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Headteachers' leadership in implementing differentiated instruction to address diverse learning needs in public primary schools

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Abstract

This research analysed headteachers' leadership in implementing differentiated instruction to address diverse learning needs in public primary schools in Gasabo District, Rwanda. A mixed-methods research design was used, combining quantitative data from 99 teachers, 37 Directors of Studies, and 37 headteachers, alongside qualitative insights from interviews with 15 headteachers. Data were collected using questionnaires and interviews, and analysis combined descriptive statistics with thematic interpretation. Findings revealed that differentiated instruction is moderately implemented, with professional development workshops (M = 3.53-4.49) and collaborative planning opportunities (M = 3.33-4.61) serving as the main support strategies. Individualised coaching and one-on-one support were less consistently applied. Structural challenges, including large class sizes (M = 3.23-4.67) and limited time for professional development (M = 3.43-4.47), were reported across all respondent groups. Headteachers were identified as pivotal in creating supportive learning environments, monitoring instructional practices, and promoting inclusive pedagogy**,** although variation across schools highlighted the need for more consistent leadership practices. The study concludes that headteachers' leadership is critical for promoting differentiated instruction, but its effectiveness depends on systematic learning support, teacher capacity-building, and addressing structural barriers**.** Recommendations include strengthening individualised coaching, provision of materials needed, reducing class sizes, and providing ongoing professional development focused on inclusive teaching practices. These findings provide evidence-based insights for educational leaders, policymakers, and teacher development programs aiming to improve quality differentiated instruction and equity in Rwandan public primary schools.

ARTICLE HISTORY

Keywords:

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SUBJECTS: Leadership, teaching and learning

1. Introduction

In today's diverse classrooms, providing equitable and meaningful learning opportunities for every learner has become a fundamental concern for education systems worldwide. Education systems are increasingly challenged by learner diversity resulting from differences in cognitive abilities, learning styles, language backgrounds, socio-economic conditions, and special educational needs. Addressing such diversity requires pedagogical approaches that move beyond uniform instructional practices toward more responsive and inclusive teaching (Goyibova et al., 2025). Differentiated instruction has therefore emerged as a key instructional strategy designed to accommodate varied learning needs through deliberate adaptation of instructional content, learning processes, classroom activities, and assessment methods. Adam and Porta (2025) explain that within primary education, where foundational learning experiences are established, the effective implementation of differentiated instruction is essential for ensuring equitable and meaningful learning for all learners.

According to Acharja and Begum (2025), differentiated instruction is widely recognised as an effective classroom strategy, as its successful implementation is largely dependent on the leadership context within which teaching and learning occur. Headteachers, as the primary instructional leaders in schools, play a critical role in translating differentiated instruction from policy and theory into classroom practice. Through instructional supervision, professional guidance, mentoring, and the provision of pedagogical direction, headteachers influence how teachers plan, deliver, and evaluate instruction. In the absence of active learning-centered leadership, differentiated instruction is likely to remain inconsistently applied or misunderstood by teachers (Lüddeckens, 2025).

This study is guided by Learning-Centered Leadership theory, which emphasises that the fundamental role of school leadership is to place learner learning particularly for diverse learners at the center of all leadership practices (Murphy et al., 2007). Hallinger (2011) explains that this theory posits that effective school leaders influence learning outcomes by fostering teacher professional learning, supporting instructional improvement, allocating resources strategically, and creating inclusive learning environments that respond to learner diversity. Within this theoretical framework, differentiated instruction is conceptualised not merely as a classroom strategy, but as a leadership-supported pedagogical practice through which headteachers promote equitable learning opportunities. Learning-centered leadership therefore provides a strong lens for examining how headteachers' leadership practices enable, shape, and sustain differentiated instruction in primary school contexts.

As a matter of fact, the leadership role of headteachers extends beyond administrative management to the deliberate creation of school environments that support responsive teaching. Luhamya (2026) explains that headteachers are responsible for establishing a shared vision for inclusive and learner-centered instruction, organising continuous professional development opportunities, facilitating collaborative teaching practices, and ensuring the availability and effective use of instructional resources. In relation to differentiated instruction, headteachers' leadership is particularly important in guiding teachers to identify learner diversity, apply appropriate instructional strategies, and reflect on instructional effectiveness (Anderse &Ottesen, 2024). Thus, headteachers' leadership practices directly shape the quality and consistency of differentiated instruction in classrooms.

In Rwanda, educational reforms have increasingly emphasised inclusive education, learner-centered pedagogy, and instructional quality as central to national development goals. Forexample, Ndayisenga (2025) highlight that Competence-Based Curriculum promotes instructional approaches that recognise and respond to learner diversity. Besides, Mukobwajana (2025) explains that within this policy framework, headteachers are entrusted with the responsibility of leading instructional change at the school level. They are expected to supervise teaching practices, support teachers in implementing learner-centered strategies, and ensure that classroom instruction aligns with national curriculum expectations (MINEDUC, 2024; NESA, 2025). However, the extent to which headteachers effectively fulfill this learning-centered leadership role in relation to differentiated instruction remains insufficiently explored.

In public primary schools in Gasabo District, learner diversity is pronounced due to variations in socio-economic backgrounds, language exposure, and learning abilities. Nsengumuremyi and Imaniriho (2025) and Ndayambaje et al. (2025) report that teachers in these schools often face large class sises and limited instructional resources, making the practice of differentiated instruction particularly demanding. In such contexts, the leadership of headteachers becomes even more critical. It is in that regard Gatsinzi et al. (2022) explain that effective headteachers can mitigate these challenges by providing targeted instructional support, encouraging collaborative problem-solving among teachers, and prioritising differentiated instruction within school improvement efforts. Conversely, limited leadership engagement may hinder teachers' capacity to address diverse learning needs effectively.

Although the importance of headteachers' leadership in promoting inclusive and effective instruction is widely acknowledged, empirical research in Rwanda and specifically in Gasabo District remains limited with regard to how headteachers' leadership practices support or constrain the implementation of differentiated instruction in public primary schools. Existing studies often examine learning-centered leadership or inclusive education as separate

constructs, without adequately exploring their intersection within daily school leadership and classroom practice. This gap highlights the need for a focused investigation into the specific learning-centered leadership practices headteachers employ to support differentiated instruction and how these practices contribute to addressing diverse learning needs.

The present study examines differentiated instruction as a strategy of headteachers' learning-centered leadership practices for addressing diverse learning needs in public primary schools in Gasabo District, Rwanda. By analysing how headteachers plan for, support, supervise, and sustain differentiated instructional practices, the study seeks to generate context-specific evidence on leadership approaches that enhance inclusive and equitable learning. The study is significant in informing headteacher leadership practice, teacher professional support, and education policy implementation, particularly within the Competence-Based Curriculum framework. Furthermore, the novelty of the study lies in its integration of differentiated instruction and learning-centered leadership within the Rwandan primary education context, an area that remains underexplored in both national and regional educational research. Specifically, the study is guided by the following objectives:

i. To examine how headteachers ensure the implementation of differentiated instruction practices in public primary school
ii. To identify the challenges headteachers face in ensuring effective differentiated instruction in public primary school
iii. To explore the practices employed by headteachers to address diverse learning needs in public primary school

2. Literature review

2.1. Conceptualising differentiated instruction

According to Moallemi (2024), differentiated instruction (DI) is a pedagogical approach designed to address the diverse learning needs, readiness levels, and interests of students within the same classroom. It challenges traditional uniform teaching by advocating for flexibility in instructional content, processes, learning activities, and assessment. Sukhu and Sukhu report that effective DI requires teachers to vary what is taught (content), how students engage with it (the process), how learning is demonstrated (the product), and how the classroom environment is organised (the learning environment). These dimensions collectively ensure that each learner has equitable access to learning and can achieve at an appropriate level.

Empirical evidence suggests that DI enhances student engagement, motivation, and academic achievement (Zhang, & Chen, 2025). By tailoring instruction to learning needs, teachers can reduce the risk of marginalization and failure, particularly in heterogeneous classrooms. However, successful DI implementation depends not only on teacher competency but also on supportive leadership and availability of resources. Studies according to Siddik (2025) indicate that when instructional guidance and leadership support are limited, DI is inconsistently applied, limiting its effectiveness. Therefore, while DI is widely acknowledged as an effective learner-centered strategy, its success is closely linked to contextual factors such as leadership and school support.

In the context of public primary schools, DI is particularly relevant. Students often exhibit wide variations in cognitive abilities, learning styles, and prior knowledge. Implementing DI in such settings is essential for promoting equity, inclusivity, and quality instruction. In this study, DI is conceptualised as the primary instructional strategy (independent variable), whose effectiveness is influenced by the leadership practices of headteachers.

2.2. Diverse needs of learners in public primary schools

Diverse learning needs encompasses variations in abilities, learning styles, socio-economic backgrounds, language proficiency, and special educational needs (Firmansyah & Aslan, 2025). Addressing this diversity is a core challenge

for primary education, particularly in public schools where resources are often limited and class sizes are large. Research according to Nzuza and Sulaimon (2025) indicates that diverse learners require differentiated pedagogical approaches to ensure that all students are engaged and achieving learning outcomes.

In Rwanda, public primary schools often serve learners from varied socio-economic backgrounds, with disparities in prior knowledge and language exposure (MINEDUC, 2019). These contextual factors make differentiated instruction critical. However, (Gatsinzi et al. 2024) stress that teachers frequently face challenges implementing DI due to insufficient training, lack of instructional materials, and large class sizes. Without targeted support, these challenges can compromise learning outcomes and perpetuate inequities in education.

2.3. Differentiated instruction and learner outcomes

Research consistently demonstrates that DI positively impacts learner engagement, motivation, and achievement. Dhakal (2024) found that students in classrooms where teachers implemented differentiated strategies showed higher levels of participation and academic success. Similarly, Huong (2025) reported that DI enhances inclusivity, enabling students with diverse learning needs to achieve curricular objectives. However, empirical studies also highlight limitations such as the effectiveness of DI is contingent on teacher skill, professional development, and institutional support. In contexts where teachers lack guidance or resources, DI strategies are often inconsistent, reducing their impact on learner outcomes.

2.4. Headteachers' learning-centered leadership

Cereno and Daryl (2025) define learning-centered leadership as a leadership approach student learning as the central purpose of leadership by supporting instructional improvement, promoting teacher professional learning, allocating resources strategically, and fostering inclusive school environments that respond to learner diversity. Through this approach, headteachers influence teaching practices and learning outcomes by guiding, supporting, and supervising teachers in ways that enhance equitable and meaningful learning for all learners.

Alanoglu (2023) explains that headteachers play a pivotal role in shaping teaching and learning environments by placing learner learning at the core of school leadership practices. Similarly, Blumberg (2023) that learning-centered leadership involves guiding, supporting, and supervising teachers with the explicit purpose of improving learning outcomes for all learners. Nsengumuremyi and Imaniriho (2025) demonstrate that through this leadership approach, headteachers influence curriculum implementation, resource allocation, teacher professional development, and school culture, all of which directly affect classroom instructional practices. Empirical studies consistently indicate that strong learning-centered leadership is associated with higher-quality teaching and improved learner outcomes.

In the context of differentiated instruction (DI), Andersen and Ottesen (2024) show that headteachers are instrumental in facilitating effective implementation by promoting instructional practices that respond to learner diversity. Through mentorship, encouragement of collaborative lesson planning, monitoring of classroom practices, and strategic allocation of instructional resources, headteachers enable teachers to adapt instruction to diverse learning needs. Without purposeful learning-centered leadership, differentiated instruction risks remaining theoretical, as teachers often require sustained professional support to implement responsive instructional strategies effectively.

Despite growing recognition of its importance, relatively few studies have examined the intersection between headteachers' learning-centered leadership and differentiated instruction implementation, particularly in primary schools within developing country contexts. Evidence from Sub-Saharan Africa suggests that schools led by proactive learning-centered leaders demonstrate higher levels of adoption of inclusive and learner-centered practices. Leadership practices such as professional guidance, instructional supervision, and collaborative teacher development have been shown to significantly enhance teachers' capacity to implement differentiated instruction effectively (Fabunan & Cabal, 2025).

In Rwanda, the Competence-Based Curriculum (CBC) emphasises learner-centered teaching and explicitly requires teachers to employ differentiated instructional strategies to address learner diversity (Ndayisenga, 2025). Within this policy framework, headteachers' learning-centered leadership is crucial for translating curriculum expectations into classroom practice through effective instructional supervision and teacher support (MINEDUC, 2024). However, despite these expectations, empirical studies examining how headteachers facilitate differentiated instruction in practice remain limited in the Rwandan context, thereby revealing a clear gap in the literature that this study seeks to address.

2.5. Contextual evidence in Rwanda and Gasabo District

According to Gatsinzi et al. (2025), public primary schools in Gasabo District reflect a typical urban-peri-urban Rwandan context, with diverse learner populations and varying socio-economic conditions. Large classes, limited resources, and varying teacher competence create challenges for implementing DI effectively. Ukwigize et al. (2025) demonstrate that headteachers' leadership is therefore critical in providing instructional support, monitoring teaching, and fostering a school culture that values responsive and inclusive pedagogy. The scarcity of research in this context highlights the need for empirical studies to understand how headteachers' leadership practices facilitate or constrain differentiated instruction in Gasabo District.

2.6. Synthesis and research gap

The literature demonstrates that differentiated instruction is an effective strategy for addressing diverse learning needs, but its success is highly dependent on teacher competence, resources, and supportive leadership. While headteachers' learning-centered leadership is known to influence teaching quality, there is limited empirical evidence on how their leadership facilitates the implementation of DI in public primary schools, particularly within Rwanda and Gasabo District. This gap justifies the present study, which seeks to examine differentiated instruction as an instructional strategy and the role of headteachers in its effective implementation.

3. Methodology

3.1. Research design

A mixed-methods research design was adopted, combining both quantitative and qualitative approaches to examine the implementation of differentiated instruction and the role of headteachers' leadership in facilitating it. This approach was deemed appropriate because it allows the researcher to capture measurable trends while also gaining an in-depth understanding of contextual factors (Creswell & Creswell, 2023).

Quantitative data provided insights into the prevalence and patterns of differentiated instruction and leadership practices, whereas qualitative data offered deeper understanding of headteachers' strategies, decision-making, and contextual challenges.

The study was guided by learning-centered leadership theory, emphasising structured supervision, curriculum monitoring, and assessment practices, and instructional leadership theory, focusing on motivation, shared vision, and teacher engagement (Siregar, 2025). Combining these perspectives allowed the research to examine both structural and relational dimensions of headteachers' leadership in practice.

3.2. Study area

The study was conducted in public primary schools in Gasabo District, Rwanda, an urban district within Kigali City characterised by diverse learner populations and varied instructional conditions. Schools in the district differ in size, class composition, teacher qualifications, and availability of instructional resources. This diversity makes Gasabo District an appropriate context for examining learning-centered leadership and its role in supporting differentiated

instruction. Moreover, the district has actively implemented the Competence-Based Curriculum (CBC), which emphasises learner-centered teaching and the need for instructional strategies that address individual learning needs. These factors provided a relevant policy and practical context for the study.

3.3. Sampling techniques

A mixed-methods approach was employed, combining quantitative and qualitative methods to obtain both breadth and depth of understanding. 37 headteachers and 37 Directors of Studies were purposively selected due to their leadership roles in supervising teaching, supporting professional development, and promoting learning-centered practices. Their inclusion ensured that the study captured informed perspectives on leadership strategies that influence differentiated instruction. Besides, 99 teachers were selected using stratified random sampling to ensure representative data on classroom practices. Teachers were stratified by school and grade level, then randomly selected within each stratum. The Yamane (1967) formula guided the sample size to achieve sufficient statistical reliability while maintaining an acceptable margin of error.

3.4. Qualitative sampling

For the qualitative component, 15 headteachers, one from each sector in Gasabo District, were purposively selected for in-depth interviews. This ensured sectoral representation and allowed exploration of how leadership strategies vary across different school contexts. The interviews provided rich, contextualised insights into leadership practices, decision-making, and challenges related to implementing differentiated instruction.

3.5. Participant demographics

Demographic data such as gender, professional experience, academic qualifications, and leadership tenure were collected from all participants to contextualise findings and explore how these factors might influence leadership practices and perceptions of differentiated instruction (Creswell, 2018). Incorporating demographic variables enhances interpretive depth, allowing analysis of patterns across different leadership and teaching profiles.

3.6. Data collection instruments and procedures

Data were collected using questionnaires and semi-structured interviews in line with a mixed-methods design (Creswell, 2014). The questionnaire was designed to capture quantitative data on headteachers' learning-centered leadership practices and their influence on differentiated instruction. It included items on curriculum coordination, classroom supervision, teacher professional development, monitoring instructional quality, and strategies for addressing diverse learning needs. The items were developed based on established literature on learning-centered and transformational leadership (Murphy et al., 2007; Hallinger, 2011; Tomlinson, 2017) and were aligned with the study objectives to ensure coverage of all relevant dimensions.

The questionnaire employed structured Likert-scale items to measure participants' perceptions and closed-ended items to collect demographic and professional background information. It was pretested with a small group of teachers and school leaders outside the study area to ensure clarity, relevance, and reliability. Feedback from the pretest was used to refine ambiguous items and confirm that the instrument accurately captured leadership support for differentiated instruction.

For the qualitative component, semi-structured interviews were conducted with 15 headteachers, one from each sector in Gasabo District, to obtain detailed insights into leadership strategies and contextual challenges. The interview protocol focused on instructional supervision, teacher support, decision-making, and approaches to

fostering inclusive, differentiated learning environments. Interviews were conducted in private settings within schools, audio-recorded with consent, and supplemented by field notes capturing non-verbal cues and contextual observations.

Data collection procedures followed ethical and systematic guidelines. Permission was obtained from the Gasabo District Education Office and school administrations, and participants were informed of the study's purpose, voluntary participation, and confidentiality. Questionnaires were administered with researcher guidance to ensure completeness, while interviews were conducted in a manner that encouraged open and honest discussion.

Both instruments were explicitly aligned with the study's learning-centered leadership framework, ensuring that data addressed the relationship between headteachers' leadership practices and the effective implementation of differentiated instruction. This integration strengthened the study's ability to provide robust, context-specific evidence on how leadership supports inclusive and learner-centered teaching in public primary schools.

Using multiple data sources enabled methodological triangulation, enhancing the credibility and robustness of the study.

3.7. Validity, reliability, and trustworthiness

The validity of the questionnaire was ensured through review by three educational experts, including two lecturers from the University of Rwanda and one former headteacher, all with extensive experience in school leadership and inclusive pedagogy. They evaluated the instrument for clarity, relevance, and alignment with the study objectives, ensuring it accurately captured learning-centered leadership practices and support for differentiated instruction. Reliability was established through pilot testing in three public primary schools outside the study sample, involving teachers, headteachers, and Directors of Studies.

Internal consistency was confirmed with a Cronbach's alpha of 0.83, indicating that the instrument reliably measured the intended constructs. Minor revisions were made based on expert and pilot feedback to finalise the questionnaire. For qualitative data, trustworthiness was strengthened through systematic interview guide design, prolonged engagement with participants, and rigorous thematic analysis. Verbatim quotations were included in reporting to ensure authenticity and credibility of interpretations.

3.8. Ethical considerations

The study adhered to strict ethical standards that involve human participants. Permission was obtained from the University of Rwanda-College of Education Research Screening and Ethical Clearance Committee (UR-CE RSEC-C) under the Directorate of Research and Innovation (Reference: DRI-CE/029(a)/EN/gi/2025; Rukara, 29 April 2025).

All methods were performed in accordance with the relevant guidelines and regulations of the University of Rwanda-College of Education Research Screening and Ethical Clearance Committee.

All participants were fully informed about the study's purpose, voluntary participation, and the right to withdraw at any time without any harm. Informed consent was obtained, and confidentiality and anonymity were maintained using codes instead of participant names. All data were securely stored and used solely for this academic purpose.

3.9. Data analysis

Quantitative data were analysed using descriptive statistics, including frequencies, percentages, mean scores, and standard deviations, to summarise patterns of differentiated instruction and leadership practices.

Qualitative data from interviews were analysed thematically, involving data familiarization, coding, categorization, and identification of recurring themes related to leadership practices, challenges, and enabling conditions for implementing differentiated instruction. Integrating quantitative and qualitative findings enabled the study to connect observed trends with contextual explanations, illustrating how headteachers' leadership facilitates differentiated instruction in practice.

3.10. Study limitations

The study had several limitations. First, it focused solely on public primary schools in Gasabo District, which may limit the generalizability of findings to other districts or contexts. Second, the sample size, while suitable for a mixed-methods design, may not capture all variations in leadership practices. Third, the study relied primarily on self-reported data, which may be affected by social desirability bias. Limited classroom observations and follow-up interviews also constrained the depth of qualitative insights. Finally, external factors such as policy implementation, school financing, and community engagement, though potentially influential, were not extensively examined.

Despite these limitations, the study provides contextually grounded and credible insights into how headteachers' leadership supports differentiated instruction and addresses the diverse learning needs of students in public primary schools.

4. Findings

This chapter presents the findings collected from the 4th June to the 31st of July 2025 on the study of differentiated instruction (DI) for addressing diverse learning needs in public primary schools in Gasabo District and the role of headteachers' leadership in supporting its implementation. The findings integrate data from teachers, Directors of Studies (DOS), and headteachers, and are presented in a synthesised table followed by an in-depth interpretation. The result section presents the key findings of the study.

4.1. Practices of headteachers to ensure differentiated instruction practices and challenges

This section presents the findings on headteachers' practices in promoting differentiated instruction and the challenges encountered in its implementation in public primary schools. Drawing on responses from headteachers, Directors of Studies, and teachers, the analysis examines leadership-supported strategies for differentiated instruction as well as barriers that hinder effective classroom differentiation. Table 1 summarises the mean scores and standard deviations for key practices and challenges, providing a comparative view of how these aspects are perceived across the three respondent groups and highlighting areas of convergence and divergence between leadership intentions and classroom realities.

Table **1:** Practices of headteachers ensure implementation of differentiated instruction practices across respondent groups

Key Aspect	Item	Teachers (M ± SD)	DOS (M ± SD)	Headteachers (M ± SD)	Synthesis
Strategies to support DI	Professional development workshops	3.53 ± 1.24	4.49 ± 1.03	3.76 ± 1.19	Workshops are moderately applied by teachers and headteachers, with DOS indicating strong implementation; structured

					support is widely available but consistency varies.
	Individualised coaching / support	3.37 ± 1.28	1.72 ± 1.34	3.48 ± 1.23	One-on-one support is inconsistently applied; DOS report minimal provision while teachers and headteachers indicate moderate efforts.
	Collaborative planning time	3.33 ± 1.23	4.61 ± 0.95	3.63 ± 1.18	Collaborative planning is strongly emphasised by DOS and moderately applied by teachers and headteachers; teamwork is partially implemented across schools.
	No specific strategy	2.45 ± 1.38	1.61 ± 1.38	2.26 ± 1.36	A minority of schools lack structured differentiation strategies, highlighting gaps in systematic implementation.

Note: M = Mean, SD = Standard Deviation; DI = Differentiated Instruction
Source: (Field data, 2025)

The findings demonstrated in table 1 indicate that differentiated instruction is moderately to strongly implemented, but the effectiveness of these strategies depends largely on leadership support and systemic school conditions. Professional development workshops were reported as widely applied, with Directors of Studies indicating strong implementation (M = 4.49, SD = 1.03), while teachers and headteachers reported moderate application (M = 3.53 and 3.76). This suggests that although training opportunities exist, their impact varies depending on participation, follow-up, and monitoring by leadership.

Collaborative planning time is strongly emphasised by DOS (M = 4.61, SD = 0.95), reflecting their role in coordinating teacher teamwork and instructional alignment. Teachers and headteachers reported moderate engagement (M = 3.33 and 3.63), indicating that while collaboration occurs, it is not consistently implemented across schools. Individualised coaching and support, crucial for addressing diverse learning needs, was applied inconsistently. Teachers (M = 3.37, SD = 1.28) and headteachers (M = 3.48, SD = 1.23) reported moderate efforts, whereas DOS reported minimal implementation (M = 1.72, SD = 1.34). This indicates a leadership gap in personalised teacher support, which is essential for effective differentiated instruction.

4.2. Challenges headteachers face in ensuring effective differentiated instruction

Headteachers face several challenges in ensuring effective differentiated instruction across respondent groups. As indicated in table 2, time constraints, heavy administrative workloads, large class sizes, and limited resources are key barriers, while differences in perceptions particularly between classroom-based staff and instructional supervisors highlight gaps between practice and oversight. Overall, these systemic and contextual challenges constrain headteachers' ability to sustain differentiated instruction despite commitment to learner-centered practices.

Table 2: Challenges headteachers face in ensuring effective differentiated instruction among various respondent groups.

Key Aspect	Item	Teachers (M ± SD)	DOS (M ± SD)	Headteachers (M ± SD)	Synthesis
Challenges in implementing DI	Limited time for professional development	3.43 ± 1.17	4.47 ± 1.02	3.82 ± 1.14	Time constraints are a major barrier, especially noted by DOS; teachers and headteachers also experience moderate challenges.
	Time constraints and heavy administrative workload	3.00 ± 1.21	3.68 ± 1.08	4.56 ± 0.96	Administrative workload is perceived as a substantial challenge, particularly by headteachers, with DOS and teachers also reporting notable time-related constraints.
	Difficulty meeting diverse student needs	3.38 ± 1.21	1.77 ± 1.33	3.32 ± 1.23	Teachers and headteachers report moderate difficulty, while DOS perceive it less consistently, suggesting differences in classroom versus oversight perspectives.
	Large class sizes	3.23 ± 1.27	4.67 ± 0.97	3.78 ± 1.14	Structural challenges affect DI; DOS report it as a significant barrier, while teachers and headteachers perceive moderate difficulty.
	Scarcity of teaching and learning resources	4.52 ± 0.94	4.12 ± 1.03	4.72 ± 0.89	Resource scarcity is a critical barrier across all respondent groups, with headteachers reporting the highest level of concern, indicating systemic constraints on differentiated instruction.
	No challenge	2.33 ± 1.36	1.63 ± 1.36	2.13 ± 1.37	Very few respondents report no challenges, showing that barriers to DI are widely experienced.

Note: M = Mean, SD = Standard Deviation; DI = Differentiated Instruction
Source: (Field data, 2025)

The challenges identified in table 2 reveal systemic barriers that limit the full implementation of DI. These findings indicate that headteachers face multiple, interrelated challenges in ensuring effective implementation of differentiated instruction in public primary schools. Across respondent groups, time-related constraints emerge as a prominent barrier. Limited time for professional development is rated highly by Directors of Studies (M = 4.47, SD = 1.02), suggesting strong concern from those responsible for instructional oversight, while teachers (M = 3.43, SD = 1.17) and headteachers (M = 3.82, SD = 1.14) report moderate to high levels of constraint. Similarly, heavy administrative workload is perceived as a substantial challenge, particularly by headteachers (M = 4.56, SD = 0.96), reflecting the competing demands between administrative responsibilities and instructional leadership.

Structural and contextual factors further constrain the implementation of differentiated instruction. Large class sizes are identified as a significant challenge, especially by Directors of Studies (M = 4.67, SD = 0.97), highlighting systemic conditions that limit teachers' ability to tailor instruction to individual learner needs. Teachers and headteachers also acknowledge this challenge at moderate levels, indicating widespread recognition of its impact on classroom practice.

The findings also reveal disparities in perceptions regarding difficulty in meeting diverse student needs. Teachers (M = 3.38, SD = 1.21) and headteachers (M = 3.32, SD = 1.23) report moderate difficulty, reflecting direct classroom

experiences with learner diversity. In contrast, Directors of Studies report a much lower mean (M = 1.77, SD = 1.33), suggesting a possible gap between classroom realities and supervisory perspectives.

In addition, scarcity of teaching and learning resources is consistently rated as a major challenge across all respondent groups, with headteachers reporting the highest concern (M = 4.72, SD = 0.89). This underscores the centrality of material and instructional resources in enabling differentiated practices and points to systemic limitations within the school context.

Finally, the low mean scores for the item "no challenge" across all groups confirm that barriers to differentiated instruction are widely experienced, reinforcing the conclusion that effective implementation requires sustained leadership support, adequate resources, and structural adjustments. Overall, the findings suggest that while headteachers demonstrate commitment to differentiated instruction, their efforts are constrained by time, workload, resource limitations, and contextual factors beyond their immediate control.

4.2. Practices of headteachers to address diverse learning needs

This section demonstrates key findings related to differentiated instruction, inclusive support mechanisms, learner engagement, language support, monitoring of learner progress, and equity in resource provision. Mean scores and standard deviations are used to illustrate the extent to which these practices are implemented across respondent groups, offering insight into both leadership commitment and classroom-level realities in meeting diverse learner needs. Table 3 presents findings on how headteachers, Directors of Studies, and teachers perceive leadership practices aimed at addressing the diverse learning needs of pupils in public primary schools.

Table 3: Practices of headteachers to address diverse learning needs across all group respondents

Key aspects	Items	Headteachers (M ± SD)	Directors of Studies (M ± SD)	Teachers (M ± SD)	Synthesis
Indicators of how headteachers meet diverse learning needs	Adjust differentiated instruction based on learner ability	2.65 ± 0.16	2.45 ± 0.16	2.25 ± 0.16	Moderate implementation across groups, with slightly stronger emphasis from headteachers than classroom teachers.
	Provision of professional development on inclusive strategies	3.35 ± 0.35	2.95 ± 0.35	2.50 ± 0.35	Leadership reports stronger support for inclusive PD than teachers experience in practice, indicating uneven access.
	Support teachers in developing Individualised Education Plans (IEPs)	2.45 ± 0.34	2.50 ± 0.34	1.75 ± 0.34	Support for IEP development is generally low, particularly at classroom level, highlighting gaps in inclusive provision.
	Encouraging student participation through positive school climate and discipline	4.35 ± 0.06	4.45 ± 0.06	4.50 ± 0.06	Very strong and highly consistent emphasis across all groups, showing shared commitment to socio-emotional inclusion.
	Language support and promotion of improved communication	3.40 ± 0.24	2.85 ± 0.24	2.95 ± 0.24	Moderate implementation, with leadership reporting stronger emphasis than classroom practice.

	Monitoring progress, individualised attention, and differentiation in lessons	3.50 ± 0.31	3.00 ± 0.31	2.75 ± 0.31	Leadership places greater emphasis on monitoring and differentiation than is realised in classroom instruction.
	Promoting equity and resource provision in class	4.50 ± 0.65	4.45 ± 0.65	3.10 ± 0.65	Strong leadership commitment to equity, but reduced classroom-level implementation suggests resource and capacity constraints.

Note: M = Mean, SD = Standard Deviation; DI = Differentiated Instruction
Source: (Field data, 2025)

As far as the findings from table 3 are concerned, the data indicate that adjusting differentiated instruction based on learner ability is implemented at a moderate level across all respondent groups, with headteachers reporting a mean of 2.65 ± 0.16, Directors of Studies 2.45 ± 0.16, and teachers 2.25 ± 0.16. The relatively small standard deviation suggests consistency in perceptions across groups, yet the declining mean from leadership to classroom practice indicates that differentiation based on learner ability is more strongly emphasised at leadership levels than fully realised in daily teaching. This suggests that while differentiated instruction is recognised as important, its classroom enactment remains constrained.

The provision of professional development on inclusive strategies shows a stronger emphasis among headteachers (3.35 ± 0.35) than among Directors of Studies (2.95 ± 0.35) and teachers (2.50 ± 0.35). The moderate standard deviation reflects noticeable variation in how inclusive professional development is experienced across roles. These findings imply that although leadership structures support professional learning, teachers may not consistently access or experience professional development that directly equips them to address learner diversity in practice.

Support for teachers in developing Individualised Education Plans (IEPs) recorded generally low mean scores, particularly among teachers (1.75 ± 0.34), compared to headteachers (2.45 ± 0.34) and Directors of Studies (2.50 ± 0.34). This indicates that targeted support for learners with special educational needs is limited, especially at classroom level. The findings point to a significant gap between inclusive education policy intentions and actual instructional practices, likely influenced by limited training, time constraints, and resource availability.

In contrast, encouraging student participation through a positive school climate and discipline recorded the highest mean scores across all groups, with headteachers at 4.35 ± 0.06, Directors of Studies at 4.45 ± 0.06, and teachers at 4.50 ± 0.06. The very low standard deviation demonstrates strong agreement and consistency, highlighting a shared commitment to socio-emotional inclusion. This suggests that creating supportive and respectful learning environments is a well-established leadership and instructional practice in public primary schools.

Findings on language support and improved communication indicate moderate implementation, with headteachers reporting a mean of 3.40 ± 0.24, Directors of Studies 2.85 ± 0.24, and teachers 2.95 ± 0.24. The variation in means suggests that leadership perceives language support more positively than classroom teachers do, pointing to potential gaps in the application of language-responsive strategies within classrooms, particularly for learners with limited proficiency.

The indicator on monitoring learner progress, providing individualised attention, and differentiating lessons reflects moderate engagement, with headteachers reporting higher emphasis (3.50 ± 0.31) than Directors of Studies (3.00 ± 0.31) and teachers (2.75 ± 0.31). The variation suggests that although leadership promotes monitoring and

differentiation, practical constraints at classroom level limit sustained individual attention. This highlights the impact of workload and class size on the effective implementation of differentiated instruction.

Finally, promoting equity and resource provision in the classroom recorded high mean scores for headteachers (4.50 ± 0.65) and Directors of Studies (4.45 ± 0.65), but a noticeably lower mean among teachers (3.10 ± 0.65). The relatively larger standard deviation indicates significant variation across roles, suggesting that while leadership demonstrates strong commitment to equity, teachers experience limitations in accessing or utilising resources equitably in their classrooms.

Overall, the findings reveal a consistent pattern in which leadership commitment to addressing diverse learner needs is strong, particularly in fostering positive learning environments and promoting equity. However, classroom-level implementation of differentiated instruction and targeted support for diverse learners remains moderate to limited, constrained by structural challenges such as large class sizes, limited professional development time, and insufficient specialised support. These results underscore the central role of headteachers in bridging the gap between inclusive leadership intentions and effective differentiated instructional practices.

5. Discussion

The discussion interprets findings collected from 4th June to 31st July 2025 on headteachers' leadership in implementing differentiated instruction to address diverse learning needs in public primary schools in Gasabo District, linking findings to current literature and highlighting broader implications for policy and practice. The discussion is organised according to the study's objectives to ensure clarity and coherence.

5.1. Implementation of Differentiated Instruction Practices by Headteachers

The findings indicate that differentiated instruction is widely acknowledged as a key strategy for addressing diverse learner needs across leadership and classroom levels in Gasabo District. Headteachers and Directors of Studies demonstrate strong conceptual and strategic understanding of differentiation, emphasising planning, lesson supervision, and coordination of teaching and learning. However, classroom-level enactment of differentiated practices remains moderate, suggesting a gap between leadership expectations and actual teaching practice.

This pattern aligns with Ndayisenga (2025), who observed similar discrepancies in the translation of Rwanda's Competence-Based Curriculum (CBC) into practice. While structured opportunities such as workshops, collaborative planning sessions, and policy guidance are provided, follow-up supervision and hands-on mentoring are inconsistent, reflecting the findings of Liang and Zou (2025) and Jamil et al. (2024). Teachers may thus lack the practice-oriented support needed to fully implement differentiated instruction strategies in their classrooms.

Headteachers excel in fostering a positive school climate, promoting student participation, and embedding socio-emotional inclusion, as indicated by high agreement and low variability across respondents. These findings resonate with Safeer et al. (2025) and DeMatthews (2025), showing that headteachers' leadership effectively cultivates safe, respectful, and motivating learning environments, which is in line with Rwanda's education vision prioritising learner wellbeing and active participation.

Language support and communication strategies were found to be moderately implemented, with leadership reporting stronger support than teachers. This highlight potential gaps in classroom-level application, especially given Rwanda's multilingual context, confirming Ndayisenga (2025) that language-responsive instruction remains essential and requires enhanced teacher capacity and targeted professional development.

5.2. Challenges Faced by Headteachers in Ensuring Effective Differentiated Instruction

The study revealed multiple challenges that constrain headteachers' ability to ensure effective differentiated instruction. Time constraints, including limited opportunities for professional development and heavy administrative workloads, were cited as major barriers, particularly by Directors of Studies and headteachers. Structural factors**,** such as large class sizes and insufficient teaching and learning resources, further limit teachers' capacity to implement differentiated strategies effectively.

Differences in perceptions among respondent groups were also notable. While teachers and headteachers reported moderate difficulty in addressing diverse learner needs, Directors of Studies perceived this challenge less strongly, suggesting a gap between classroom realities and supervisory oversight. This aligns with the work of Baharudin (2025) and Chandra et al. (2025), who highlighted that structural constraints such as workload, class size, and limited time hinder classroom-level differentiation, even when leadership commitment is strong.

Limited support for Individualised Education Plans (IEPs) was another significant challenge. While leadership recognises the importance of targeted support for learners with special educational needs, practical constraints—including limited training, insufficient specialised resources, and time pressures—impede consistent implementation. These findings echo Nketsia (2025) and Rehman et al. (2025), illustrating a persistent implementation gap between inclusive education policies and daily instructional practice.

5.3. Practices Employed by Headteachers to Address Diverse Learning Needs

Despite the challenges, headteachers actively employ several strategies to promote differentiated instruction. Findings show that monitoring learner progress, providing individualised attention, and promoting equity in resource allocation are prioritised, although teachers report moderate implementation at the classroom level. Leadership engagement is stronger in coordinating teaching, motivating teachers, and supervising assessment practices.

These practices are consistent with the literature on learning-centered leadership, which emphasises the headteacher's role in creating enabling conditions for instructional improvement (Nzuza & Sulaimon, 2025; Chandra et al., 2025). Headteachers' efforts in fostering positive school climates, encouraging student participation, and supporting socio-emotional inclusion are particularly noteworthy, suggesting that while structural barriers persist, leadership interventions significantly influence the learning environment and teacher motivation.

The gap between leadership intention and classroom execution highlights the need for aligned professional development**,** ongoing mentoring, and systemic support to enable teachers to translate policy into practice effectively. This aligns with findings from Haideri and Parveen (2025), emphasising that sustained teacher support, coupled with systemic resources, is essential for effective differentiated instruction.

The study demonstrates that headteachers in Gasabo District play a pivotal role in promoting differentiated instruction and creating inclusive school environments. While leadership commitment is strong, classroom-level implementation is constrained by systemic and structural factors such as workload, large class sizes, and limited specialised support. Strengthening learning-centered leadership through aligned professional development, enhanced mentoring, and improved resource allocation is critical to bridging the gap between policy and practice, ensuring that Rwanda's Inclusive Education Policy and Competence-Based Curriculum are effectively translated into classrooms.

6. Conclusion

This study examined headteachers' leadership in implementing differentiated instruction to address diverse learning needs in public primary schools, with a particular focus on the leadership role of headteachers in practice. The findings demonstrate that differentiated instruction is recognised and partially implemented across schools in

Gasabo District, mainly through structured approaches such as professional development workshops, collaborative planning, remedial programs, and supportive school environments. These practices reflect a growing awareness of learner diversity and the importance of inclusive pedagogy in public primary education.

The study further reveals that headteachers play a central role in shaping the implementation of differentiated instruction. As learning-centered leaders, they influence teacher practices by organising training opportunities, promoting collaboration, monitoring classroom practices, and fostering positive learning environments. Despite resource constraints, many headteachers demonstrated commitment and innovation in supporting teachers and responding to diverse learning needs, highlighting their importance as catalysts for inclusive teaching practices.

However, the findings also show that the implementation of differentiated instruction remains uneven and constrained by systemic challenges. Large class sizes, limited time for professional development, and insufficient individualised coaching significantly hinder effective differentiation. While Directors of Studies reported strong engagement with structured strategies, teachers and headteachers reported moderate and inconsistent support, particularly in individualised mentoring and follow-up supervision. This gap suggests that differentiated instruction is often supported at a policy or planning level but is less consistently translated into classroom practice.

Overall, the study concludes that differentiated instruction in Gasabo District is feasible and valued, but its effectiveness depends on strong, consistent learning-centered leadership, enhanced teacher capacity, and supportive systemic conditions. Without addressing structural barriers and strengthening leadership practices, differentiated instruction is unlikely to achieve its full potential in meeting the diverse learning needs in public primary schools.

7. Recommendations

7.1. Recommendations for headteachers

- Since the findings showed that professional development workshops and collaborative planning are moderately implemented, headteachers should strengthen and regularise these practices to ensure consistent support for differentiated instruction across all schools.
- Given that individualised coaching was less consistently applied, headteachers should prioritise one-on-one instructional support, particularly for teachers struggling to address diverse learning needs.
- As limited time and large class sizes emerged as major challenges, headteachers should optimise school timetables to create protected time for instructional planning and professional learning.
- In response to variability in implementation across schools, headteachers should establish clear school-level guidelines and monitoring mechanisms for differentiated instruction.
- Building on findings that headteachers actively create supportive learning environments, they should further integrate learner-centred and inclusive practices into school routines and policies.

7.2. Recommendations for teachers

- Since teachers reported moderate use of differentiated instruction and persistent challenges, they should adopt practical and manageable differentiation strategies, such as flexible grouping and remedial sessions, even in large classes.
- Teachers should actively engage in collaborative planning opportunities, which the findings identified as a key support mechanism for differentiated instruction.
- In light of reported time constraints, teachers should focus on continuous formative assessment to guide instructional adjustments rather than relying solely on end-term evaluations.
- Teachers should seek professional learning opportunities to strengthen their skills in addressing learner diversity, especially for learners with special educational needs.

7.3. Recommendations for Directors of Studies

- Given that the findings showed strong emphasis on workshops but limited individual coaching, Directors of Studies should balance group-based training with targeted classroom-based coaching.
- Since large class sizes and limited professional development time were identified as major barriers, Directors of Studies should support teachers by simplifying instructional expectations and prioritising essential differentiation practices.
- Directors of Studies should strengthen instructional monitoring and follow-up, ensuring that differentiated instruction moves beyond planning to effective classroom practice.
- To reduce inconsistencies reported across schools, Directors of Studies should facilitate school-based professional learning communities focused on inclusive instruction.

7.4. Recommendations for the Ministry of Education and policy makers

- In response to findings that large class sizes significantly hinder differentiated instruction, the Ministry should consider teacher deployment strategies and class size reduction initiatives, particularly in urban districts such as Gasabo.
- Since time for professional development was a consistent constraint, policies should ensure dedicated and protected professional learning time within the school calendar.
- Provide adequate instructional materials and assistive resources to support differentiated and inclusive teaching practices.
- Strengthen learning-centered leadership training for headteachers and Directors of Studies, with a specific focus on leading differentiated instruction in resource-constrained contexts.

7.5. Recommendations for future research

- Building on the observed variation in implementation, future studies should explore factors influencing successful school-wide adoption of differentiated instruction.
- Further research should examine the long-term effects of differentiated instruction on learner achievement and inclusion in public primary schools.
- Comparative studies across districts would help identify contextual factors that enhance or constrain learning-centered leadership effectiveness.

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9. Ethical approval

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10. Use of Artificial Intelligence

The authors acknowledge the use of the generative AI tool ChatGPT (GPT-5 Mini) exclusively for language refinement, grammar correction, and clarity enhancement. All research content, analyses, and interpretations were independently developed by the authors.

11. Consent approval from administrative authority

The consent approval for this study was obtained from the City of Kigali, a central province and city of the Republic of Rwanda (Ref. No: CoK. 6187/07.01.16/25) on 06 May 2025 and It was granted by the Director General of Cooperate Services in Kigali City. Subsequently, it was approved by the Central Secretarial and the Director of Education from Gasabo District on 12 May 2025. In addition, a written permission to conduct the study was obtained from the administration of each participating public primary school prior to the commencement of data collection in each school.

12. Consent to publish

Not applicable in this research

13. Clinical trial number

Not applicable in this research.

14. Author contributions

Grace Ukwigize was responsible for conceptualising and structuring the study, collecting and curating data, developing methodology, performing formal analysis, and preparing the original manuscript draft. **Assoc. Prof. Irene Ndayambaje** and **Dr. Jean Baptiste Ndagijimana** provided academic supervision, methodological guidance, validation of findings, and critically reviewed and revised the manuscript to ensure intellectual rigor.

15. Disclosure statement

The authors declare no competing interests.

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17. Data availability

All data supporting the findings of this study are available from the corresponding author upon reasonable request.

18. About the authors

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