Strengthening Literacy, Numeracy, and Digital Skills: An Action Research Plan

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EDLD 5315

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As a Pre-K teacher at a charter school in Houston, TX, I've become increasingly aware of the disparities in technological access between schools—even those just minutes apart. While my campus lacks devices for Pre-K3 students, a close friend who teaches at another charter school nearby shared how her 3- to 4-year-old students are already using iPads to support instruction and are demonstrating advanced skills such as solving two-digit equations and early reading.

This realization deeply impacted me and highlighted the urgent need for equitable technology integration in early childhood education. Early in the school year, I sought insight from our Kindergarten teachers and discovered that many students struggle not only with foundational academic skills but also with digital literacy, which leads to wasted instructional time. This feedback, coupled with the success stories from my colleague's campus, inspired me to propose an innovation plan to my administrator: implementing iPads in Pre-K3 classrooms to foster digital literacy and enhance academic readiness. By starting with basic technology skills at an early age, we can lay a stronger foundation for student success in later grades..

Fundamental Research Question

My research question is: *In what ways does the integration of iPads in preschool classrooms influence students' academic development?* This question is important

because it challenges common misconceptions that technology, especially in early childhood education, is more of a distraction than a benefit. Many educators and stakeholders often hesitate to implement digital tools in Pre-K settings due to concerns about screen time or developmental appropriateness. However, when used intentionally and in alignment with instructional goals, iPads can serve as powerful tools to reinforce learning, promote engagement, and build foundational skills such as early literacy, numeracy, and digital literacy.

Technology, when implemented thoughtfully, can bridge educational gaps and enhance learning outcomes (Shifflet et al., 2020). By investigating this, I aim to demonstrate that technology—when implemented with purpose, supports and enhances traditional instruction, rather than replacing it. Research supports this approach, demonstrating that "technology is more effective than traditional printed texts in training phonological skills and developing phonological awareness, and in the acquisition of reading and writing in preschoolers, especially those who have difficulties learning to read" (Raposo-Rivas et al., 2024). Ultimately, proving this question will help shift the narrative and encourage more educators to see iPads as valuable resources that contribute to the success of young learners.

Summary of the Literature Review

The literature review explores recent research on iPad use in early learning settings, particularly for 3- and 4-year-olds. Three major themes are discussed throughout the literature review:

The development of digital skills and technological fluency: This section focuses on backing up the fact that the development of digital skills and technological fluency among preschoolers is essential for their future academic and personal success (Masyhura & Ramadan, 2021). Including that fact that programs that integrate iPads intentionally help students develop these skills, reducing the digital divide that can hinder later academic success (Abdullah et al., 2017).

Enhancement of early literacy: This section focuses on a study titled "Using Tablets in a Prekindergarten Classroom to Foster Phonological Awareness", to back up that technology, when implemented thoughtfully, can bridge educational gaps and enhance learning outcomes (Shifflet et al., 2020).

Improvement of early numeracy: This section uses scholarly research articles to back up that Tablet-based number recognition games are effective at teaching counting skills to preschoolers (Mattoon et al., 2015; Texas Education Agency, 2022). Math readiness is another key area strengthened by intentional iPad use in Pre-K3 classrooms.

The literature review aligns with the fundamental research question: In what ways does the integration of iPads in preschool classrooms of 3- and 4-year-olds influence the

students' academic development? The literature highlights the potential benefits of using iPads to improve phonological awareness, letter recognition, vocabulary acquisition, and early math skills in early childhood settings. It also points to the importance of fostering digital literacy and independence from an early age

Study Information

Since I am piloting implementation of technology through ABC mouse at my school my study will measuring academic progress but also closely observing the day-to-day integration of iPads in a real-world Pre-K3 setting. The goal of this study is to support students in developing foundational academic skills, strengthening their computer literacy, and preparing them for the types of technology they will use in kindergarten. By introducing iPads and other digital tools early on, students can become more confident and independent in navigating educational apps, following digital instructions, and engaging in interactive learning activities—skills that are increasingly essential in modern kindergarten classrooms.

Research Design

I plan to use both qualitative and quantitative research methods in my study. I believe that combining these approaches will provide a more comprehensive understanding of the impact iPad integration has on preschool students. Quantitative data will help measure specific academic outcomes and track student progress, while qualitative data will offer deeper insights into student behavior, engagement, and the

learning process. Together, these methods will not only strengthen the validity of my findings but also help me understand why the results are effective.

Data Collection and Analysis

I plan to gather data through a combination of scheduled assessments, ongoing observations, app-generated reports, and informal conversations, all organized into a clear ten-week timeline.

Week 1: I'll administer standardized pre-assessments (Appendix A) in letter recognition, phonemic awareness, and number sense, and introduce our digital-literacy screener.

Weeks 2–9: Each small group of four to five students will participate in two 20-minute ABC mouse sessions per week. During these sessions, I'll complete a brief observation rubric—rating engagement, independence, and digital-navigation skills—and collect screenshots of student work (Appendix B). Along with printing copies of their reports to compare their growth from the beginning to the end. The ABC mouse platform will automatically log accuracy, progression levels, and time on tasks after each session.

Week 5, I'll conduct semi-structured interviews with four students to capture their feelings about learning on the iPad (Appendix C).

Week 10, I'll repeat the literacy, numeracy, and digital-literacy post-assessments (Appendix A), compile the platform's end-of-unit performance reports, and hold a focus group with two Kindergarten teachers to reflect on observed readiness changes because

they can tell us whether those gains really translate into smoother log-ins, more independent learning centers, or stronger phonics work when kids enter their classrooms. Getting their perspective at that moment helps us validate our findings and refine recommendations for future cohorts. (Appendix D).

Sharing and Communicating Results

I plan on compiling the study's findings into a PowerPoint. I will include all data collected along with recordings from interviews with the students.

Since I'm piloting the program, sharing results with the principal and curriculum coordinator ensures they understand the concrete impact on literacy, numeracy, and digital-literacy skills, which helps secure continued support and resources for expansion.

At the same time, I'll hold a brief debrief session with our Kindergarten teachers, walking them through the same data and inviting their feedback on how well the skills we've built translate into their classrooms. Their insights are invaluable for validating whether the digital-navigation habits, letter-recognition gains, and engagement strategies we taught in Pre-K3 carry over into smoother log-ins, stronger phonics work, and more independent centers in kindergarten.

Final Reflection

Once the study is complete, I will gather my findings and dedicate time to step back and thoughtfully evaluate every phase of the research—from planning and data

collection to analysis and sharing results. I'll revisit my initial goals and research question to see how well the outcomes align with my expectations, noting any unexpected findings or trends. This will allow me to see what worked, what did not work, and in what ways I can possibly improve next year. By honestly assessing the process and outcomes, I can ensure that future iterations of the program are even more effective in the future.

References

Abdullah, M. S., Toycan, M., & Anwar, K. (2017). The cost readiness of implementing e-learning. Custos e Agronegócio On Line, 13(2), 156–175.

Mashyhura, Nufaisah & Hadikusuma Ramadan, Zaka. (2021). Implementation of Digital Literacy in Elementary Schools. International Journal of Elementary Education.5(4), 639–647. https://doi.org/10.23887/ijee.v5i4.39480.

Mattoon, C., Bates, A., Shifflet, R., Latham, N., & Ennis, S. (2015). Examining computational skills in pre kindergarteners: The effects of traditional and digital manipulatives in a prekindergarten classroom. Early Childhood Research & Practice, 17(1)

Raposo-Rivas, M., Halabi-Echeverry, A. X., Sarmiento Campos, J. A., & García-Fuentes, O. (2024). Associations among Variables in Technology-Enhanced Phonological Awareness Programmes Based on a Meta-Analysis. Education Sciences, 14(4). https://doi-org.libproxy.lamar.edu/10.3390/educsci14040343

Shifflet, R., Mattoon, C., & Bates, A. (2020). Using tablets in a prekindergarten classroom to foster phonological awareness. International Research in Early Childhood. DOI:10.26180/5F84706726DA5.

Texas Education Agency. (2022). 2022 Texas prekindergarten guidelines comprehensive guide. TEA. https://tea.texas.gov/academics/early-childhood-education/2022-texas-pkg-compr ehensive-guide.pdf

Appendix A: Pre‑ and Post‑Assessment Protocols

Name of Student: _____

1. **Letter Recognition Checklist**
    - Show student flashcards in random order for letters A–Z.
    - Record “Yes/No” for each letter the student can correctly identify.
    - Time limit: 30 seconds per card.
2. **Phonemic Awareness Task**
    - **Initial Sound Identification**: Say three words (e.g., “mat,” “ball,” “cat”) and ask “Which word starts with /b/?”
    - **Rhyme Discrimination**: Of “cat,” “hat,” and “dog,” which one does not rhyme?
    - Score: 1 point per correct response (total possible = 10).
3. **Number Sense Assessment**
    - Count aloud from 1 to 20.
    - Show cards with numerals 1–10; student names each.
    - Ask to place ten counters in order and group into sets (e.g., “Show me three counters”).
4. **Digital‑Literacy Screener**
    - **Tap Accuracy**: Student taps a large on‑screen target (≥2" diameter) three times—record “Independent/Prompted.”
    - **Swipe Gesture**: Student swipes left to right on a shape—record success on first attempt.
    - **Menu Navigation**: Student opens a specified app icon from a 4‑icon screen—note number of prompts needed

Appendix B: Observation Rubric

Name of Student: _____

Dimension	1 – Needs Support	3 – Developing	5 – Independent
Engagement	Frequently distracted, needs redirection	Focused most of the time, occasional prompts	Fully on-task and engaged throughout
Independence	Relies heavily on teacher for every step	Completes parts of the task alone, some support	Complete all tasks without help
Digital Navigation	Cannot open or close apps without help	Opens app but needs assistance navigating menus	Opens app and completes basic functions independently
Problem Solving	Gives up quickly when unsure	Attempts different strategies with hints	Tries multiple strategies and self-corrects

(Use this rubric during each iPad session—circle the score that best reflects the student's behavior.)

Appendix C: Student Interview Guide

RECORD INTERVIEW TO DEMONSTRATE ON PP

Name of Student: _____

1. "What do you like most about using the iPad?"

2. "Can you show me how you open your favorite app?"

3. "Tell me one thing you learned today on the iPad."

4. "Was anything hard or confusing when you were playing the games?"

5. "How does learning with the iPad compare to playing with blocks or books?"

Appendix D: Teacher Focus-Group Questions

1. “Based on students’ strengths and gaps, what kinds of support or review activities would you recommend Pre-K3 add to better prepare learners for your curriculum?”

2. What resources, training, or communication would help you—and our Pre-K3 team—build an even stronger bridge between preschool iPad work and Kindergarten expectations?

3. “Which academic skills (letter recognition, counting, etc.) seem to improve most with iPad use?”

4. “What challenges have emerged during daily iPad sessions—technical or instructional?”

5. “What supports or resources would help you integrate iPads more smoothly into your lesson plans?”