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THE INTEGRATION OF DIFFERENTIATED AND ADAPTIVE APPROACHES IN PRIMARY EDUCATION

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Abstract. This article examines the theoretical and methodological foundations of integrating differentiated and adaptive approaches into primary education. The study is based on the assumption that primary school classrooms are characterized by significant differences in learners' prior knowledge, learning pace, interests, abilities, motivation, and learning needs. Therefore, a uniform instructional model may not adequately support the educational development of every learner. The article clarifies the relationship between differentiated instruction and adaptive teaching and proposes an integrated pedagogical model based on diagnostic assessment, flexible grouping, differentiated tasks, adaptive instructional strategies, formative assessment, feedback, and individual learning support. The study applies theoretical analysis, comparison, synthesis, pedagogical modelling, and analysis of contemporary educational research. Particular attention is given to the role of formative assessment as a mechanism for identifying students' learning needs and adapting instruction accordingly. The proposed model demonstrates how differentiation can provide planned variations in content, process, and learning outcomes, while adaptive teaching enables teachers to make real-time adjustments according to students' responses and progress. The integration of these approaches can contribute to learner-centred, inclusive, flexible, and responsive primary education.

Keywords: differentiated instruction, adaptive teaching, primary education, personalized learning, formative assessment, learner-centred education, flexible grouping, individual learning needs, inclusive education, pedagogical adaptation.

Introduction. Contemporary primary education increasingly recognizes that learners do not enter the classroom with identical levels of prior knowledge, learning experience, motivation, interests, or cognitive development. Even when students study within the same grade and follow the same curriculum, their learning trajectories may differ considerably. Consequently, the traditional "one-size-fits-all" instructional model may not adequately address the diversity of learners within a primary

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classroom. Differentiated instruction has emerged as an important pedagogical response to learner diversity. It involves providing different learning experiences according to students' readiness, interests, and learning profiles. OECD research describes differentiation as a proactive, student-centred approach that may vary content, learning processes, and expected products while combining whole-class, group, and individual forms of instruction [1]. Adaptive teaching is closely related to differentiation but places greater emphasis on the teacher's ongoing response to evidence of student understanding. In adaptive teaching, information obtained through assessment, observation, questioning, and classroom interaction is used to modify instruction and provide appropriate support. OECD research specifically emphasizes that teachers can use diagnostic information about student learning to adapt teaching to students' current understanding and needs [2]. The integration of differentiated and adaptive approaches is particularly important in primary education because this stage establishes fundamental academic, social, communicative, and self-regulatory competencies. UNESCO similarly emphasizes that differentiated teaching can respond to differences in learners' readiness, interests, preferences, and backgrounds while maintaining high expectations for all students [3]. The purpose of this article is to examine the pedagogical potential of integrating differentiated and adaptive approaches in primary education and to develop a methodological model for their effective classroom implementation.

Literature Review. The theoretical foundations of differentiated instruction are strongly associated with learner diversity and the need to adapt instruction to individual differences. Tomlinson conceptualizes differentiated instruction as an approach in which teachers proactively modify learning content, processes, products, and learning environments according to students' readiness, interests, and learning profiles. OECD analyses similarly characterize differentiation as student-centred, assessment-based, flexible, and involving multiple instructional formats [1]. Adaptive teaching represents another important dimension of responsive pedagogy. OECD research distinguishes adaptive teaching from differentiation by emphasizing the teacher's continuous adaptation of instruction based on learners' responses and needs. Adaptive teaching can include both longer-term adaptations and short-term adjustments during classroom interactions [4]. The distinction between these approaches can therefore be summarized as follows: differentiation is often planned in advance, whereas adaptive teaching involves ongoing adjustment during the learning process. However, the two approaches are complementary rather than mutually exclusive. Research on formative assessment provides an important bridge between differentiation and adaptive teaching. When teachers collect information about students' understanding and use it to modify instructional strategies, assessment becomes an integral component of teaching rather than merely a mechanism for assigning grades. OECD evidence indicates that differentiation combined with progress monitoring and adaptation of instruction can have positive effects on primary-level mathematics and language learning, although effect sizes vary across studies [2]. The development of digital technologies has also expanded opportunities for adaptive learning. Digital platforms can provide individualized tasks, adaptive

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assessment, self-paced learning, and learning analytics. OECD notes that adaptive learning systems and intelligent tutoring systems can be used to adjust learning experiences according to students' levels and observed difficulties [5]. Thus, the literature suggests that differentiated and adaptive approaches should not be viewed as isolated pedagogical techniques. Rather, they can be incorporated into an integrated system in which assessment identifies learner needs, differentiation structures learning opportunities, and adaptive teaching continuously adjusts instructional support.

Results and discussion. The analysis of differentiated and adaptive approaches in primary education demonstrates that their integration can provide a more responsive instructional framework for addressing learner diversity. The findings of the theoretical and methodological analysis indicate that differentiation and adaptation should not be treated as independent teaching techniques. Rather, they should function as interconnected components of a continuous pedagogical process in which teachers identify learners' needs, provide appropriate learning opportunities, monitor progress, and adjust instruction accordingly.

Results of the conceptual analysis. The first result of the study was the clarification of the functional relationship between differentiated instruction and adaptive teaching. Differentiated instruction primarily involves the planned organization of different learning pathways, whereas adaptive teaching emphasizes the continuous modification of instruction in response to evidence of student learning. This distinction is important for primary education. A teacher may initially prepare tasks at different levels of complexity based on students' prior knowledge. However, students' actual responses during the lesson may demonstrate that some learners need additional scaffolding while others are ready for more challenging activities. Therefore, pre-planned differentiation alone is insufficient. It needs to be complemented by adaptive instructional decisions. This finding is consistent with OECD evidence indicating that differentiated instruction should be rooted in assessment and should provide multiple approaches to content, process, and product rather than simply placing students into homogeneous groups.

The relationship can therefore be represented as:

Differentiated planning → Student response → Formative assessment → Adaptive adjustment → Reassessment

This sequence represents the central mechanism of the integrated approach proposed in this study.

Results concerning learner diversity. The analysis also demonstrates that learner diversity in primary classrooms should be considered multidimensional. Differences may occur not only in academic achievement but also in prior knowledge, learning pace, motivation, interests, language development, independence, and preferred ways of engaging with learning activities.

Consequently, differentiation should not be limited to preparing "easy," "medium," and "difficult" versions of the same worksheet. A more comprehensive approach involves varying:

- learning content;
- task complexity;

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- instructional support;
- learning materials;
- grouping arrangements;
- time allocation;
- forms of student participation;
- methods of demonstrating learning.

The findings indicate that this broader interpretation of differentiation creates more opportunities for students to participate in a common learning process while receiving different forms of support. This is particularly relevant to inclusive primary education, where students with different learning needs are expected to participate in the same classroom. OECD guidance identifies differentiated instruction as proactive, assessment-based, student-centred, and capable of combining whole-class, group, and individual instruction.

Results of the proposed integrated pedagogical model. A central result of the study is the development of an integrated model consisting of seven interconnected stages:

Diagnosis → Differentiated planning → Differentiated instruction → Formative assessment → Adaptive response → Feedback → Reassessment

Each stage performs a specific pedagogical function.

Table 1. Integrated differentiated-adaptive teaching model

Stage	Main teacher action	Expected learner response
1. Diagnosis	Identifying prior knowledge and learning needs	Demonstrating existing knowledge and difficulties
2. Differentiated planning	Preparing alternative tasks, resources and support	Selecting or receiving an appropriate learning pathway
3. Differentiated instruction	Providing varied content, processes and tasks	Engaging in appropriately challenging activities
4. Formative assessment	Monitoring learning progress	Demonstrating understanding
5. Adaptive response	Adjusting explanation, support, pace or task difficulty	Responding to revised instructional conditions
6. Feedback	Providing specific information about progress	Identifying strengths and areas for improvement
7. Reassessment	Checking progress after intervention	Demonstrating new level of understanding

The model indicates that assessment is not positioned at the end of the instructional process. Instead, it functions as a mechanism that continuously connects differentiation and adaptation. This interpretation corresponds with current OECD evidence that formative assessment involves diagnosing learning, providing feedback, and adapting teaching to students' thinking and needs.

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Comparative discussion of the two approaches. The results indicate that differentiated and adaptive approaches are closely related but should not be considered synonymous.

Table 2. Functional comparison of differentiated and adaptive approaches

Dimension	Differentiated Approach	Adaptive Approach
Primary purpose	Address anticipated learner differences	Respond to observed learning needs
Main orientation	Proactive	Responsive
Planning	Mainly before instruction	During and after instruction
Evidence base	Diagnostic information and learner profiles	Continuous formative evidence
Teacher action	Designs multiple pathways	Modifies the pathway
Grouping	Flexible grouping	Dynamic regrouping
Task design	Prepared alternatives	Adjusted according to response
Assessment	Supports instructional planning	Drives immediate instructional adjustment

The comparison demonstrates that differentiation answers the question:

"How can instruction be designed for learner diversity?"

Adaptive teaching answers:

"How should instruction change when evidence shows that a learner needs something different?"

The integration of both approaches therefore provides a more complete response to classroom diversity.

Discussion of effectiveness and limitations. The findings support the assumption that integrated differentiated-adaptive instruction can improve the responsiveness of primary education. However, the evidence does not justify the conclusion that differentiation automatically produces better outcomes in every context. Several conditions influence its effectiveness. First, differentiation must be based on meaningful assessment evidence. If teachers incorrectly identify students' needs, differentiated tasks may not correspond to actual learning barriers. Second, excessive differentiation may increase teacher workload. Preparing multiple resources, monitoring several groups, and providing individualized feedback requires time and professional expertise. Third, differentiation should not lower expectations for students who experience difficulties. The purpose of additional support is to provide an appropriate pathway toward the same or appropriately aligned learning objectives. Fourth, fixed ability grouping should be avoided. Research indicates that grouping alone is not equivalent to effective differentiation and may create disadvantages for lower-achieving students. Finally, adaptive teaching requires continuous professional judgement. The teacher must decide not only whether to adapt instruction but also when, why, and how much to adapt it. The findings also indicate that further empirical research is necessary. Future studies should examine the effectiveness of the proposed model through controlled

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classroom interventions and should investigate its effects on academic achievement, learner engagement, motivation, self-regulation, collaboration, and long-term learning progress. Such research would provide stronger evidence concerning what forms of differentiation and adaptation work, for which learners, and under what classroom conditions. OECD research similarly emphasizes the need for further investigation into how, why, for whom, and under what conditions high-quality teaching practices have the greatest impact.

Conclusion. The study demonstrates that differentiated and adaptive approaches have complementary functions in primary education. Differentiated instruction provides a planned structure for addressing learner diversity by varying content, learning processes, tasks, resources, and forms of demonstrating learning. Adaptive teaching, in turn, enables teachers to modify instruction continuously in response to students' understanding, progress, difficulties, and emerging learning needs. The integration of the two approaches can be organized through a systematic pedagogical cycle: diagnostic assessment → differentiation → adaptive instruction → formative assessment → feedback → adjustment. Such a model allows teachers to maintain common educational objectives while providing learners with different pathways toward achieving them. The proposed integrated model emphasizes five important principles: learner-centredness, flexibility, continuous assessment, dynamic grouping, and individualized support. It also highlights the importance of maintaining high expectations for all students while varying the level and type of instructional support. For primary education, the practical significance of the model lies in its potential to help teachers respond to differences in students' readiness, interests, learning pace, and achievement levels without separating learners from the common educational process. Differentiated and adaptive approaches can therefore serve as mutually reinforcing mechanisms for developing more inclusive, flexible, and responsive classrooms. Future empirical research should test the proposed model in primary schools through experimental and longitudinal studies. Particular attention should be given to measuring its influence on academic achievement, learner engagement, self-regulated learning, motivation, collaboration, and the development of individual learning trajectories.

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