International Journal Of Engineering Research And Development
e- ISSN: 2278-067X, p-ISSN: 2278-800X, www.ijerd.com
Volume 20, Issue 11 (November, 2024), PP 1374-1381

A Review of Primary School Teachers' Insight into Traditional Instruction and Activity-Based Learning in Mathematics Education

Oluwafemi Motunrayo Dairo[1], Chioma Angela Okonkwo[2], Christiana Uchechukwu Orakwe[3]
[1] *Independent Researcher Manchester, UK*
[2] *Community Secondary School, Umunnachi, Nigeria*
[3] *Tuteria, Lagos, Nigeria*
Corresponding author: thefemidairo@gmail.com

Abstract
This review paper explores primary school teachers' perceptions of two distinct instructional approaches in mathematics education: traditional instruction and activity-based learning (ABL). While traditional instruction is valued for its structured and efficient approach to foundational skill-building, it can sometimes result in student disengagement due to its emphasis on memorization and repetitive tasks. In contrast, teachers perceive ABL as fostering deeper understanding, engagement, and critical thinking by providing hands-on, interactive learning experiences. However, ABL requires more planning, classroom management, and alternative assessment methods, presenting unique challenges for teachers. This review highlights teachers' insights into the strengths and limitations of each approach and emphasizes the need for a blended instructional model that balances traditional structure with the exploratory benefits of ABL. Recommendations are provided for improving instructional practices through professional development, enhanced classroom resources, and assessment strategies that reflect both procedural fluency and conceptual understanding. The findings underscore the importance of equipping teachers with the tools to implement a hybrid teaching model that meets diverse student needs, thereby promoting a more engaging and effective mathematics education.

Keywords*: Traditional Instruction, Activity-Based Learning, Mathematics Education, Teacher Perceptions, Primary School, Blended Instruction*

Date of Submission: 12-11-2024 Date of Acceptance: 25-11-2024

I. Introduction

1.1 Overview of Mathematics Education in Primary Schools

Mathematics education is foundational in primary school curricula, as it equips students with essential skills for logical reasoning, problem-solving, and analytical thinking (Jamil, Bokhari, & Iqbal, 2024). In the early stages of schooling, math forms the basis of numeracy, spatial understanding, and even broader cognitive development, impacting students' capacity to engage in subjects that require quantitative skills (Gilligan-Lee, Hawes, & Mix, 2022). Recognizing the significance of mathematics, primary education emphasizes mastery of basic arithmetic and an understanding of mathematical concepts that encourage lifelong learning and adaptability. This early exposure to math is vital, as it builds the groundwork for more advanced mathematical study and helps children develop a positive attitude toward the subject. However, effectively fostering mathematical understanding and enthusiasm among young learners depends greatly on the teaching methods employed (Silver & Libertus, 2022).

Traditionally, mathematics instruction in primary schools has relied on direct instruction, where teachers explain concepts and demonstrate problem-solving methods before students practice through rote exercises. This approach ensures consistency and structure, offering clear guidelines and step-by-step solutions that help students achieve a certain level of procedural proficiency. However, educational researchers and practitioners have increasingly explored alternative teaching methods, such as activity-based learning, to address the diverse learning needs of primary school students (Chen & Kalyuga, 2020). Activity-based learning moves away from rote memorization and repetition, encouraging a more interactive and student-centered approach that allows learners to explore mathematical concepts through practical, hands-on activities. By incorporating real-life examples, games, and collaborative exercises, activity-based learning aims to enhance students' understanding and make math more accessible and engaging (Kartal & Tillett, 2021).

1.2 Significance of Teaching Methods in Shaping Student Learning Experiences

The choice of teaching method in mathematics education significantly shapes student engagement, comprehension, and attitude toward the subject. Traditional instruction provides a structured environment where students can follow a clear path to mastering specific skills. Teachers can control the pace of learning, ensuring that fundamental concepts are covered systematically, which can be particularly beneficial for learners who thrive in a guided environment (Pei & Wang, 2021). For instance, the repetitive nature of traditional instruction often aids students in reinforcing concepts through practice, which is crucial for developing skills in arithmetic and memorizing basic formulas. However, this method may also have limitations, as it tends to focus heavily on procedural knowledge rather than conceptual understanding. As a result, students may succeed in calculations without fully grasping the underlying principles, limiting their ability to apply knowledge to novel situations (Archambault, Leary, & Rice, 2022).

In contrast, activity-based learning offers a more experiential and student-centered approach. By involving students in tasks that require them to apply mathematical concepts in context, this method promotes critical thinking and encourages students to see math as an interactive and relevant subject. Activities like using manipulatives, conducting experiments, and solving real-world problems make learning math a more dynamic and memorable experience (Arisoy & Aybek, 2021). Additionally, this approach supports collaborative learning, where students work in pairs or groups to solve problems, discuss strategies, and exchange ideas, which helps develop communication skills and promotes a deeper understanding of concepts through peer interaction. However, activity-based learning requires careful planning, as it can sometimes lead to off-topic discussions or may overwhelm students who need clear directions and repetition (Williams, 2022).

The significance of these methods extends beyond academic performance; they influence students' confidence, motivation, and attitudes toward math. When teaching methods align with students' individual learning styles, they are more likely to develop a positive relationship with mathematics, crucial in primary school as students form their earliest academic identities. Conversely, a mismatch between teaching style and learning preference can create barriers, leading some students to view math as a challenging or intimidating subject. Therefore, understanding how teachers perceive these methods is vital, as their attitudes and preferences directly impact their teaching approach and student outcomes.

1.3 Purpose of Exploring Teachers' Perceptions of Traditional Instruction vs. ABL

Investigating primary school teachers' perceptions of traditional instruction and activity-based learning in mathematics education offers insights into the strengths and challenges of each approach, as seen from the classroom's front line. Teachers' perceptions matter significantly because they affect their instructional choices and how effectively these methods are implemented. For instance, teachers who favor traditional methods might emphasize procedural mastery and consistency, providing students with the skills needed to perform well in tests and meet curriculum standards. On the other hand, teachers who believe in the benefits of activity-based learning might prioritize fostering an exploratory environment that enables students to understand math concepts more intuitively and apply them to real-world scenarios (Jablonka, 2020).

Examining teachers' perspectives allows educational researchers and policymakers to understand the practical implications of each method, including the factors that contribute to its success or limitations within the primary school setting. For example, suppose teachers report challenges in implementing activity-based learning due to limited resources, time constraints, or curriculum rigidity. This feedback can guide interventions to support more flexible teaching frameworks in that case. Likewise, suppose teachers express concerns about students' ability to retain information without structured repetition. This feedback can be addressed by combining traditional instruction's strengths with activity-based learning engagement strategies. Furthermore, understanding teachers' perceptions sheds light on professional development needs, as educators may benefit from targeted training to confidently implement new teaching methods or integrate traditional and activity-based approaches effectively.

Ultimately, the goal of exploring teachers' perceptions is to improve mathematics instruction by aligning it with both pedagogical best practices and the realities of classroom implementation. By considering the experiences and insights of teachers, education stakeholders can work toward refining instructional methods to create a balanced approach that meets the diverse needs of primary school students. The findings from such research can contribute to developing more flexible, engaging, and effective math education strategies that foster a strong mathematical foundation, helping students not only excel academically but also view mathematics as a useful and enjoyable subject.

II. Background on Teaching Methods in Mathematics

II.1 Overview of Traditional Instruction Methods in Primary School Mathematics

Traditional instruction methods have been the cornerstone of mathematics education in primary schools for many years. This approach is structured around direct instruction, where teachers present mathematical concepts, demonstrate methods, and guide students through examples. Traditional instruction is typically characterized by lectures, worksheets, drills, and rote learning exercises, where students repeat problem-solving

steps to internalize specific skills. This method is rooted in behaviorist learning theories that emphasize repetition and reinforcement as ways of solidifying knowledge and ensuring consistency in student performance (Chaiyarat, 2024).

The benefits of traditional instruction are particularly evident in its structure and focus on foundational skills. Primary school students, who are often new to formal education, benefit from the stability and predictability of direct instruction, which provides a clear framework for learning. For example, in arithmetic, students learn basic operations through repeated practice, which helps them gain fluency in addition, subtraction, multiplication, and division. Traditional instruction can help young learners build a strong mathematical foundation by emphasizing correct procedures and step-by-step problem-solving (Voskoglou & Salem, 2020).

However, traditional instruction has limitations, particularly when it comes to fostering conceptual understanding and critical thinking. While this method may produce proficient students in procedural tasks, it often falls short in promoting deeper comprehension of mathematical ideas. Research suggests that a strictly traditional approach can lead to "surface learning," where students may excel at applying formulas and algorithms but struggle to understand the underlying concepts (Staddon, 2022). As a result, students may find it difficult to transfer their mathematical knowledge to real-world applications, problem-solving scenarios, or advanced mathematical studies. This approach can also make mathematics feel rigid and inaccessible, sometimes discouraging students from engaging deeply with the subject (Alzahrani, 2020).

II.2 Activity-Based Learning in Mathematics and Its Goals

In contrast to traditional instruction, activity-based learning has emerged as a student-centered approach to enhance engagement and understanding in mathematics. This method emphasizes experiential learning, where students actively participate in tasks that require them to explore, experiment, and apply mathematical concepts. Activity-based learning is grounded in constructivist theories of education, which suggest that learners construct knowledge through hands-on experiences and interactions with their environment (Mehmood & Kanwal, 2021).

Activity-based learning in mathematics often includes the use of manipulatives, interactive games, group activities, and real-life problem-solving exercises. For instance, students may use blocks, counters, or digital tools to visualize numbers, understand place value, and explore patterns. Teachers in activity-based classrooms create a dynamic learning environment where students work in pairs or groups, encouraging collaboration and communication (Başkahya, 2021). This method is particularly beneficial in primary education, where young learners thrive in settings that allow for physical interaction and play. Activity-based learning aims to make mathematics more relatable by connecting abstract concepts to tangible experiences, fostering a deeper understanding of mathematical principles (Cheng & Yeo, 2022).

A core goal of activity-based learning is to cultivate critical thinking and problem-solving skills. By engaging with mathematical concepts in diverse and meaningful ways, students gain a stronger conceptual grasp, which enables them to adapt their knowledge to new situations. Research has shown that activity-based learning can improve students' attitudes toward mathematics, as they see the subject not merely as a set of rules to memorize but as a tool for understanding and navigating the world. This method encourages curiosity, creativity, and persistence in solving mathematical challenges, significantly enhancing students' confidence and enjoyment of the subject. However, implementing activity-based learning can be resource-intensive, requiring additional materials, time, and planning to ensure that activities align with curriculum standards and learning objectives (Judijanto, 2024).

II.3 Comparative Insights from Existing Research

Research comparing traditional and activity-based instruction in mathematics has yielded valuable insights into their respective impacts on student learning outcomes. Studies suggest that each approach has unique strengths that can benefit different aspects of mathematical learning, but also indicate that a balanced or hybrid model may offer the most comprehensive benefits.

Traditional instruction is often associated with improvements in procedural knowledge and calculation speed. A study by Cowan et al. (2011) found that primary school students taught through traditional methods performed well on standardized tests that measured arithmetic proficiency and basic problem-solving skills. This is particularly relevant for students in early grades, where developing foundational skills is critical. Traditional instruction's focus on repetition and mastery of procedures enables students to achieve accuracy and fluency, which are essential for progressing to more complex mathematical tasks. However, their study also noted that students taught exclusively through traditional methods were more likely to struggle with non-standard problems that required flexible thinking or creative solutions.

Activity-based learning, by contrast, has been shown to improve students' conceptual understanding and ability to apply mathematical knowledge to novel situations. According to a meta-analysis by Rosli, Capraro, and Capraro (2014), students who experienced activity-based instruction demonstrated better problem-solving abilities, especially in open-ended tasks that required logical reasoning and experimentation. This approach was also found to be particularly beneficial for students who initially struggled with mathematics, as the engaging and

interactive nature of activities helped reduce math anxiety and build confidence. The study highlighted that students in activity-based classrooms developed stronger collaborative skills and were more likely to view math as enjoyable and relevant to real life. However, they also noted that these students occasionally lagged in procedural fluency compared to those taught through traditional methods, suggesting that activity-based learning might need to be complemented by direct instruction to ensure balanced development.

These comparative insights emphasize that while traditional and activity-based learning have distinct advantages, a flexible teaching strategy that integrates both methods may be optimal for primary mathematics education. Traditional instruction can provide the procedural groundwork that students need to perform well in fundamental areas of math, while activity-based learning can enhance critical thinking, adaptability, and engagement. By understanding the benefits and limitations of each method, educators can tailor their teaching to meet diverse student needs, fostering both competence and enthusiasm in mathematics.

III. Teachers' Perceptions of Traditional Instruction

III.1 Key Themes Regarding Teachers' Views on Traditional Instruction

Teachers' perceptions of traditional mathematics instruction are multifaceted, reflecting a blend of appreciation for its stability and reservations about its limitations in engaging diverse learners. Traditional instruction, primarily characterized by direct teaching and structured practice, is often praised by educators for its clear and systematic approach to conveying fundamental mathematical skills. Many teachers perceive traditional methods as reliable, especially for young learners who are just beginning to understand the structure of formal education. The consistency and order inherent in traditional instruction give students a dependable framework that is easily replicable and measurable. Through regular lessons, drills, and practice exercises, students reinforce basic arithmetic and algebraic skills in a efficient and straightforward way.

One of the primary strengths of traditional instruction, as reported by teachers, is its effectiveness in building procedural fluency. For early mathematics concepts like addition, subtraction, and multiplication, procedural fluency is essential, and traditional instruction's emphasis on repetition and reinforcement helps ensure that students develop these skills to an automatic level. Many teachers consider this aspect particularly valuable in primary education, where students require a strong foundation in basic operations before progressing to more advanced topics. According to a study by Nguyen and Tran (2023), teachers noted that traditional instruction enabled them to control the pace of the lesson, ensuring that all students received a baseline understanding of key concepts. This structured approach also allowed teachers to clearly monitor student progress, identify areas of weakness, and provide additional support to those who struggled.

However, teachers also recognize notable limitations in traditional instruction, especially regarding its impact on student engagement and conceptual understanding. While traditional methods are effective for procedural practice, they are often perceived as insufficient for fostering deeper comprehension of mathematical concepts (Wong & Liem, 2022). Teachers report that a significant drawback of traditional instruction is its tendency to encourage rote learning, where students focus on memorizing steps rather than understanding underlying principles. This surface-level learning can limit students' ability to apply their knowledge in novel or complex situations, leading to a gap between procedural proficiency and conceptual mastery. Some teachers feel that traditional instruction fails to inspire curiosity and critical thinking in students, resulting in a more passive learning experience. This can be especially problematic in primary education, where students are forming their early attitudes toward mathematics (Owens, Sadler, Barlow, & Smith-Walters, 2020).

Furthermore, teachers frequently express concerns about the rigidity of traditional instruction. While its structured nature can be advantageous for foundational learning, it also restricts opportunities for creativity and exploration in the classroom. Teachers report that students often find the repetitive nature of traditional methods monotonous, which can lead to disengagement, especially among students who learn better through interactive and hands-on activities. Traditional instruction may not be flexible enough to accommodate all students in classrooms with diverse learning needs, leading to disparities in learning outcomes. For instance, students who struggle with memorization may fall behind, while those who are more advanced may feel unchallenged. This lack of adaptability has led many teachers to question the efficacy of traditional instruction in meeting the needs of all students, particularly as educational research increasingly emphasizes the importance of differentiated learning (Xu, Chen, & Chen, 2020).

III.2 Common Challenges and Successes Reported by Teachers Using Traditional Methods

Teachers' experiences with traditional instruction methods reveal a range of challenges and successes, illustrating both the enduring appeal and the evolving limitations of this approach in modern classrooms. One of the most commonly cited challenges is maintaining student interest and motivation. Teachers report that, while traditional instruction is straightforward, its predictable format can make keeping students engaged over time difficult (Ho & Dimmock, 2023). This issue is particularly pronounced in primary education, where young students are often more responsive to dynamic and interactive activities than to lectures or worksheets. Teachers also note that when students become disinterested, their performance tends to suffer, as they are less likely to

invest effort in understanding the material. This disengagement can create a cyclical problem, where students view mathematics as a tedious subject, making it even more challenging for teachers to capture their attention (Al Haddar, Haerudin, Riyanto, Syakhrani, & Aslan, 2023).

Another significant challenge teachers encounter with traditional methods is adapting instruction to accommodate different learning styles and abilities. In a study by Gao and Zhang (2020), teachers reported feeling constrained by the structure of traditional instruction, which does not easily allow for modifications to suit individual student needs. This one-size-fits-all approach can be especially problematic in classrooms with diverse student populations, including those with varying levels of prior knowledge, learning preferences, and cognitive abilities. For students who struggle with the pace or format of traditional instruction, the result can be frustration or a lack of confidence, which may deter them from fully participating in class. Teachers, in turn, often feel the pressure to move forward with the curriculum despite these disparities, knowing that some students may be left behind.

Despite these challenges, many teachers also experience notable successes with traditional instruction, particularly in developing students' basic arithmetic skills. Traditional methods allow teachers to systematically build students' knowledge step-by-step, ensuring that they grasp essential skills before moving on to more complex topics. This gradual progression is particularly useful for younger students, who may need time to develop a firm grasp of concepts like number sense and place value. In this way, traditional instruction can provide a stable foundation for more advanced mathematical understanding. Teachers frequently observe that students who excel under traditional instruction tend to demonstrate high accuracy and speed in solving standard problems, which is advantageous for standardized testing and other assessments (Zakarneh, Al-Ramahi, & Mahmoud, 2020).

Teachers also report that traditional instruction is valuable for reinforcing discipline and focus in the classroom. The structured nature of this approach encourages students to follow instructions closely, complete assignments on time, and develop a routine for studying mathematics. These habits can contribute to students' overall academic success, fostering a sense of responsibility and resilience. In a classroom where traditional instruction is the primary method, students learn to rely on systematic problem-solving approaches, which can benefit mathematics and other subjects requiring logical thinking (Abu Khurma, Al Darayseh, & Alramamneh, 2022).

IV. Teachers' Perceptions of Activity-Based Learning

IV.1 Teachers' Insights on the Effectiveness of Activity-Based Learning in Mathematics

Activity-based learning (ABL) has gained considerable attention in recent years as an alternative approach to traditional instruction in mathematics, especially in primary education. Teachers generally perceive ABL as an engaging and effective way to teach mathematics, promoting active participation, curiosity, and critical thinking among students. Unlike traditional instruction, which often centers on memorization and repetitive practice, ABL emphasizes hands-on activities, group collaboration, and real-world problem-solving (Noreen, 2022). Many teachers feel that these elements of ABL help demystify mathematical concepts for young learners, making abstract ideas more tangible and accessible. Through activities like games, manipulatives, and interactive experiments, students are encouraged to explore mathematical principles on their own terms, which can help foster a sense of ownership over their learning (Dar, 2021).

Teachers often highlight the effectiveness of ABL in supporting conceptual understanding. For example, rather than merely memorizing formulas or rules, students in an ABL environment are more likely to discover patterns and relationships for themselves, which can lead to a deeper comprehension of mathematical concepts. This approach is particularly useful for foundational topics such as addition, subtraction, and basic geometry, where students benefit from visualizing and manipulating objects to see how numbers and shapes interact. Teachers have noted that ABL facilitates this kind of exploratory learning, enabling students to make connections between different mathematical ideas and apply their knowledge in new and creative ways (Chakawodza, Nakedi, & Kizito, 2024).

Moreover, teachers report that ABL is highly effective in building students' problem-solving and critical-thinking skills. By presenting students with open-ended tasks or real-life scenarios, ABL encourages them to think beyond rote procedures and develop strategies for tackling various types of problems. Many teachers find this approach aligns with the goals of modern mathematics education, which emphasizes mathematical knowledge and skills like reasoning, communication, and adaptability. According to a study by Chan and Lee (2023), teachers found that students exposed to ABL demonstrated greater confidence in their abilities and were more willing to take risks in solving challenging problems. This increase in confidence is often attributed to the less rigid, more exploratory nature of ABL, where mistakes are seen as part of the learning process rather than as failures.

IV.2 Challenges and Opportunities Identified by Teachers

Despite its benefits, teachers also identify challenges associated with implementing activity-based learning in mathematics. One of the primary challenges is the significant amount of planning and preparation required for ABL lessons. Teachers must design activities that are engaging, aligned with curriculum objectives,

and appropriate for different learning levels. This can be time-consuming and may require un readily available resources in schools, particularly underfunded or overcrowded classrooms. Teachers report that ABL also requires careful consideration of classroom management, as students are more active and collaborative, which can sometimes lead to distractions and off-task behavior if not well managed (Burden, 2020).

Another challenge noted by teachers is assessing student progress in an ABL setting. Traditional assessment methods, such as quizzes and exams, may not fully capture the learning through hands-on activities and group projects. Many teachers feel that ABL calls for alternative assessment approaches, such as observational notes, student portfolios, and reflective journals, which allow students to demonstrate their understanding in more varied and expressive ways. However, these assessment methods can be labor-intensive, requiring teachers to devote additional time to evaluating individual and group performance. Additionally, some teachers feel uncertain about objectively measuring learning outcomes in ABL, especially since students may arrive at solutions in diverse ways, making it challenging to apply standardized criteria.

Nonetheless, teachers also see substantial opportunities in ABL, particularly in terms of boosting student engagement and inclusivity. In contrast to traditional instruction, ABL provides multiple entry points for students of varying abilities and backgrounds, enabling each student to participate at their own level. Teachers often observe that students who struggle with traditional instruction become more engaged and motivated when given the chance to learn through activities. This inclusivity is especially important in diverse classrooms, where students have different learning needs and prior experiences. By offering a range of activities that cater to different strengths—such as visual aids, manipulatives, or cooperative learning—teachers can create a more equitable learning environment in which all students have the chance to succeed.

When comparing traditional instruction and activity-based learning, teachers' preferences and attitudes often depend on the specific needs of their students, the subject matter, and the available resources. Some teachers appreciate the structure and predictability of traditional instruction, especially for topics that require a high degree of procedural knowledge. Traditional instruction allows for straightforward lesson planning, clear progression through the material, and consistent assessment criteria. Teachers who value traditional instruction often feel that it provides students with a solid foundation in basic skills, which can later be applied in more complex problem-solving situations (Iwuanyanwu, 2020).

However, many teachers prefer ABL, particularly its ability to make mathematics more engaging and relevant to students' lives. Teachers who advocate for ABL argue that it creates a more dynamic and inclusive classroom environment, where students are encouraged to think independently, collaborate with peers, and apply mathematical concepts in real-world contexts. Teachers also note that their preferences may shift depending on the topic and grade level. For example, in early primary grades, where foundational skills are crucial, some teachers may lean towards traditional instruction to ensure that students acquire essential arithmetic skills. However, as students become more comfortable with basic operations, teachers may transition to ABL to cultivate higher-order thinking skills and creativity. This hybrid approach allows teachers to capitalize on the strengths of both methods, using traditional instruction to build procedural fluency and ABL to encourage conceptual understanding and engagement (Padilla Rodriguez & Armellini, 2021).

V. Conclusion and Recommendations

V.1 Summary of Findings on Teachers' Perceptions of Both Instructional Methods

In examining teachers' perceptions of traditional instruction and activity-based learning (ABL) in mathematics education, this review highlights the strengths and challenges of each approach. Teachers recognize traditional instruction for its structure, efficiency in covering syllabus material, and emphasis on developing procedural fluency in fundamental mathematical skills. For many teachers, traditional instruction provides the consistency and order necessary for laying a solid foundation in arithmetic and other core areas, especially in early primary education where repetitive practice and memorization play a key role. However, despite these benefits, teachers also note that traditional methods can sometimes lead to disengagement, as they often lack opportunities for interactive learning and may fail to foster deeper understanding or critical thinking skills in students.

Conversely, teachers generally view ABL as an effective and engaging alternative, particularly suited to developing conceptual understanding, problem-solving abilities, and a positive attitude towards mathematics. Activity-based methods enable students to explore mathematics in hands-on, meaningful ways, often making abstract ideas more relatable and enjoyable. Teachers report that ABL promotes active learning, collaboration, and creativity, encouraging students to see mathematics as more than just numbers on a page. Nonetheless, ABL also presents challenges, such as the additional preparation time, classroom management demands, and complexities in assessing learning outcomes. Many teachers, however, believe that these obstacles can be managed with adequate support, and they view ABL as an effective complement to traditional teaching, particularly in promoting long-term engagement with the subject.

V.2 Recommendations for Improving Mathematics Teaching Practices

Based on teachers' perspectives, a blended approach combining the strengths of traditional instruction and ABL could be highly beneficial for mathematics education. This hybrid approach would enable teachers to use traditional methods to build essential skills and ABL to encourage exploration and application of mathematical concepts. Schools and education policymakers should consider providing resources and training that equip teachers with the skills to integrate both methods effectively, ensuring that each teaching style enhances the other. For example, workshops and professional development programs could help teachers develop effective ABL strategies while maintaining the rigor and structure of traditional methods. Schools should also consider investing in resources like manipulatives, digital tools, and learning kits that facilitate ABL, reducing teachers' preparation time and making it easier to conduct hands-on activities.

Developing alternative assessment tools aligned with ABL practices is crucial to address assessment challenges. Tools such as student portfolios, performance-based tasks, and reflective journals allow for a more comprehensive view of student progress. Policymakers should consider integrating such assessment methods alongside standardized testing, enabling teachers to gauge both procedural skills and conceptual understanding. This holistic approach to assessment aligns well with the goals of a blended teaching model, as it would capture the diverse learning experiences provided by both traditional and activity-based methods.

Additionally, providing teachers with resources to manage larger classes or increase classroom support staff could improve the feasibility of ABL, especially in settings where traditional instruction is currently the norm. By lightening the classroom management burden, teachers can focus more on delivering interactive, meaningful activities without compromising the learning environment. Ultimately, a supportive framework for teachers, including training, resources, and assessment tools, will allow them to leverage the benefits of both instructional methods, creating a more dynamic and effective mathematics learning experience for primary school students.

References

[1] Abu Khurma, O., Al Darayseh, A., & Alramamneh, Y. (2022). A framework for incorporating the "learning how to learn" approach in teaching STEM education. Education Sciences, 13(1), 1.

[2] Al Haddar, G., Haerudin, H., Riyanto, A., Syakhrani, A. W., & Aslan, A. (2023). The revolution of islamic education thought in the era of society 5.0: Corrections and analysis of studies in islamic higher education institutions in south kalimantan. International Journal of Teaching and Learning, 1(4), 468-483.

[3] Alzahrani, N. M. (2020). Augmented reality: A systematic review of its benefits and challenges in e-learning contexts. Applied Sciences, 10(16), 5660.

[4] Archambault, L., Leary, H., & Rice, K. (2022). Pillars of online pedagogy: A framework for teaching in online learning environments. Educational Psychologist, 57(3), 178-191.

[5] Arisoy, B., & Aybek, B. (2021). The Effects of Subject-Based Critical Thinking Education in Mathematics on Students' Critical Thinking Skills and Virtues. Eurasian Journal of Educational Research, 92, 99-119.

[6] Başkahya, Z. I. (2021). The effect of using game-based learning activities in algebra on seventh-grade students' algebra achievement, attitude towards mathematics and opinions about game-based learning activities. Middle East Technical University,

[7] Burden, P. R. (2020). Classroom management: Creating a successful K-12 learning community: John Wiley & Sons.

[8] Chaiyarat, K. (2024). Enhancing creative problem solving and learning motivation in social studies classrooms with gamified cooperative learning. Thinking Skills and Creativity, 54, 101616.

[9] Chakawodza, J. M., Nakedi, M. M., & Kizito, R. N. (2024). Effectiveness of Blended Teaching on Academic Achievement in Organic Chemistry: A case of Grade-12 Learners from an Underprivileged South African School. International Journal of Learning, Teaching and Educational Research, 23(3), 248-274.

[10] Chan, C. K. Y., & Lee, K. K. (2023). The AI generation gap: Are Gen Z students more interested in adopting generative AI such as ChatGPT in teaching and learning than their Gen X and millennial generation teachers? Smart learning environments, 10(1), 60.

[11] Chen, O., & Kalyuga, S. (2020). Exploring factors influencing the effectiveness of explicit instruction first and problem-solving first approaches. European Journal of Psychology of Education, 35(3), 607-624.

[12] Cheng, L. P., & Yeo, K. K. J. (2022). Singapore school mathematics curriculum. In Education in Singapore: People-Making and Nation-Building (pp. 405-421): Springer.

[13] Cowan, R., Donlan, C., Shepherd, D.-L., Cole-Fletcher, R., Saxton, M., & Hurry, J. (2011). Basic calculation proficiency and mathematics achievement in elementary school children. Journal of Educational Psychology, 103(4), 786.

[14] Dar, W. A. (2021). Pedagogy for its own sake: teacher's beliefs about activity-based learning in rural government schools of Kashmir. Quality Assurance in Education, 29(2/3), 311-327.

[15] Gao, L. X., & Zhang, L. J. (2020). Teacher learning in difficult times: Examining foreign language teachers' cognitions about online teaching to tide over COVID-19. Frontiers in psychology, 11, 549653.

[16] Gilligan-Lee, K. A., Hawes, Z. C., & Mix, K. S. (2022). Spatial thinking as the missing piece in mathematics curricula. npj Science of Learning, 7(1), 10.

[17] Ho, L., & Dimmock, C. (2023). Changing teachers' beliefs and practices towards learner-centred education: experiences and lessons from Vietnam's education system reforms. Practice, 1-20.

[18] Iwuanyanwu, P. N. (2020). Nature of problem-solving skills for 21st century STEM learners: What teachers need to know. Journal of STEM Teacher Education, 55(1), 4.

[19] Jablonka, E. (2020). Critical thinking in mathematics education. Encyclopedia of mathematics education, 159-163.

[20] Jamil, M., Bokhari, T. B., & Iqbal, J. (2024). Incorporation of critical thinking skills development: A case of mathematics curriculum for grades I-XII. Journal of Asian Development Studies, 13(1), 375-382.

[21] Judijanto, L. (2024). Integration of Artificial Intelligence in Activity-Based Project Costing: Enhancing Accuracy and Efficiency in Project Cost Management. International Journal of Communication Networks and Information Security, 16(4), 66-79.

[22] Kartal, O., & Tillett, W. (2021). Transforming preservice teachers' conceptions and lesson plan designs for teaching mathematics from a direct-teaching approach to a reform-based approach. Investigations in Mathematics Learning, 13(2), 107-124.

[23] Mehmood, K., & Kanwal, W. (2021). Implementation of activity based teaching at primary level: A theoretical perspective. Pakistan Journal of Educational Research, 4(1).
[24] Nguyen, D. T., & Tran, D. (2023). High school mathematics teachers' changes in beliefs and knowledge during lesson study. Journal of Mathematics Teacher Education, 26(6), 809-834.
[25] Noreen, A. (2022). Activity-based Curriculum: How do Primary School Teachers Respond to it? Archives of Educational Studies (ARES), 2(1), 47-64.
[26] Owens, D. C., Sadler, T. D., Barlow, A. T., & Smith-Walters, C. (2020). Student motivation from and resistance to active learning rooted in essential science practices. Research in Science Education, 50, 253-277.
[27] Padilla Rodriguez, B. C., & Armellini, A. (2021). Cases on active blended learning in higher education: IGI Global.
[28] Pei, Z., & Wang, Y. (2021). Analysis of computer aided teaching management system for music appreciation course based on network resources. Computer-Aided Design and Applications, 19(S1), 1-11.
[29] Rosli, R., Capraro, M. M., & Capraro, R. M. (2014). The Effects of Problem Posing on Student Mathematical Learning: A Meta-Analysis. International Education Studies, 7(13), 227-241.
[30] Silver, A. M., & Libertus, M. E. (2022). Environmental influences on mathematics performance in early childhood. Nature Reviews Psychology, 1(7), 407-418.
[31] Staddon, R. V. (2022). A supported flipped learning model for mathematics gives safety nets for online and blended learning. Computers and Education Open, 3, 100106.
[32] Voskoglou, M. G., & Salem, A.-B. M. (2020). Benefits and limitations of the artificial with respect to the traditional learning of mathematics. Mathematics, 8(4), 611.
[33] Williams, K. A. M. (2022). Student Perceptions of Instructor Communication and Instructor Presence Online: The University of Alabama.
[34] Wong, Z. Y., & Liem, G. A. D. (2022). Student engagement: Current state of the construct, conceptual refinement, and future research directions. Educational Psychology Review, 34(1), 107-138.
[35] Xu, B., Chen, N.-S., & Chen, G. (2020). Effects of teacher role on student engagement in WeChat-Based online discussion learning. Computers & Education, 157, 103956.
[36] Zakarneh, B., Al-Ramahi, N., & Mahmoud, M. (2020). Challenges of teaching English language classes of slow and fast learners in the United Arab Emirates Universities. International Journal of Higher Education, 9(1), 256-269.