

Implementation Gaps and Challenges in Curriculum Differentiation for Students with Special Needs Among Primary School Teachers in Inclusive Classrooms

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Abstract

Background

Curriculum differentiation is a critical pedagogical strategy for addressing student diversity in inclusive classrooms. However, a significant gap often exists between policy aspirations for inclusive education and teachers' classroom practices. Understanding this implementation gap is essential for improving educational outcomes for students with special needs, particularly in developing country contexts like Ethiopia.

Methods

This explanatory sequential mixed-methods study (QUAN → qual) explored this implementation gap by examining primary school teachers' practices and challenges with curriculum differentiation for students with special needs in South Ethiopia Regional State. Quantitative data were collected from 471 randomly selected teachers using a modified survey questionnaire, while qualitative data were gathered through semi-structured interviews with 28 purposefully selected senior teachers and open-ended survey questions. Data were analyzed using descriptive statistics, independent t-tests, one-way ANOVA, and thematic analysis.

Results

Quantitative findings indicated that teachers moderately practiced all six differentiation components (student interest, assessment, lesson planning, content, process, and product), with mean scores ranging from 2.84 to 3.07 on a 4-point scale. Teachers demonstrated the highest experience in product differentiation ($M = 3.07$, $SD = 0.62$) and the lowest in process differentiation ($M = 2.84$, $SD = 0.67$). Significant differences emerged across towns for five components ($p < .05$), except process differentiation. Female teachers showed significantly better process differentiation than males ($t = -2.034$, $df = 469$, $p = .043$). Teachers' qualifications significantly influenced assessment ($F = 3.692$, $p = .026$) and product differentiation ($F = 3.107$, $p = .046$), while teaching experience significantly affected lesson planning ($F = 3.899$, $p = .009$) and content differentiation ($F = 3.058$, $p = .028$). However, qualitative findings revealed substantial gaps in teachers' understanding and implementation of differentiation strategies, exposing the implementation gap. Major challenges included: inadequate teacher knowledge and skills, limited pre- and in-service training, large class sizes, shortage of resources and assistive technologies, curriculum rigidity, lack of collaboration among stakeholders, and low student motivation.

Conclusions

While teachers reported moderate differentiation practices quantitatively, qualitative data exposed significant competency gaps and systemic barriers—the implementation gap. Addressing this gap requires comprehensive professional development, resource provision, curriculum flexibility, and strengthened collaborative support systems to enable effective differentiation for students with special needs.

1 Introduction

Contemporary classrooms are characterized by significant student diversity, making it essential for schools committed to inclusive education to adapt their systems and practices to meet varied learner needs [1]. Within these inclusive settings, learners present a wide spectrum of educational requirements, strengths, and areas for growth. Curriculum differentiation (CD) emerges as a crucial pedagogical strategy to identify and accommodate this diversity, ensuring all students can access and engage with learning [2]. CD can be understood as the process of tailoring the curriculum to match the varied ability levels present in a single classroom [3]. It represents a teaching model that requires educators to adopt flexible methods, adjusting both the curriculum and their instruction to suit individual students [4]. The core of differentiation involves proactively modifying curricula, teaching strategies, learning activities, and assessment methods to address student diversity [5, 6]. This approach acknowledges learner variation by implementing multiple pathways that adapt instruction to individual needs [7, 8]. It encompasses adjustments to learning content, the processes of learning, the products or outputs of learning, and the overall learning environment, utilizing varied methods, strategies, and materials [9]. Ultimately, effective differentiation is built on a foundation of knowing one's students deeply, having a firm grasp of the curriculum, offering multiple avenues for learning, sharing the learning process with students, and maintaining a flexible and reflective teaching practice. When implemented well, differentiation leads to improved student learning outcomes, higher achievement, and increased motivation compared to traditional, one-size-fits-all instructional models [10, 11].

Teachers are the central agents in this process, tasked with adapting teaching and learning to the unique needs of each student [12]. Differentiated instruction is fundamentally a teacher's plan to address classroom diversity by centering on student needs and interests through the provision of choice [13]. Historically, attending to learner differences has been a hallmark of effective general education teaching [8], and contemporary educators are expected to be increasingly creative and adaptable in their use of differentiation [2]. This can involve modifying the curriculum's content, the methods for teaching that content, and the approaches to assessment [3]. Effective differentiation, as outlined by its core principles, requires teachers to make sound judgments about learning objectives, gather information about their students, and align teaching goals with individual abilities and needs [8]. Teachers who hold positive attitudes toward inclusion are more likely to adapt their practices to benefit all learners [14]. Consequently, a teacher's capacity to tailor their educational work to a diverse student group is fundamental to successful differentiation [15]. The appropriate selection and implementation of differentiation strategies enable all students within a class to access a shared curriculum meaningfully.

Conversely, ignoring student diversity and persisting with a singular teaching approach undermines classroom inclusiveness. This can place many learners with special needs at risk of disengagement, falling behind, losing motivation, or failing to reach their full potential [16]. An undifferentiated curriculum can lead to a lack of participation, interest, and confidence among students who cannot connect with its content [17]. Numerous challenges hinder effective differentiation. A primary obstacle is the lack of adequate teacher training and ongoing professional development opportunities, which are essential for effectively including diverse learners [18]. Without the necessary skills, teachers may become frustrated and unable to accommodate children with special needs in their classrooms. Furthermore, despite widespread acceptance of its importance, the consistent and complete implementation of differentiated instruction in daily practice remains an elusive goal [19]. Teachers often struggle to translate theoretical knowledge gained from professional development into practical classroom application [20]. Other significant barriers frequently cited in the literature include limited planning time, large class sizes, heavy teacher workloads, a shortage of resources, and a lack of teacher motivation or specific skills for differentiation [21, 22, 23].

1.1 The Ethiopian Context

Within the Ethiopian context, national education policies have explicitly prioritized quality education that addresses the diverse learning needs of all students through flexible curricula and differentiated instruction [24, 25]. To support this goal, the Ministry of Education developed a national "Guideline for Curriculum Differentiation and Individual Education Program." This document aims to introduce CD concepts, offer technical support to educators, clarify the target audience for differentiation, and provide practical implementation strategies [26]. Local researchers have noted that addressing the varied needs and interests of a diverse student body through differentiated instruction is a timely and critical concern [27]. However, despite increasing classroom diversity, the practical application of differentiated instruction remains limited, with many teachers continuing to rely on traditional, lecture-based methods where all students learn the same material in the same way and are assessed against identical standards [25, 27, 28, 29]. Research by Solomon [30] verifies this, indicating that teachers do not regularly differentiate due to factors such as limited knowledge of specific strategies, large class sizes, time constraints for planning, and a lack of adequate resources and opportunities for collaborative planning and reflection.

When examining teachers' actual teaching practice for general students, their instructional delivery proceeds without taking cognizance of their students' varying background knowledge, interests, readiness, and learning profiles. Applying a one-size-fits-all approach leaves too many students behind instead of moving them forward [29, 31]. Though it needs further research, the MoE specified that it has become very challenging for schools and teachers to welcome and accommodate learners with special educational needs in accordance with their learning potential.

This study is guided by the following research questions:

1. To what extent do teachers differentiate the curriculum components (student interest, assessment, lesson planning, content, process, and product) for SSN?
2. Do teachers' experiences of differentiating the curriculum for SSN vary across their demographic characteristics (gender, qualifications, and work experience)?
3. What difficulties (if any) do teachers encounter while differentiating curriculum for SSN?

1.2 Theoretical Frameworks

This study draws on two complementary perspectives: the Curriculum Relation Model and Tomlinson's differentiated instruction model. These frameworks were selected because they connect curriculum structures, teacher decisions, and inclusive responses to learner diversity. The Curriculum Relation Model, as developed by Johnsen [32], treats inclusion as an ongoing process rather than a fixed state. In this view, schools become more inclusive when they actively pursue participation, commitment, and equity while recognising differences in learning styles, methods, curricula, and the welcome extended to every learner [32, 33]. The model identifies eight interacting frame factors that shape inclusive education for learners with special needs: the pupil's background and learning profile; factors that condition practice; educational intentions; curriculum content; teaching strategies; methods and organisation; assessment arrangements that generate feedback for practice; communication patterns; and care [32, 33].

Tomlinson's model, by contrast, centers on the teacher's instructional response to varied learner needs. It proposes that differentiated lessons are informed by continuous assessment and adjustment, use flexible grouping, and offer respectful tasks [6]. The purpose is to enlarge learning possibilities for all students by diagnosing needs and designing classroom experiences accordingly [34, 35]. A responsive teacher therefore adapts instruction so that learners can access ideas and skills through pathways that make sense to them [36]. Tomlinson [37] specifies six differentiation components: student interest, assessment, lesson planning, content, process, and product. These components are interconnected and can be adjusted in relation to readiness, interest, and learning profile [38, 39, 40]. UNESCO [41] similarly argues that an inclusive curriculum should be flexible enough to accommodate individual needs and to encourage teachers to seek solutions suited to each pupil's abilities.

Grounded in these two models, the present study investigates teachers' experiences and difficulties in implementing CD for SSN. Teachers' gender, educational qualifications, and work experience are examined as demographic factors potentially associated with their CD experiences. The six differentiation components from Tomlinson [37] structure the survey. Figure 1 presents the conceptual framework, which links teachers' demographic characteristics, their CD experiences, and their CD difficulties to their actual experiences of CD for SSN.

2 Materials and Methods

2.1 Research Design

The present study employed a mixed-methods research approach, specifically an explanatory sequential design (QUAN → qual). This design comprises both quantitative and qualitative data in response to the research questions. As illustrated in Fig. 2, when employing this design, quantitative data (QUAN) receives more emphasis, and in-depth qualitative (qual) data collection follows to provide appropriate analysis and interpretation. This design was particularly appropriate for examining the implementation gap, as it allowed us to first quantify teachers' reported practices and then explore the qualitative dimensions of their challenges and experiences.

2.2 Study Site, Population, and Sampling

The study was conducted in four towns of the South Ethiopia Regional State, namely Arba Minch, Dilla, Wolita Sodo, and Jinka. This region was officially formed in August 2023, consisting of South Omo, Gamo, Gedeo, Gofa, Wolaita, Konso, Ari, Kore, Basketo, Burji, Derashe, and Ale zones. Arba Minch, Wolita Sodo, Sawela, Dilla, Karat, and Jinka are the six capital towns (centers) of the region, and as shown in Fig. 3 below, this study covered four of them. During the 2022/23 academic year, there were 33 primary schools with 4,676 teachers in the four selected study towns, and this research project focused on those primary schools to investigate the teachers' experiences and difficulties while differentiating the curriculum for SSN.

To obtain representative participants, 14 primary schools (Kofe, Dawit, Dilla, Ligaba, Abiyot Chora, Otona, Sodo Giorgis, Arba Minch/Limat, Garo, Kulfo, Sikela, Nearry, Jinka/Kera, and Gorgorcha) from the four towns were first selected purposefully, taking into consideration schools having a higher enrollment of students with disabilities/special needs groups. Of the total of 4,676 teachers in the four towns' primary schools, 471 ($\approx 10\%$) teachers—170 males and 301 females—were randomly selected to collect quantitative data, and 28 senior teachers (two from each school) were purposefully selected to collect qualitative data. This sample size exceeded the minimum required for a 95% confidence level with a 5% margin of error.

2.3 Instrumentation

Data were collected using two main instruments: a survey questionnaire and a semi-structured interview guide. Concerning the survey questionnaire, it was modified from the "Teacher Survey on Differentiated Instruction" [42]. The utilized part of the original instrument consists of items to measure the level of teachers' implementation experiences of the CD elements, such as student interest, assessment, lesson planning, content, process, and product, with 26 Likert scale questions/items that require responses ranging from 1 to 4, indicating teachers' extent of experience: (1) hardly ever/never do this, (2) sometimes/have used on a few occasions, (3) frequently use this, and (4) use intentionally and often. To align the instrument with the study's objectives, several modifications were made by incorporating questions related to teachers' demographic characteristics, contextualizing items to SSN, and incorporating an open-ended item on the challenges to implementing CD for SSN. To facilitate communication with respondents, the entire questionnaire was translated into Amharic, the official working language of the region. On the other hand, as a qualitative instrument, a semi-structured

interview guide was developed to explore teachers' experiences with CD in greater depth. The questions prompted teachers to describe their practical approaches to differentiating the various curriculum components and to elaborate on the specific challenges they face in their daily work with SSN.

Regarding instrument validation, the face and content validity of the survey questionnaires were first checked by senior researchers of the School of Pedagogical and Behavioral Sciences at Arba Minch University. Subsequently, to examine the internal consistency of the items, a pilot study was conducted at Chamo Primary School in Arba Minch town. According to the test results, the reliability analysis for the 26-item teacher experience subscale yielded a Cronbach's alpha of .913, which, according to George and Mallery [43], indicates excellent internal consistency.

2.4 Data Analysis Techniques

In relation to data analysis, descriptive statistics such as percentage, mean, and standard deviation were first computed to determine the teachers' agreement or disagreement with the items referring to their experiences of implementing the components of CD for SSN. Inferential statistics, specifically independent-samples t-test and one-way ANOVA, were utilized to examine whether statistically significant differences existed in the means of teachers' experiences of the elements of CD among the four town administrations and across teachers' demographic variables, such as gender, educational qualifications, and working experiences. In addition, to complement and elaborate on the quantitative data obtained, qualitative data from the open-ended items of the questionnaires and semi-structured interviews were analyzed thematically. This process involved identifying, analyzing, and reporting patterns or themes within the data, which were then presented through detailed descriptions and narrations. The analysis followed the six phases outlined by Braun and Clarke: familiarization, coding, generating themes, reviewing themes, defining themes, and writing up.

2.5 Ethical Considerations

This study was approved by the Research Ethics Committee of the School of Pedagogical and Behavioral Sciences, Arba Minch University (Ref No: SPBS/101/2023). The study was conducted in accordance with the Declaration of Helsinki and the institutional research guidelines of Arba Minch University. All procedures involving human participants were performed in accordance with these guidelines and regulations. Oral informed consent was obtained from all individual participants involved in the study. Participants were informed about the purpose of the research, the voluntary nature of their participation, and the confidentiality and anonymity of their data, which would be used for academic purposes only. They were assured of their right to withdraw from the study at any time without consequence. This method of consent was approved by the ethics committee to accommodate varying literacy levels and to ensure a clear, personal understanding of the participants' rights in a culturally appropriate manner.

3 Results

3.1 Teachers' Experiences in Implementing the Components of CD

Using descriptive analysis of the quantitative data and narration of the qualitative data, the study revealed the extent of teachers' experiences of CD for SSN in line with the six components: student interest, assessment, lesson planning, contents, process, and product. The teachers' responses to the survey items with high values indicate that they have a great extent of experience; alternatively, low scores indicate teachers' poor experiences of CD.

Table 1 presents descriptive statistics for teachers' experiences across all six CD components. For student interest differentiation, the overall mean score was $M = 2.96$ ($SD = 0.62$), indicating frequent experience. For assessment differentiation, the mean score was $M = 3.07$ ($SD = 0.61$), also indicating frequent experience. Lesson planning differentiation showed a mean of $M = 3.05$ ($SD = 0.61$), content differentiation $M = 3.04$ ($SD = 0.65$), process differentiation $M = 2.84$ ($SD = 0.67$), and product differentiation $M = 3.07$ ($SD = 0.62$).

Table 1
Descriptive Statistics Showing Teachers'
Experiences of the CD Components for SSN
($N = 471$)

Variable	M	SD	Ranking
Student Interest	2.96	.62	5th
Assessment	3.07	.61	2nd
Lesson Planning	3.05	.61	3rd
Content	3.04	.65	4th
Process	2.84	.67	6th
Product	3.07	.62	1st

When ranking their extent of experience in differentiating curriculum components from highest to lowest: product, assessment, lesson planning, content, student interest, and process.

Qualitative Findings on Teachers' Experiences:

Concerning differentiating the components of the CD for SSN, interviewee teachers reflected their views. A senior teacher from Dilla town mentioned: "I tried to apply differentiation by describing the lesson based on students' levels of understanding. I used a simple approach to teaching and considered the students' learning situation and needs. Also, I applied an assessment that is comfortable for all." Another teacher, from the same town, added: "In my daily and annual lesson plans, I tried to differentiate the curriculum for SSN by considering their learning interests and providing different educational supports that help to make them more effective in their studies."

A teacher from Wolita Sodo town mentioned: "In my teaching, I differentiate the curriculum for students with special needs by providing extra educational support for those academically weak and female students, supporting them according to their educational receptiveness level, and letting them ask questions in any place and situation at school." However, a different teacher from the same town reported: "There was no different approach that I followed in considering students with special educational needs. I employed the usual or traditional teaching approach. My core reason for this is that the curriculum by itself was not designed in accordance with SSN."

From Arba Minch town, a teacher described: "I tried to teach with extra help in the form of tutorials and make-up classes so that SSN could understand the lesson well." Another teacher elaborated: "In my experience, I differentiate the curriculum to SSN by properly identifying those students in need and by seating them in front chairs. When there are key ideas or concepts in the lesson, I present them by giving more emphasis, and to make sure students understand, I collect their feedback by asking questions. However, the teaching aids and assessment process that I employed are not that much different from what I used before."

A teacher from Jinka town reported: "My instruction was usually student-focused, and I feel that I'm in a good status of differentiating the content by making the lesson more concrete. However, I have no experience in applying differentiation for SSN through adapting and modifying the teaching methods and assessments." Finally, a teacher from the same town shared: "When I differentiate, I try to adapt the main aspects of the curriculum, such as content, teaching methods, teaching aids, and assessment. But for the most part, I don't use a different approach to the teaching aids and assessment process than other students."

The Implementation Gap Revealed

When examining both quantitative and qualitative results, the study disclosed the extent of teachers' experiences of implementing CD for SSN in primary school. Teachers frequently experienced difficulty differentiating all six components according to their self-reports. However, according to the qualitative results, the teachers reflected their general or traditional methods of teaching instead of CD, and the specific practices regarding components were not clearly addressed in their responses. This discrepancy—the implementation gap—implies the teachers' understanding and skill gaps in the implementation of the differentiation techniques specific to the components.

Town-Level Differences

Comparisons were made between the teachers' differentiation experiences of components among the four town administrations' primary schools. As shown in Table 2, except for differentiating the process, the study found statistically significant differences between the mean scores of teachers' experiences in the remaining five CD components in primary schools at Dilla, Wolita Sodo, Arba Minch, and Jinka towns. Using one-way ANOVA, significant differences were measured in practices of student interest differentiations [$F(3,467) = 5.923, p=.001$], assessment differentiations [$F(3,467) = 5.969, p=.001$],

lesson planning differentiations [$F(3,467) = 4.291, p = .005$], contents differentiations [$F(3,467) = 3.873, p = .009$], and product differentiations [$F(3,467) = 4.520, p = .004$]. Contrarily, there was no significant difference observed in teachers' differentiation practices of the process component [$F(3,467) = 1.010, p = .388$].

Table 2
One-way ANOVA Showing Mean Differences in Teachers' Experiences of the CD Components Among the Four Town Administrations (N = 471)

Components/Variables	Sum of Squares	df	Mean Square	F	Sig.
Student Interest	6.620	3	2.207	5.923	.001
Assessment	6.405	3	2.135	5.969	.001
Lesson Planning	4.732	3	1.577	4.291	.005
Contents	4.763	3	1.588	3.873	.009
Process	1.365	3	.455	1.010	.388
Product	5.114	3	1.705	4.520	.004

3.2 Teachers' Experiences of the CD Elements and Demographic Variables

Gender Differences

Using an independent-samples t-test, the study revealed comparisons of teachers' experiences of differentiating the components between male and female teachers. As shown in Table 3, a significant difference was observed in teachers' experiences of differentiating the process component ($t = -2.034, df = 469, p = .043$) between male and female teachers. By contrast, significant differences were not observed at the $p < .05$ level in their implementation experiences of student interest differentiation ($t = -.370, df = 469, p = .712$), assessment differentiation ($t = -1.121, df = 469, p = .263$), lesson planning differentiation ($t = -1.293, df = 469, p = .197$), contents differentiation ($t = -.346, df = 469, p = .730$), and product differentiation ($t = -.980, df = 469, p = .328$).

These results revealed that, with no significant differences in teachers' experiences of differentiating, female teachers' experiences of the components of student interest, assessment, lesson planning, content, and product surpassed those of male teachers. However, with a significant difference in differentiating the process component, female teachers ($M = 2.88, SD = .67$) were better than male teachers ($M = 2.75, SD = .67$).

Table 3
Independent Samples t-Test Showing Mean Differences in Teachers' Experiences by Gender
(N = 471)

Components/Variables	Category	N	M	SD	t-value	df	Sig
Student Interest	Male	170	2.9456	.63460	- .370	469	.712
	Female	301	2.9676	.61236			
Assessment	Male	170	3.0271	.61305	-1.121	469	.263
	Female	301	3.0924	.60408			
Lesson Planning	Male	170	2.9965	.63001	-1.293	469	.197
	Female	301	3.0724	.60194			
Contents	Male	170	3.0309	.62800	- .346	469	.730
	Female	301	3.0523	.65698			
Process	Male	170	2.7574	.67083	-2.034	469	.043
	Female	301	2.8879	.66778			
Product	Male	170	3.0338	.62785	- .980	469	.328
	Female	301	3.0922	.61713			

Educational Qualifications

Using one-way ANOVA, comparisons were made to examine the teachers' experiences of differentiating the components based on teachers' educational qualifications categorized into diploma, degree, and master's holders. As indicated in Table 4, among the three categories of educational qualifications, significant differences were measured in the average responses of teachers' experiences of assessment differentiation [$F(2,468) = 3.692, p = .026$], and product differentiation [$F(2,468) = 3.107, p = .046$]. In contrast, the study found no statistically significant difference among teachers of varying educational levels in experiences of student interest differentiation [$F(2,468) = 2.994, p = .051$], lesson planning differentiation [$F(2,468) = 2.735, p = .066$], contents differentiation [$F(2,468) = 1.124, p = .326$], and process differentiation [$F(2,468) = 1.310, p = .271$].

These results indicate the mean score differences in teachers' experiences in differentiating the assessment and product components among teachers having different educational qualifications. Master's holders ($M = 3.30, SD = .676$) exceeded diploma holders ($M = 3.14, SD = .566$) and degree holders ($M = 3.01, SD = .629$) in assessment differentiation, but in product differentiation, diploma holders ($M = 3.15, SD = .586$) exceeded degree holders ($M = 3.01, SD = .633$) and master's holders ($M = 3.00, SD = .886$).

Table 4
One-way ANOVA Showing Mean Differences in Teachers' Experiences by Educational Qualifications (N = 471)

Components/Variables	Sum of Squares	df	Mean Square	F	Sig.
Student Interest	2.282	2	1.141	2.994	.051
Assessment	2.694	2	1.347	3.692	.026
Lesson Planning	2.038	2	1.019	2.735	.066
Contents	.938	2	.469	1.124	.326
Process	1.179	2	.589	1.310	.271
Product	2.375	2	1.188	3.107	.046

Work Experience

Using one-way ANOVA, comparisons were conducted on the mean values of teachers' experiences of differentiating the components of curriculum among different teachers' work experiences that were categorized according to the stages of teachers' career structure—between 0–5 years (beginner and junior teacher), 5–11 years (teacher and higher teacher), 11–17 years (associate lead and lead teacher), and > 17 years (higher lead teacher). Hence, as shown in Table 5, there was a statistically significant difference in teachers' experiences of lesson planning and content differentiation among teachers who had different groups of work experiences [$F(3,467) = 3.899, p=.009$] and [$F(3,467) = 3.058, p=.028$], respectively. Contrarily, a significant difference was not observed at the $p < .05$ level for student interest differentiation [$F(3,467) = 1.867, p=.134$], assessment differentiation [$F(3,467) = 2.178, p=.090$], process differentiation [$F(3,467) = 1.585, p=.192$], and product differentiation [$F(3,467) = 2.177, p=.090$].

Based on the results, one can conclude that teachers with different years of teaching work experience have a close level of differentiation in experiences in student interest, assessment, process, and product components. However, the mean comparisons of teachers' practices in differentiating lesson planning and content showed differences. Teachers experienced between 0–5 years ($M = 3.17$ for lesson planning; $M = 3.15$ for content) and 5–11 years ($M = 3.15$ for lesson planning; $M = 3.17$ for content) were better than those with 11–17 years ($M = 3.04$ for lesson planning; $M = 2.97$ for content) and > 17 years ($M = 2.94$ for lesson planning; $M = 2.97$ for content).

Table 5
One-way ANOVA Showing Differences in Teachers' Experiences by Work Experience
(N = 471)

Components/Variables	Sum of Squares	df	Mean Square	F	Sig.
Student Interest	2.140	3	.713	1.867	.134
Assessment	2.393	3	.798	2.178	.090
Lesson Planning	4.310	3	1.437	3.899	.009
Contents	3.780	3	1.260	3.058	.028
Process	2.134	3	.711	1.585	.192
Product	2.499	3	.833	2.177	.090

3.3 Teachers' Difficulties in Differentiating Curriculum for SSN

Data related to teachers' challenges of CD for SSN were collected from teachers using an open-ended item of the survey and interviews. When examining the teachers' responses for an open-ended item, the obtained results can be categorized into three themes: (1) challenges originating from teachers themselves, (2) challenges related to students with special needs, and (3) challenges related to the provision of educational services. These themes collectively illuminate the barriers that constitute the implementation gap.

Challenges Related to Teachers Themselves: Commonly reflected and identified differentiation challenges included: gaps in knowledge, skill, commitment, and experiences; lack of planning and readiness; limitations in preparation and utilization of teaching aids; lack of confidence in managing flexible classrooms; viewing differentiation as a time-consuming process; following traditional teacher-centered teaching approaches; not supporting students based on their educational needs and performance; difficulty to timely cover subjects/courses having large portions; skills gaps in sign language and braille reading/writing to accommodate deaf and blind students; giving less expectation for needy students; and lack of collaboration with school principals, parents, and other professionals.

Challenges Related to Students with Special Needs: Teachers shared challenges including: lack of motivation and passivity in the classroom; poor confidence to explain their learning interests, abilities, and difficulties; inability to explain when facing problems; lack of interest to receive guidance and counseling services; absenteeism and late coming to school; not attending some classes like mathematics, physics, chemistry, and computer subjects after grade four (for blind students); and low acceptance and cooperation by other classmates.

Challenges Related to Provision of Educational Services

Participants commonly forwarded training gaps at the college or university level (in both pre- or in-service training); absence of related capacity building training at school level; lack of identification and consideration of students with disabilities when designing curriculum; enrolling large number of students per class; shortage of educational aids and facilities including student textbooks; inaccessibility of the school physical environment; absence of sign language interpreters, braille, audiobooks, and other assistive technological devices; lack of training when curriculum revision was made; not subsidizing teachers' overtime work; lack of conducting meetings with teachers and parents; lack of hiring or placing of special needs professionals in appropriate work position; and lack of continuity of the existing support and monitoring.

Interview Findings: Relying on the results of an open-ended item, interviews with the senior teachers also showed the teachers' challenges. A teacher from Dilla town mentioned: "Not having an equal level of understanding of the concepts among teachers, considering the process as an extra and time-consuming activity, inadequate professional development training, lack of skills such as sign language and Braille to accommodate deaf and blind students, and lack of passion for the teaching profession." Another teacher from the same town added: "Lack of educational resources, students' absenteeism and not paying attention to their education, lack of parental concern and support, and the differentiation approach not getting due attention in teacher education training at the college and university level."

A teacher from Wolita Sodo town mentioned: "Teachers were challenged to differentiate curriculum due to understanding gaps in the differentiation concepts, a shortage of text and other reference books, a lack of teaching aids, an absence of well-equipped laboratories, not placing teachers based on their field of study, and an absence of introducing the revised curriculum before the academic year commenced." Another teacher from the same town indicated: "The existing curriculum doesn't consider some SSNs. For instance, blind students are exempted from part of the science subjects like physics, chemistry, and mathematics. As a result, they can't join the natural sciences stream in their middle and secondary school career, and this may affect students' learning interests. Additionally, inaccessibility of the classroom environment, lack of collaboration of special needs professionals and education experts, having a large number of students per class, teachers' awareness gap concerning differentiation, the lack of teacher involvement in the curriculum preparation, and the inability to participate all students in the laboratory class were considered as the challenges."

A teacher from Arba Minch town mentioned: "Shortage of teaching materials, students' interest in learning, and some students' difficulty in understanding the medium of instruction (especially students who were born in town)." Another teacher reported: "The teacher's negative attitude and interest in the teaching profession, lack of approaching students with love and understanding of their needs, shortage of teaching aids, teaching without proper preparation, lack of supervision and monitoring by the school principals, insufficient training for teachers, and lack of collaboration among teachers as the major challenges."

From Jinka town, a teacher added: "Lack of awareness and training for teachers, not making the classrooms more conducive and accessible, a shortage of educational materials, poor incentive packages for teachers, and a lack of commitment from teachers and school leaders." Another interviewee added: "Lack of understanding and attention, frequent curriculum revision and changes at the national and regional levels, overcrowding of students in a classroom, lack of teaching materials, and lack of understanding of the situation of SSN."

4 Discussion

The current study explored primary school teachers' experiences and difficulties in implementing curriculum differentiation for students with special needs in South Ethiopia Regional State, revealing a significant implementation gap between policy aspirations and classroom practices. The findings present a complex picture where quantitative data suggest moderate implementation of differentiation practices, while qualitative data expose significant gaps in understanding and skills, along with numerous systemic challenges.

4.1 The Implementation Gap in Teachers' Differentiation Experiences

The quantitative findings indicated that teachers reported frequent experience in differentiating all six curriculum components (student interest, assessment, lesson planning, content, process, and product), with mean scores ranging from 2.84 to 3.07 on a 4-point scale. Teachers demonstrated the highest experience in product differentiation ($M = 3.07$) and the lowest in process differentiation ($M = 2.84$). This finding is consistent with previous research suggesting that teachers find it easier to differentiate products (such as assignments and assessments) than processes (such as instructional delivery and grouping strategies) because product differentiation often involves more tangible and manageable adjustments [27, 37].

However, the qualitative data painted a different picture—revealing the implementation gap. The interviews and open-ended responses revealed that teachers primarily described general or traditional teaching methods rather than specific differentiation strategies. Most teachers could not articulate clear, concrete practices for differentiating instruction for students with special needs. This discrepancy between quantitative and qualitative findings suggests that teachers may overestimate their differentiation practices on surveys due to social desirability bias or a lack of deep understanding of what constitutes authentic differentiation. This finding aligns with research by Ruys et al. [19], who noted that despite widespread acceptance of its importance, the complete implementation of differentiation in daily practice remains an elusive goal. Similarly, Santangelo and Tomlinson [35] and Tomlinson and McTighe [44] found that in many schools, students with diverse needs, interests, and readiness levels are still learning the same material through the same methods in a "one-size-fits-all" approach.

The implementation gap is particularly concerning because it represents a disconnect between teachers' self-perceptions and their actual practices. This gap may be partially explained by what Sobel et al. [45] described as teachers being less able to develop skills in applying a differentiated instruction approach to teaching, lacking the knowledge and development needs, not trying hard enough to appreciate diversity and consider justice for all, and also not applying enough understanding in the classroom. Moreover, studies by Westwood [23], Simpson and Ure [46], and Ysseldyke et al. [47] also revealed that teachers encountered difficulties in accommodating students' differences by applying differentiation strategies in practice, and particularly in sustaining their use over time. Since teaching is a low-privileged, less-paid profession in Ethiopia, teacher educators' motivation and commitment to implement highly demanding instructional strategies like differentiation is low [27, 37, 48, 49].

4.2 Demographic Variations in Differentiation Experiences

Gender Differences

The finding that female teachers demonstrated significantly better process differentiation than males is noteworthy. This may reflect gender-related differences in teaching styles and classroom management approaches. Previous research by Chliwniak [52] and Lad [53] found that female teachers were better at encouraging and motivating students, coordinating curriculum, employing desirable teaching methods, and promoting professional development. Rosener [54] also acknowledged that females demonstrate more friendly, caring, supportive, sensitive, and empathetic behaviors than their counterparts, which may translate into more effective differentiation practices, particularly in areas requiring flexible grouping and varied instructional pace.

Educational Qualifications

The significant differences in assessment and product differentiation based on teachers' educational qualifications suggest that higher education levels may provide teachers with better skills in these areas. Master's holders outperformed diploma and degree holders in assessment differentiation, possibly due to more exposure to educational assessment theories and practices during their graduate studies. However, the finding that diploma holders outperformed both degree and master's holders in product differentiation is counterintuitive and may reflect other factors such as years of experience, school context, or professional development opportunities rather than educational level alone. This result contrasts with Tadesse [55], who found no significant differences in differentiated instruction practices between degree and diploma teachers based on qualifications.

Work Experience

The significant differences in lesson planning and content differentiation among teachers with different work experience levels are interesting. Teachers with 0–5 and 5–11 years of experience showed higher levels of differentiation in these areas than those with more than 11 years of experience. This may reflect recent teacher education programs that place greater emphasis on differentiation and inclusive practices. Conversely, more experienced teachers may have been trained in more traditional pedagogical

approaches and may be less likely to adopt new strategies. This finding supports research by Danielson [59], who noted that effective teachers will notice the diversity of learning needs and use differentiated instruction approaches. However, it contrasts with Hilyard [57] and Hobson [58], who found no significant differences between novice and experienced teachers in the use of differentiated instruction.

4.3 Systemic Barriers: The Challenges Underpinning the Implementation Gap

The study identified three main categories of challenges that together help explain the implementation gap: teacher-related, student-related, and system-related.

Teacher-Related Challenges

The most prominent challenges were gaps in knowledge, skills, and commitment. Teachers reported limited understanding of differentiation concepts, lack of skills in sign language and Braille, and difficulty managing flexible classrooms. These findings align with earlier research by Siam and Al-Natour [16], Tadesse [27], and Tomlinson [36], who confirmed that the absence of required knowledge and skills is a primary reason for failure to differentiate instruction. Similarly, Santangelo and Tomlinson [35] and Fullerton et al. [63] emphasized that successful implementation of differentiated education is practically impossible without a fundamental understanding of differentiation principles.

Teachers also expressed low motivation and commitment, which Chamberlin and Powers [48] and Nicolae [49] identified as major factors hindering effective differentiation. The perception of differentiation as a time-consuming process is consistent with findings by Blecker and Boakes [74] and Harris and Brown [75], who noted that teachers often consider differentiated instruction as challenging to implement on a day-to-day basis due to time management complications.

Student-Related Challenges

Teachers reported that many students with special needs lack motivation, are passive in class, have poor confidence, and frequently absent themselves from school. These challenges are concerning because they may create a cycle where teachers become discouraged from implementing differentiation, further disengaging students. Previous research by Haywood et al. [17] noted that an undifferentiated curriculum can lead to lack of participation, interest, and confidence among students who cannot connect with its content.

System-Related Challenges

The most significant systemic challenges were inadequate pre- and in-service training, large class sizes, shortage of resources and assistive technologies, and curriculum rigidity. These findings are consistent with numerous studies [60, 65–70] that identified large class sizes as a major barrier to effective differentiation. Walker and Musti-Rao [70] noted that large class sizes cannot provide adequate learning

support for students with special needs to succeed. Similarly, Aldossari [65], Kyeremeh et al. [66], Moosa and Shareefa [67], Suprayogi [68], and Wan [69] found that because of the increasing diversity of learners and **diverse** needs, learning styles, and backgrounds, implementation of differentiated instruction in large class sizes was more difficult.

The lack of adequate teacher training is particularly critical. Teachers reported receiving insufficient preparation at both the college/university level and through in-service professional development. This finding aligns with Corbett's [18] assertion that a primary obstacle to effective differentiation is the lack of adequate teacher training and ongoing professional development opportunities essential for effectively including diverse learners. The shortage of teaching aids, assistive technologies, and accessible learning materials also emerged as significant barriers, consistent with findings by Westwood [23], Scott et al. [22], and Chan et al. [21].

4.4 Theoretical Implications

The study's findings support both the Curriculum Relation Model [32] and Tomlinson's model of differentiated instruction [6]. The eight frame factors of the Curriculum Relation Model—pupil background, frame factors dictating practice, intentions of education, curricular contents, strategies employed, methods and organization, assessment models, communication patterns, and care—all emerged as relevant to understanding teachers' experiences and difficulties. For example, teachers' difficulties were influenced by their backgrounds (training and qualifications), curricular contents (rigid curriculum), strategies employed (traditional teaching methods), methods and organization (large class sizes), assessment models (limited assessment differentiation), communication patterns (lack of collaboration), and care (limited motivation and commitment).

Similarly, Tomlinson's emphasis on ongoing assessment, flexible grouping, and respectful tasks resonated with the study's findings. Teachers who reported more experience in differentiation also appeared to engage more in these practices. However, the significant gaps in understanding and implementation suggest that more intensive support is needed to help teachers translate theoretical knowledge into practice, as noted by Marotta-Garcia [20]. The implementation gap concept we introduce in this study provides a useful framework for understanding the disconnect between policy aspirations and classroom realities in inclusive education contexts.

5 Conclusions

While teachers reported moderate differentiation practices quantitatively, the qualitative findings revealed significant competency gaps and systemic barriers that constitute the implementation gap. Teachers frequently reported differentiating all six components on self-report measures, yet their interview responses described general or traditional teaching methods rather than specific differentiation strategies. This discrepancy suggests that teachers may lack a deep understanding of what authentic curriculum differentiation entails. The study further identified three interconnected categories of challenges—teacher-related, student-related, and system-related—that sustain the

implementation gap. Addressing this gap requires coordinated action across policy, professional development, resource provision, and stakeholder collaboration to enable effective differentiation for students with special needs in South Ethiopia Regional State and comparable contexts.

6 Recommendations

1. **Policy and Guideline Implementation:** The country's Ministry of Education should ensure that all policies mandating inclusive education are made available and introduced, along with official documents, including the Guidelines for Curriculum Differentiation and Individual Educational Program, which is a very important guideline to implement CD in schools. Policy alone is insufficient; mechanisms for implementation and accountability must be strengthened.
2. **Professional Development:** Schools should organize continuous professional development training and short-term workshops for teaching staff to re-examine and refresh their pre- and in-service teacher training, to provide sufficient opportunities to learn from one another, and to assist in how they support students' learning needs through differentiating the curriculum components. Training should focus on specific skills such as assessment differentiation, flexible grouping, and adaptation of content, process, and product.
3. **Supervision and Feedback:** Schools should facilitate opportunities for teachers to get feedback on their teaching through built-in (internal) supervision. This approach may help teachers to detect their limitations early and to improve their preparation, understanding, and experiences. Regular classroom observations and constructive feedback sessions can help bridge the gap between reported and actual practices.
4. **Resource Provision:** Since educational processes require teaching aids, facilities, and a conducive learning environment, the concerned school bodies should prioritize the provision of educational facilities and services for the proper implementation of differentiation, including assistive technologies, accessible materials, and appropriate physical infrastructure. Resource allocation must be aligned with inclusive education priorities.
5. **Stakeholder Collaboration:** Since the responsibility of implementing differentiation does not fall only on teachers, for its effective implementation, a joint and coordinated effort is required from school administrators, parents, and other stakeholders. Regular meetings and communication channels should be established to ensure all parties contribute to closing the implementation gap.
6. **Future Research:** Since this study was conducted on teachers' experiences and difficulties of CD in primary schools, it would be interesting if further research could examine teachers' understanding and practices at high school and college/university levels. Additionally, future studies could explore the perspectives of students with special needs and their parents regarding differentiation practices. Longitudinal studies tracking the implementation gap over time would also be valuable.

7 Limitations

This study has several limitations. First, the quantitative data relied on self-reported measures, which may be subject to social desirability bias. This is particularly relevant given the implementation gap we identified between reported and actual practices. Future studies should include classroom observations to validate self-report data. Second, the study was conducted in only four towns of the South Ethiopia Regional State, limiting the generalizability of findings to other regions. Third, the cross-sectional design captures a snapshot of teachers' experiences but cannot determine causality. Fourth, the study focused on teachers' perspectives and did not include direct classroom observations or student outcomes data. Despite these limitations, the mixed-methods approach provides a comprehensive understanding of both the extent and nature of teachers' differentiation experiences and difficulties, and the implementation gap concept offers a useful framework for understanding these findings.

Declarations

Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Ethics

The study was approved by the Research Ethics Committee of the School of Pedagogical and Behavioral Sciences, Arba Minch University (Ref No: SPBS/101/2023). The study was conducted in accordance with the Declaration of Helsinki and the institutional research guidelines of Arba Minch University.

Consent to Participate

Oral informed consent was obtained from all participants involved in the study.

Consent to Publish

Not applicable.

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Author Contribution

MTK (Muluken Tesfaye Kabtyimer) and SSS (Solomon Sapo Shanko) conceptualized and designed the study. MTK collected the data, performed quantitative and qualitative analyses, and wrote the original manuscript draft. SSS critically reviewed and revised the manuscript for intellectual content. Both authors interpreted the findings and approved the final version. MTK serves as the corresponding author and takes primary responsibility for the integrity of the work.

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Data Availability

The authors can provide data upon reasonable request.

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Figures

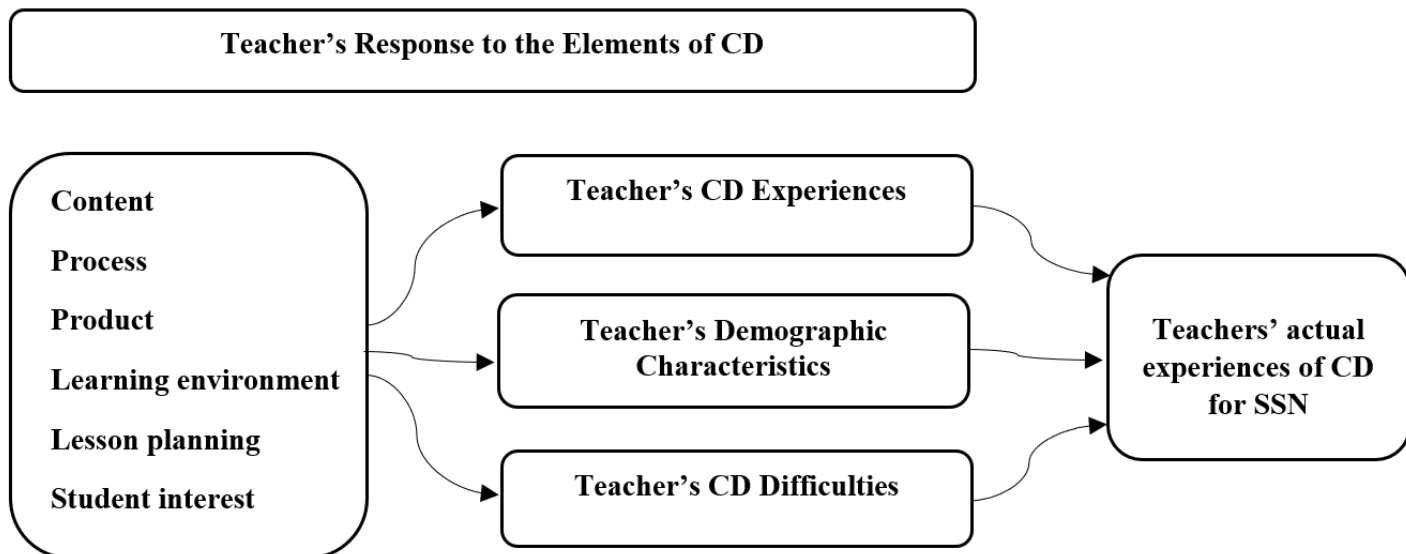


Figure 1

Conceptual framework of the study (Teachers' Response to the Elements of CD)

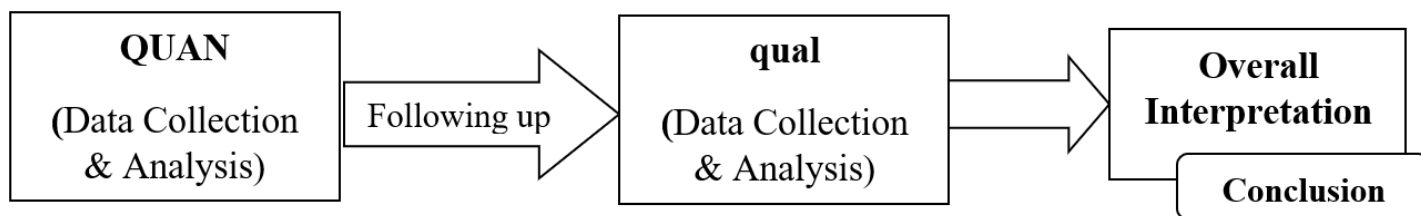


Figure 2

Procedural diagram for the explanatory sequential design

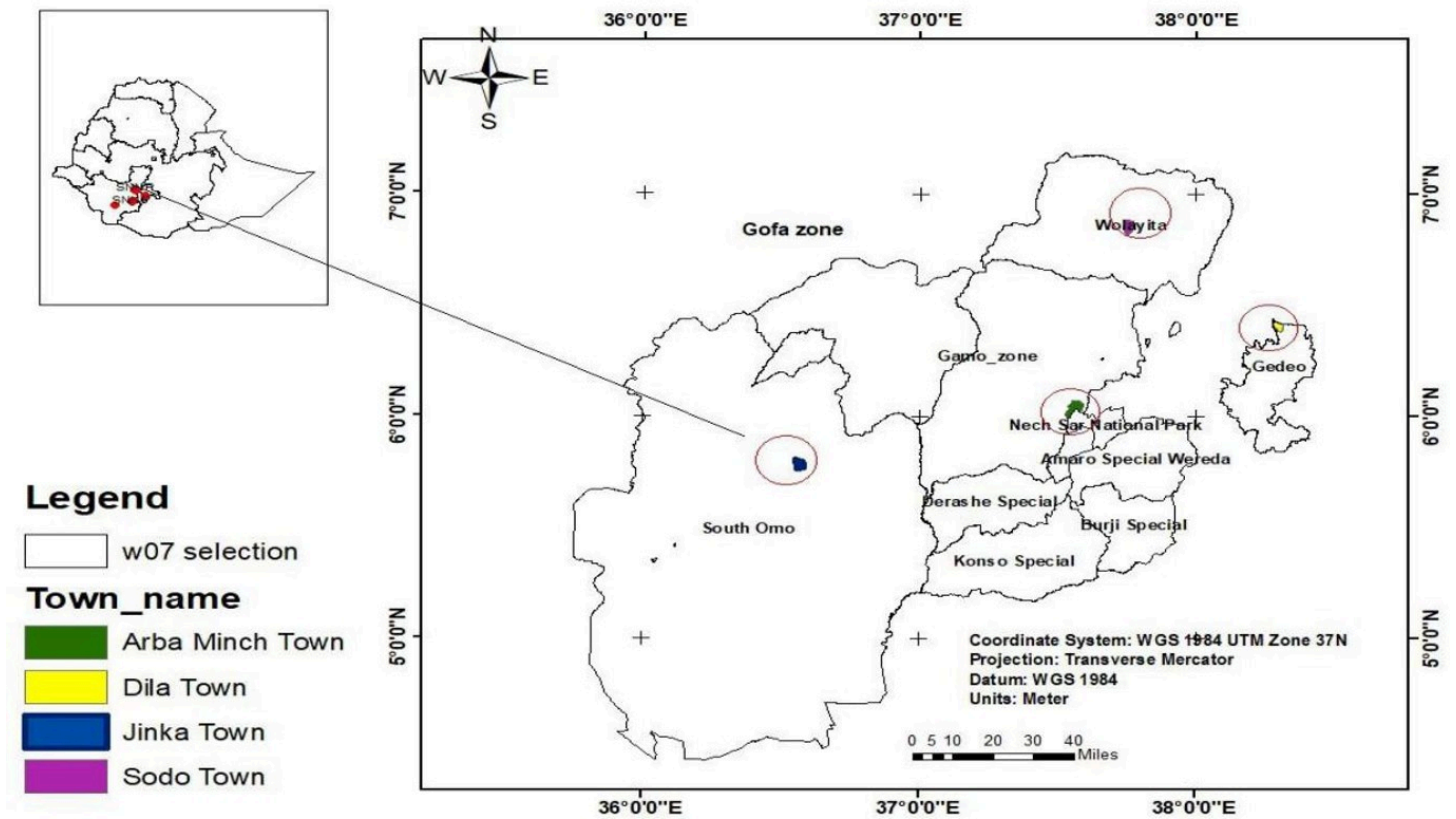


Figure 3

Map of the study area/towns