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Unpacking the Layers: A Comparative Insight into Differentiated Instruction Strategies for Deeper Learning Across Educational Contexts

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Abstract: Indonesian teachers, especially in Central Java, encountered challenges in crafting differentiated activities to create deeper learning form students. They include being able to determine students' prior knowledge and readiness, along with what works best for how learners like to learn (themselves using delivery and assessment methods) in related to individual learners. The research was conducted to explore kindergarten, elementary and secondary school teachers (n = 112) practices about implementation of differentiated instruction for deeper learning in public and private schools n= 35 using descriptive qualitative method. The data collection technique was carried out with Self-Reported Essays, Video-Taped DI Practices and Interviews at the Teacher Appreciation event in Indonesia. The findings revealed that the most frequently used in all levels are giving explanation, providing additional support, and set goals. Furthermore, important variations in the selection of materials, goal introduction, prior knowledge activation, adapted instruction, grouping, adapted materials and varied assessment were also found across levels. This article suggests that teacher professional development be focused on strengthening differentiated teaching practices through classroom supervision programs and practical workshops. Areas of development that need to be carried out include understanding the concept of DI, the application of techniques such as flexible grouping and formative assessment, the design of differentiated lesson plans, and the use of adaptive learning media and supporting technologies.



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INTRODUCTION

Differentiated instruction (DI) is substantially based on the notion that students have a lot of diverse factors in all school setting. Keep in mind that school achievement should not be the only factor in distinguishing among students; while academic performance is significant, it does not encompass the full spectrum of student diversity (Pozas et al., 2020; Suprayogi et al., 2017). Classrooms usually have children with different readiness levels, learning styles, interests, prior knowledge etc. of course socioeconomic status is significant but also personality and social skill. DI is critical for educators to be able to support all students with strategies that recognize and serve these various needs so each youngster can be given the unique help they need to be successful both academically and personally (Tomlinson, 2015; Bondie et al., 2019; De Neve & Devos, 2017). By accommodating those needs, students will have deeper learning and engage with content on a profound level, fostering critical thinking and real-world problem-solving skills.

Previous studies have highlighted the benefits of DI in promoting deeper learning, student engagement and achievement. For instance, research by Tomlinson et al. (2003) indicates that differentiated practices can significantly enhance learning outcomes, particularly for students with diverse learning needs. Similarly, a meta-analysis by Deunk et al., (2018) emphasizes the positive impact of tailored instructional strategies on student performance. A quasi-experimental study performed by Valiandes, (2015) indicate that in classrooms where differentiated instruction methods were systematically employed, students made better progress compared to students in classrooms where differentiated instruction methods were not employed. In a sequential mixed methods design, Wan, (2016) discovered that teachers who have positive perception on DI practices boost students' achievement. This shows that if teachers visualize differentiated teaching as beneficial and successful for responding to the diverse needs of our students, they are far more likely to deploy strategies that drive student activation and academic bottom-lines.

Although findings in various studies show that differentiated instruction (DI) has great potential in improving student learning outcomes, there is a significant gap in the literature, particularly related to comparative studies of DI practice that cover all techniques and theoretical orientations. DI practice has often been narrowed to certain aspects, such as the grouping of students based on ability or general adaptation of the material, without taking into account the wider diversity of approaches and complex theories (Smale-Jacobse et al., 2019; Deunk et al., 2018).

In practice, many teachers claim to apply DI, but their understanding and implementation vary widely. Letzel-Alt, Pozas, and Schwab (2024) reveal that teachers in vocational education tend to interpret DI in a limited way, leading more to simplification of the material than a structured approach based on differentiation theory. This indicates a gap between the concepts of DI developed in theory (e.g. the Tomlinson model) and real practice in the classroom.

Another study by Frerejean, Keuning, and van Geel (2021) reinforces this view by analyzing five main principles in the implementation of DI, such as goal orientation, monitoring learning progress, appropriate challenge provisioning, instructional adaptation, and self-regulation. However, they also note that these five principles are rarely implemented simultaneously and systematically by teachers. Thus, a holistic approach to DI is still rare, let alone studied comparatively across techniques and theoretical orientations.

In addition, cross-country studies by Maulana et al. (2020) and Lindner & Schwab (2020) confirm that the application of DI is strongly influenced by local contexts and educational cultures, making it difficult to directly compare the effectiveness of DI techniques. They concluded that the success of DI depends not only on the techniques used, but also on the readiness of the education system, teacher training, and policy support. Therefore, a study is needed that explicitly explores how different DI techniques work in different theoretical and practical contexts.

Furthermore, Dierendonck, Poncellet, and Tinnes-Vigne (2024) use the Theory of Planned Behavior framework to explain why teachers choose or avoid the application of DI. The study found that teachers' intentions to implement DI were influenced by their attitudes towards DI, social norms in the school environment, and their perceptions of behavioral control factors that had not been touched much in previous comparative approaches.

Thus, it can be seen that there are still very limited studies that compare various DI techniques comprehensively and across theoretical orientations. The need for more in-depth comparative research is urgent, both in the form of experiments and mixed-methods-based field studies, in order to provide a complete understanding of DI practices and their effectiveness in diverse contexts.

The difficulty in implementing differentiated instruction (DI) lies not only in the complexity of the classroom context, but also in the many techniques and theoretical frameworks available, which often confuse teachers in choosing the right approach. In the past, Tomlinson was considered the main figure who formulated the foundations of DI, but the modern approach demands a review of current evolving concepts and practices. Pozas and Schneider (2020), for example, developed a more comprehensive taxonomy of DI practice, covering six main categories: tiered assignments, flexible grouping, peer tutoring, visual aids, mastery learning, and giving students choices. They emphasized that this diversity of techniques requires a thorough theoretical understanding so that its implementation is not random or simply follows intuition.

In the context of real implementation in the classroom, a study conducted in the Asia Pacific region (2024) shows that the success of DI relies heavily on four important elements: the learning environment, content, processes, and products. Teachers who effectively implement differentiation strategies not only change the content of the material, but also adjust the learning process and the expected final outcome, based on continuous formative assessments. These findings expand on long-held views and show

that differentiation teaching cannot be implemented partially, but must be designed holistically from the beginning of learning.

A new approach to formative assessment is also examined by Bi et al. (2024) who examined the practice of DI in primary schools in China. They emphasized that formative assessments should be used proactively, not just as an evaluation after the teaching has taken place. Formative assessments are integrated into the learning design cycle, helping teachers respond to students' needs before they fall behind. This is an answer to the challenge previously described by Smit and Humpert (2012) regarding the importance of communication and collaboration in accommodating students' differences, but is now supported by a more systematic and contextual framework.

Furthermore, technological innovations have also enriched the differentiation approach. Liu, Latif, and Zhai (2025) examined intelligent tutoring systems based on artificial intelligence (AI) and robotics, which have been proven to support teachers in providing learning that suits students' cognitive and emotional needs in real-time. This technology answers the limitations of teachers in adapting learning individually, especially in classrooms with large numbers of students and very diverse abilities.

In addition, Rashid (2025) formulated ten current differentiation strategies that can be used by teachers at various levels of education. This strategy includes a multi-sensory approach, flexible grouping, multi-level tasks, educational technology, and the provision of constructive formative feedback. He emphasized the importance of choosing techniques that are contextual, based on student data, as well as the alignment between learning objectives and differentiation strategies used.

Thus, the DI paradigm in the last five years has undergone a significant shift. If previously it focused on a variety of strategies in implementation, now DI emphasizes more reflective learning planning, integration of formative assessments from the beginning, and the use of technology to expand the range of teachers' responses to student needs. Complexity in DI practice is no longer considered a mere barrier, but rather an integral part of teachers' professionalism in crafting equitable, adaptive, and student-centered learning.

Another expert, Prast et al., (2018), called upon teachers to be specific in differences between learning objectives and speed of learning. He insists that knowing this diversity is very important for effective teaching. Teachers learned how pacing and more specificity in goals drive instruction to be student led and individual needs met. It makes the classroom a more inclusive space, where all students are heard and acknowledged. Finally, when teachers see these differences, they make all kids succeed and grow better. Also, Moore, (2016) states the researcher must realize that teacher ought be aware of difference in content, process, product and context which multi layers some black magic complexity to DI. Much of the variety in approaches can lead to DI applied differently at each of these levels, leaving some questions on these practices needing further study.

Another difficulty faced by teachers at this level is the limited professional training that specifically leads to the implementation of DI. Many teachers implement teaching strategies based on intuition or personal experience, without a strong pedagogical foundation about the principles of differentiation. This is exacerbated by limited resources, such as a high teacher-to-student ratio, a dense curriculum, and a lack of teaching materials that can be tailored to individual student needs. In that context, it is crucial to understand how teachers at different levels of education design and implement DI in their daily practice.

This study aims to provide an in-depth comparison of the practices used by kindergarten and elementary school teachers regarding differentiated instruction (DI), a comparative analysis that illuminates the ways in which instructional strategies change as students move further along their educational path. The distinctive of this research is its thorough examination of the DI practices frequency as well as richness across school levels. It is important that such variations are emphasized – not just for the sake of high-quality teaching and facilitating but also to help guide policy responses and professional development aimed at developing better learning experiences for all. This research contributes to the ongoing conversation about educational equity and transforms by interrogating the nuance of DI practice across the levels of schooling.

The anticipated findings of this study are expected to provide valuable insights for educators, administrators, and policymakers, emphasizing the importance of cultivating a culture of differentiated instruction that evolves alongside students' developmental stages. Ultimately, this research seeks to bridge the gap between theory and practice, promoting a more nuanced understanding of how DI can be effectively integrated into classroom settings across all educational levels.

METHOD

This study uses a descriptive qualitative approach to describe in depth the dynamics of the implementation of differentiated instruction (DI) in the classroom, especially at the Kindergarten (TK) and Elementary School (SD) levels. This approach was chosen because it allows researchers to understand the context, experience, and real practice of teachers in implementing DI based on the participant's point of view, without intervention or manipulation of variables as in quantitative research. This very inquiry of qualitative research provides one's attention to the experiences of teachers, allowing a fuller understanding of how the different factors from the school context cause the way DI goes by (Chu, PH. and Chang, 2017; Creswell, 2014). It does not really capture the free expression of teachers but rather the meanings and insights from those lived experiences, thus shedding light on the complexities of DI practices (Denzin, N. K., & Lincoln, 2008).

The study sample comprises subjects of the 2024 Annual Teachers' Appreciation event in Indonesia, which covers 112 teachers of 35 districts among all educational levels. Therefore, they represented most possible cases because there were both primary and secondary school teachers from some vocational schools. Special attention was given to

those whose responses have gone to the event as they got interested and committed to the event as willing to develop their skills and competencies.

The tools used in data collection in this case are diverse and allow to perceive DI practices in their totality:

1. **Self-Reported Essays:** Participants are asked to write essays with respect to their experiences with DI strategies, what works for them, and what challenges they are faced with. This engage-a-learner tool allows an educator to put down his/her thoughts and experiences in plain language in a written form thus providing a qualitative response (Baker, 2011),
2. **Video-Taped DI Practices:** Participants are allowed to post video clips of their live classroom instruction incorporating DI during their teaching. Video recording and analysis provides a useful complement to data collection and analysis of teaching practices (Cocca et al., 2019),
3. **Interviews** After the participants submitted their videos of their teaching, several substantive interviews were carried out with them to investigate further their pedagogical practices, reasons behind those practices and views on DI. Interviews provide means through which insights can be gathered as well as provide a platform for clarifications on the responses given by participants (Kvale & Brinkmann, 2009). These interviews are conducted to gather more information about their experience, specifically the practice they used, and any obstacles experienced while implementing DI. This step is essential in evaluating the quality of data, hence improving its trustworthiness and dependability (Flick, 2018).

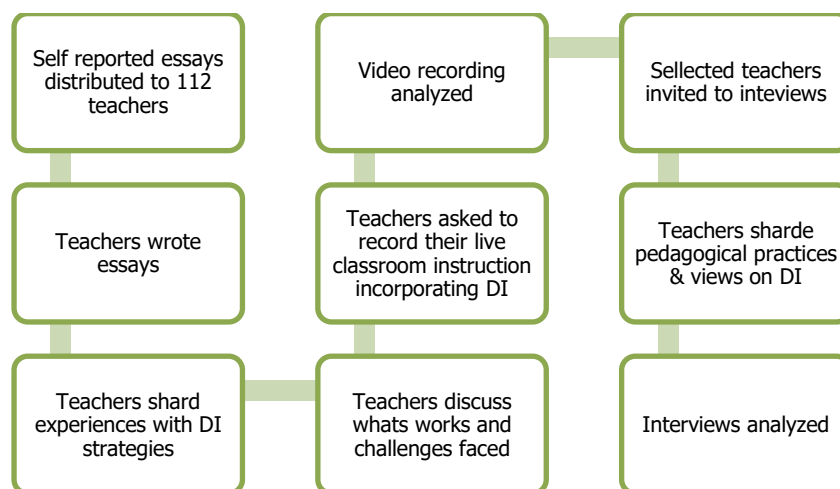


Figure 1. Data Collection and Analysis Procedures

By using these methods and instruments, the study explores strategies on how DI implemented in classroom situation that gives valuable insights for educators and policymakers.

RESULT AND DISCUSSION

Most frequently used DI practices

According to the analysis, teachers from kindergarten, primary and secondary level are using five common DI practices to create deeper learning. Teachers at the secondary education level use various explanatory techniques to adapt the material to the level of understanding and learning style of students. These techniques include systematic expository explanations, the use of analogies to bridge abstract concepts, visual explanations with the help of images or simulations, and contextual explanations that relate the material to real life. In addition, teachers also apply an interactive approach by involving students in discussions, as well as step-by-step explanations for complex concepts. This variation of technique not only clarifies the material, but also becomes an important part of differentiated teaching strategies in the classroom. Primary teachers have also reported the use of this practice with a significant percentage of 91.11%. 80.65% of kindergarten teachers have also employed this practice. Providing additional help is another common practice. Certainly, in kindergarten this practice is reported by 90.32% of them. In the secondary education sector, the percentage of 91.67% shows this practice to be equally important, while in primary schools it is used infrequently by teachers 68.89%.

Table 1. Most Frequently Used DI Practices

DI Practices	Kindergarten (%)	Primary (%)	Secondary (%)	Average (%)
Giving Explanation	80.65	91.11	100.00	90.59
Providing additional support	90.32	68.89	91.67	83.63
Set Goals	80.65	88.89	83.33	84.29
Providing adapted instruction	41.94	68.89	100.00	73.05
Grouping options	35.48	71.11	88.89	65.16

Another common practice that teachers of all levels of education have been known to employ in setting goals. Out of all teachers, primary teachers' ones who practice this the most at a rate of 88.89%. Kindergarten teachers also practice this after which hold a rate of 80.65% and secondary teachers practice this at 84.29%. Regarding 'providing

adapted instruction' this practice generates a high significant frequency at secondary education due to all teachers of upper classes applying it.

In primary education this practice is also adopted by a significant percentage of teachers 68.89% while kindergarten teacher's application level turns out to be lower 41.94%. Grouping options are used more frequently in secondary education 88.89% and primary education 71.11%. Nevertheless, this practice is not a common phenomenon in kindergarten; only 35.48% of teachers report using it.

In summary, all five practices are applied at all educational levels, yet there are significant differences in their use. On the one hand, secondary teachers use giving explanations and adapted instruction much more regularly than others, and on the other hand, kindergarten teachers are very much inclined to additional support. These findings show the diversity in which differentiated instruction is applied based on an education context.

Practices with Significant Differences Across Levels

The analysis revealed notable disparities in the implementation of differentiated instruction practices among kindergarten, primary, and secondary teachers. Certain practices were highly utilized at one educational level while being significantly less common at others.

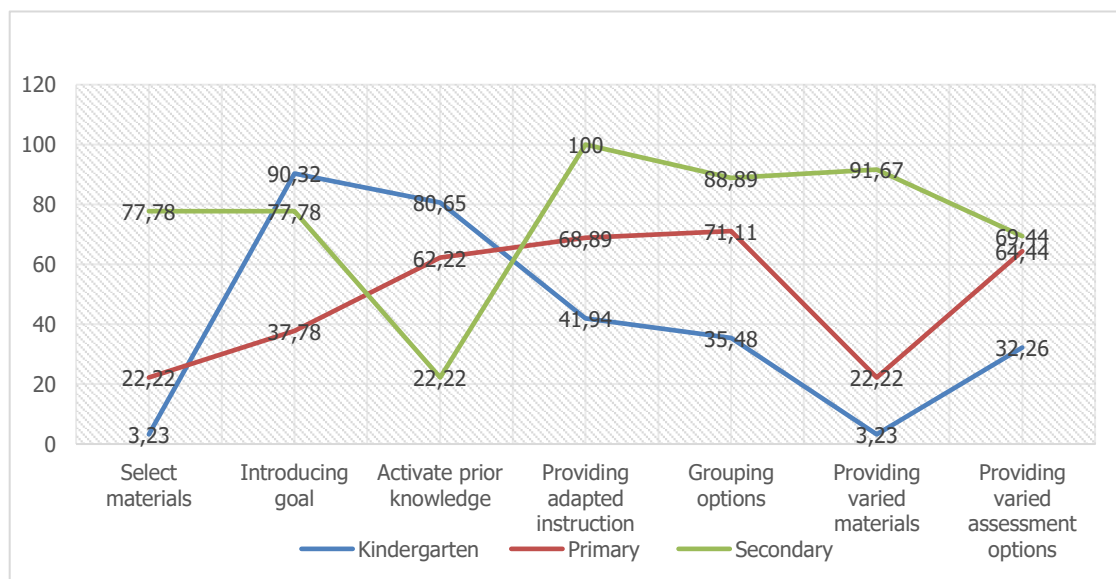


Figure 2. Differences Across School Levels

The practice of selecting materials according to students' preferences showed a marked increase across educational levels. Only 3.23% of kindergarten teachers reported using this practice, compared to 22.22% of primary teachers. In stark contrast, a substantial 77.78% of secondary teachers actively select materials based on student preferences, indicating a strong emphasis on this practice at the secondary level. Introducing goals is predominantly practiced in kindergarten, with 90.32% of teachers

implementing this strategy. In primary education, this practice is significantly lower at 37.78%. However, secondary teachers also demonstrate a commitment to this practice, with 77.78% indicating its use, showcasing a notable difference in goal-setting approaches across the levels. The activation of prior knowledge is a common practice among kindergarten teachers (80.65%) and primary teachers (62.22%). Conversely, this practice is significantly less emphasized in secondary education, where only 22.22% of teachers reported utilizing it. This stark contrast highlights the varying importance placed on activating prior knowledge across different educational stages.

Providing adapted instruction shows significant variation, with secondary teachers fully implementing this practice at 100%. Primary teachers follow at 68.89%, whereas kindergarten teachers report a lower frequency of 41.94%. Grouping options are utilized more frequently in higher educational levels, with secondary teachers reporting an 88.89% implementation rate. Primary teachers also show a significant use at 71.11%, while kindergarten teachers have the lowest usage at 35.48%. The provision of varied materials is notably low in kindergarten at 3.23%, while primary teachers increase this to 22.22%.

Comparatively, the secondary teachers have also show more commitment to this practice (91.67%). Primary/Secondary - Providing varied assessments is a practice more characteristic of kindergarten and beyond, where primary teachers reach this threshold at 64.44%, and among secondary teachers it occurs even more frequently, at rates of 69.44%. K Teachers report a lower percent (% = 32.26).

The overall results point to definitive differences by educational level in the extent to which various differentiated instruction practices have been implemented. Kindergarten teachers are great at providing extra supports and goals, Secondary teachers provide a lot of explaining, varied materials. This data further emphasizes the necessity for differentiated instruction that is tailored to varying levels of education, and different requirements in those settings.

Pros of Differentiated Instruction Practices

This investigation has illustrated how differentiated instruction (DI), to create deeper learning, manifests in our classrooms—from kindergarten classrooms to secondary education—through how the findings emerge. It is obvious that although there are a lot of great advantages to these practices, we as humans need to acknowledge that there are problems.

1. **Higher Student Engagement:** As the data clearly demonstrates, a lot of teachers are actually getting their students involved — 80.65% in kindergarten, 91.11% of primary and outstandingly 100% in secondary. This is significant point because Hattie, (2019) writes that students learn more when teachers give clear explanations and feedback. So the vision is to create a space in which students feel like they belong and must participate.
2. **Recognition of Diverse Learning:** We observe that a larger part of teachers is providing extra support specially in kindergarten and secondary (90.32%; 91.67%). This is a step

in the right direction given the message of Meyer et al., (1966) and (Hall, T., Vue, G., Strangman, N., & Meyer, 2004) around Universal Design for Learning. They prefer flexible approaches which include a variety of methodologies to delivery instruction to different learners to make everyone feel included and important.

3. **Goal Setting:** The emphasis on setting goals is notable, particularly among primary teachers (88.89%). Tomlinson & Murphy, (2016) highlight how important it is for students to understand their objectives. When students know what they're aiming for, they're more likely to take ownership of their learning and stay engaged. It is empowering for them.
4. **Adapted Instruction:** The fact that 100% of secondary teachers report using adapted instruction is encouraging. Zhang et al., (2020) found that when teachers tailor their methods based on student needs, it can lead to better academic performance. This adaptability shows that educators are recognizing the unique strengths and challenges of their students.

Cons of Differentiated Instruction Practices

1. **Inconsistent Implementation:** However, there's a flip side. The inconsistency in practices—like the low percentage of kindergarten teachers providing adapted instruction (41.94%)—raises some eyebrows. Subban, (2006) warns that when DI is not applied consistently, it can create unequal learning experiences.
2. **Limited Resources:** The low rates of varied materials in kindergarten might indicate a lack of resources or training. De Jager, (2017) point out that when teachers don't have access to diverse teaching materials, it can hinder their ability to effectively differentiate instruction. This could lead to a more uniform approach that doesn't meet everyone's needs.
3. **Potential Overwhelm for Teachers:** Implementing multiple DI strategies can be overwhelming for teachers, especially if they don't receive proper support. Valiandes, (2015) discuss how this pressure can lead to burnout. Educators are juggling so much already, and without the right training and resources, it can be tough to keep up.

In summary, while differentiated instruction practices offer many benefits—like increased engagement and support for diverse learners—there are also significant challenges we must address. To truly maximize the advantages of DI, we need to ensure consistency in practices, provide adequate resources and training for teachers, and maintain a balanced focus across all educational levels. By doing so, we can create equitable learning environments where every student can succeed

CONCLUSION

This study gave great understanding of how to apply differentiated instruction to create deeper learning in practice with teachers at various educational level: kindergarten, elementary and secondary. Results suggest substantial differences in the

percentages and weighting of these DI strategies, and thus reflect the need for individualized programs to address the diverse needs of learners from early education through to high school. Nevertheless, we must mention a few limitations. The research findings are not representative of all educational levels because the sample size may be unrepresentative of individual educational institutions. Also, the teachers based self-report may create bias, as participants may for example over-estimate, when necessary, DI practices were employed. The study was limited to a small number of DI practices and, therefore, may not represent all teacher strategies.

In addition, the results of this study are also time-based, so they may not fully reflect the dynamics of changes in educational practices and policies that develop after the data is collected. This is important considering that the differentiated teaching (DI) approach is greatly influenced by the context of policies, teacher training, and the development of changing learning technologies. When compared to previous research, which shows that there are variations in the application of DI between levels of education. the importance of proactive and systematic planning in the implementation of DI, especially at the primary education level, as also reflected in this study.

To overcome these limitations, several recommendations are delivered. Schools need to continuously invest in professional development for teachers that prioritize the use of differentiated instruction practices and giving teachers opportunities to strengthen their knowledge in selecting materials and variety of assessment. Teacher collaboration will allow for the discussion of and sharing of DI strategies among teachers at different educational levels; Mentorship programs or professional learning communities may help in the process of exchanging ideas and resources. Research in future should be conducted to a larger and more representative sample to enhance the generalizability of findings and examining the impact of differentiated instruction on student outcomes.

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