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Needs Analysis of Adaptive Teaching Strategies In Primary Schools to Support Inclusive Education in Langsa

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ABSTRACT

Inclusive primary education requires teaching that responds to diverse learning needs. This study mapped priorities for adaptive teaching across seven purposively selected primary schools in five subdistricts of Langsa, Indonesia. Seven principals provided one school-level response each, informed by teachers, using a four-point rating instrument covering ten indicators in human resources and instructional practices. Available field notes provided contextual information. Indicator scores were summed and expressed as percentages of their theoretical maxima. The lowest attainment was recorded for variety of instructional media (32.14%), planning based on students' needs (35.71%), and variety of teaching methods (39.29%). Differentiated instruction and task adaptation each attained 42.86%, while identification of learning barriers and flexible formative assessment each attained 50.00%. The findings identify priorities for planning, accessible resources, and instructional flexibility. As the instrument received only a general expert review and no formal psychometric testing, the findings should be interpreted as descriptive school-level assessments rather than direct measures of teaching effectiveness.

Keywords: Adaptive Teaching; Differentiated Instruction; Inclusive Education; Needs Analysis; Primary Education

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INTRODUCTION

Inclusive education is an educational approach that provides all students with opportunities to receive educational services appropriate to their abilities and learning needs. Its implementation involves not only admitting students to mainstream schools but also ensuring that schools provide environments and learning processes that enable every student to participate actively. UNESCO (2020) explains that inclusive education must address barriers that may limit students' access, participation, and learning success. Thus, the presence of students with diverse learning needs in the same classroom does not, by itself, indicate successful inclusion. Schools must ensure that learning activities, instructional materials, teaching methods, and assessment can be adapted to students' needs.

At the primary school level, inclusive education presents challenges because students differ in academic abilities, social development, and independence. In a single classroom, teachers may encounter students who understand explanations quickly, those who require repetition, and those who need additional support with reading, writing, communication, or completing assignments. These differences require teachers to move beyond a uniform instructional approach. Studies by van Steen and Wilson (2020) and Guillemot et al. (2022) indicate that teachers' attitudes toward inclusive education are associated with various factors.

However, positive attitudes toward learner diversity do not necessarily translate into the ability to design and deliver instruction that meets students' needs.

These challenges are also relevant to primary schools developing inclusive education services in Langsa. Available documentation and field reports indicate that schools have enrolled students with diverse learning needs in mainstream classrooms. Teachers have also made adjustments, such as simplifying assignments, allowing additional time, repeating explanations, and providing direct assistance when students experience learning difficulties. These efforts demonstrate attention to students' needs. Nevertheless, available field notes also point to the need to strengthen the identification of learning needs, instructional planning, and more targeted assessment. Support and professional capacity building for teachers remain important concerns in teaching students with diverse needs.

These conditions reveal a gap between the principles of inclusive education and their implementation in classroom practice. Ideally, inclusive education ensures that every student has learning opportunities through activities and support appropriate to their needs. In practice, teachers may face limitations in time, support personnel, and instructional options. For example, a student who struggles to understand a lesson may receive additional explanations without necessarily receiving materials or activities designed to address the underlying difficulty. Extra time may also help students complete assignments, but it may not fully meet their needs if task formats and assessment procedures remain unchanged. Therefore, teachers' assistance should be developed into more systematic instructional strategies so that students not only attend class but also have opportunities to understand the material and achieve learning objectives.

One way to support inclusive education is to implement adaptive teaching strategies. Such strategies involve adjusting learning activities according to students' abilities, barriers, and learning needs. Adjustments can be made during planning, selection of instructional materials, use of media, choice of methods, assignment design, and assessment. Adaptive teaching does not mean that every student must have different content or learning objectives. Teachers may retain shared learning objectives while offering different ways for students to understand the content and demonstrate learning. Adaptive teaching thus provides more appropriate learning opportunities without compromising the intended competencies.

In practice, adaptive teaching does not always require digital devices or specialized facilities. Teachers can use concrete objects, pictures, videos, step-by-step instructions, or smaller task components to facilitate understanding. In assessment, students may be offered different ways to demonstrate understanding, including written responses, oral explanations, or demonstrations, provided that these methods remain aligned with the competencies being assessed. Such adjustments should be informed by students' prior abilities and learning progress. Accordingly, adaptive strategies should become part of everyday planning and instruction rather than merely reactive assistance when students encounter difficulties. Atasoy and Kaya (2022), in a meta-synthesis of formative assessment in science education, highlighted the importance of teachers' pedagogical knowledge and instructional decision-making when using assessment evidence to respond to students' learning needs.

Universal Design for Learning (UDL) provides a foundation for designing more flexible instruction. UDL emphasizes multiple means of engaging students, presenting information, and allowing students to demonstrate understanding. Almeqdad et al. (2023) and King-Sears et al. (2023) discuss the application of UDL principles to address diverse learning needs. Zhang et al. (2024), meanwhile, identify challenges in planning and implementing UDL. In the context of primary schools in Langsa, this approach can inform the use of more varied instructional media and learning activities. Technology such as interactive displays or instructional videos may support content delivery, but its contribution to adaptive teaching depends on its suitability for students' needs.

In addition to UDL, differentiated instruction provides a foundation for adaptive teaching strategies. Deunk et al. (2018) emphasize the importance of instructional designs that account for differences in students' abilities rather than relying solely on grouping. Kahmann et al. (2022) and Langelaan et al. (2024) discuss the role of professional development in

strengthening teachers' differentiated instruction skills. In primary classrooms, differentiation may involve adjusting levels of support, activity sequences, learning resources, and assignment formats. For example, in science lessons, some students may independently read a text and answer questions, while others receive supporting illustrations, step-by-step guidance, or teacher assistance. Such adjustments are intended not to limit students' abilities but to help them achieve learning objectives through appropriate pathways.

Teachers' ability to implement inclusive instruction is also related to their knowledge, experience, and available support. Wray et al. (2022) examine factors associated with teacher self-efficacy in inclusive education, while Donath et al. (2023) investigate the role of professional development in improving teacher competence. Yada et al. (2022) also discuss the relationship between teachers' self-efficacy and attitudes toward inclusive education. These studies underscore the importance of supporting teachers in responding to diverse learning needs. In schools with limited support personnel, classroom teachers may bear greater responsibility for identifying students' needs and adapting instruction. Professional development should therefore focus on practical skills, including initial assessment, designing alternative activities, adapting assignments, and monitoring student progress.

Research in Indonesia has also examined instruction adapted to students' needs. Siringo Ringo (2025) reviews differentiated instruction in primary education, while Karlina et al. (2025) discuss factors affecting UDL implementation in primary schools. These studies provide foundations concerning flexible instruction, teacher competence, and the support required for inclusive education. However, knowledge of these principles and enabling factors must be connected to actual classroom conditions. For schools developing inclusive services, information about general readiness is insufficient without identifying the instructional aspects requiring improvement.

Recent empirical investigations offer further context for this gap. In a study of 41 Australian primary teachers, Woodcock et al. (2022) reported differences in inclusive practices between teachers with higher and lower self-efficacy despite similar conceptual understandings of inclusion. Urton et al. (2023), surveying 585 primary teachers in Germany, found that attitudes, subjective norms, and perceived behavioral control were associated with intentions to implement inclusion. Kahmann et al. (2024) triangulated lesson plans, interviews, and observations of nine Dutch elementary teachers and documented variation in how instructional elements were adapted. Kalinowski et al. (2024), drawing on 489 elementary teachers, identified associations between self-efficacy, enthusiasm, assessment during planning, and differentiated instruction. These studies reinforce the value of examining concrete instructional indicators rather than relying on general awareness or training alone.

Additional empirical evidence from inclusive school settings highlights the importance of teacher and school conditions. Wächter et al. (2024) examined associations between teachers' inclusion-related attitudes, self-efficacy, and pupils' well-being in 26 schools. Saka and Celik (2024), using interviews and observations with three primary teachers, identified the need for professional learning and support when teachers address diverse learning needs under challenging conditions. Yang et al. (2024) also examined relationships among teachers' attitudes, intentions, inclusive behaviors, and competencies of students with special educational needs. These findings offer international context for the present school-level needs assessment, although the studies use different designs and outcome measures.

Previous studies have provided substantial evidence on the principles and implementation of inclusive education, particularly Universal Design for Learning (UDL), differentiated instruction, teacher attitudes, self-efficacy, and professional development (Deunk et al., 2018; Wray et al., 2022; Almeqdad et al., 2023; Donath et al., 2023; Zhang et al., 2024). These studies have contributed to understanding the pedagogical approaches and professional competencies required to accommodate diverse learning needs. However, translating these broader principles into context-specific instructional priorities remains an important practical challenge. Assessments of inclusive education conditions may identify general areas requiring improvement without sufficiently clarifying which aspects of instructional planning, media selection, teaching methods, task adaptation, or formative assessment should receive greater

attention. Consequently, an indicator-based needs analysis is necessary to provide a more operational basis for prioritizing adaptive teaching strategies in inclusive primary school settings.

To address this need, the present study examines ten indicators across two dimensions, namely human resources and instructional practices, in seven primary schools in Langsa, Indonesia. Rather than evaluating the effectiveness of a particular intervention or comparing individual schools, the study uses descriptive indicator attainment to identify instructional areas potentially requiring greater attention. The analysis focuses on translating school-level assessments into context-sensitive recommendations for adaptive teaching, particularly in relation to instructional planning, accessible learning resources, differentiated activities, and flexible assessment.

The contribution of this study lies in its context-specific, indicator-based mapping of adaptive teaching needs and its connection to practical instructional recommendations informed by UDL and differentiated instruction. By examining ten pedagogically relevant indicators collectively, the study provides a structured basis for identifying improvement priorities without assuming that the same instructional challenges occur equally across all schools. This approach offers descriptive empirical evidence to inform school-level planning and teacher professional development. Nevertheless, the findings do not establish the effectiveness of the recommended strategies and require further investigation through classroom observations, broader samples, and intervention-based research.

Accordingly, this study aims to identify priority needs for adaptive teaching strategies based on ten indicators across seven inclusive primary schools in Langsa and to formulate recommendations aligned with the identified needs. The findings are expected to support teachers and schools in planning more responsive instructional practices that accommodate diverse learning needs and strengthen participation in inclusive primary education.

METHOD

This study used a quantitative descriptive survey to identify priority needs for adaptive teaching in primary schools implementing inclusive education in Langsa, Indonesia. Conducted in 2026, it involved seven schools purposively selected from five subdistricts covering all administrative subdistricts of Langsa. Eligibility criteria were the enrollment of students with special educational needs in mainstream classrooms and the presence of teachers who had attended inclusive education training. The sample was intended to describe the participating schools, not to represent statistically all primary schools in Langsa.

Seven school principals served as respondents, one from each school. They assessed school-level instructional conditions using information from teachers working with students with special educational needs and teachers who had received inclusive education training. One questionnaire was completed per school. Thus, the unit of analysis was the school (n = 7); teachers were supporting information sources rather than independent survey respondents.

The instrument contained ten indicators in two dimensions. Human resources comprised understanding inclusive education, participation in inclusive education training, identifying learning barriers, and implementing differentiated instruction. Instructional practices comprised needs-based planning, variety of instructional media, task adaptation, variety of teaching methods, flexible formative assessment, and nondiscriminatory student participation. Each indicator used a four-point rating scale: 1 = not yet available, 2 = planning initiated, 3 = available but not yet optimal, and 4 = available and functioning well. Higher scores indicated more favorable reported conditions. These common descriptors were applied across different indicators, which may limit their specificity for constructs such as knowledge and training.

Before data collection, two experts in special and inclusive education conducted a general review of the instrument for relevance and suitability to the study context. They did not provide systematic numerical ratings of individual indicators; therefore, no quantitative content validity coefficient was calculated. Internal consistency reliability was not statistically tested. This preliminary expert review should not be interpreted as evidence of established

psychometric validity or reliability. Future research should undertake more rigorous instrument evaluation, including indicator-specific content validity assessment and appropriate reliability testing.

Questionnaires were administered through Google Forms, and responses were exported to a CSV dataset. All seven questionnaires provided usable ratings for all ten indicators; no imputation was necessary. Available field documentation and interview notes were consulted only to contextualize the survey results. As these records were not uniformly available across schools, they were not used to estimate the prevalence of instructional practices or barriers.

For each indicator, ratings were summed across the seven schools and expressed as a percentage of the theoretical maximum score of 28 (7 schools × 4 points). Percentage attainment was calculated as follows:

$$P_i = \frac{\sum_{j=1}^{7} X_{ij}}{28} \times 100\%$$

Where P_i is the percentage attainment for indicator i, X_{ij} is the rating of indicator i at school j, and 28 is the theoretical maximum aggregate score. These percentages are proportions of the maximum possible score, not percentages of schools or teachers implementing a practice. Because the rating scale begins at 1, the theoretical attainment range is 25%–100%. The minimum value of 25% corresponds to the lowest response category (not yet available) and should not be interpreted as a zero score or as a direct estimate of the absence of a practice across schools.

Indicators were ranked descriptively from lowest to highest attainment. Lower scores were used to flag areas potentially requiring greater attention, alongside their relevance to classroom practice and the available contextual notes. Proposed responses were informed by Universal Design for Learning (UDL) and differentiated instruction; neither their feasibility nor their effectiveness was evaluated in this study. The indicator-specific alignment with these pedagogical frameworks warrants further examination in subsequent research.

Interpretation is restricted to ten school-level indicators from seven purposively selected schools. Findings reflect principals' assessments informed by teachers, not systematic classroom observations or direct measurements of individual teacher competence. The limited sample, broad rating descriptors, and absence of formal psychometric testing constrain interpretation and statistical generalization. No school-level comparisons or rankings were undertaken.

RESULT AND DISCUSSION

Analysis of the seven school-level responses revealed variation across the ten adaptive teaching indicators. Table 1 presents aggregate scores and attainment percentages ordered from lowest to highest. Each indicator had a maximum possible score of 28 (seven schools × four points). The percentages represent aggregate scores relative to this maximum, not the proportion of schools or teachers implementing a practice.

Table 1. Aggregate scores and attainment percentages for adaptive teaching indicators

No.	Indicator	Score / 28	Attainment (%)
1	Variety of instructional media	9	32.14
2	Planning based on students' needs	10	35.71
3	Variety of teaching methods	11	39.29
4	Differentiated instruction	12	42.86
5	Task adaptation	12	42.86
6	Understanding inclusive education	13	46.43
7	Identifying learning barriers	14	50.00
8	Flexible formative assessment	14	50.00
9	Inclusive education training	16	57.14
10	Nondiscriminatory student participation	16	57.14

The three lowest-scoring indicators were variety of instructional media (9/28; 32.14%), planning based on students' needs (10/28; 35.71%), and variety of teaching methods (11/28; 39.29%). Differentiated instruction and task adaptation each attained 42.86%; understanding inclusive education reached 46.43%; and identifying learning barriers and flexible formative assessment each reached 50.00%. Inclusive education training and nondiscriminatory student participation had the highest attainment, at 57.14% each. These differences are descriptive and do not establish statistical significance or causality.

Available field notes from SDN 16 Langsa document examples of simplified assignments and assistance during lessons, alongside a need for additional support. These observations provide contextual illustrations only; they do not represent all seven schools and were not used to estimate how frequently barriers occurred.

DISCUSSION

The novelty of this study lies in linking an indicator-based assessment of inclusive instructional conditions to explicit priorities for adaptive teaching in primary schools. Whereas much of the existing literature addresses inclusive attitudes, teacher self-efficacy, Universal Design for Learning (UDL), or differentiated instruction in general, the present analysis examines ten concrete indicators spanning human resources and classroom instruction in seven schools across five subdistricts of Langsa. Its distinctive approach is to use aggregate indicator attainment to identify pedagogical needs and formulate context-sensitive recommendations without ranking individual schools. The study does not propose a new instructional theory or claim that the recommended strategies have been experimentally validated; rather, it offers a locally grounded basis for deciding which aspects of adaptive teaching warrant attention first.

The main finding is that variety of instructional media (32.14%), planning based on students' needs (35.71%), and variety of teaching methods (39.29%) were the lowest-attaining indicators. Differentiated instruction and task adaptation each attained 42.86%, while identifying learning barriers and flexible formative assessment each attained 50.00%. Inclusive education training and nondiscriminatory participation attained 57.14%, the highest values in the set. This pattern highlights a practical need to strengthen how teachers plan learning activities, select accessible media, vary instructional methods, and adjust tasks and assessments for different learners. The contrast between training and classroom-related indicators merits attention, although the survey cannot determine whether training caused, improved, or failed to improve particular teaching practices.

These findings are broadly compatible with previous research on flexible instruction and inclusive education. Deunk et al. (2018) identified the importance of effective differentiation practices in primary education, while Kahmann et al. (2022) and Langelaan et al. (2024) examined teacher preparation and professional development for differentiated instruction. Almeqdad et al. (2023) and King-Sears et al. (2023) synthesized evidence relating to UDL and learner outcomes, supporting the relevance of multiple pathways for accessing and demonstrating learning. Zhang et al. (2024) documented challenges in UDL implementation, and Layachi and Pitchford (2025) emphasized matching educational technology to learners' needs rather than treating technology itself as sufficient. Donath et al. (2023) and Wray et al. (2022) further examined professional development and teacher self-efficacy in inclusive education. In the Indonesian primary-school context, Karlina et al. (2025) reviewed factors influencing UDL implementation. Unlike these broader reviews and studies, the present research identifies the relative attainment of specific adaptive teaching indicators in a defined local group of schools; it does not estimate the effects of differentiation or UDL on student achievement.

Additional empirical findings provide a more practice-focused comparison. Kahmann et al. (2024) observed adaptations in instructional processes and environments, whereas adaptations to content and products were less common; this is compatible with the present descriptive pattern of low attainment in media variety, needs-based planning, and task adaptation, although the designs and measures differ. Kalinowski et al. (2024) linked differentiation to teacher characteristics and assessment activities during planning, while

Woodcock et al. (2022) identified differences in inclusive practices associated with teacher self-efficacy. Urton et al. (2023) and Mentel et al. (2024) investigated predictors of inclusive teaching intentions, which should not be equated with directly observed classroom implementation. Jager et al. (2025) showed that instructional differentiation can involve simultaneous adjustments to multiple elements, while Schnepel et al. (2025) identified the importance of teacher collaboration in primary inclusive classrooms. Hendriksen et al. (2024) highlighted school management support for teachers' inclusive initiatives, and Smit and Weingartner (2026) examined diverse differentiated-instruction practices. Taken together, these studies suggest that adaptive teaching requires practical pedagogical decisions and organizational support; the present survey, however, cannot establish which factors caused the reported indicator scores.

Further empirical comparisons underscore the relevance of collaboration and practical classroom support. Birot-Gautron et al. (2025) investigated interprofessional collaboration and teachers' professional dilemmas in French multigrade primary classrooms including pupils with special educational needs. Lewis and Pulsford (2025) used case studies in six English primary schools to examine how early-career teachers and teaching assistants negotiated inclusive pedagogy in everyday practice. In teacher preparation, Lin et al. (2024) evaluated an augmented-reality-supported learning-by-design approach for developing pre-service teachers' understanding and performance in inclusive education. These studies address classroom teamwork and professional learning, while the present study identifies reported instructional priorities rather than testing an intervention or observing teaching directly.

The convergence with earlier literature may reflect the practical complexity of responding to diverse learning needs: teachers must move beyond awareness of inclusion to select appropriate resources, design varied tasks, and monitor progress. Lower attainment in media and planning may also indicate that access to equipment alone is insufficient unless resources are pedagogically accessible and chosen in response to students' needs. Differences from previous studies should, however, be interpreted in light of design and context. Several cited studies are systematic reviews, meta-analyses, or investigations of teacher development and learner outcomes, whereas this study is a descriptive survey of seven purposively selected schools using one principal-completed response per school, informed by teachers. It therefore measures school-level reported conditions rather than directly observed classroom quality or intervention effectiveness. The higher score for training than for differentiated instruction suggests a possible gap between available training and reported instructional implementation, but cannot establish why that difference occurred or whether the training itself was effective. In this regard, English et al. (2022) reviewed the use of rubrics in K–12 formative assessment and identified their potential to support student participation and teachers' assessment practices. This literature provides a rationale for considering flexible formative assessment, although the present study did not evaluate the effectiveness of particular assessment tools.

The study contributes a practical, indicator-based approach to prioritizing adaptive teaching needs in inclusive primary education. Its findings position accessible media, needs-responsive planning, and methodological variety as initial priorities, supported by task adaptation, differentiated instruction, identification of learning barriers, and flexible formative assessment. Together, these elements suggest a coherent cycle in which teachers identify learning needs, plan alternative routes to shared learning objectives, provide suitable instructional support, and use formative evidence to refine subsequent teaching. This is an interpretive framework derived from the observed pattern and established pedagogical principles, not a model whose relationships were statistically tested. The contribution is therefore to connect local descriptive evidence with actionable pedagogical priorities rather than to claim causal effectiveness or generalizability beyond the participating schools.

Practically, the findings suggest that schools could begin with simple, non-diagnostic learning-needs profiles, accessible materials in multiple formats, flexible activity and assignment options, and formative assessment through oral, written, or practical demonstrations aligned with learning objectives. School leaders could support teacher mentoring, collaborative lesson planning, repositories of accessible media, and reflection on student work. At the policy level, these priorities may inform targeted support for inclusive

schooling and the provision of reasonable accommodation consistent with Indonesia's Ministerial Regulation Number 48 of 2023.

Academically, the findings offer a baseline for subsequent development and evaluation of adaptive teaching approaches. Limitations include the small purposive sample, principal-reported school-level assessments, uneven field documentation, and the absence of systematic classroom observation; consequently, the results cannot be generalized statistically to all schools in Langsa or used to infer teaching effectiveness. Future studies should involve more schools and respondent groups, incorporate direct observation and student perspectives, and evaluate the feasibility and outcomes of the proposed strategies through intervention or development research. Teacher collaboration may also support shared planning and reflection, but Grosche and Moser Opitz (2023) cautioned that evidence establishing the effectiveness of interdisciplinary teacher collaboration for inclusive instruction remains limited. Accordingly, collaborative planning is proposed here as a possible support strategy rather than a proven intervention in the participating schools.

CONCLUSION

This study found that the principal needs for developing adaptive teaching strategies across seven primary schools in Langsa were variety of instructional media (32.14%), planning based on students' needs (35.71%), and variety of teaching methods (39.29%). These findings identify pedagogical improvement priorities based on ten indicators without ranking schools. The study contributes an empirical mapping of needs that can inform context-sensitive adaptive teaching strategies to support inclusive primary education. Recommended measures include initial assessment of learning needs, development of adaptive instructional materials, use of multimodal media, differentiated instruction, formative assessment, and sustained teacher mentoring. Schools should periodically evaluate strategy implementation and student participation. Future studies should include more schools, classroom observations, and teacher and student perspectives, and should examine the feasibility and effectiveness of the recommended strategies.

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