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Needs Analysis for the Development of 21st Century Knowledge and Skills Framework through Differentiated Pedagogy in Mathematics (Basic Operations) in Multigrade Classes in Malaysia

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Abstract

This study examined the necessity of creating a framework that integrates 21st-century knowledge and skill using differentiated pedagogy in teaching basic mathematics operations in Malaysia's low enrolment schools. This study takes a quantitative approach with survey methods. This study's respondents included 76 primary school mathematics teachers from Malaysia's. The data was collected via a questionnaire. The results revealed that teachers have a high level of awareness of the importance of differentiated pedagogy in teacher and learning since their practical skills in implementing that approach remain moderate. They also recognized the importance of differentiated pedagogy in addressing diverse learning needs, enhancing students' achievement and fostering 21st century skills such as critical thinking and problem solving. However, obstacles such as limited resources, inadequate training and absence of a structured pedagogical framework were identified. The study recommends targeted professional development, resource allocation, and the establishment of collaborative learning communities to address the identified gaps. By identifying these needs, the proposed framework aims to empower teachers, improve mathematics instruction and promote equitable education in Malaysia's rural schools. The findings underscore the critical role of differentiated pedagogy in preparing students for the challenges of the 21st century.

Keywords: Needs Analysis, Differentiated Pedagogy, Mathematics, Multigrade Classes, Basic Operations

Introduction

Mastering basic operations is the most essential skill that students need to acquire in the field of Mathematics. Students must first grasp the basic operation to comprehend more complicated mathematical concepts. These operations such as addition, subtraction,

multiplication and division serve as the building blocks for understanding more complex mathematical concepts and engaging in higher-order problem-solving tasks. The early stage of education is particularly critical to ensure the students acquire proficiency in basic operations. Based on Ilukena et al. (2020), once students have a strong grasp of basic operations like addition, subtraction, multiplication, and division, they can transition to more advanced concepts and engage in problem-solving. To address this issue from spreading further, prioritising the mastery of fundamental operations for more complicated mathematics learning is necessary, especially for Level 1 students. Strategies and interventions can assist teachers in providing more appropriate and efficient activities for students to develop their understanding of mathematical fact fluency (Hawkins et al., 2017).

Teachers can improve their students' comprehension and interest in studying basic operations by implementing various strategies and methods. However, putting these approaches and techniques into practice to help students comprehend is difficult in the educational system, especially in Low Enrolment Schools. The importance of this study is amplified in the context of Malaysia's Low Enrolment Schools, which serve rural and remote areas and often struggle with limited resources, diverse student needs and multigrade classrooms. Low Enrolment Schools accounts for 7% of all primary school enrolment and can be defined as a school with 150 students or fewer (Ministry of Education Malaysia, 2013). Teachers in Low Enrolment School face unique challenges in delivering quality education including limited resources, teacher's workload, and the need to address foundational skills such as basic mathematical operations effectively (Hashim et al., 2021; Yusuf et al., 2019). Thus, according to Tomlinson (2014) and Pridmore (2007), differentiated instruction is particularly beneficial in multigrade settings, as it enables teachers to address diverse learning needs and optimize instructional time.

Differentiated pedagogy has emerged as a promising strategy to address the diverse learning needs in multigrade classrooms. By tailoring instruction to individual students' profiles, differentiated pedagogy enhances engagement, promotes critical thinking and support the development of 21st-century skills such as collaboration, creativity and problem solving (Tomlinson, 2014; UNESCO, 2017). Despite having a small enrolment size of students, Low Enrolment Schools still improves the performance and calibre of education in Malaysia. However, studies have shown that multigrade teaching in Malaysia often lacks adequate professional development and pedagogical frameworks, limiting its potential impact on student learning outcomes (Ismail & Hassan, 2020). In order to guarantee that students in multigrade settings receive high-quality instruction catered to their specific needs, a complete framework that complies with 21st-century learning criteria must be developed.

The significance of this study lies in bridging the gap between theoretical approaches and practical applications of differentiated pedagogy within the context of multigrade classrooms. Developing a 21st-century knowledge and skills framework tailored to basic mathematical operations in Low Enrolment School will not only empower teachers but can improve student outcomes and educational equity in rural Malaysia. To ensure no student left behind in multigrade teaching contexts, this research addresses a critical need for educators to be equipped with useful, evidence-based tools (Berry, 2010; Yusuf et al., 2019).

The findings of this study will benefit various stakeholders. Policymakers can leverage the insights to design targeted interventions for Low Enrolment Schools, while educators will

gain access to actionable strategies for enhancing instructional quality. Additionally, students in rural and remote areas will experience improved learning experiences, equipping them with the skills necessary for academic and lifelong success. Hence, by focussing the utility and effectiveness of differentiated pedagogy, this research underscores its role as a transformative approach in addressing the unique challenges of Low Enrolment School and preparing students for demands of the 21st century. Thus, it will help to enhance teaching methods and student results.

Problem Statement

The effective teaching of basic mathematical operations is essential for building foundational skills in mathematics, which are critical for students' boarder problem-solving and reasoning abilities. The implementation of multigrade classrooms, especially in Low Enrolment Schools, in Malaysia encounters many challenges in reaching this objective. These schools are usually in rural and remote areas, serving only 150 pupils or less while teachers are required to teach a variety of students across different grade levels (Ministry of Education Malaysia, 2013). These types of settings result in major academic and organizational challenges including the available subject matter expertise often becomes limited, and personalized instructional materials become scarce or non-existent, while time constraints prevent individualized schooling (Berry, 2010; Hashim et al., 2021).

Well aware that the evidence of multigrade teaching has not lived up to its expected potential, multigrade is seen by some as being a cheap solution that is an effective strategy in delivering education in rural settings with the eventual goal being inclusion. Research by Yusuf et al. (2019) and Little (2006) indicates that multigrades classrooms in Malaysia are still dominated by conventional teaching methods, leading to disengagement and gaps in students' learning, especially in mathematics. Additionally, there is a lack of system support and differentiation of pedagogical practices to address the needs of a diverse group of learners (Pridmore, 2007; Suprayogi, Valcke & Godwin, 2017). Differentiated pedagogy is widely understood to improve student learning outcomes through consideration of diverse needs, yet much of this practice is underused in multigrade classrooms due to poor training and resources for teachers (Tomlinson, 2014; Ministry of Education Malaysia, 2013).

All these underscores the importance of educational innovation for multigrade classrooms appropriate for the 21st century. Pedagogical practices must entail critical thinking, problem-solving, cooperation and creativity in preparing students for the challenges of the future (Chai et al., 2019; UNESCO, 2017). Nevertheless, it is challenging for a multigrade teacher in Malaysia to match their teaching according to requirements as there are no frameworks available for skills development in those contexts, especially for the 21st century (Ismail & Hassan, 2020; Hashim et al., 2021).

Moreover, despite the call for suitable pedagogical frameworks in multigrade education (Berry, 2010; Little, 2006) from international studies, limited studies were conducted in Malaysia. Moreover, previous frameworks do not adequately account for the unique challenges of teaching basic mathematics operations in multigrade classrooms, where instruction must navigate the demands of diverse needs and pedagogical resources (Yusuf et al., 2019; Suprayogi et al., 2017).

Therefore, there is a critical need for a comprehensive needs analysis to identify the challenges, gaps, and opportunities in mathematics education within multigrade classrooms. Such an analysis can inform the development of a 21st-century knowledge and skills framework through differentiated pedagogy. This framework will not only improve mathematics instruction but also empower teachers to enhance learning outcomes and reduce educational inequities in rural Malaysia.

Literature Review

The 21st century calls for students to develop critical thinking, problem-solving, and collaboration skills to succeed in a rapidly changing world (UNESCO, 2017; Chai et al., 2019). However, these skills are difficult to implement in rural multigrade classrooms, particularly in Malaysia's Low Enrolment Schools. Multigrade teaching, which involves students from multiple grade levels in one classroom, is common in rural areas due to limited resources and teacher shortages (Little, 2006; Pridmore, 2007). This approach, while practical, poses challenges in addressing the diverse needs of students and effectively teaching subjects like mathematics (Berry, 2010; Ismail & Hassan, 2020).

Students in multigrade classrooms often struggle with basic mathematical operations due to fragmented instruction and lack of individualized support (Yusuf et al., 2019; Hashim et al., 2021). Differentiated pedagogy, which tailors teaching to students' varying abilities, offers a solution by ensuring that all learners are engaged and receive the support they need (Tomlinson, 2014; Suprayogi et al., 2017). This method has shown positive effects on students' mathematics outcomes (Chai et al., 2019; Ismail & Hassan, 2020).

However, the implementation of differentiated instruction is still limited in Malaysia's multigrade classrooms due to insufficient teacher training and resources (Hashim et al., 2021; Kementerian Pendidikan Malaysia, 2013). Moreover, integrating 21st-century skills into multigrade teaching requires clear frameworks and strategies that support both pedagogical innovation and resource management (Zhu et al., 2021; Goh & Wong, 2014).

Studies from other countries, such as India and South Africa, show that multigrade teaching can be effective when teachers are well-supported with targeted training and policy frameworks (Sharma, 2019; Little, 2006). Malaysia would benefit from a framework that integrates differentiated pedagogy and 21st-century skills to improve mathematics teaching in multigrade settings (Yusuf et al., 2019; Berry, 2010). Such a framework would help address the challenges teachers face and ensure that all students, regardless of their grade level, receive high-quality education.

Research Objective

This study aims at the need for the development of 21st century knowledge and skills framework through differentiated pedagogy in mathematics (basic operations) in multigrade classes in Malaysia. Specifically, the objectives of the study are as follows:

1. Identifying the level of knowledge regarding the needs of differentiated pedagogy among the mathematics teachers in primary schools.
2. Investigating the skills in implementing differentiated pedagogy among mathematics teachers in primary schools.

3. Identifying the needs of developing a framework for the integration of 21st century skills through differentiated pedagogy in the teaching mathematics (basic operations) in multigrade classrooms.

Research Methodology

This study aimed to collect input from primary school mathematics teachers about their requirements for developing a framework for the integration of 21st century skills through differentiated pedagogy in the teaching mathematics (basic operations) in multigrade classrooms. The study used a survey approach and selected a sample of 76 primary mathematics teachers in Malaysia through simple random sampling. The goal of the study was to obtain a clear picture of the teachers' needs for the development of differentiated pedagogy framework.

The study employed a set of questionnaires as a means of conducting a needs analysis. This questionnaire consists of four parts. Table 1 shows the parts of the questionnaire.

Table 1
Component of the questionnaire

Section	Component
Section A	Respondent demographics.
Section B	Teachers' knowledge related to the needs of differentiated pedagogy in learning and teaching in primary school mathematics.
Section C	Teachers' skills in differentiated pedagogy during implementing learning dan teaching during mathematics.
Section D	The level of needs toward development of 21st century knowledge and skills framework through differentiated pedagogy in mathematics (basic operations) in multigrade classes in Malaysia.

Section B, C and D use a five-point Likert scale for respondents to express their degree of agreement with each item presented. Each score on the 5-point Likert Scale represents a certain level of agreement: 1 for strongly disagree, 2 for disagree, 3 for neutral, 4 for agree, and 5 for strongly agree.

The data collected was analysed using descriptive statistical methods. The analysis included demographic analysis of respondents (Section A), analysis of teachers' knowledge about the needs of differentiated instruction in mathematics (Section B), analysis of teachers' skills in differentiated pedagogy (Section C) and analysis of the level of acceptance of teachers towards developing differentiated pedagogy (Section D). The mean value and standard deviation were calculated using Microsoft Excel, and the analysis of the level is presented accordingly. Table 2 shows the interpretation of mean values adapted from Zulkifli Awang (2012) for part B to D.

Table 2
Interpretation of Mean Score

Range of Mean	Interpretation
1.00 to 2.49	Very low
2.50 to 3.79	Moderate
3.80 to 5.00	Very High

Results

A total of 76 primary school mathematic teachers in Malaysia have answered the questionnaire distributed by post and email. The findings of the study are presented in four sections.

Demographic Analysis of Respondents

The demographic distribution analysis of the respondents is as shown in Table 4.

Table 4
Demographics of study respondents

Gender	Frequency (%)	Types of school	Frequency (%)	Total service years	Frequency (%)
Female	53 (30.0)	Low enrolment schools	48 (63.0)	1 to 5 years	16 (21.1)
Male	23 (70.0)	Not a low enrolment school	28 (37.0)	6 to 10 years	8 (10.5)
				11 to 15 years	12 (15.8)
				16 to 20 years	21 (27.6)
				20 years and above	19 (25.0)
Total	76 (100.0)	Total	76 (100.0)	Total	76 (100.0)

The result of the analysis shows that the highest data was recorded for female gender (70.0%), from low enrolment schools' teachers (63.0%) and total services years within 16 to 20 years (27.6%). The large difference between the number of male and female respondents is due to the lower enrolment of male teachers in the teaching staff in Malaysia (Ismail & Abdullah, 2017).

Analysis on the Knowledge of Differentiated Pedagogy Needs

In part B, there are eight (8) items to study teachers' perceptions related to the knowledge of differentiated pedagogy needs learning in primary school mathematics. Table 5 shows the mean, standard deviation and interpretation (based on table 2) of the knowledge of differentiated pedagogy needs among the primary mathematics teachers.

Table 5
Analysis on the Knowledge of Differentiated Pedagogy Needs

	Item	Mean (M)	Standard Deviation (SD)	Interpretation
B1	I got my own teaching style.	4.22	.641	Very High
B2	Each students got different characteristic.	4.66	.474	Very High
B3	I know about the differentiated pedagogy before this.	4.03	.760	Very High
B4	Everyone has different learning intelligences.	4.68	.465	Very High
B5	Differentiated pedagogy is a new method in education.	3.76	.958	Moderate
B6	Differentiated pedagogy helps me to be more attentive to the diverse intelligences of students in the classroom.	4.25	0.588	Very High
B7	Differentiated pedagogy is essential in today's teaching and learning process.	4.25	0.780	Very High
B8	I need to learn more about differentiated pedagogy, especially in Mathematics (Basic Operations).	4.25	0.746	Very High
	Average	**4.30**		**Very High**

The study respondents showed a very high level of agreement regarding their knowledge of the need for differentiated pedagogy (M=4.30). Specifically, respondents strongly agreed that everyone has different learning intelligences (M=4.68, SD= .465) and that each individual has unique characteristics (M=4.66, SD= .474). However, a small number of respondents disagreed with the statement that differentiated pedagogy is a new method in the educational landscape (M=3.76, SD= .958). Despite some respondents perceived that differentiated pedagogy as not being a novel approach in education, the agreement level among respondents regarding its role in helping them be more attentive to the diverse intelligences of students in the classroom remained high (M=4.25, SD= .588). Furthermore, the necessity of differentiated pedagogy in today's teaching and learning processes was also rated highly (M=4.25, SD= .780). Respondents also expressed strong agreement on the need for greater emphasis on differentiated pedagogy, particularly in Mathematic (Basic Operations) (M=4.25, SD= .746).

Analysis of Skills in Implementing Differentiated Pedagogy

In part C, there are eight (8) items to examine the skills in implementing differentiated pedagogy among primary school mathematics teachers. Table 6 below shows the mean, standard deviation and interpretation (based on table 2) of the teachers' skills in implementing differentiated pedagogy.

Table 6
Analysis of Skills in Implementing Differentiated Pedagogy

	Item	Mean (M)	Standard Deviation (SD)	Interpretation
C1	I am skilled in implementing differentiated pedagogy in the teaching and learning (T&L) of Mathematics, particularly in the topic of basic operations.	3.87	.656	Very High
C2	I am skilled in managing lesson content or the scope of learning according to student diversity based on the differentiated pedagogy approach.	3.79	.749	Moderate
C3	I am skilled in diversifying differentiated pedagogy activities according to the suitability title and learning objectives.	3.79	.694	Moderate
C4	I am skilled in providing teaching and learning instruments for differentiated pedagogy specifically for basic operations.	3.75	.763	Moderate
C5	I am skilled in preparing student assessment instruments during the teaching of differentiated pedagogy for the basic operations topic.	3.71	.775	Moderate
C6	I am able in managing differentiated pedagogy activities materials based on the planned time allocation.	3.70	.744	Moderate
C7	I am skilled in managing differentiated pedagogy activities and the learning process according to the planned teaching and learning objectives.	3.77	.722	Moderate
C8	I am capable of enhancing 21st century skills through the use of pedagogical approaches.	3.87	.614	Very High
	Average	**3.78**		**Moderate**

According to the analysis above, the average mean score on the level of skill in implementing differentiated pedagogy among respondents remains at a moderate level (M=3.78). Specifically, teachers demonstrated a high level of agreement regarding their skills in using differentiated pedagogy in the teaching and learning (T&L) of Mathematics, focusing on basic operations topic (M= 3.87, SD= .656). In addition, the respondents' ability to enhance 21st century skills through pedagogical approaches also in high level of agree (M=3.87, SD=.744).

Respondents showed a moderate level of agreement regarding their skills in managing lesson content or scope according to student diversity using differentiated pedagogy and diversifying activities to align with the suitability of topics and learning objectives, each recording (M= 3.79, SD= .749) and (M= 3.79, SD= .694) respectively. Additionally, respondents also indicated moderate agreement on their skills in preparing teaching and learning materials for differentiated pedagogy in basic operation topic (M= 3.75, SD= .763). Similarly, their skills in preparing student assessment instruments during the teaching of differentiated pedagogy in the topic of basic operation (M= 3.71, SD= .775).

Moreover, moderate agreement was observed for their skills in managing differentiated pedagogy activity materials based on planned time allocation (M= 3.70, SD= .744) and in managing differentiated pedagogy activities and the learning process according to the planned teaching and learning objectives (M=3.77, SD= .722).

Analysis of the Needs to Develop Differentiated Pedagogy Frameworks

In part D, there are also eight (8) items to study the needs for developing differentiated pedagogy frameworks among the primary school mathematic teachers. Table 7 shows the mean, standard deviation and interpretation (based on table 2) of the needs of differentiated pedagogy frameworks.

Table 7
Analysis of the Needs to Develop Differentiated Pedagogy Frameworks

	Item	**Mean (M)**	**Standard Deviation (SD)**	**Interpretation**
D1	A framework that incorporates elements of differentiated pedagogy in the teaching of Mathematics (Basic Operations) has not yet been developed.	3.20	.744	Moderate
D2	There is a need to develop differentiated pedagogy frameworks that suits with Mathematics, particularly for basic operation topic.	4.01	.734	Very High
D3	The integration of differentiated pedagogy elements in Mathematics (Basic Operations) can influence teachers' teaching practices.	4.13	.614	Very High
D4	The integration of differentiated pedagogy elements give highly impact towards students with diverse level.	4.20	.562	Very High
D5	The application of differentiated pedagogy can influence teachers in delivering lesson contents with various approaches.	4.12	.725	Very High
D6	Differentiated pedagogy element is important to be implement in	4.21	.614	Very High

	Mathematics (Basic Operation) lesson to develop students' 21st century skills.			
D7	The usage of differentiated instruction approaches in teaching can increase teachers' productivity.	4.08	.684	Very High
D8	Differentiated pedagogy approaches in teaching enhance students' opportunities achieve better outcomes.	4.23	.644	Very High
	Average	**4.02**		Very High

Based on the analysis above, generally shows that there was a high level of agreement among respondents about the need for developing such a framework (M= 4.02). On the contrary, they had moderate agreement whether a framework integrating elements of differentiated pedagogy through which Mathematics (Basic Operation) can be taught has not been devised yet (M= 3.20, SD= .744). However, most respondents agreed that developing an appropriate framework of differentiated pedagogy for teaching Mathematics (Basic Operations) was essential (M= 4.01, SD= .734).

They also agreed that various elements of differentiated pedagogy in Mathematics (Basic Operations) influence the practice of learning teachers (M=4.13, SD= .614) and is very effective in teaching multi-class intelligences (M= 4.20, SD= .562). Furthermore, respondents acknowledged that differentiation in pedagogy elements can guide teachers to present lesson content through diverse approaches (M= 4.12, SD= .725). They absolute advocated the implementation of differentiated pedagogy in Mathematics (Basic Operations) that could nurture the 21st century skills among the students (M= 4.21, SD= .614).

Additionally, the respondents indicate that employing differentiated pedagogy approaches in teaching enhances teacher productivity (M= 4.08, SD= .684) while simultaneously improving students' opportunities to increase their achievement (M= 4.23, SD= .644).

Discussion

This study was conducted to examine the need for the development of 21st century knowledge and skills framework through differentiated pedagogy in Mathematics (basic operations) in multigrade classes in Malaysia. Researchers need to conduct a needs analysis study to gather information about the context and situation of the study. Primary mathematics teacher low enrolment schools are selected as target users for the construction for this differentiated pedagogy framework. Although these are the average results, they reveal a great concordance of opinions among respondents, about differentiated pedagogy as a valuable tool in the teaching process of the topic Basic Operations in Mathematics.

Once again, there was a very high agreement level about the importance of differentiated pedagogy — this is a powerful tool for addressing the needs of diverse students (M=4.30). This resonates with Tomlinson (2014) who claimed that differentiated instruction is essential to suit the diverse learning profiles of students. Data also indicates the strong agreement in having multiple intelligences which make each person uniquely

capable of learning (M=4.68, SD= .465) and characteristics (M=4.66, SD= .474) confirming Gardner's (1983) theory of multiple intelligences, which highlights the diversity of learning modalities. While some respondents considered differentiated pedagogy as not new (M=3.76, SD=. 958), which highlights its core significance in facilitating attentiveness to students' diverse needs (M=4.25, SD=. of ability group, and delivery style (M=4.25, SD= .780).

There was a strong inter-respondent agreement over their knowledge; their skill level as moderate (M=3.78) in implementing differentiated pedagogy. This gap calls for need based professional development programs. Research by Darling-Hammond et al. (2017) emphasize that training and ongoing professional development of teachers is vital for converting theory into practice. Looking at specific skills, a very high confidence was indicated of using a differentiated pedagogy when teaching Mathematics (M=3.87, SD= .656) and for improving 21st-century skills (M=3.87, SD= .744). Nonetheless, moderate agreement was noted in the management of content diversity (M=3.79, SD= .749) and clustering events (M = 3.79, SD =.694). Similar identified gaps in the practical implementation of differentiated strategies reported by Stronge (2018) suggesting that, "differentiating instruction means continuing to help students face their unique learning needs as learners move from novice to expert through the discipline" was echoed in this note.

Moreover, there was a great consensus that the framework should include integrating the elements of differentiated pedagogy for teaching Mathematics (M=4.02). The framework effectiveness in changing teaching practices was acknowledged by respondents (M=4.13, SD=. 614) and meeting students' needs who had different forms of intelligences (M=4.20, SD=. 562). These observations are in line with Hall et al. (2019) that structured frameworks make differentiated instruction more effective by giving such instruction clear guides and resources. Also, the integration of differentiated pedagogy, enables 21st-century skills (M=4.21, SD=. 614). As Trilling and Fadel (2009) point out, these reflect the current global priorities of education, echoing an emphasis on promoting critical thinking, cooperation, and creativity, among other widely discussed attributes, as essential skills for contemporary education. Finally, utilizing differentiated pedagogy improves teacher productivity (M=4.08, SD=. 684) and enhances students´ chances of obtaining better results (M=4.23, SD=. 644). These findings support Hattie's (2009) findings, which show that pedagogical approaches have a positive effect on student achievement.

In conclusion, the findings highlight the need to address gaps in practical skills through professional development and the importance of developing a comprehensive framework for implementing differentiated pedagogy in Mathematics education. This framework could serve as a guide to enhance teacher practices and student outcomes, ultimately contributing to the broader goal of improving education quality in diverse classroom settings.

Conclusion

This study highlights the critical role of differentiated pedagogy in addressing the diverse learning needs of students, particularly in Mathematics (Basic Operations) within multigrade classrooms in Malaysia. While teachers demonstrate moderate skills in implementing differentiated approaches, there is a strong consensus on its importance and potential to enhance teaching quality, support 21st-century skill development, and improve student outcomes. The absence of a structured framework for differentiated pedagogy in

Mathematics reveals a critical gap that must be addressed to optimize teaching effectiveness and inclusivity. Teachers also recognize the value of differentiated pedagogy in catering to students' varied intelligences and characteristics, making it a key component of modern education. However, the moderate levels of confidence in executing specific strategies highlight the need for systematic support through targeted training and resources.

To address these challenges, several recommendations are proposed. First, policymakers and educational stakeholders should prioritize the development of a comprehensive differentiated pedagogy framework tailored to multigrade classrooms. This framework should provide practical guidelines, strategies, and resources to support teachers in planning, implementing, and assessing differentiated teaching approaches. Additionally, regular and targeted professional development programs are essential to improve teachers' skills and confidence in applying differentiated pedagogy. Workshops, mentoring sessions, and online courses focusing on planning, managing, and assessing differentiated instruction can significantly enhance educators' capabilities.

Resource allocation is another crucial step. Schools should be equipped with appropriate teaching materials and tools, including technological resources and manipulatives, to facilitate effective differentiated instruction. Furthermore, establishing collaborative learning communities, such as teacher networks or professional learning communities (PLCs), can provide a platform for educators to share best practices, exchange ideas, and support each other in implementing differentiated pedagogy.

Finally, ongoing research and evaluation are vital to refining the proposed framework, exploring its impact, and addressing challenges faced by teachers. Continuous assessment will ensure that the framework remains relevant and effective in addressing the evolving needs of students and educators. By implementing these recommendations, educational systems can ensure that differentiated pedagogy becomes an integral part of classroom practice. This approach not only fosters equitable and meaningful learning experiences for all students but also empowers teachers to deliver high-quality education that meets the diverse needs of learners in a dynamic and inclusive manner.

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