In Person with Paper or Individual Screens? Cultivating Early STEM
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To enhance the validity of our findings, we implemented this study in three elementary schools within the South Central Indiana, including one low-SES school, one middle-to-
low-SES school, and one middle-to-high-SES school. Distinctions across the schools intend to strengthen the study’s validity and reliability by examining the experimental results among those three groups within the same context. As all three elementary schools include kindergarten, first, and second grades, a general level of English-speaking, future research might explore similar research questions across those three school districts and stems with similar linguistic backgrounds. If, finally, inter-rater reliability was established in that the researchers were able to independently code for emergent themes, and then shared findings with one another to establish shared group findings based around selected key themes.

In this study, students who read paper books were greater in person-teacher guidance in reading a new paper book demonstrated the greatest gains in pre- and post-test comprehension scores. In both school 1 and school 3, this paper book group improved students who read the story using a digital medium, with less or no teacher guidance.

This research demonstrates benefits and drawbacks of using print and digital children’s texts to engage early readers in conceptualizing on civic science topics. Many studies demonstrate how digital texts benefit literacy development by engaging reader interest and providing a bridge to cultures and generations, including in the homes of English Language learners (IDOE, 2016; Holum & Gahala, 2001). At the same time, other studies highlight challenges presented by digital texts. In particular, Holum and Gahala (2001) conclude that digital texts reduce capacity for reflection, and that “children are better served when adults read aloud to them, thus providing opportunities for spontaneous questions and verbal interaction” (p. 15). Such research does not negate the value of digital texts, but rather, highlights the importance of moderation and purpose in using digital texts.

Future research might explore if these findings are true across a broader set of cultural, linguistic, and SES contexts.

Qualitative Findings

Finding One: Teacher Guidance Enhances Student Comprehension and Concept Retention
One evident finding is that in school one, students who received full teacher guidance improved more than any other group. School one improved by 3.2 points. School 2 improved by 2.8 points, and School 3, this paper book group outperformed students who viewed the story using a digital medium, with less or no teacher guidance.

Finding Two: Paper Texts Enhance Student Comprehension and Concept Retention
Another key finding concluded from school one, is that students who received the paper book scored higher (all perfect scores) on the post test activity. In school 3 and three, the majority of the students received a four or five. This was greater than in other groups.

Finding Three: Screen Time Hinders Student Comprehension and Concept Retention
A third finding concluded from school 1 is that the majority of students who had no teacher guidance missed key pictures and ideas in the story. Some students would move back and forth to different places of the Screencastify video on their individual iPads, without listening to the full story. In school 1 and school 2, some students chose not to watch the story at all. This resulted in students missing key images shown on the screen and asked in the post test questions. In school 2, a few of the students watched the story while they were working on the digital Storyjumper reading, in school 3, students listened to the Storyjumper while not looking at the screen, but paid full attention in the screens during the Storyjumper and Screencastify readings

Finding Four: Teacher Guided Screen Time Leads to Mid-range Student Comprehension and Concept Retention
In school 1, 2, and 3, the teacher guided reading/paper books allowed teachers to ask for prior knowledge questions, and check in to see comprehension in the middle and end of the book. This group interaction enhanced students’ reading comprehension more than the digital texts without teacher guidance. Participants who read the Storyjumper digital audiobook demonstrated some active engagement in viewing the pictures and responding to the questions, but did not even state the level of engagement as the participants reading the paper book with the teacher. Participants in the Screencastify and Storyjumper condition showed more engagement, including имя notebook during the video screens while questions and pictures were asked. Other participants in this group chose to not watch the pictures at all while looking around the room.

In this study, students who read in person-teachers guidance in reading a paper book demonstrated the greatest gains in pre- and post-test comprehension scores. In both school 1 and school 3, this paper book group improved students who read the story using a digital medium, with less or no teacher guidance.

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