanding, engagement, and achievement.

Purpose of the study: The purpose of this study was to reveal the capabilities of Grade Seven Mathematics students at SLA High School in rural Clarendon, Jamaica, with the use of differentiated instruction to address their poor academic achievement in Mathematics and to determine its effectiveness in improving their overall engagement and performance; therefore, a qualitative approach was utilized. Differentiated instruction is an action for change, which was grounded in the concepts associated with Vygotsky's Zone of Proximal Development (ZPD) and Gardner's Theory of Multiple Intelligences.

Research Questions

The following research questions provided specificity for this study aligned to Creswell and Guetterman (2019) perspectives on research:

RQ 1: How do grade 7 Mathematics students at the rural high school describe their experiences with differentiated instruction?

RQ 2: What do teachers say about the challenges and benefits of using differentiated instruction in Grade 7 math classes, based on reports?

RQ 3: How do students perceive the impact of differentiated instruction on their motivation and engagement in Mathematics?

Significance of the Study: This study is significant because it through the investigation of the persistent problem of low academic achievement in Mathematics among Grade 7 students at SLA High School, the findings can indicate the effectiveness in using differentiated instruction. Furthermore, with Mathematics being an essential subject for all students' academic success and specifically for wider development and career opportunities (Tomlinson, 2017); catering to students' diverse needs may not have been satisfactorily addressed by other teaching methods than differentiated instruction. Therefore, this research provides insights into how differentiated instruction can be adapted to drive students' engagement, improve comprehension, and enhance their overall achievement. Also, the findings will contribute to the existing literature and offering practical recommendations for secondary-level Mathematics learning. Additionally, stakeholders including teachers, school administrators and others stand to benefit from the findings by recognizing differentiated instruction as an accommodation strategy intended to address varied learning styles and readiness levels, as well as inform instructional planning and professional development.

Delimitation of the Study: The researcher recognised that there are various differentiated instruction strategies but decided to focus particularly on flipped classrooms, flexible grouping, and scaffolded assignments primarily. These strategies were implemented through the action research cycle involving planning, acting, observing, and reflecting geared towards addressing Grade 7 students' poor performance. These students were focused on specifically due to their weak foundation Mathematics skills based on a critical transition phase from primary to secondary education (Grade 7). Tomlinson (2017) pointed out that at this juncture, differentiated instruction is fitting because it facilitates modification of teaching, content, and assessment to accommodate students' different learning styles, aptitudes, and interests. Nevertheless, there exists delimitations as a result of focusing on a specific area in Clarendon, group of students, and instructional strategy. In other words, the study included on Grade 7 students from SLA High School in rural Clarendon, thus the findings limit the generalizability of the results to other

rural schools. Furthermore, the research in examining Mathematics performance did not include other academic self-controls, and only considered only differentiated instruction as the primary teaching strategy.

Definition of Key Terms

Differentiated Instruction: According to Magableh and Abdullah (2020), differentiated instruction is a pedagogical paradigm that aims to satisfy the needs of academically varied students based on their learning profiles, interests, and readiness levels. (p. 630).

Flexible grouping: Flexible grouping related to differentiated instruction. It gives the opportunities for students to be part of different groups based on their readiness, interest, or learning style (Mursky, 2011).

Scaffolded Assignments: Scaffolding assignments involves structuring parts of a single assignment or designing a sequence of assignments so that they gradually increase in cognitive complexity (Depaul University, 2008).

Learning Needs: These needs influence how student's best engage and hold information this were a unique educational requirements for students based on their cognitive abilities, learning styles, interests, and prior knowledge. (Santangelo & Tomlinson, 2012, p. 312).

Flip classroom strategy: Flipped classroom strategy the students have time to reive the subject, the students who cannot attend class will obtain the materials of learning, the students do not need to do homework and actively work, discuss and solve problems in a group.(Nichols, 2012, p. 18).

***Motivation*:** Sasson. (2020) Motivation is the power that activate the engine of success that moves you toward accomplishment**.** (p.2)

MATERIALS AND METHODS

Methodology is a set of procedures and activities used to gather and validate information about a subject and to answer research questions (Little & Profile, 2020), referring to the forms of data collection, analysis, and interpretation a researcher proposes for a study (Creswell & Creswell, 2023).

Research Design and Approach: Research design encompasses the plans and procedures for a study, spanning decisions from broad philosophical assumptions to detailed methods of data collection and analysis (Creswell & Creswell, 2023). Given the purpose and nature of this study, a qualitative, action-research design was adopted. Action research is an iterative process used to solve a problem systematically (Creswell & Creswell, 2023); here, the problem was students' underperformance in Mathematics, making the design well-suited to an educational problem the researcher sought to solve directly. This qualitative approach explored the meanings students and teachers ascribed to differentiated instruction through emerging questions, data collection in participants' natural settings, and inductive, theme-based analysis.

Action research focuses on addressing practical problems within organizations such as schools, emphasizing both the generation of knowledge and the implementation of change by collaboratively identifying problems and implementing solutions. The researcher followed a four-stage cycle: planning, in which the problem was identified and an intervention plan designed; acting, in which differentiated instruction strategies were implemented in the classroom; observing, in which data related to the intervention were collected and organized; and reflecting, in which data were evaluated, analyzed, and interpreted for effectiveness. Preliminary information was first collected to define the problem; an intervention plan was then implemented, further data were collected to assess outcomes, and the researcher reflected on the results through analysis, interpretation, conclusions, and recommendations. Figure 1 illustrates this cycle (Kemmis & McTaggart, 1988).

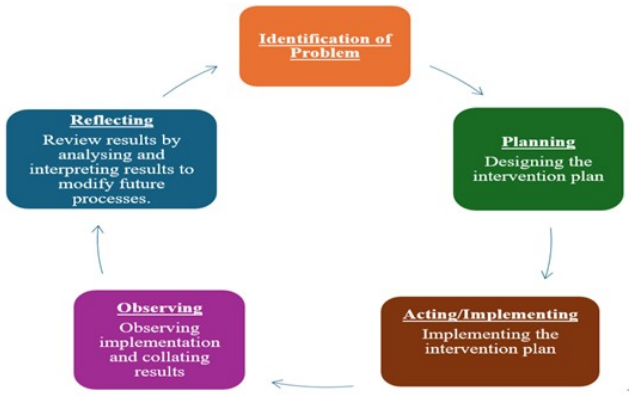

Figure 1. Action Research cycle adapted from Kemmis& McTaggart (1988)

Research Site, Population, Sample and Sampling Method: The study used the pseudonym, SLA High School, which is the research site of a coeducational secondary school located in rural Clarendon, Jamaica. This institution has been operating for over 50 years and currently have a total of approximately 300 students during the week days Monday through Friday between the hours of 8:00 a.m. to 2:45 p.m. Amongst its academic departments, there exist the Mathematics Department which has six Mathematics teachers including the department head serving the entire school population. The researcher adopted an entry approach aligned to Macík (2018), where a formal letter was written and submitted to request permission to conduct the research and access to the Grade 7 students.

The researcher selected the population including twenty Grade 7 students, male and female, at the institution that seems to be have some difficulty transitioning from primary Grade 6 to secondary school Grade 7 who shows sign of a weak Mathematics foundation. Their teachers were also chosen because they decided to plan and implement differentiated instruction in the classroom. Of these students, six Grade 7 Mathematics students (four males, two females) were identified because they performed poorly on Mathematics tests, which according to Bunce *et al.* (2006), Creswell & Creswell (2018)and Patton (2015) is a size considered appropriate for generating rich, detailed qualitative information. Furthermore, this study used purposive sampling to select the participants deliberately due to the knowledge and expertise of the teachers, and the relevance of the students to the research problem (Alkassim*et al.*, 2016). Also, these participants were carefully considered because they were directly involved in the teaching and learning process under differentiated instruction.

Data Collection Instruments: To conduct the research study, the researcher used interviews, focus group discussions, classroom observation, and document analysis. The semi-structured interviews consisted of open-ended questions to explore their experiences and perspectives on differentiated instruction, using probing questions. The two teachers were interviewed capturing the challenges and benefits of implementation, after being informed of the nature of the study and permission was requested to audio record the study for transcription later in order to complete the analysis. Additionally, the study involved a focus group discussion with the six students to explore how differentiated instruction influenced their motivation and engagement. Classroom observation, supported by an observation checklist, examined students' participation, engagement, and responses during lessons that used differentiated instruction strategies, providing the researcher with a contextual understanding of participants' behaviour. Document analysis examined lesson plans, students' class work, tests, pre-tests, student journals, and post-tests to determine whether differentiated instruction had influenced students' academic performance, and the teacher also recorded evaluations of each lesson implemented to support ongoing reflection on the effectiveness of the strategies used.

Data Collection Procedures and Data Analysis:A pilot study was first conducted to test the research instruments and identify potential problems before the main study began (Turner, 2020). Following the pilot, the intervention was implemented over a six-week period, during which the researcher applied differentiated instruction strategies during Mathematics lessons. Students completed a pre-test before the intervention and a post-test afterward to measure changes in academic performance, classroom observations were conducted throughout, and interviews with students and teachers were conducted after the intervention to gather participants' reflections. Data analysis involved systematically examining, cleaning, transforming, and representing data to extract meaningful insights and identify patterns, including setting clear goals, preparing and cleaning the data for accuracy and consistency, analysing it using appropriate methods, and presenting findings through tables and charts where necessary. The researcher also performed a comparative analysis of the pre-test and post-test scores to uncover the impact differentiated instruction had on students' performance, while the qualitative data was analysed using coding and thematic analysis, with codes grouped into categories to generate themes addressing the research questions. Finally, the classroom observation data were similarly analysed into themes and codes focusing on whether classroom practices aligned with differentiated instruction strategies.

Trustworthiness and Ethical Considerations: The study captured data collected from both students and teachers across several instruments including interviews, observational notes, and documentary analysis. This facilitate triangulation of the findings which allowed the researcher to garner deeper, richer, more credible insights of the research problem (Cohen & Crabtree, 2006). This was also supported by consistent, reliable behaviour, transparent communication, and genuine interest in participants (Lincoln & Guba, 1985). Furthermore, prior to the data collection, institutional ethics approval was sought and obtained. After which, the researcher in selecting participants for the study explained the nature of the study, its objectives and how they can be involved, explaining that throughout the study the researcher will ensure protection the integrity of, and respect for, participants (Sanjari*et al*., 2021). Moreover, the researcher requested permission and informed consent from the school, teachers and parents; also the participants were informed that anonymity and confidentiality would be maintained. Participants were informed of their rights and was told that they could withdraw at any time. The study also created pseudonyms of both the institution and the participants to ensure the protected participants' identities, and data were securely stored and documented honestly, without supplementation (Nowell, Norris, White, & Moules, 2017). The researcher also took care to minimize risk and protect participants' dignity, privacy, and autonomy; especially since minors were involved (Shamoo & Resnik, 2003). Also, member-checking was used to verify that interpretations, particularly from the focus group discussion, accurately reflected participants' perspectives.

RESULTS

This study shares results on using tiered teaching, a form of differentiated instruction strategy, to boost math scores for seventh-graders at SLA High School. The researcher provided analyses from interviews, classroom observations, and paper reviews, through the application of descriptive and inferential statistics. Vygotsky's (1978) Zone of Proximal Development and Gardner's (1983) Theory of Multiple Intelligences shaped the work.

Response Rate and Demography: The research population comprised roughly 300 students, from whom a subset of 30 was selected. Furthermore, a specialized focus group of six students (four boys, two girls) was assembled for interviews, classroom observation, and document analysis. Every chosen subject engaged in the research, yielding a complete 100% participation rate. As indicated in Table 1, the attendees were mostly thirteen years of age, with a single subject aged twelve, and the group contained a higher number of boys than girls, mirroring the makeup of the focus group.

Table 1. Students' demographic profile

Student	Age	Gender
A	13	Female
B	12	Male
C	13	Male
D	13	Female
E	13	Male
F	13	Male

Data Analysis and Development of Assertions: The researcher examined the interview records, field notes, and paperwork over and over again to identify repeating concepts and trends. These items were then tagged, sorted into groups, and arranged into main topics that matched the study goals using thematic analysis. Additionally, based on the data from this action research study, the researcher recognized three emerged assertions that resulted from this analytical procedure.

Assertion 1: Students' Experiences with Differentiated Instruction

Grade 7 mathematics learners characterized their encounters with differentiated instructional methodologies as highly constructive, encouraging, and immersive. This was especially evident when the implementation of educational videos,

Table 2. Descriptive statistics for pre-test, worksheet, and post-test assessment

Type of Test	Number of Students (n)	Mean (%)	Mode (%)	Standard Deviation (SD) (%)	Minimum Score (%)	Maximum Score (%)
Pre-test	20	64.7%	60	6.04	35	80
Worksheet	20	71.3%	44,75,81, 85,95	5.4	41	97
Post-test	20	76.4%	46,65,85, 89,90,98	5.6	40	99

collaborative group activities, structured scaffolding, and diverse pedagogical techniques facilitated their conceptual comprehension and active lesson engagement. Moreover, pre-intervention observations revealed that while the majority of students seemed genuinely intrigued by the mathematics, a significant 66.7% of participants disclosed during preliminary interviews that they perceived mathematics as a challenging discipline. Their struggles were primarily attributed to a lack of clarity in the teacher's verbal explanations, disorientation during numerical computations, or encountering overly complex assessment tasks. Prior to executing the intervention, the teacher had not yet integrated tailored pedagogical practices designed to accommodate the diverse learning modalities within the classroom. Consequently, this absence of instructional customization seemed to constrain the academic comprehension of numerous learners, even though conventional "chalk and talk" lecturing methods yielded a moderate level of success for some students (Figure 2).

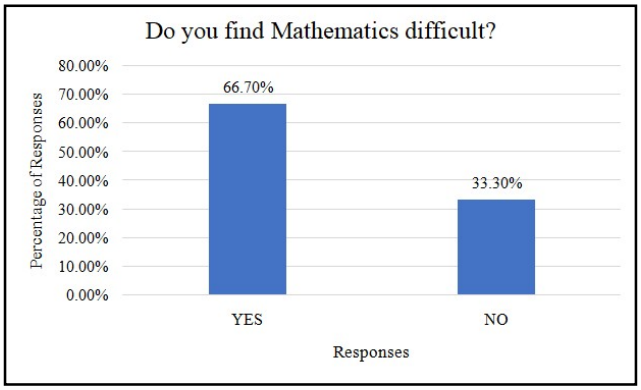

Figure 2. Students' Responses to Mathematics Difficult

Additionally, structured classroom observations further demonstrated that, in the absence of tailored instructional frameworks, standard lessons failed to accommodate the diverse cognitive modalities and academic capacities of the student cohort. Specifically, certain learners acquire knowledge more efficiently through illustrative techniques such as multimedia clips and practical modeling. Conversely, their peers thrive during collaborative tasks, peer dialogues, educational games, or experiential, tactile learning. Relying on a monolithic teaching paradigm introduced a distinct risk, frequently leaving a segment of the student population perplexed, disengaged, or stripped of academic drive. Furthermore, qualitative feedback from participant interviews revealed that learners exhibited a heightened sense of being driven, self-assured, and deeply invested in mathematical concepts when individualized pedagogical approaches were integrated. Strategies such as adaptive peer clustering, instructional videos, and sequential, granular clarifications proved highly effective. These insights strongly imply that adaptive instruction serves an indispensable function in bolstering conceptual mastery, active classroom involvement, intrinsic drive, and overall academic performance. Ultimately, this approach fosters a nurturing and equitable educational ecosystem where every individual is afforded an identical prospect for scholastic triumph.

Assertion 2: Teachers' perspectives on Differentiated instruction: The two teachers reported that varied teaching methods enhanced learner performance, involvement, and active group participation; nevertheless, instructors also pointed out hurdles like the requirement for thorough preparation, ambiguous guidelines, inadequate assistance, and trouble meeting the wide-ranging educational requirements of every pupil successfully (Table 2 and Figure 3, 4, and 5).

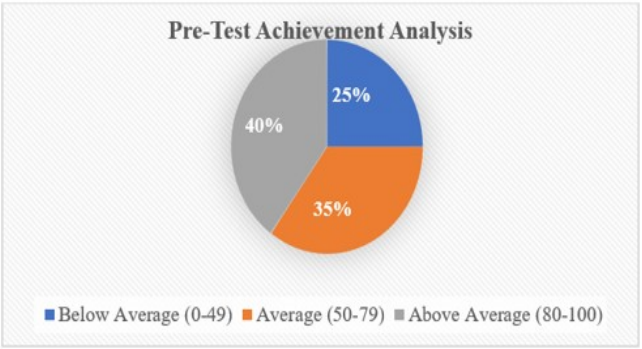

Figure 3. Students' mathematics performance before implementation

Document analysis, including students' journals, showed that differentiated instruction had a positive impact on academic achievement and on how students engaged with tasks, reflected on their understanding, and responded to classroom challenges (Table 2 and Figure 3, 4, and 5). Many students initially reported that they did not understand the content being taught, suggesting conceptual misunderstanding and gaps in prior knowledge; however, as differentiated instruction was implemented, these challenges began to mitigate, with students who once wrote that they did not understand Mathematics later expressing understanding of topics such as fractions, word problems, and algebraic expressions. This shift suggests that differentiated instruction supports both academic improvement and students' capacity to self-reflect on their learning.

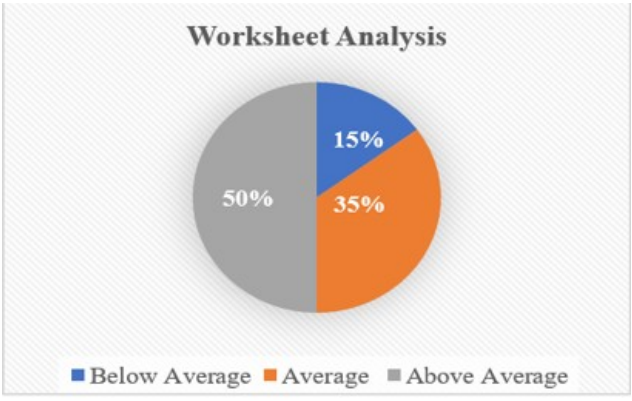

Figure 4. Students' mathematics performance during the implementing of differentiated instruction

Journal entries further revealed that many students struggled with abstract concepts and with traditional methods that did not always match their learning preferences, often feeling lost when teachers moved quickly or relied on a single method of explanation. When teachers instead grouped students by ability, provided step-by-step guidance, and used visual or practical examples, students were more likely to engage and to describe Mathematics as "easier when explained in steps" or to report trying more questions and feeling more confident working in groups. Despite these gains, some students continued to report difficulties, such as with word problems, indicating that

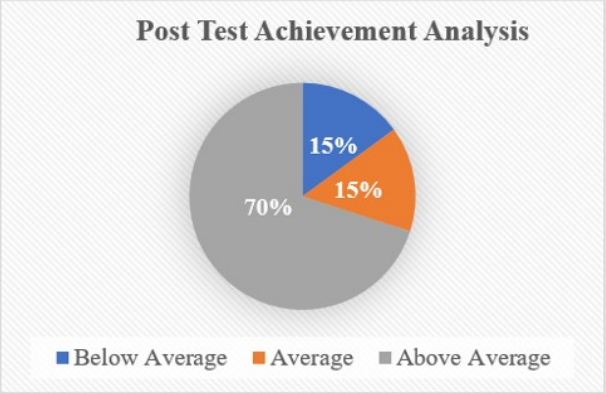

Figure 5. Students' mathematics performance after the implementing of differentiated instruction

differentiated instruction must be consistently applied and refined, and that some students may need additional support outside the classroom, such as remedial sessions or peer tutoring.

Assertion 3: Students' Motivation and Engagement in Mathematics

Students perceived differentiated instruction as having a positive impact on their motivation and engagement in Mathematics, as collaborative activities, multimedia resources, and student-centered teaching increased their confidence, participation, and willingness to learn, while limited support and lack of scaffolding reduced these benefits (Table 3).

Table 3. Percentage distribution of students' differentiated instruction experiences

Description	Number of Students	Percentage
Better understand concepts	5	80%
Preferred working in group	6	100%
Enjoyed watching videos	6	100%

Pre-interview responses indicated that differentiated instruction had a positive impact on students' academic achievement and motivation; one student explained that the teacher's use of different ways of teaching helped them understand the work better. Pre-observation similarly showed students to be excited, engaged, and motivated during lessons, actively participating in classroom activities. All respondents (100%) indicated that they viewed Mathematics as important in everyday life (Table 4). In post-interviews, students linked differentiated instruction directly to their motivation and effort, with one noting that varied activities and teaching methods motivated them to perform well, and another stating that it encouraged them to work harder. However, some students indicated that they did not enjoy Mathematics because they found it too difficult to understand.

Table 4. Percentage Distribution of Students' responses on the Importance of Mathematics in Everyday Life

Responses	Number of Students	Percentage
Yes	6	100%
No	0	0%

DISCUSSION OF RESULTS AND IMPLICATIONS

This study examined the use of differentiated instruction as a strategy to increase academic performance among seventh-grade students in Mathematics at SLA High School, specifically investigating how differentiated instructional practices influenced students' engagement, understanding, participation, and academic achievement. While differentiated instruction has been widely discussed internationally, there is limited research within the Jamaican context on its role in motivating students and improving Mathematics achievement, making this study relevant to Mathematics teachers, policymakers, and future researchers. Vygotsky's emphasis on social interaction, guidance, and support aligns with differentiated instruction's provision of varied levels of assistance based on individual needs, while Gardner's theory supports the use of varied teaching methods to accommodate different learning abilities and improve mathematical understanding.

Consistent with the assertions above, findings indicated that differentiated instruction improved students' mathematics achievement, understanding, and engagement, with students showing increased attention, focus, and participation when the approach was in use, reinforcing the importance of teachers engaging with varied instructional approaches to support effective teaching and learning. Two implications follow for Mathematics teachers and education practitioners. First, the study found a relationship between teachers' use of differentiated instruction and students' achievement, indicating that teachers should engage in a more tailored process of applying multiple teaching approaches to support effective instruction and improve academic achievement. Second, the study found that differentiated instruction was significantly reinforcing of students' motivation: varying instructional approaches improved not only academic achievement but also motivation, particularly where students had limited interest in the subject. This aligns with the view that differentiation can improve students' motivation, engagement, and sustained interest, and suggests that teachers should reflect on their current practices and tools to determine whether they adequately support student engagement.

CONCLUSION

The study found that differentiated instruction improved students' mathematics achievement, understanding, and engagement, contributing to sustained gains in academic performance. Students were more inclined to show increased attention, focus, and engagement in the mathematics classroom when differentiated instruction was in use, reinforcing the effectiveness of the strategy and the importance of teachers

engaging with varied instructional approaches to support effective teaching and learning.

Recommendations

Based on the findings and conclusions, the following recommendations are offered: Teachers should consistently apply differentiated instructional strategies that address students' diverse learning needs, planning lessons that include a variety of methods such as group activities, hands-on learning, visual aids, and guided instruction to enhance understanding and engagement. Continuous assessment strategies should be used to monitor students' progress, observe and evaluate students, and provide timely, individualized support. Policymakers should ensure that curriculum guidelines and educational policies support the implementation of differentiated instruction in schools, and that adequate resources, training opportunities, and professional development programmes are provided to help teachers apply differentiated strategies effectively, while promoting flexibility in teaching practices to meet the needs of diverse learners. Schools should encourage collaboration among teachers through peer support, mentoring, and professional learning communities focused on differentiated instruction, and school administrators should provide necessary teaching materials and reduce barriers that limit the effective use of differentiated strategies in the classroom. Further studies should explore the effectiveness of differentiated instruction in other subject areas and grade levels to allow broader generalization of findings, examine possible differences between rural and urban schools, investigate the long-term impact of differentiated instruction on students' academic achievement and attitudes toward Mathematics, and explore how technology can be integrated with differentiated instruction to further enhance teaching and learning in secondary education.

ACKNOWLEDGEMENT

I must thank God for taking me through this research. Also, I want to thank Dr. Debbie Devonish and my supervisor, Dr. Knola Oliphant, who guided me through the final study, for it to be a successful one. I must also thank my mother, my colleagues, and my Programme Director, Dr. Shaneille Samuels, who encourage me to continue the process in this research.

Conflict of Interest statement: There is no conflict of interest because this study was completed by the teacher-researcher under the guidance of the supervisor.

Funding statement: The researcher in no point in time received any funding from any funding body.

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