INTEGRATING TECHNOLOGY-ASSISTED INSTRUCTION TO ENHANCE THE BASIC OPERATIONS SKILLS OF GRADE ONE MATHEMATICS LEARNERS AT SEÑOR SANTIAGO LEARNING CENTER

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Abstract

Foundational numeracy is an essential early-grade competency because it supports learners' ability to recognize numbers, count accurately, understand number relationships, and perform basic operations needed for later mathematical learning . This study determined the effectiveness of technology-assisted instruction in enhancing the basic operations skills of Grade One Mathematics learners at Señor Santiago Learning Center . Specifically, it assessed learners' basic operations skills before and after the intervention in terms of number recognition, counting, number relationships, addition, and subtraction . The study employed a quasi-experimental research design, specifically the one-group pretest–posttest design, involving 40 Grade One Mathematics learners selected through total enumeration sampling . The researcher used a Basic Operations Skills Test as the pretest and posttest instrument and a Challenges Encountered Checklist to identify difficulties experienced during the intervention . The intervention consisted of teacher-guided technology-assisted instruction using digital tools, interactive applications, multimedia presentations, educational videos, online games, virtual manipulatives, and technology-supported mathematics activities . Results showed that the learners' overall pretest mean of 2.28 was interpreted as Low, while the overall posttest mean of 4.15 was interpreted as High, indicating improvement after the intervention . Counting obtained the highest posttest mean of 4.48, while subtraction obtained the lowest posttest mean of 3.82, although both were interpreted as High . The paired-samples t-test showed a significant difference between pretest and posttest scores, with a mean difference of 1.87, t-value of 18.72, and p-value of $p < .001$. Learners sometimes encountered challenges during technology-assisted instruction, with an overall mean of 3.32, particularly repeated need for teacher guidance, difficulty following digital instructions, and distraction from sounds, animations, or game features . Based on the findings, the study proposed Project TAI-BOS: Technology-Assisted Instruction for Basic Operations Skills to strengthen number recognition, counting, number relationships, addition, and subtraction through structured, teacher-guided, and developmentally appropriate technology-assisted mathematics instruction .

Keywords: Technology-Assisted Instruction, Basic Operations Skills, Grade One Mathematics, Foundational Numeracy, Digital Tools, Project TAI-BOS, Señor Santiago Learning Center

1. Introduction

Mathematics plays a vital role in early-grade education because it develops learners' ability to recognize patterns, compare quantities, reason logically, and solve practical problems World Bank, 2025). In the first years of schooling, mathematics serves not only as a subject for learning numbers but also as a foundation for critical thinking, communication, and interpretation of everyday experiences National Research Council, 2009). Foundational learning, which includes basic numeracy, supports lifelong learning, cognitive development, and productive participation in society (World Bank, 2025). For this reason, mathematics in Grade One should be treated as a core learning area that shapes academic readiness and essential life skills UNICEF, 2021).

Grade One is a critical stage in developing foundational numeracy because learners begin to formalize their understanding of numbers, quantities, symbols, and basic operations UNICEF, 2021). At this level, children move from informal counting experiences to structured mathematical learning, especially in addition and subtraction Frye et al., 2013). Foundational numeracy builds on children's early mathematical ideas, including counting, quantity comparison, and emerging understandings of addition and subtraction (UNICEF, 2021). These early competencies form the basis for more advanced mathematical concepts, such as place value, measurement, multiplication, division, and problem-solving (Frye et al., 2013; National Research Council, 2009).

Proficiency in basic operations is essential because it enables young learners to combine, separate, compare, and represent quantities in meaningful ways Frye et al., 2013). Addition and subtraction are not merely procedural skills because they help learners understand number relationships and solve simple quantitative problems National Research Council, 2009). The development of number sense requires learners to connect objects, pictures, symbols, and mathematical language through concrete and guided experiences (Frye et al., 2013). When learners acquire accurate and confident basic operations skills, they become better prepared to participate in classroom activities and handle more complex mathematics lessons in later grade levels World Bank, 2025).

However, many young learners experience difficulty in mathematics because numeracy involves more than memorizing number names or reciting counting sequences UNICEF, 2026). Learners must understand that numbers represent quantities, quantities can be compared, and groups can be joined or separated through addition and subtraction Frye et al., 2013). If instruction does not connect mathematical symbols with objects, images, actions, and real-life situations, learners may perform procedures without fully understanding the relationships behind them Frye et al., 2013). This concern becomes more evident when instruction is too abstract for young learners who still need concrete, visual, and meaningful experiences National Research Council, 2009).

Developmentally appropriate early mathematics instruction should therefore progress from concrete experiences to visual representations and, finally, to abstract symbols (Frye et al., 2013). Young learners may use fingers, blocks, tally marks, counters, drawings, and digital manipulatives to represent mathematical ideas before solving written number sentences independently (Frye et al., 2013; Yaris, n.d.). This progression is important because learners differ in readiness, attention span, counting ability, language development, and prior exposure to mathematical activities Frye et al., 2013). Instruction that follows a developmental progression can help learners build number recognition, counting accuracy, number relationships, addition, and subtraction systematically (Frye et al., 2013; Yaris, n.d.).

Technology-assisted instruction offers a possible response to the need for concrete, visual, engaging, and learner-centered mathematics instruction in the early grades UNESCO, 2023). Digital tools can help translate abstract numerical symbols into visible, interactive representations through number lines, virtual counters, digital flashcards, animated examples, drag-and-drop activities, and educational games Mayer, 2021). These tools can help learners see how quantities are combined in addition and separated in subtraction Mayer & Fiorella, 2021). When used properly, technology-assisted instruction can support foundational numeracy by helping learners visualize number relationships, practice basic operations, and receive immediate feedback Barana et al., 2021).

The value of technology in education depends on its relevance, appropriateness, and connection to learning goals rather than its mere availability (UNESCO, 2023). Technology should strengthen pedagogy by helping teachers present lessons more clearly, provide guided practice, monitor learner progress, and address specific learning needs (UNESCO, 2023; OECD, 2025). In Grade One Mathematics, technology-assisted instruction should not replace the teacher or concrete materials, as young learners still need explanations, questioning, encouragement, routines, and adult guidance OECD, 2023). Instead, technology should enrich instruction by

making mathematical ideas more visible, interactive, and understandable for young learners Mayer, 2021).

Interactive applications, multimedia presentations, educational videos, online games, and teacher-guided digital activities may increase learners' participation in mathematics lessons Dan et al., 2024). Digital game-based learning may motivate learners to repeat basic operations tasks in a less threatening and more engaging manner when the games are aligned with mathematical objectives (Dan et al., 2024; Debrenti, 2024). Multimedia learning can also support early numeracy, as learners often understand concepts more effectively when words, pictures, sounds, and animations are clearly and meaningfully organized (Mayer, 2021; Mayer & Fiorella, 2021). Immediate feedback from digital activities can further help learners recognize errors, correct misconceptions, and try another strategy while the learning experience is still fresh (Barana et al., 2021).

At Señor Santiago Learning Center, the study focused on strengthening the basic operations skills of Grade One Mathematics learners through technology-assisted instruction The study examined learners' performance in number recognition, counting, number relationships, addition, and subtraction before and after the intervention The intervention included teacher-guided use of digital tools, interactive applications, multimedia presentations, educational videos, online games, and other technology-supported mathematics activities These activities were designed to make basic operations more concrete, visual, engaging, and responsive to the developmental needs of young learners UNESCO, 2023).

Accordingly, this study determined the effectiveness of technology-assisted instruction in enhancing the basic operations skills of Grade One Mathematics learners at Señor Santiago Learning Center Specifically, it assessed learners' basic operations skills before and after the intervention, tested for a significant difference between pretest and posttest scores, identified challenges encountered during technology-assisted instruction, and proposed an instructional enhancement plan based on the findings The study is important because early numeracy must be strengthened through evidence-based strategies that are developmentally appropriate, engaging, teacher-guided, and aligned with learning outcomes Frye et al., 2013). By generating school-based evidence, the study may guide teachers and administrators in improving early mathematics instruction through purposeful and pedagogically sound technology integration UNESCO, 2023).

2. Method

2.1 Research Design

The study employed a quantitative quasi-experimental research design, specifically the one-group pretest–posttest design, to determine the effectiveness of technology-assisted instruction in enhancing the basic operations skills of Grade One Mathematics learners at Señor Santiago Learning Center This design was appropriate because the study measured the performance of the same group of learners before and after their exposure to technology-assisted instruction (Campbell & Stanley, 1963). The pretest was administered before the intervention to determine the learners' initial level of basic operations skills in terms of number recognition, counting, number relationships, addition, and subtraction After the pretest, the learners were exposed to teacher-guided technology-assisted instruction using digital tools, interactive applications, multimedia presentations, educational videos, online games, and other technology-supported mathematics activities The posttest was administered after the intervention to determine whether learners' basic operations skills improved through technology-assisted instruction The comparison of pretest and posttest results served as the basis for identifying whether a significant difference existed in learners' performance before and after the intervention (Shadish et al., 2002). The one-group pretest–posttest design was suitable for classroom-based intervention research because it allowed the researcher to evaluate measurable improvement

among the same learners within an actual instructional setting (Creswell & Creswell, 2018). Although the design did not include a separate control group, it provided a practical method for examining the effect of a specific instructional intervention on learners' early numeracy performance (Campbell & Stanley, 1963; Shadish et al., 2002). The study also identified the challenges learners encountered during technology-assisted instruction, providing additional evidence of the intervention's implementation These challenges were used to understand learner-related and instruction-related concerns, such as attention, participation, understanding of digital activities, use of learning devices, and need for teacher assistance The findings from the pretest, posttest, significant difference test, and challenges encountered served as the basis for developing an instructional enhancement plan to strengthen basic operations instruction in Grade One Mathematics.

2.2 Participants

The study was 40 Grade One Mathematics learners at Señor Santiago Learning Center who were officially enrolled at the time of the study. These learners were selected because they were directly involved in early-grade mathematics instruction in which technology-assisted instruction was implemented. Since the study focused on basic operations skills, the participants were appropriate because Grade One is a critical stage for developing number recognition, counting, number relationships, addition, and subtraction. Early mathematics learning should be strengthened during the primary years because number and operations competencies serve as foundations for later mathematical understanding (Frye et al., 2013). The study used total enumeration sampling because the entire group of Grade One learners was included as respondents. This approach was appropriate because the population was manageable and allowed the researcher to gather complete data from all learners who participated in the intervention. Total enumeration also ensured that every learner in the target group had the opportunity to take the pretest, participate in technology-assisted instruction, complete the posttest, and report challenges encountered during the intervention. The same learners participated in both the pretest and posttest, allowing their performance before and after the intervention to be compared. This procedure was consistent with one-group pretest–posttest designs, in which the same participants are measured before and after exposure to an instructional treatment (Campbell & Stanley, 1963). The learners' scores served as the primary data for determining whether technology-assisted instruction improved their basic operations skills. Including all Grade One learners in the target group also supported classroom-based evidence generation, as the study examined the intervention within the actual learning context. Since the respondents were young learners, the study required teacher guidance, child-friendly instructions, and age-appropriate assessment procedures. Early mathematics instruction should be developmentally appropriate because young learners differ in readiness, attention span, prior number knowledge, and ability to connect concrete experiences with mathematical symbols (Frye et al., 2013). Overall, the participants were suitable for the study because they represented the learner group for whom technology-assisted instruction was intended and whose basic operation skills needed to be measured before and after the intervention.

2.3 Instrumentation

The study used researcher-developed instruments to gather data on the effectiveness of technology-assisted instruction in enhancing the basic operations skills of Grade One Mathematics learners. The main instrument was the Basic Operations Skills Test, which served as both the pretest and posttest. The test measured learners' performance in five foundational numeracy areas: number recognition, counting, number relationships, addition, and subtraction. These skill areas were appropriate because early mathematics instruction should develop number and operations through a developmental progression that begins with concrete number understanding and proceeds toward more formal operational thinking (Frye et al., 2013). The

pretest was administered before the intervention to determine the learners' initial level of basic operations skills. The posttest was administered after technology-assisted instruction to determine whether learners improved in the same skill areas. Using comparable pretest and posttest measures was appropriate because one-group pretest–posttest studies require the same group of participants to be assessed before and after an instructional intervention (Campbell & Stanley, 1963). The test items were designed to be age-appropriate and aligned with Grade One Mathematics competencies, particularly in identifying numbers, counting objects, comparing quantities, recognizing number relationships, solving simple addition problems, and solving simple subtraction problems. This alignment was important because early-grade mathematics assessment should reflect learners' developmental readiness and the foundational competencies expected in number and operations (Frye et al., 2013). In addition to the Basic Operations Skills Test, the study used a Challenges Encountered Checklist to identify difficulties learners experienced during technology-assisted instruction. The checklist included learner- and instruction-related concerns such as attention span, participation, understanding of digital activities, use of learning devices, following instructions, need for teacher assistance, and completion of technology-supported mathematics tasks. This instrument was appropriate because technology integration should be evaluated not only in terms of learning outcomes but also in terms of relevance, appropriateness, accessibility, and actual classroom implementation (UNESCO, 2023). Since the respondents were young learners, the checklist was administered with teacher guidance and classroom observation to ensure responses and observations were appropriate for their age and level of understanding. The research instruments were validated by mathematics teachers, early-grade teachers, and research experts to ensure clarity, age appropriateness, content relevance, and alignment with the study's objectives. Validation was necessary because research instruments should accurately measure the intended variables and be reviewed for appropriateness before actual administration (Creswell & Creswell, 2018). Overall, the Basic Operations Skills Test and the Challenges Encountered Checklist provided the necessary data to determine learners' performance before and after the intervention, identify implementation challenges, and develop an instructional enhancement plan for Grade One Mathematics instruction.

2.4 Data Analysis

The data gathered from the Basic Operations Skills Test and the Challenges Encountered Checklist were checked, scored, tabulated, organized, analyzed, and interpreted in accordance with the specific research problems of the study (Creswell & Creswell, 2023). Descriptive statistics were used to determine the level of basic operations skills of the Grade One Mathematics learners before and after the implementation of technology-assisted instruction (Creswell & Creswell, 2023). The mean was computed to determine the learners' average performance in number recognition, counting, number relationships, addition, and subtraction before and after the intervention (Creswell & Creswell, 2023). The standard deviation was used to determine the extent of variation or consistency in the learners' pretest and posttest scores across the assessed basic operations skills (Field, 2024). The pretest results served as the baseline measure of learners' initial numeracy performance, while the posttest results served as the measure of learners' performance after exposure to technology-assisted instruction (Creswell & Creswell, 2023). The descriptive interpretation of the mean scores was used to classify learners' level of performance in each basic operations skill area before and after the intervention (Creswell & Creswell, 2023). To determine whether a significant difference existed between the pretest and posttest scores of the same group of learners, the paired-samples t-test was employed at the 0.05 level of significance (Field, 2024). This statistical test was appropriate because the study compared two related sets of scores obtained from the same learners before and after the instructional intervention (Field, 2024). The result of the paired-samples t-test served as the basis for determining whether technology-assisted instruction significantly enhanced the learners' basic

operations skills (Creswell & Creswell, 2023). To address challenges encountered during technology-assisted instruction, frequency counts and percentages were used to determine how many learners experienced each difficulty and the proportion of the group that encountered the same concern (Creswell & Creswell, 2023). A weighted mean was used to determine the extent to which learners encountered each challenge during technology-assisted instruction (Creswell & Creswell, 2023). Ranking was applied to arrange the challenges from most to least encountered based on learners' responses and classroom observations (Creswell & Creswell, 2023). The analysis of challenges was important because technology integration should be evaluated not only through learning outcomes but also through its relevance, appropriateness, accessibility, and actual classroom implementation (UNESCO, 2023). The interpretation of the results also considered that young learners need guided, high-quality, and developmentally appropriate digital learning experiences rather than passive exposure to technology (OECD, 2023). The findings from the pretest, posttest, significance test, and challenges encountered served as the empirical basis for developing an instructional enhancement plan to improve basic operations skills in Grade One Mathematics (Creswell & Creswell, 2023). Overall, the statistical tools provided a systematic basis for determining the effectiveness of technology-assisted instruction and for identifying priority areas for strengthening number recognition, counting, number relationships, addition, and subtraction among Grade One learners (World Bank, 2025).

3. Results

Before the implementation of technology-assisted instruction, the Grade One Mathematics learners obtained an overall pretest mean of 2.28, interpreted as Low, indicating that their basic operations skills still needed strengthening before the intervention. Among the five assessed skills, counting had the highest pretest mean of 2.55, followed by number recognition (2.48), number relationships (2.31), addition (2.10), and subtraction (1.98). These findings showed that the learners had some initial ability to recognize and count numbers but still experienced difficulty understanding number relationships and performing addition and subtraction. This result supports the view that foundational numeracy requires more than mere counting familiarity, as learners must also connect numbers to quantities, relationships, and operations (UNICEF, 2021; World Bank, 2025). The low pretest performance further emphasized the need for concrete, visual, guided, and developmentally appropriate mathematics instruction in the early grades (Department of Education, 2023; OECD, 2023).

After implementing technology-assisted instruction, the learners' overall posttest mean increased to 4.15, indicating a High level. Counting obtained the highest posttest mean of 4.48, followed by number recognition with a mean of 4.35, number relationships with a mean of 4.12, addition with a mean of 3.96, and subtraction with the lowest mean of 3.82. Although subtraction remained the lowest skill area, it was still rated High, indicating that learners improved even in the operation that was initially most difficult. These findings indicated that technology-assisted instruction helped learners improve across all basic operations indicators. The improvement may be attributed to the use of digital tools, interactive applications, multimedia presentations, educational videos, online games, virtual manipulatives, and teacher-guided technology activities that made numbers and operations more concrete, visual, and engaging (Mayer, 2021; UNESCO, 2023). This result aligns with the idea that young learners benefit when technology is used purposefully to support learning goals rather than merely provide screen-based activity (OECD, 2023; UNESCO, 2023).

The comparison of the pretest and posttest results showed a statistically significant improvement in learners' basic operations skills. The overall pretest mean of 2.28 increased to an overall posttest mean of 4.15, producing a mean difference of 1.87. The computed overall t-value of 18.72, with a p-value of 0.000 ($p < .001$ in APA style), indicated that the improvement was statistically significant at the 0.05 level. Therefore, the null hypothesis was rejected, confirming that there was a significant difference between the learners' basic operations skills before and

after the use of technology-assisted instruction. The improvement across number recognition, counting, number relationships, addition, and subtraction suggests that technology-assisted instruction contributed positively to early numeracy development. This finding is consistent with current views that digital learning environments can support mathematics learning when they provide visual representation, interaction, guided practice, and feedback (Barana et al., 2021; Dan et al., 2024).

The learners also encountered challenges during the implementation of technology-assisted instruction. The overall weighted mean of 3.32 indicated that the challenges were Sometimes Encountered. The most frequently encountered challenge was learners' repeated need for teacher guidance in using digital tools, with a mean of 3.92, indicating it was Often Encountered. This was followed by difficulty following instructions in digital activities (mean = 3.75) and by distraction caused by sounds, animations, or game features (mean = 3.58). Other challenges included difficulty transferring learning from digital activities to written tasks, limited attention span, difficulty operating devices independently, needing more time to complete technology-supported mathematics tasks, becoming overly focused on the game aspect, confusion when switching activities, and hesitation when using unfamiliar applications. These findings imply that technology-assisted instruction for young learners should remain teacher-guided, structured, age-appropriate, and closely connected to mathematics objectives (OECD, 2023; UNESCO, 2023).

Based on the findings, the study proposed Project TAI-BOS: Technology-Assisted Instruction for Basic Operations Skills as an instructional enhancement plan for Grade One Mathematics. The plan focused on strengthening number recognition, counting, number relationships, addition, and subtraction through a concrete–visual–symbolic progression. It included digital flashcards, number-tracing applications, matching games, interactive counting tasks, number lines, digital sorting activities, animated joining-and-taking-away activities, virtual counters, and guided problem-solving exercises. The plan also emphasized formative assessment through short quizzes, oral questions, observation checklists, written exercises, small-group remediation, and progress monitoring. This enhancement plan was appropriate because the findings showed both significant learning gains and implementation challenges that required structured teacher support. Overall, the results demonstrated that technology-assisted instruction can be an effective instructional strategy for improving Grade One learners' basic operations skills when implemented through guided, developmentally appropriate, and instructionally purposeful activities (Department of Education, 2023; OECD, 2023; UNESCO, 2023; World Bank, 2025).

4. Discussion

The study's findings revealed that technology-assisted instruction enhanced the basic operations skills of Grade One Mathematics learners. The increase from low pretest to high posttest performance indicates that young learners benefited from instruction that made number concepts more visual, concrete, interactive, and engaging. This finding supports the view that foundational numeracy is essential in the early grades because it develops learners' ability to understand numbers, quantities, relationships, and operations needed for future learning (World Bank, 2025). It also aligns with the MATATAG Mathematics Curriculum, which emphasizes the development of mathematical knowledge, understanding, problem-solving, and critical thinking among learners (Department of Education, 2023).

The improvement in number recognition and counting suggests that technology-assisted instruction helped learners connect numerals with quantities and number names. Digital flashcards, number tracing applications, interactive counting tasks, and visual matching activities may have strengthened learners' ability to identify numbers and count objects accurately. This result is consistent with the idea that young learners need concrete and visual learning experiences before they can work confidently with abstract mathematical symbols (UNICEF,

2021). It also supports the principle that digital learning experiences for young children should be guided, developmentally appropriate, and integrated into broader learning activities rather than used as passive screen exposure (OECD, 2023).

The improvement in number relationships indicates that learners became more capable of comparing quantities, identifying greater or lesser values, arranging numbers, and understanding how numbers relate to one another. This is important because number relationships serve as a bridge between simple counting and more complex operations such as addition and subtraction. Technology-assisted instruction may have supported this skill through digital number lines, sorting activities, matching games, and visual comparison tasks. Multimedia learning theory supports this finding because learners understand concepts more effectively when verbal explanations are combined with clear visual representations (Mayer, 2021).

The additional gains show that technology-assisted instruction helped learners understand the process of joining quantities. Animated joining activities, virtual counters, drag-and-drop exercises, and teacher-guided digital games may have helped learners see how separate groups combine to form a total. This supports the idea that technology can contribute to learning when it is intentionally selected to address a specific instructional goal (UNESCO, 2023). It also reflects the value of interactive learning environments that allow learners to practice repeatedly and receive immediate responses while solving mathematical tasks (Barana et al., 2021).

Although subtraction remained the lowest posttest skill, its improvement still indicates that learners developed a better understanding of taking away or separating quantities. Subtraction is often more difficult for young learners because it requires them to understand decrease, remaining quantity, and the relationship between the original set and the resulting set. Technology-assisted activities may have helped reduce this difficulty by visually showing objects being removed from a group. This interpretation is supported by multimedia learning principles, which explain that learners can better understand abstract ideas when instructional materials combine words, pictures, animations, and meaningful demonstrations (Mayer, 2021).

The significant difference between the pretest and posttest results confirms that technology-assisted instruction contributed to measurable improvement in learners' basic operations skills. The use of teacher-guided digital tools, interactive applications, multimedia presentations, educational videos, and online games appears to have supported learners in moving from low performance to high performance. This finding is consistent with recent discussions on educational technology, which emphasize that technology should be evaluated on the basis of its relevance, appropriateness, equity, and contribution to learning outcomes (UNESCO, 2023). It also supports the view that successful digital learning depends not only on device availability but also on how technology is integrated into pedagogy (OECD, 2023).

The findings also showed that learners sometimes encountered challenges during technology-assisted instruction. The repeated need for teacher guidance suggests that Grade One learners still require close supervision when using digital tools for mathematics learning. Difficulty following digital instructions and distraction from sounds, animations, or game features also indicate that technology must be carefully selected and managed for young learners. This supports the OECD's position that young children's digital engagement should be high-quality, adult-guided, and balanced with broader learning experiences (OECD, 2023).

The challenges encountered further suggest that technology-assisted instruction should not be treated as a substitute for teacher-led instruction. Young learners still need explanation, questioning, modeling, encouragement, correction, and structured classroom routines. Digital games and applications can increase engagement, but they may also distract learners if the entertainment features outweigh the mathematical goal. This is consistent with recent research on digital game-based learning, which emphasizes that games support mathematics learning only when they are aligned with instructional objectives, designed for learning, and facilitated properly by the teacher (Dan et al., 2024).

Overall, the findings support the proposed Project TAI-BOS: Technology-Assisted Instruction for Basic Operations Skills as a relevant instructional enhancement plan for Grade One Mathematics. The plan is appropriate because it addresses the need to strengthen number recognition, counting, number relationships, addition, and subtraction through concrete, visual, symbolic, interactive, and teacher-guided learning activities. It also responds to the identified challenges by emphasizing teacher guidance, structured use of digital tools, progress monitoring, remediation, and purposeful technology integration. Therefore, technology-assisted instruction may be considered an effective and practical strategy for improving early numeracy when it is developmentally appropriate, instructionally aligned, and guided by the teacher (Department of Education, 2023; OECD, 2023; UNESCO, 2023; World Bank, 2025).

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