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Analysis of grade V students' learning needs: readiness, interest, and learning profile

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ABSTRACT

Differentiated instruction within the *Merdeka Curriculum* requires teachers to understand students' learning needs as a foundation for designing student-centered instruction. However, systematic mapping of students' learning needs remains limited in Indonesian primary schools, including in Grade 5, where students demonstrate increasingly diverse levels of academic readiness, interests, and learning preferences. This study aimed to analyze the learning needs of fifth-grade students based on the dimensions of readiness, interest, and learning profile as a foundation for designing differentiated instruction. The study employed a qualitative descriptive approach conducted at SD Negeri 2 Ternate City. From a population of 33 fifth-grade students, three participants were selected through purposive sampling to represent low, moderate, and high academic ability levels. Data were collected using a learning needs questionnaire consisting of items covering the dimensions of readiness, interest, and learning profile, measured using a five-point Likert scale. The data were analyzed descriptively through mean score calculations and qualitative interpretation. The findings indicate that students' learning needs were heterogeneous across all three dimensions. The interest dimension obtained the highest mean score (4.12), followed by learning profile (3.86), while readiness had the lowest mean score (3.44). Students with moderate academic ability demonstrated the highest scores across all three dimensions, whereas students with high academic ability did not necessarily exhibit the greatest learning needs. These findings indicate that academic ability alone cannot serve as the sole basis for determining instructional strategies. Therefore, systematic assessment of students' learning needs is essential for developing differentiated instruction that is adaptive, effective, and responsive to the characteristics of each learner.



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Introduction

Twenty-first-century education requires learning that is oriented not only toward the achievement of academic competencies but also toward accommodating the diverse characteristics of learners. The paradigm shift from *teacher-centered learning* to *student-centered learning* positions students as the primary subjects of learning, each possessing different potentials, needs, and learning characteristics. In line with the implementation of the *Merdeka Curriculum*, learning is expected to be more flexible, meaningful, and responsive to students' needs. Therefore, teachers need to design adaptive learning experiences so that every student has an equal opportunity to develop optimally.

One important step in realizing student-centered learning is conducting a *learning needs assessment*. Learning needs assessment is a systematic process of identifying students' actual conditions, competency gaps, and the needs that must be addressed to achieve learning objectives. Such information can serve as a foundation for teachers in determining learning objectives, strategies, media, methods, and assessments that are appropriate to students' characteristics. Thus, instructional planning is not based solely on teachers' assumptions but also on empirical data regarding students' actual conditions. Efriyanti and Albina (2025) emphasize that learning needs assessment is a fundamental stage in instructional design because it can identify gaps between actual conditions and expected competencies through observation, interviews, surveys, and diagnostic assessments. The concept of needs itself is understood as a discrepancy between the actual condition (*what is*) and the desired condition (*what should be*), as proposed by Kaufman and Witkin and Altschuld. Accordingly, needs assessment serves not only to identify students' weaknesses but also to determine instructional improvement priorities (Ulfah, 2017; Witkin & Altschuld, 1995).

Within the implementation of the Merdeka Curriculum, learning needs assessment is closely associated with diagnostic assessment (Saputra, 2024). Diagnostic assessment is conducted to obtain information regarding students' prior knowledge, readiness, interests, characteristics, and learning difficulties, which can subsequently be used as a basis for implementing differentiated instruction. Recent studies have also demonstrated the practical importance of systematically identifying learners' characteristics before determining instructional strategies. Efriyanti and Albina (2025) found that needs assessment provides empirical information that can guide the selection of learning materials, strategies, and instructional support according to students' conditions. Similarly, Saputra (2024) emphasized the role of diagnostic assessment in identifying students' initial conditions and learning differences as a basis for designing more responsive instruction. In the context of differentiated learning, Suwono et al. (2021) further showed that identifying students' characteristics and interests can assist teachers in designing learning activities that are more relevant and meaningful. These findings indicate that learning needs assessment should not be treated merely as an administrative stage but as an empirical foundation for instructional decision-making.

Differentiated instruction requires teachers to adjust the learning process according to students' characteristics, particularly through three key dimensions: readiness, interest, and learning profile. Readiness refers to students' levels of prior knowledge, skills, and understanding in achieving particular learning objectives (Saprudin et al., 2020). Tomlinson (2017) explains that learning readiness is dynamic and can develop through experience, feedback, and appropriate instructional support. This concept is also consistent with Vygotsky's Zone of Proximal Development (ZPD), which emphasizes the importance of providing scaffolding so that learners can accomplish tasks that are slightly beyond their current level of ability (Tomlinson & Moon, 2013). Therefore, identifying students' readiness enables teachers to determine an appropriate level of challenge and provide instructional support that corresponds to students' current learning conditions.

In addition to readiness, interest is an important aspect influencing students' engagement in learning. Interest is associated with students' attraction, curiosity, and inclination toward particular topics or learning activities. Students who learn in accordance with their interests tend to demonstrate higher levels of motivation and engagement (Hidi & Renninger, 2006; Madi et al., 2026). Therefore, teachers need to consider students' interests when determining learning contexts, media, activities, and projects so that the learning process becomes more meaningful (Suwono et al., 2021). Mapping students' interests can consequently provide teachers with information for selecting learning experiences that are not only relevant to curriculum objectives but also capable of encouraging students' active participation.

The third dimension is learning profile, which refers to individual characteristics that influence how students receive, process, and express information. Learning profiles may be influenced by learning preferences, multiple intelligences, cultural backgrounds, learning environments, and previous learning experiences (Tomlinson, 2017). These differences require teachers to provide a variety of media, activities, and assessment formats so that instruction can accommodate the diverse ways in which students learn. Thus, understanding students' learning profiles contributes to the development of more flexible learning environments and enables teachers to provide multiple pathways for students to engage with and demonstrate their understanding of learning materials.

These three dimensions demonstrate that students' learning needs are heterogeneous and cannot be determined solely on the basis of academic ability. Mapping readiness, interest, and learning profile is important because it provides more comprehensive information as a basis for determining adaptive instructional strategies. Several studies have shown that differentiated instruction has the potential to improve students' engagement, motivation, and learning outcomes by adapting instruction to students' characteristics (Punggeti et al., 2025; Tomlinson, 2017; Marlina, 2020). In the Indonesian context, this approach has become increasingly relevant with the implementation of the Merdeka Curriculum, which positions the results of diagnostic assessments as

one of the foundations for designing student-centered learning (Ministry of Education, Culture, Research, and Technology, 2022).

Nevertheless, previous studies have predominantly examined the implementation of differentiated instruction and its effects on learning outcomes, motivation, creativity, and thinking skills. Research specifically mapping students' learning needs based on the three dimensions of readiness, interest, and learning profile, particularly at the primary school level, remains relatively limited. Existing studies have also tended to emphasize the implementation or effectiveness of differentiated instruction rather than the initial empirical process of systematically identifying students' needs before instructional strategies are designed. However, the success of differentiated instruction is largely determined by the accuracy with which teachers identify students' needs before the learning process begins (Tomlinson & Moon, 2013). This indicates a need for empirical studies that place learning needs assessment at the initial stage of differentiated instructional planning, particularly within the context of the Merdeka Curriculum.

A similar condition was observed at SD Negeri 2 Ternate City, where instructional planning still generally refers to the same learning objectives and activities for students despite differences in their academic abilities and learning characteristics. Although teachers have recognized variations in students' academic performance, information concerning students' readiness, interests, and learning profiles has not yet been comprehensively and systematically mapped. Consequently, instructional strategies may not fully accommodate the diversity of students' characteristics. This condition highlights the importance of conducting a systematic learning needs assessment that moves beyond academic achievement as the sole basis for determining instructional strategies.

Based on these conditions, this study aims to analyze the learning needs of fifth-grade students at SD Negeri 2 Ternate City based on three dimensions of differentiated instruction: readiness, interest, and learning profile. Specifically, the study addresses how systematic mapping of these three dimensions can provide an empirical foundation for instructional planning within the implementation of the Merdeka Curriculum. Unlike previous studies that primarily focus on the implementation or effectiveness of differentiated instruction, this study emphasizes the preliminary process of identifying students' learning needs before differentiated strategies are designed and implemented. The study therefore contributes a contextual empirical description of the heterogeneity of primary school students' learning needs and demonstrates that academic ability alone is insufficient as a basis for determining instructional strategies. The findings are expected to assist teachers in conducting more systematic learning needs assessments, determining appropriate instructional strategies, selecting relevant media and activities, and designing assessments that correspond to students' characteristics. More broadly, this study provides practical evidence for strengthening the role of learning needs assessment as an essential foundation for developing adaptive, meaningful, and student-centered differentiated instruction within the Merdeka Curriculum.

Method

This study employed a qualitative descriptive approach aimed at describing and analyzing students' learning needs based on data obtained through a questionnaire instrument. The qualitative descriptive approach was used to understand and describe phenomena in their natural context by systematically presenting data in accordance with actual field conditions (Moleong, 2017). In this study, the approach was considered appropriate for identifying variations in students' learning needs and interpreting these variations based on the dimensions of readiness, interest, and learning profile.

The study was conducted among fifth-grade students at SD Negeri 2 Ternate City, with a population of 33 students. The sample was selected using purposive sampling, a sampling technique in which participants are selected based on specific considerations aligned with the objectives of the study (Sugiyono, 2015). In this study, the selection criteria were based on differences in students' learning ability levels. The sample consisted of three students representing low, moderate, and high learning ability categories. The selected participants were considered capable of representing variations in academic ability and providing different perspectives on students' learning needs. To maintain research ethics and protect participants' identities, the respondents were anonymized using the initials S-1, S-2, and S-3.

The research instrument was a Student Needs Assessment Questionnaire developed using a five-point Likert scale, ranging from 1 = Strongly Disagree to 5 = Strongly Agree. The questionnaire consisted of 60 statements covering four main aspects: (A) Students' Background and Initial Conditions; (B) Students' Learning Needs; (C) Effective Ways of Teaching Students; and (D) Effective Learning Strategies. The Likert scale was selected because it enables the systematic measurement of respondents' attitudes, perceptions, and opinions toward a particular research object (Sugiyono, 2015). These four aspects were subsequently categorized into three dimensions of learning needs based on Tomlinson (2017): learning readiness (readiness), learning interest

(interest), and learning profile (learning profile). This categorization was intended to provide a systematic framework for identifying individual differences among students as a basis for designing differentiated instruction.

Data were collected through the direct administration of the questionnaire to the three selected student participants. Before completing the questionnaire, the participants were provided with explanations regarding the purpose of the study and instructions for responding to each statement. The students completed the questionnaire based on their actual learning experiences, preferences, interests, and perceived learning conditions. The researchers subsequently reviewed the completed questionnaires to ensure that all responses were recorded and suitable for analysis.

The collected data were analyzed descriptively by calculating the mean scores for each indicator and each learning-needs dimension for every participant. Although the questionnaire generated numerical data through the five-point Likert scale, these scores were used as descriptive indicators rather than for statistical hypothesis testing. The quantitative scores were transformed into qualitative descriptive findings through an interpretative process in which the mean scores were compared across indicators, dimensions, and participants. Higher and lower mean scores were interpreted as indicating relatively stronger or weaker levels of learning needs within each dimension. The resulting patterns were then described qualitatively to explain similarities and differences in students' readiness, interests, and learning profiles.

Furthermore, the interpretation process focused on identifying the heterogeneity of learning needs among the three students representing low, moderate, and high learning ability levels. The descriptive results were subsequently interpreted to explain their implications for the design of differentiated instruction and diagnostic assessment (Miles, Huberman, & Saldaña, 2014; Sugiyono, 2015). Through this process, the numerical questionnaire results were integrated with qualitative interpretation to provide a comprehensive description of students' learning-needs profiles and to identify instructional considerations that are responsive to individual student characteristics.

Results and Discussions

General Profile of Questionnaire Results

The questionnaire responses from the three sampled students revealed variations in mean scores, reflecting differences in their respective learning ability levels, as presented in Table 1.

Table 1. Questionnaire Results

Student	Learning Ability Level	Mean Questionnaire Score	Category
S1	Low	3.08	Moderate
S2	Moderate	4.03	High
S3	High	3.77	High

The questionnaire analysis indicates that each student has distinct learning-needs characteristics despite belonging to the same class. These differences are reflected in the variation of the mean questionnaire scores across the research participants. The student in the low-ability category obtained a mean score of 3.08, while the student in the moderate-ability category obtained the highest mean score of 4.03, followed by the high-ability student with a score of 3.77. This finding indicates that the results of learning-needs assessment do not necessarily correspond directly with students' academic ability classifications.

The higher questionnaire score obtained by the student with moderate learning ability indicates that learning needs are influenced not only by cognitive ability but also by affective factors and learning characteristics, such as motivation, interest, self-confidence, and preferences regarding the learning process. Therefore, academic ability cannot be used as the sole indicator for determining appropriate instructional services. This finding supports Tomlinson's (2017) view that differentiated instruction should be based on comprehensive information regarding learners' characteristics rather than solely on their academic achievement.

These findings also highlight the importance of conducting diagnostic assessment before instruction begins. Information regarding students' learning needs enables teachers to obtain a more comprehensive understanding of students' conditions, allowing instructional decisions to be more appropriately targeted. Therefore, learning-needs assessment serves as a foundation for determining appropriate forms of differentiation in learning content, processes, and products.

Analysis Based on Differentiated Instruction Dimensions

To obtain a more meaningful picture for differentiated instruction planning, the questionnaire results were categorized into three dimensions based on Tomlinson (2014), namely learning readiness, learning interest, and learning profile, as presented in Table 2.

Table 2. Students' Learning Needs Based on Differentiated Instruction Dimensions

Subject (Ability Level)	Readiness	Interest	Learning Profile
Student 1 – S (Low)	2.83	3.76	3.26
Student 2 – D (Moderate)	3.83	4.53	4.48
Student 3 – A (High)	3.67	4.06	3.84
Overall Mean	3.44	4.12	3.86

Categorizing the questionnaire results into the dimensions of readiness, interest, and learning profile provides more specific information regarding the learning characteristics of each student. These three dimensions constitute key components of differentiated instruction proposed by Tomlinson (2017) and serve as a foundation for determining appropriate instructional support for individual learners.

Based on the analysis, the interest dimension obtained the highest overall mean score (4.12), followed by learning profile (3.86), while readiness obtained the lowest mean score (3.44). This finding indicates that, in general, students demonstrate relatively strong motivation and interest in learning but still require reinforcement in terms of learning readiness, particularly with regard to prior understanding, learning pace, and mastery of concepts before engaging with new material.

These findings demonstrate that high learning motivation does not necessarily correspond to an equivalent level of academic readiness. This condition reinforces the view that learning readiness represents an independent dimension that cannot be inferred solely from students' academic ability levels. Therefore, teachers need to assess and map each dimension separately so that the instructional strategies designed are genuinely aligned with students' individual learning needs.

Readiness Dimension (Learning Readiness)

The findings indicate that the student with low learning ability obtained the lowest learning readiness score (2.83), while the student with moderate learning ability obtained the highest score (3.83), followed by the student with high learning ability (3.67). This finding indicates that learning readiness is not determined entirely by students' academic ability categories but is also influenced by previous learning experiences, prior conceptual understanding, students' confidence, motivation, and preparedness in dealing with new learning materials. Thus, students who demonstrate higher academic achievement do not necessarily possess the highest level of readiness for every learning situation.

For the student with low learning ability, the low readiness score was reflected in difficulties in understanding learning materials, a need for repeated explanations, and a longer time required to master new concepts. This condition indicates that the student is still at an initial stage of conceptual mastery and therefore requires more intensive learning support (Marinda et al., 2023). The finding suggests that instruction delivered at the same pace and level of complexity to all students may create additional difficulties for learners with lower readiness. Consequently, teachers need to identify students' initial conditions before determining the level of content, learning activities, and support provided during instruction.

According to the *Zone of Proximal Development* (ZPD) theory developed by Vygotsky, as discussed in Damanik et al. (2025), learning can take place optimally when learners receive support appropriate to their level of ability. Such support can be provided through *scaffolding*, namely the gradual provision of assistance until students are able to learn independently (Tomlinson & Moon, 2013). Therefore, for students with low learning readiness, teachers can implement content differentiation by simplifying learning materials, using concrete learning media, providing additional examples, and presenting learning activities incrementally through *chunking*. These strategies can reduce the cognitive demands of complex learning tasks and provide students with opportunities to develop their understanding gradually before progressing to more advanced concepts.

Interestingly, the student in the moderate-ability category demonstrated the highest level of learning readiness. This condition indicates that academic ability is not the only factor determining learning readiness. Students with high motivation, curiosity, positive learning habits, and sufficient prior experiences may demonstrate greater readiness than students with higher academic achievement. This finding reinforces Tomlinson's (2017) view that *readiness* is a dynamic condition that can develop through learning experiences and appropriate learning-environment support. In this context, the moderate-ability student may have

demonstrated a stronger combination of conceptual preparedness, learning confidence, and willingness to engage with new material.

Meanwhile, the student with high learning ability obtained a readiness score of 3.67, which was higher than that of the low-ability student but lower than that of the moderate-ability student. This result further demonstrates that high academic ability should not automatically be equated with the highest level of learning readiness. A student may demonstrate strong academic performance based on previous learning outcomes while still having varying levels of confidence, prior knowledge, motivation, or preparedness when encountering new and unfamiliar learning materials. Therefore, teachers should avoid using academic achievement as the sole indicator for grouping students or determining the level of instructional challenge.

The variation in readiness scores among the three students highlights the importance of conducting diagnostic assessment before and during the learning process. Through systematic identification of students' prior knowledge and learning conditions, teachers can determine the appropriate level of complexity, support, and challenge for each learner. Students with lower readiness may require more structured guidance and concrete examples, whereas students with moderate and higher readiness can be provided with increasingly complex tasks, opportunities for independent exploration, and activities that promote deeper conceptual understanding.

Overall, the findings demonstrate that learning readiness is a heterogeneous and dynamic characteristic that cannot be inferred solely from students' academic ability categories. The differences among S-1, S-2, and S-3 suggest that differentiated instruction should be based on students' actual readiness rather than assumptions derived from their academic performance. This finding has important implications for instructional planning, particularly in the context of the *Merdeka Curriculum*, which emphasizes learning that is responsive to students' diverse characteristics. Systematic assessment of learning readiness can therefore serve as an important foundation for determining appropriate content, instructional processes, learning support, and levels of challenge so that each student can participate in learning according to their current developmental and learning conditions.

Interest Dimension (Learning Interest)

The *interest* dimension obtained the highest overall mean score (4.12), indicating that, in general, all students demonstrated positive interest in learning activities. The highest score was obtained by the student with moderate learning ability (4.53), followed by the student with high learning ability (4.06), while the student with low learning ability obtained a score of 3.76. These differences indicate that students' interest in learning varies across individuals and cannot be determined solely by their academic ability levels.

These findings indicate that most students expect learning activities to be more engaging, interactive, and enjoyable. All research participants gave high ratings to the use of learning media, varied learning activities, and teaching methods that avoid monotony. This condition suggests that an engaging learning environment is an important factor in increasing students' involvement throughout the learning process. The findings also imply that students' interest can be stimulated when teachers provide opportunities for active participation and present learning experiences that are relevant to students' preferences and experiences.

According to Hidi and Renninger (2006), interest is one of the factors that promotes intrinsic motivation, encouraging learners to become actively involved in the learning process. Students who learn in accordance with their interests tend to demonstrate greater attention, higher persistence, and better retention of information over longer periods. Thus, interest should not merely be viewed as a personal preference but as an important instructional consideration that can influence students' engagement and participation in learning.

The findings also show that the student with moderate learning ability demonstrated the highest level of learning interest. This indicates that learning motivation does not necessarily correlate directly with academic ability. Students with moderate ability may demonstrate greater enthusiasm when learning activities are aligned with their needs, preferences, and interests. The relatively high interest score of this student may also explain why the student demonstrated a strong level of readiness, as positive engagement and willingness to participate can support students' preparedness to engage with learning activities.

Meanwhile, the student with high learning ability obtained an interest score of 4.06, which indicates a positive level of interest but remains lower than that of the moderate-ability student. This finding further reinforces that high academic ability does not automatically correspond to the highest level of learning interest. Although students may possess strong academic competencies, their engagement can still be influenced by the relevance, variety, challenge, and attractiveness of the learning activities provided. Similarly, the student with low learning ability obtained the lowest interest score (3.76), although the score still indicates a generally positive orientation toward learning. This suggests that students with lower academic ability should not be assumed to

lack interest; rather, their learning engagement may depend on the extent to which instructional activities are accessible, supportive, and connected to their preferences.

These findings have important implications for the implementation of interest-based differentiation. Teachers need to identify the topics, activities, media, and learning contexts that attract students' attention and then use this information to design varied learning experiences. Interest-based differentiation does not necessarily require teachers to develop entirely different learning objectives for each student. Instead, teachers can provide multiple pathways for students to engage with the same learning objectives through different media, activities, topics, or forms of participation. Therefore, teachers can implement interest-based differentiation through engaging learning media, project-based learning, educational games, group discussions, and learning contexts that are closely connected to students' everyday lives. Providing students with opportunities to make limited choices regarding learning activities or task formats may also strengthen their sense of involvement and ownership in the learning process. Such strategies are particularly relevant when students demonstrate heterogeneous interests, as indicated by the differences in scores among the three participants.

Overall, the findings demonstrate that interest represents an important dimension of students' learning needs and obtained the highest mean score among the three dimensions examined in this study. This result suggests that students place considerable importance on engaging, varied, and meaningful learning experiences. The differences among students with low, moderate, and high learning abilities further demonstrate that academic performance alone is insufficient for understanding students' motivational characteristics. Consequently, systematic identification of students' interests should become an important component of learning needs assessment and serve as a foundation for designing differentiated instruction that promotes active participation, sustained engagement, and meaningful learning experiences.

Learning Profile Dimension

The findings for the *learning profile* dimension reveal clear variations in learning modalities and preferences among the students, as summarized in Table 3.

Table 3. Learning Profile Dimension

Learning Profile Aspect	Salman (Low)	Danu (Moderate)	Aqila (High)
Dominant modality	Balanced (visual, auditory, and kinesthetic modalities were relatively equal)	Visual & kinesthetic (score 5)	Auditory (score 5)
Preferred media	Games and hands-on practice	Video, images, games, and hands-on practice (consistently high)	Moderately preferred across all media (score 4)
Social learning preference	Group learning (score 5) > teacher-guided learning (4) > independent learning (3)	Group learning & teacher-guided learning (score 5)	Independent & teacher-guided learning (score 4) > group learning (3)
Optimal learning time	Morning (score 3, highest)	Consistent throughout the day (score 4)	Morning & evening (score 4)

The analysis indicates that S1 (Salman) tends to learn through activities that are concrete, enjoyable, and involve direct interaction. The strong preference for games and hands-on practice indicates that the student understands learning materials more effectively when instruction is delivered through active learning experiences rather than through verbal explanations alone. In addition, S1 prefers group learning to independent learning. This condition suggests that *gamified learning*, simple experiments, demonstrations, and group activities have the potential to increase the student's learning engagement. Conversely, instruction dominated by lectures and individual assignments may reduce active participation because it is less consistent with the student's learning characteristics.

In contrast, S2 (Danu) demonstrates a learning profile that is more adaptive to various forms of instruction. This student shows strong visual and kinesthetic preferences while also assigning high ratings to almost all learning media, including videos, images, games, and hands-on activities. In addition, S2 demonstrates a relatively strong need for teacher guidance while still showing a preference for collaborative learning. This finding indicates that S2 has flexibility in responding to different instructional strategies but still requires teacher guidance to optimize the learning process (Wahid et al., 2023). Therefore, a combination of collaborative learning, visual media, and teacher support is likely to be the most appropriate strategy for S2's learning characteristics.

Meanwhile, S3 (Aqila) demonstrates characteristics that differ from those of the other two participants. The stronger preference for an auditory learning modality indicates that the student may understand learning materials more effectively through verbal explanations, discussions, and orally delivered information. S3 also tends to prefer independent learning while continuing to value teacher guidance. This preference suggests that students with stronger learning readiness may require greater opportunities for independent exploration and knowledge development. Therefore, enrichment tasks, investigative projects, and challenging problem-solving activities may be more appropriate than simply repeating material that has already been mastered.

Overall, the findings demonstrate that the three participants have different learning profiles despite being in the same class. These variations confirm that each learner has unique ways of learning, requiring teachers to provide diverse learning media, methods, and activities. This finding is consistent with the concept of *learning profile* proposed by Sibela et al. (2024) and Tomlinson (2017), which suggests that learning effectiveness can be enhanced when teachers align learning experiences with individual students' preferences and learning characteristics. Thus, process differentiation represents an important strategy for accommodating diverse learning profiles within the classroom.

Implications for Differentiated Instruction

The findings demonstrate that students' learning needs within the same classroom are heterogeneous across the dimensions of *readiness*, *interest*, and *learning profile*. These variations indicate that academic ability is not the sole factor determining students' learning characteristics. The student in the moderate-ability category obtained the highest scores across all three learning-needs dimensions, whereas the high-ability student did not necessarily demonstrate the highest level of interest or the most favorable learning profile. This finding reinforces Tomlinson's (2017) view that readiness, interest, and learning profile are three interrelated yet distinct dimensions that cannot be represented solely by students' academic achievement.

The practical implication of these findings is that teachers need to design differentiated instruction based on learning-needs assessment rather than relying solely on academic achievement (Hamid, 2020). In terms of *readiness*, teachers can implement content differentiation by adjusting the complexity of learning materials, providing *scaffolding*, using concrete examples, and regulating the pace of instruction according to each student's level of readiness (Rusidi, 2026; Rustiyana, 2025). Regarding *interest*, teachers can enhance learning motivation through engaging media, educational games, contextual projects, and activities that correspond to students' interests (Maulidina et al., 2025). Meanwhile, in terms of *learning profile*, teachers need to provide a variety of instructional methods, including group discussions, hands-on activities, demonstrations, visual media, and project-based learning, so that each student can experience learning that is aligned with their individual characteristics.

The findings also demonstrate that learning-needs assessment plays a strategic role in supporting the implementation of differentiated instruction. Through learning-needs assessment, teachers can obtain more comprehensive information about students' characteristics, enabling instructional decisions to become more objective and data-driven. Without systematic mapping of learning needs, teachers may design instruction based on general assumptions that do not necessarily correspond to students' actual conditions. Therefore, learning-needs assessment should become an integral component of diagnostic assessment conducted at the beginning of instruction and serve as a foundation for developing adaptive instructional strategies.

These findings support the concept of differentiated instruction developed by Tomlinson (2017) and are consistent with the *Merdeka Curriculum* policy, which positions diagnostic assessment as an initial step in understanding students' learning needs. Accordingly, empirically based learning-needs mapping not only assists teachers in designing more effective instruction but also provides a foundation for realizing *student-centered learning*, enabling every student to develop according to their potential and individual learning characteristics.

Conclusions

The study demonstrates that the learning needs of fifth-grade students at SD Negeri 2 Ternate City vary across the dimensions of *readiness*, *interest*, and *learning profile* and are not necessarily associated with students' academic ability levels. Diagnostic assessment is therefore essential for systematically identifying students' characteristics and providing a reliable foundation for designing differentiated instruction that is adaptive, student-centered, and meaningful. Mapping students' *readiness* can inform decisions regarding the complexity of learning materials, instructional pacing, and the provision of appropriate *scaffolding*, while *interest* and *learning profile* can guide the selection of learning media, instructional methods, activities, and assessment strategies. The findings have important practical implications for primary school teachers. Rather than grouping or designing instruction solely according to students' academic achievement, teachers should consider the multidimensional

characteristics of learners when planning instruction. The integration of learning-needs assessment into diagnostic assessment can enable teachers to make more data-informed instructional decisions and provide appropriate differentiation in content, process, and learning products. At the school level, the findings imply the need to strengthen teachers' capacity to conduct and interpret learning-needs assessments as part of systematic instructional planning. Theoretically, this study reinforces the relevance of Tomlinson's differentiated instruction framework by demonstrating that *readiness, interest, and learning profile* provide distinct yet complementary information for understanding learner diversity. Given the limited number of participants in this study, future research is recommended to involve larger and more diverse samples across different primary school contexts. Further studies should also implement the resulting learning-needs mapping in differentiated teaching modules or instructional designs and examine their effects on students' engagement, learning processes, and academic outcomes. Such research would provide stronger empirical evidence regarding the effectiveness of data-driven differentiated instruction in supporting diverse learners within primary education.

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