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Urban–Rural Differences in Teachers' Implementation of Differentiated Instruction under the Merdeka Curriculum: Evidence from Indonesian Junior High Schools

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ABSTRACT
The implementation of differentiated instruction is one of the main approaches in the Merdeka Curriculum to accommodate students' diverse learning needs. However, differences in geographical contexts, particularly between urban and rural schools, are presumed to influence the level of its implementation. This study aims to analyze the differences in the implementation of differentiated instruction between teachers in urban and rural schools. This study employed a comparative, quantitative approach, supported by qualitative data from interviews. The research sample consisted of 50 teachers selected purposively. Quantitative data were collected through a questionnaire that had been tested for validity and reliability, and were then analyzed using an independent-samples t-test. Meanwhile, qualitative data were obtained through interviews with six teachers selected based on questionnaire results to represent variations in implementation levels. The results showed a significant difference between teachers in urban and rural schools in the implementation of differentiated instruction. Teachers in urban schools have a higher level of implementation, especially in the dimensions of process differentiation, product differentiation, and learning environment. In contrast, the difference in the content differentiation dimension is relatively small. The interview findings reinforce these results by showing that resource limitations, learning environment conditions, and institutional support are the main factors influencing implementation in rural schools. These findings indicate that although teachers have a conceptual understanding of differentiated instruction, its implementation is still influenced by contextual factors. Therefore, more targeted efforts from the government and educational stakeholders are needed to ensure the equitable implementation of the Merdeka Curriculum, particularly through improving access to teacher training, providing learning resources, and strengthening institutional support in schools.

Keywords: Differentiated Instruction, Merdeka Curriculum, Urban and Rural Schools, Instructional Implementation, Educational Inequality.

INTRODUCTION

Educational systems around the world are increasingly required to address the diverse learning needs of students in heterogeneous classrooms. Differences in students' prior knowledge, learning pace, interests, and socio-cultural backgrounds require instructional approaches that go beyond traditional uniform teaching models (OECD, 2018; Tomlinson & Moon, 2022). In response to this challenge, differentiated instruction (DI) has been widely recognized as an effective pedagogical approach that enables teachers to adjust content, learning processes, and assessment strategies to accommodate student diversity (Tomlinson, 2014). Research consistently shows that differentiated instruction can enhance student engagement, foster inclusive learning environments, and improve academic achievement when implemented systematically (Smale-Jacobse et al., 2019; Subban, 2006). In line with these findings, various education systems around the world have begun integrating the principles of differentiated instruction into curriculum reforms to promote more inclusive and student-centered learning practices (Global Education Monitoring Report Team, 2020; OECD, 2018).

The importance of differentiated instruction becomes increasingly prominent in the context of contemporary curriculum reforms that emphasize flexibility, personalization, and competency-based learning (OECD, 2018; Tomlinson, 2017). Several studies indicate that the successful implementation of differentiated instruction depends not only on teachers' pedagogical knowledge, but also on institutional support, professional development opportunities, and contextual conditions within schools (Pozas et al., 2019; Prast et al., 2015). Teachers are required to be able to diagnose students' learning needs, design adaptive instructional strategies, and implement formative assessments that guide individual learning pathways (Prast et al., 2015; Tomlinson & Moon, 2022). However, empirical evidence shows that many teachers still face significant challenges in translating the theoretical principles of differentiated instruction into effective classroom practices, particularly in contexts where learning resources and support are limited (Smale-Jacobse et al., 2019).

In Indonesia, the Merdeka Curriculum is a major educational reform aimed at promoting student-centered learning and improving the quality of teaching. Introduced by the Ministry of Education, Culture, Research, and Technology, this curriculum emphasizes flexible learning pathways, formative assessment, project-based learning, and differentiated instruction as key components of effective teaching practices (Anggraena et al., 2021; Fajri & Andarwulan, 2023). Within this framework, teachers are encouraged to design instruction that accommodates students' readiness levels, interests, and learning profiles, thereby fostering more inclusive and meaningful learning experiences. This policy shift aligns with global trends that emphasize personalized learning and instructional differentiation in modern education systems (OECD, 2018; Tomlinson, 2017). Despite the strong policy emphasis on differentiated instruction in the Merdeka Curriculum, the implementation may vary across schools due to contextual differences. One important factor that may influence the enactment of curriculum reform is the urban–rural gap in educational resources and opportunities. A substantial body of international research highlights persistent disparities between urban and rural schools in terms of teacher qualifications, access to professional development, technological infrastructure, and teaching resources (Azano & Stewart, 2015; OECD, 2018; Plessis & Mestry, 2019). Such structural inequalities can affect teachers' capacity to implement innovative pedagogical practices, including differentiated instruction. For example, teachers in rural areas often face limited access to teaching materials, heavier teaching loads, and fewer opportunities to engage with professional learning communities, which may hinder the adoption of adaptive instructional strategies (Azano & Stewart, 2015; OECD, 2018; Plessis & Mestry, 2019).Research on differentiated instruction has largely focused on teachers' beliefs, instructional strategies, and classroom practices across various educational contexts. For example, Prast et al. (2015) found that teachers' ability to implement instructional differentiation is closely related to their diagnostic competence and pedagogical knowledge. Similarly, Pozas et al. (2020) showed that teachers' differentiation practices are influenced by both individual and institutional factors, including school culture and instructional leadership. A systematic review by Smale-Jacobse et al. (2019) further indicates that although differentiated instruction has significant potential to improve student learning outcomes, its implementation remains inconsistent across educational contexts. However, most of these studies have been conducted in Western contexts, and empirical evidence on the implementation of differentiated instruction within curriculum reform in developing countries remains relatively limited (Subban, 2006; Tomlinson, 2014).

In Indonesia, emerging studies on the Merdeka Curriculum have largely focused on teachers' perceptions, readiness, and challenges in adopting the new curriculum framework (Fajri & Andarwulan, 2023; Hura, 2024). Although these studies provide valuable insights into the early stages of curriculum implementation, they rarely explore how contextual inequalities between urban and rural schools influence teachers' classroom practices, particularly in relation to differentiated instruction. Given Indonesia's vast geographical diversity and uneven distribution of educational resources, it is reasonable to assume that teachers' capacity to implement differentiated instruction strategies may differ significantly between urban and rural settings. However, empirical evidence examining these differences remains limited, particularly at the junior high school level, which plays an important role in shaping students' foundational competencies.

Addressing this research gap is important to understand the extent to which the pedagogical aspirations of the Merdeka Curriculum are implemented equitably across educational contexts. Therefore, this study aims to investigate differences between urban and rural areas in teachers' implementation of differentiated

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instruction within the framework of the Merdeka Curriculum in Indonesian junior high schools. By comparing teachers' practices across different school locations, this study seeks to identify potential gaps in the application of differentiated instruction strategies and to explore contextual factors that may influence these practices. The novelty of this study lies in several key contributions. First, this study provides empirical evidence on the implementation of differentiated instruction within the context of the Merdeka Curriculum, a relatively new educational reform that is still limitedly discussed in the international literature. Second, this study explicitly integrates the perspective of the urban–rural gap, which has long been recognized as an important factor in educational inequality and access to learning resources (OECD, 2018). Third, by focusing on junior high schools in Indonesia, this study contributes to the literature on curriculum implementation and differentiated instruction in developing countries, where empirical evidence on innovative pedagogical practices remains relatively limited (Smale-Jacobse et al., 2019). The findings of this study are expected to enrich the literature on educational equity, differentiated pedagogy, and curriculum reform, while also providing practical implications for policymakers and educators in strengthening the implementation of student-centered learning across various educational contexts.

METHODOLOGY

This study employed a quantitative comparative research design to examine differences in the implementation of differentiated instruction by teachers in urban and rural junior high schools in Indonesia. A comparative research design is commonly used to investigate differences between groups across contexts and to identify patterns associated with contextual variables (Creswell & Creswell, 2017). In the context of educational research, such a design is particularly useful for examining differences in teaching practices across different school environments, including urban and rural contexts (Johnson & Christensen, 2019). A cross-sectional survey approach was adopted to collect data from teachers at a single point in time. Survey research is widely used in educational studies to explore teachers' perceptions, practices, and instructional strategies across different contexts (Fraenkel et al., 2012). This design allows for the systematic collection of standardized data from a relatively large sample, thereby enabling comparisons of teaching practices across different school locations. The participants in this study were junior high school teachers who implemented the Merdeka Curriculum in Indonesia. Junior high school teachers were selected because this level of education plays an important role in supporting students' transition to more advanced learning and in implementing curriculum innovations such as differentiated instruction. Approximately 50 teachers participated in this study, including 27 from urban schools and 23 from rural schools. The inclusion of teachers from both contexts was intended to enable a comparative analysis of differentiated instruction practices across different school environments. Participants were selected using a stratified sampling approach, in which teachers were grouped by school location (urban or rural). This approach was used to ensure that both groups were adequately represented and to facilitate meaningful comparisons between the two contexts (Cohen et al., 2011). The classification of schools as urban or rural was determined based on the administrative categorization used by local educational authorities (Azano & Stewart, 2015; OECD, 2018). Although the sample size was relatively small, it was considered sufficient for a comparative statistical analysis using an independent-samples t-test, which can be applied to small samples as long as the assumptions of normality and homogeneity of variance are met (Field, 2018). In addition to the survey participants, a small number of teachers from urban and rural schools were selected for semi-structured interviews to provide deeper insights into their experiences in implementing differentiated instruction under the Merdeka Curriculum. Data were collected using a structured questionnaire designed to assess teachers' classroom implementation of differentiated instruction. This instrument was developed based on the key dimensions of differentiated instruction proposed in the literature, including content differentiation, process differentiation, product differentiation, and learning environment (Tomlinson, 2014; Tomlinson & Moon, 2022).

Several items were also adapted from previous empirical studies that examined teachers' differentiation practices in educational settings (Pozas et al., 2019; Prast et al., 2015). The questionnaire used a Likert scale, allowing respondents to indicate the frequency or level of their instructional practices. Likert-type scales are widely used in educational research because they facilitate the quantitative measurement of attitudes, perceptions, and teaching behaviors (Joshi et al., 2015). The questionnaire consisted of two sections. The first section gathered demographic information, including participants' teaching experience, subject area, and school location. The second section focused on differentiated instruction practices, specifically assessing teachers' strategies for adapting instruction to meet students' diverse learning needs.In addition to the survey questionnaire, a semi-structured interview guide was developed to obtain deeper insights into teachers' experiences in implementing differentiated instruction under the Merdeka Curriculum. The interview questions were designed based on the main dimensions of differentiated instruction: content, process, product, and learning environment (Tomlinson, 2014). Semi-structured interviews were selected because they allow researchers to explore participants' perspectives in greater depth while maintaining focus on the research topic (Cohen et al., 2011). The interview guide consisted of several open-ended questions addressing teachers' instructional strategies, challenges, and contextual factors influencing the implementation of differentiated instruction. To ensure the quality of the research instruments, content validity and reliability tests were conducted before the main data analysis. Content validity testing was conducted to determine whether the questionnaire items and interview guide adequately represented the construct of differentiated instruction (Cohen et al., 2011), while reliability testing examined the instrument's consistency. First, content validity was established through expert judgment. The questionnaire items were reviewed by several experts in the field of curriculum and educational pedagogy to ensure that the statements accurately reflected the key dimensions of differentiated instruction, namely content, process, product, and learning environment differentiation (Tomlinson, 2014; Tomlinson & Moon, 2022). Feedback from the experts was used to refine and improve the clarity and relevance of the questionnaire items, and the instrument was deemed appropriate for use in this study. The instrument's reliability was then examined using Cronbach's alpha to assess its internal consistency (Table 1).

Table 1: Reliability Statistics

Cronbach's Alpha	N of Items
0.946	33

A Cronbach's alpha value of 0.70 or higher is generally considered acceptable for social science research, indicating that the instrument demonstrates adequate reliability (Hair et al., 2019). Through this procedure, the questionnaire was found to have acceptable validity and reliability for measuring teachers' implementation of differentiated instruction. Data for this study were collected through two main techniques: questionnaire surveys and semi-structured interviews with selected teachers. The questionnaire served as the primary instrument for collecting quantitative data on teachers' implementation of differentiated instruction, while the interviews provided deeper insights into teachers' experiences and the contextual factors influencing their instructional practices. Prior to data collection, permission was obtained from the relevant schools, and participants were informed of the study's purpose. Participation in this study was voluntary, and respondents were assured that their responses would remain confidential and would only be used for research purposes, in accordance with ethical principles in educational research (Creswell & Creswell, 2017). The questionnaire was distributed to junior high school teachers implementing the Merdeka Curriculum. Depending on accessibility and school conditions, the questionnaire was administered either online using a digital survey platform or in printed form during school visits. Teachers were asked to complete the questionnaire by responding to statements about their differentiated instruction practices using a Likert scale. Following the collection of questionnaire data, semi-structured interviews were conducted with a small number of selected teachers representing both urban and rural schools. The selection of interview participants aimed to obtain more detailed explanations of teachers' experiences implementing differentiated instruction and the challenges they encountered across different school contexts. Semi-structured interviews were used because they allow researchers to explore participants' perspectives while maintaining focus on the main research topic (Cohen et al., 2011). Each interview was conducted individually and lasted approximately 20–30 minutes. With participants' consent, the interviews were documented through written notes and audio recordings to ensure the accuracy of the collected information. The interview data were then transcribed and used to support and enrich the interpretation of the quantitative findings. The collected data were analyzed using descriptive and inferential statistical techniques. Before conducting descriptive and inferential statistical analyses, the Likert-scale questionnaire data were first converted from an ordinal to an interval scale using the Method of Successive Intervals. This procedure was carried out to ensure that the data met the assumptions of parametric statistical analysis, which require interval-level measurement (Allen & Seaman, 2007; Harwell & Gatti, 2001). After the data transformation process was completed, the data were analyzed using descriptive statistics to describe the level of teachers' implementation of differentiated instruction, and inferential statistics to examine differences between teachers in urban and rural areas. Descriptive statistics, including mean and standard deviation, were used to summarize teachers' differentiated instructional practices.Furthermore, to examine differences between urban and rural teachers, an independent samples t-test was employed. The independent t-test is commonly used to compare the means of two independent groups and to determine whether the observed difference is statistically significant (Field, 2018). However, before conducting inferential analysis, the assumptions of normality and homogeneity of variance were tested to ensure the appropriateness of the statistical test. Testing these assumptions is a standard procedure in quantitative data analysis (Pallant, 2020). Subsequently, the interview data were analyzed using thematic analysis to identify recurring themes related to teachers' experiences in implementing differentiated instruction. This analysis involved several steps, including transcribing interview responses, familiarizing with the data, coding relevant statements, and identifying key themes (Braun & Clarke, 2006). The qualitative findings were used to complement and provide deeper explanations of the quantitative results.

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RESULTS AND DISCUSSION

1. Results

1.1. Description of Respondents' Characteristics

To provide an overview of the participants involved in this study, respondents' demographic information was collected, including school location, gender, teaching experience, subject taught, and participation in Merdeka Curriculum training. Understanding these characteristics is important for describing teachers' backgrounds and providing context for interpreting the research findings. The demographic characteristics of the respondents are presented in Table 2.

Table 2: Demographic Characteristics of Respondents

Variable	Category	Frequency	Percentage (%)
School Location	Urban	27	54.0
	Rural	23	46.0
Gender	Male	22	44.0
	Female	28	56.0
Teaching Experience	< 5 years	10	20.0
	5–10 years	16	32.0
	11–20 years	15	30.0
	> 20 years	9	18.0
Subject Taught	Mathematics	11	22.0
	Science	9	18.0
	Indonesian Language	8	16.0
	English	7	14.0
	Social Studies	8	16.0
	Others	7	14.0
Participation in Merdeka Curriculum Training	Yes	34	68.0
	No	16	32.0

As shown in Table 2, the respondents comprised 50 junior high school teachers, including 27 from urban schools and 23 from rural schools. This distribution indicates that both groups are adequately represented, enabling meaningful comparisons among teachers working in different school contexts. Regarding gender distribution, female teachers accounted for a slightly larger proportion of the respondents. The participants also represented a range of teaching experience, with the largest group having between five and ten years of teaching experience. In addition, teachers from various subject areas participated in this study, reflecting the diversity of teaching assignments in junior high schools. The majority of respondents also reported having participated in training related to the implementation of the Merdeka Curriculum.

1.2. Descriptive Statistics Results

The questionnaire data from 50 junior high school teachers were processed and converted to interval data using the Method of Successive Intervals. The results of the descriptive statistical analysis of the teachers' questionnaire responses are presented in Table 3.

Table 3: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Urban	27	61.83	88.35	75.3515	7.11313
Rural	23	57.36	82.49	67.9187	7.46717
Valid N (listwise)	23				

Table 3 presents descriptive statistics on teachers' overall implementation of differentiated instruction in urban and rural schools. The results show that teachers in urban schools reported a higher mean score (M = 75.35, SD = 7.11) than those in rural schools (M = 67.92, SD = 7.47). In terms of score distribution, urban teachers' scores ranged from 61.83 to 88.35, while rural teachers' scores ranged from 57.36 to 82.49. This indicates that, overall, teachers in urban schools tend to use more differentiated instruction practices than those in rural schools. The relatively similar standard deviations in both groups indicate comparable variability in responses, suggesting consistent response patterns within each group. These findings provide an initial indication of differences in the implementation of differentiated instruction across school locations. To provide a more detailed understanding of teachers' implementation of differentiated instruction, an analysis was conducted across four main dimensions: content differentiation, process differentiation, product differentiation, and learning environment. Examining these dimensions allows for a more comprehensive comparison of instructional practices between urban and rural teachers. Descriptive statistics, including mean and standard deviation, were calculated for each dimension to identify patterns of implementation and to explore potential differences across school contexts. The results of this analysis are presented in Table 4.

Table 4: Descriptive Statistics of Differentiated Instruction Implementation by Dimension

Dimension	Urban		Rural	
	Mean	SD	Mean	SD
Content differentiation	2.46	0.92	2.44	0.93
Process differentiation	2.35	0.94	1.93	0.90
Product differentiation	2.31	0.83	2.06	0.88
Learning environment	2.02	0.79	1.87	0.86

Table 4 presents the descriptive statistics of teachers' implementation of differentiated instruction across four dimensions, comparing urban and rural school contexts. The results indicate that teachers in urban schools consistently reported higher mean scores across all dimensions compared to their counterparts in rural schools. In the content differentiation dimension, urban teachers obtained a mean score of 2.46 (SD = 0.92), slightly higher than rural teachers' 2.44 (SD = 0.93), indicating relatively similar practices in adapting instructional content in both contexts. For process differentiation, a more pronounced difference was observed, with urban teachers reporting higher mean scores (M = 2.35, SD = 0.94) compared to rural teachers (M = 1.93, SD = 0.90). This suggests that urban teachers tend to employ a greater variety of instructional strategies and learning activities. In terms of product differentiation, teachers in urban schools also demonstrated higher implementation (M = 2.31, SD = 0.83) than those in rural schools (M = 2.06, SD = 0.88), indicating greater flexibility in allowing students to demonstrate their learning outcomes in various ways. Similarly, in the dimension of learning environment, urban teachers reported higher mean scores (M = 2.02, SD = 0.79) compared to rural teachers (M = 1.87, SD = 0.86), suggesting that urban classrooms may provide more supportive and inclusive learning environments. Overall, these findings indicate that although differentiated instruction is implemented in both contexts, teachers in urban schools tend to demonstrate slightly higher levels of implementation across all dimensions.

1.3. Difference Test Results (Urban vs Rural)

To confirm differences in responses between the two teacher groups, an independent-samples t-test was conducted, preceded by prerequisite tests of normality and homogeneity. The results of the normality test are presented in Table 5.

Table 5: Tests of Normality

	Kelompok	Kolmogorov-Smirnova			Shapiro-Wilk		
		Statistic	Df	Sig.	Statistic	df	Sig.
Result	Urban	0.080	27	0.200*	0.980	27	0.873
	Rural	0.132	23	0.200*	0.950	23	0.295

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

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The results of the normality test shown in the table above are evident in the Shapiro–Wilk column, where both groups had significance (sig.) values of 0.873 and 0.295, respectively, both of which are greater than 0.05. This indicates that both datasets are normally distributed. This is also supported by the Q–Q plots for both groups, where the data points are close to and aligned with the diagonal line, further confirming that the data are normally distributed (Figures 1 and 2).

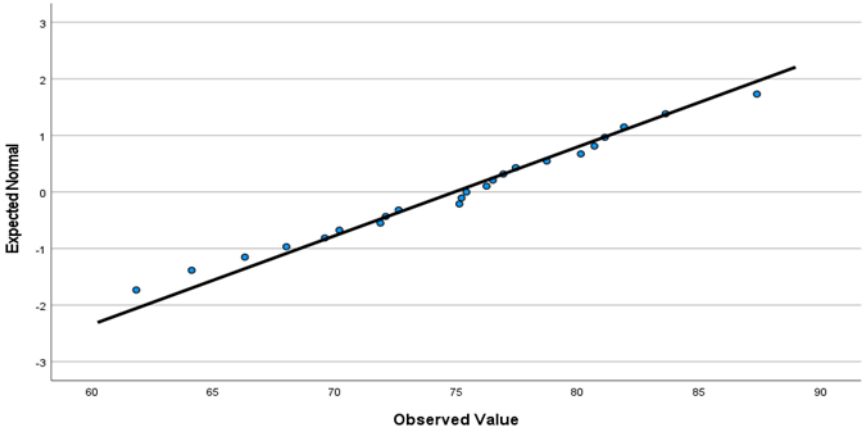

Figure 1: Normal Q-Q of Urban

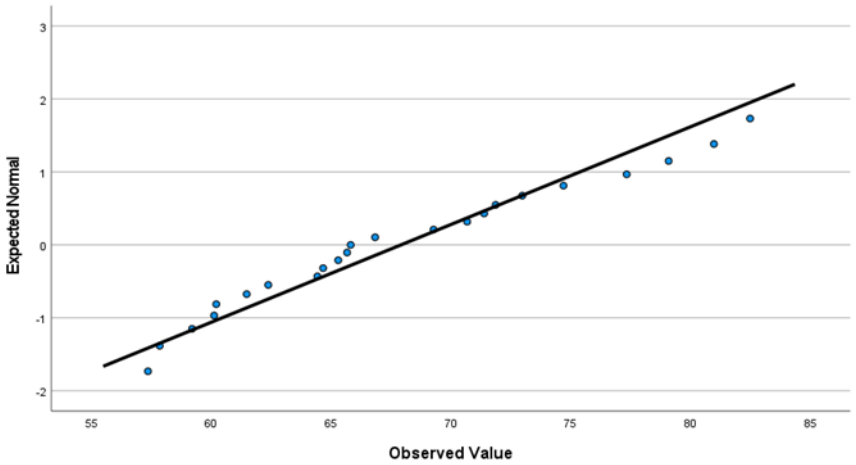

Figure 2: Normal Q-Q of Rural

Furthermore, the results of the homogeneity test are presented in Table 6.

Table 6: Tests of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Result	Based on Mean	0.227	1	48	0.636
	Based on Median	0.084	1	48	0.773
	Based on Median and with adjusted df	0.084	1	47.195	0.773
	Based on trimmed mean	0.203	1	48	0.655

The results of the homogeneity test shown in the table above indicate that the significance value based on the mean is 0.636, which is greater than 0.05. This means the variances of the two questionnaire groups are homogeneous. Since the results of the assumption tests indicate that both datasets are normally distributed and homogeneous, the analysis can proceed to the parametric test, namely the independent-samples t-test at $\alpha = 5\%$.

Table 7: Group Statistics

	Groups	N	Mean	Std. Deviation	Std. Error Mean
Result	Urban	27	75.3515	7.11313	1.36892
	Rural	23	67.9187	7.46717	1.55701

This output presents the descriptive statistics of the two groups of data. For the urban teacher group, the mean score is 75.3515; for the rural teacher group, it is 67.9187. The study included 50 respondents, comprising 27 urban and 23 rural teachers. The standard deviations for the two groups are 7.11313 and 7.46717, respectively. Finally, the standard errors of the mean for the two groups are 1.36892 and 1.55701, respectively. Since the mean score for the urban teachers' questionnaire data (75.3515) is greater than that for the rural teachers' (67.9187), this indicates a difference in average scores between the two groups. To determine whether this difference is statistically significant, the results of the independent-samples t-test are interpreted as follows.

Table 8: Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Significance		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						One-Sided p	Two-Sided p			Lower	Upper
Result	Equal variances assumed.	0.227	0.636	3.599	48	<.001	<.001	7.43	2.065	3.28	11.58
	Equal variances not assumed.			3.585	45.93	<.001	<.001	7.43	2.073	3.26	11.61

Based on the "Independent Samples Test" output in the "Equal variances assumed" section, the Sig. (2-tailed) value is < .001, which is less than 0.05. This indicates that, based on the decision criteria for the independent-samples t-test, the null hypothesis (H_0) is rejected, and the alternative hypothesis (H_a) is accepted. Thus, it can be concluded that there is a statistically significant difference between the mean questionnaire scores of the urban and rural teacher groups. Furthermore, the

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"Mean Difference" value is 7.43. This value indicates the difference between the two groups' mean scores: 75.3515 – 67.9187 = 7.43, with a 95% confidence interval of 3.28 to 11.58.

Based on the analysis above, it can be concluded that the implementation of differentiated instruction in the Merdeka Curriculum by the group of urban teachers is superior to that of teachers in rural areas. The quantitative analysis results indicating a significant difference between urban and rural teachers in the implementation of differentiated instruction were further explored through interview data. Interviews were conducted with six teachers, consisting of three teachers from urban schools and three teachers from rural schools, selected based on questionnaire results to represent variations in implementation levels. In general, the interview findings support the statistical analysis results, indicating that teachers in urban schools implement differentiated instruction at higher levels than those in rural schools. These differences are evident across several dimensions, particularly in process and product differentiation, as well as the learning environment. Teachers from urban schools demonstrate greater ability to manage a variety of instructional strategies. In the dimension of process differentiation, one teacher (G-U1) explained:

"*I usually divide students into several groups based on their abilities, then provide different activities according to their needs. Some engage in discussions, some in practice, and others learn independently using modules*."

This statement indicates that urban teachers are more active in adapting the learning process to students' characteristics, in line with the quantitative results showing higher scores in process differentiation. In addition, in the product differentiation dimension, urban teachers also demonstrate flexibility in providing a range of assessment formats. Another teacher (G-U2) stated:

"*For assessment, I do not always use a single format. Sometimes students can choose, for example, creating a poster, giving a presentation, or writing a report*."

This indicates that teachers provide opportunities for students to express their understanding in various ways, reinforcing the quantitative findings that product differentiation scores are higher in urban than in rural schools. In the dimension of learning environment, urban teachers also demonstrate efforts to create a more flexible and supportive classroom atmosphere. Another teacher (G-U3) stated:

"*I try to organize the classroom so that students feel comfortable, for example, by changing seating arrangements or providing space for group discussions. In that way, students become more active and can learn according to their own styles*."

This statement shows that classroom management is an important part of implementing differentiated instruction in urban schools, consistent with the quantitative results, which indicate higher scores in the learning environment dimension. In contrast, teachers in rural schools often face limitations in implementing differentiated instruction effectively. In the dimension of process differentiation, one teacher (G-R1) stated:

"*We want to implement different learning approaches, but sometimes it is difficult due to limited time and a large number of students*."

In addition, limited resources also become a constraint in developing varied instructional practices. Another teacher (G-R2) stated:

"*Facilities and learning resources are also limited, so we often use the same method for all students*."

In the dimension of learning environment, limitations in classroom conditions also affect the implementation of differentiation. One rural teacher (G-R3) stated:

"*The classroom conditions do not yet allow for many variations, so we adjust as much as we can*."

Nevertheless, both urban and rural teachers demonstrate efforts in implementing content differentiation. This is consistent with the quantitative results, which show relatively small differences in this dimension. Some teachers reported that they still try to adjust learning materials to students' abilities, for example, by providing additional explanations or simpler examples for students who have difficulty. Overall, these interview findings reinforce the quantitative results that the implementation of differentiated instruction in urban schools tends to be more effective than in rural schools. These differences are not only related to teachers' pedagogical practices but are also influenced by contextual factors such as resource availability, classroom management flexibility, and support for the learning environment.

Discussion

The findings of this study indicate a significant difference between teachers in urban and rural schools in the implementation of differentiated instruction within the Merdeka Curriculum. The results of the t-test confirm that teachers in urban schools demonstrate higher levels of implementation than those in rural schools, with a substantial mean difference. These findings reinforce the literature's assumption that contextual factors, particularly geographical disparities, play an important role in shaping the quality of instructional practices (Bennett, 2024; Global Education Monitoring Report Team, 2020; OECD, 2018). Conceptually, differentiated instruction requires teachers to adjust content, process, product, and the learning environment according to students' needs (Tomlinson, 2014, 2017). However, recent studies indicate that the implementation of differentiation is influenced not only by teachers' pedagogical competence but also by external factors such as school support, instructional leadership, and access to resources and professional training (Geel et al., 2019; Juwita et al., 2025; Otieno, 2025; Pozas et al., 2019). The results of this study are consistent with these findings, showing that teachers in urban schools demonstrate more optimal implementation, likely supported by better access to educational resources and professional development opportunities.

When examined according to the dimensions of differentiated instruction, the most prominent difference was found in the process differentiation dimension. Teachers in urban schools tend to be better able to implement a variety of instructional strategies, such as flexible grouping and activities tailored to students' needs. The interview results support these findings and are consistent with studies by Deunk et al. (2018) and Smale-Jacobse et al. (2019), which emphasize that process differentiation is the most complex and most difficult aspect for teachers to implement. In contrast, teachers in rural schools experience difficulties in applying such strategies, particularly due to time constraints, heavy workloads, and classroom conditions. This is also supported by recent studies indicating that teachers in resource-limited areas tend to use more uniform instructional approaches (Azano & Stewart, 2015; Plessis & Mestry, 2019; Schipper et al., 2020).

In the product differentiation dimension, teachers in urban schools demonstrate greater flexibility in providing a range of assessment formats. This practice reflects the principles of formative assessment and competency-based learning that are central to the Merdeka Curriculum (Anggraena et al., 2021; Fajri & Andarwulan, 2023). Recent studies also indicate that flexibility in learning products can enhance student motivation and engagement (Suprayogi et al., 2023; Tomlinson & Moon, 2022). However, limitations in facilities and learning resources in rural schools hinder the development of varied learning products, resulting in less optimal implementation. In the dimension of learning environment, teachers in urban schools also demonstrate better ability to create flexible learning environments that support active student participation. Adaptive learning environments are known to play an important role in supporting the success of differentiated instruction (OECD, 2018; Tomlinson & Imbeau, 2010). In contrast, limitations in infrastructure and physical classroom conditions in rural schools become major constraints in creating conducive learning environments. This is consistent with a report by the Global Education Monitoring Report Team (2020), which highlights disparities in educational facilities between urban and rural areas in many developing countries, including Indonesia.

Interestingly, in the content differentiation dimension, the difference between the two groups is relatively small. This indicates that teachers in both contexts have a basic understanding of the importance of adapting instructional content to students' abilities. This finding is consistent with recent studies showing that conceptual understanding of differentiation is relatively easier to acquire compared to its practical implementation (Suprayogi et al., 2023; Whitley et al., 2019). The Merdeka Curriculum training attended by most respondents likely contributed to the similarity in teachers' understanding of differentiated instruction concepts. However, this conceptual understanding is not always translated into optimal classroom implementation. Several studies indicate that the implementation of differentiated instruction requires continuous support, including the availability of resources, time, and institutional support (Pozas et al., 2019; Prast et al., 2015; Smale-Jacobse et al., 2019). From a methodological perspective, the use of a comparative quantitative approach complemented by interviews provides greater analytical power to understand differences in the implementation of differentiated instruction between urban and rural teachers. The quantitative data in this study successfully identified statistically significant differences between the two groups, particularly in the dimensions of process, product, and learning environment differentiation. However, these quantitative findings alone do not fully explain the underlying factors behind these differences. Therefore, qualitative data obtained through interviews play an important role in providing contextual explanations, such as resource limitations, teachers' workload, and differences in learning environments between urban and rural schools. The integration of these two types of data allows researchers not only to identify differences but also to understand why they occur. This approach aligns with Creswell and Creswell (2017), who emphasize that combining quantitative and qualitative data can provide a more holistic understanding of educational phenomena.

Furthermore, Clark and Ivankova (2017) and Greene et al. (1989) assert that integrating quantitative and qualitative methods in a single study enables complementarity, where qualitative data deepen and explain quantitative findings. In the context of this study, interviews with teachers strengthen the statistical findings by showing that the gap in differentiated instruction implementation is not only related to teachers' competence but is also influenced by structural and

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contextual factors. Thus, this approach provides a stronger basis for concluding that differences in the implementation of differentiated instruction between urban and rural schools result from the interaction between individual and environmental factors.

Based on this study's findings, significant differences in the implementation of differentiated instruction between urban and rural schools indicate that the Merdeka Curriculum has not yet been fully equitable. These disparities are particularly evident in the dimensions of process, product, and learning environment differentiation, which are strongly influenced by resource availability, institutional support, and school environmental conditions. Therefore, these findings can serve as an important consideration for governments and educational stakeholders in formulating policies that are more equity-oriented in curriculum implementation (Global Education Monitoring Report Team, 2020; OECD, 2018). More specifically, these findings suggest that national curriculum policies should be accompanied by implementation strategies that are context-specific and adaptable to local conditions. In this regard, schools in rural areas require more intensive support, including the provision of learning resources, increased access to teacher training, and the strengthening of professional learning communities. This is consistent with various studies emphasizing that the success of curriculum reform depends greatly on implementation capacity at the school level, including the quality of teacher professional development and overall educational system support (Darling-Hammond, 2017; Fullan, 2007; OECD, 2018).

In addition, based on the identified disparities, several recommendations can be proposed. First, the government needs to expand and equalize Merdeka Curriculum training programs that focus not only on conceptual understanding but also on the practical implementation of differentiated instruction in classrooms. Research shows that continuous and practice-based teacher training has a more significant impact on changes in instructional practices (Darling-Hammond, 2017). Second, there is a need for more equitable provision of learning resources, including access to instructional media and technology, given that disparities in facilities are one of the main factors affecting the quality of learning across regions (Bennett, 2024; Global Education Monitoring Report Team, 2020). Third, strengthening institutional support in schools, such as academic supervision and teacher collaboration through professional learning communities, needs to be enhanced to assist teachers in implementing differentiated instruction sustainably (Fullan, 2007; Hargreaves & Fullan, 2015). Fourth, affirmative policies specifically targeting rural schools are necessary to reduce existing disparities, in line with the principle of educational equity emphasized in various international reports (Global Education Monitoring Report Team, 2020; OECD, 2018). Thus, the findings of this study not only reveal differences in the implementation of differentiated instruction but also emphasize the importance of policy approaches that are more responsive to local contexts. Efforts to ensure equitable implementation of the Merdeka Curriculum are crucial to achieving the curriculum's main objective: creating student-centered, inclusive learning across all educational contexts.

CONCLUSION

This study aimed to examine the differences in the implementation of differentiated instruction between teachers in urban and rural schools within the context of the Merdeka Curriculum. The findings indicate a significant difference between the two groups, with teachers in urban schools demonstrating higher levels of implementation than those in rural schools. These differences are particularly evident in the dimensions of process, product, and learning environment differentiation, while the difference in the content differentiation dimension is relatively small. These findings indicate that although teachers in both contexts have a conceptual understanding of differentiated instruction, its implementation in the classroom is still influenced by contextual factors, including resource availability, learning environment conditions, and institutional support. Therefore, the success of implementing the Merdeka Curriculum depends not only on the curriculum policy itself but also on the readiness and capacity of the education system at the school level.

This study makes an important contribution to the literature on the implementation of differentiated instruction in developing countries, particularly by highlighting the gap between urban and rural areas. In addition, the findings of this study have practical implications for policymakers and educational stakeholders to pay greater attention to equity aspects in curriculum implementation, especially through improving access to teacher training, providing learning resources, and strengthening institutional support in rural schools. However, this study has several limitations, including the relatively small sample size and the limited geographical scope, which may not fully represent all contexts in Indonesia. Therefore, future research is recommended to involve a larger sample and examine other factors, such as school leadership, organizational culture, and local policies, that may influence the implementation of differentiated instruction. Overall, this study emphasizes that efforts to realize student-centered learning through the Merdeka Curriculum require an approach that not only focuses on curriculum design but also on the equitable distribution of conditions and support for implementation across different educational contexts.

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