EVALUATION PAPER

Evaluating the Educational Impact of Ignite: Engagement, Content Retention, and Teacher Perceptions

This study evaluates the effectiveness of Ignite by Hatch™ in enhancing kindergarten readiness. It examines the product's success in engaging children, supporting content retention, and meeting teachers' expectations for educational content.

Executive Summary

- Hatch Early Learning partnered with the Georgia Department of Early Care and Learning (GA DECAL) Summer Transition Program (STP) to evaluate the impact of the Ignite by Hatch™ program on rising kindergarteners during the summer of 2024.

- Researchers observed 66 children across eight Atlanta metro STP sites, tracking engagement and content retention during gameplay. Additionally, 80 teachers completed a survey on Ignite's effectiveness.

- Key findings include the following:
    - **Engagement**: Ignite maintained high engagement, with children scoring 4.5 out of 5 on attention during play.
    - **Content Retention**: Sixty-two percent of children accurately recalled key academic concepts after gameplay.
    - **Teacher Feedback**: Eighty-seven percent of teachers reported that Ignite positively impacted learning, especially in engagement, in skill development, and through data-driven instruction.

- Overall, Ignite proved effective in enhancing children's kindergarten readiness by fostering engagement, supporting skill retention, and providing valuable data for personalized teaching.

Introduction

This study evaluated the short-term educational impact of Ignite by Hatch™ on preschool-aged children. Ignite is a research-based digital learning tool designed to support kindergarten readiness by engaging young learners in activities across seven domains: Mathematics, Literacy, Language & Communication Development, Social and Emotional Learning, Science & Technology, Physical Development, and Social Studies (Hatch Early Learning, 2021). The tool offers a structured progression through eight skill levels within each domain, aligning with both foundational preschool skills and more advanced competencies expected in elementary school.

To assess Ignite's effectiveness in supporting educational outcomes, this study focused on three critical aspects of the learning process:

1. Children's engagement with the learning activities.
2. Children's retention and recall of educational content.
3. Educators' perspectives on Ignite's role in enhancing learning.

Engagement With the Learning Activities

Engagement is a critical component of the learning process. Engagement refers to a learner's ability to stay focused and on task during an educational experience To facilitate learning, digital experiences must effectively capture and sustain children's attention (Flynn et al., 2019). Children's engagement with digital tools is measured by how consistently they pay attention to the learning goals and content presented (Hirsh-Pasek et al., 2015). In this study, we used attention as a proxy for engagement, assessing how well Ignite held children's attention during learning activities. To measure this, we employed a technique commonly used in digital media research: observing whether children's eyes remained on the screen throughout the learning experience (Anderson et al., 1981; Calvert et al., 1982; Lorch & Castle, 1997; Pempek et al., 2010).

Retention and Recall of Educational Content

Beyond examining factors that support learning, such as engagement, it is also critical to measure evidence of children's learning from digital experiences that are designed to be educational. A strong piece of evidence for learning is that children remember the educational content with which they engaged during the digital experience. The information children remember serves as an initial indicator of what they have learned (Acosta et al., 2021; Ocular et al., 2022; Pagano et al., 2019; Sobel et al., 2022). One effective way to assess what children remember is by asking them to reflect on their experience. Reflection involves thinking, talking about, and making sense of what they have encountered (Haden et al., 2016). Because reflections reveal what children initially remember, reflections provide valuable insights into early learning outcomes (Benjamin et al., 2010; Eberbach & Crowley, 2017; Pagano et al., 2019, 2020). Therefore, in this study, we examined children's reflections on their Ignite experiences to determine how much they remembered the content intended for them to learn. Subsequently, we used these reflections to understand the extent to which Ignite fostered immediate learning.

Educators' Perspectives on Ignite's Role in Enhancing Learning

In addition to engagement and retention, teachers' perspectives offer another essential dimension for evaluating educational impact. Teachers' perspectives provide valuable insights into learning outcomes, as teachers are often able to accurately assess the extent to which children learn from an experience (Hill & Chin, 2018). Teachers continuously evaluate student learning, even outside of formal testing, to form groups, gauge understanding, and determine when intervention is needed. Given their expertise, teachers are a crucial resource in assessing whether a technology tool effectively supports children's learning. In this study, we examined teachers' perspectives on whether Ignite supports learning as a key component of evaluating the educational impact of the Ignite experience.

The study involved direct observations of children's engagement and reflections during Ignite sessions, supplemented by a broader analysis of teachers' assessments in a larger survey. Together, the study's findings offer a comprehensive understanding of Ignite's impact, revealing how effectively the tool supports children's learning and development in early childhood educational settings.

Method

Research Overview

For this study, Hatch Early Learning partnered with the Geogia Department of Early Care and Learning (GA DECAL) Summer Transition Program (STP). The STP is a statewide summer school program in Georgia that provides rising kindergarteners with instruction focused on core academic skills, including literacy, language development, and mathematics. Public and private licensed childcare centers across Georgia can apply to participate in the STP. Eligibility for the STP requires that children be 5 years old by September 1st of the participation year and meet at least one of the following criteria: lacks attendance or completion of a full year in Georgia's pre-K or Head Start programs, needs academic support, has dual-language learner status, is placed in foster care, lacks permanent housing, or has an individual education plan.

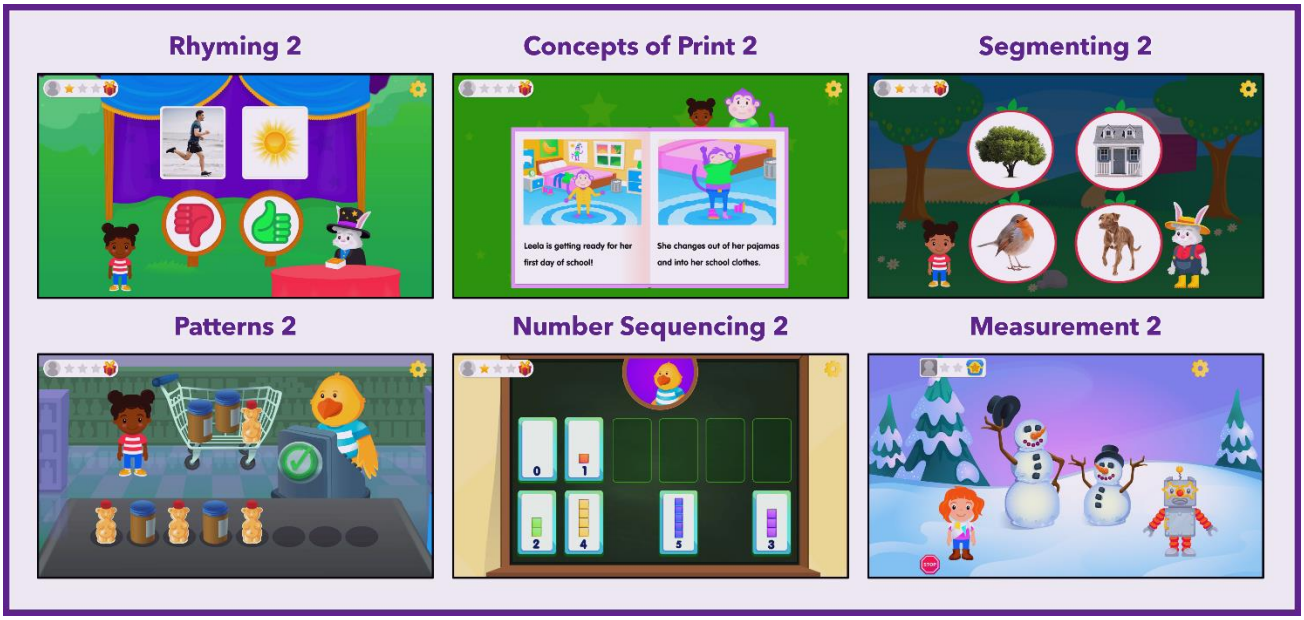
In the summer of 2024, the GA DECAL STP implemented Hatch's Ignite program in its classrooms for the fourth summer in a row. There are two main components of this study: observations of children's Ignite play and a teacher survey (both described in more detail below). Both the observations and survey were of children and teachers participating in the 2024 STP.

Participants

Researchers observed 66 children from eight STP sites that implemented Ignite in their classrooms. All eight sites were in the Atlanta metro. On average, each child used Ignite for 27 minutes per week. Additionally, the classes attended by these children progressed in Ignite by an average of 0.2 skill levels over the 5-week summer program. Furthermore, 80 teachers from various STP sites completed the teacher survey.

Child Observations and Interviews

Researchers conducted observations of individual children playing Ignite. Each child played one game from the Mathematics domain and one game from the Literacy domain. The games were selected randomly from a set of Level 2 activities. In Mathematics, children either played Number Sequencing 2, Measurement 2, or Patterns 2. In Literacy, they played Segmenting 2, Rhyming 2, or Concepts of Print 2. All selected games followed a consistent structure: A concept was introduced by an Ignite character, followed by approximately five rounds of play in which children applied the concept that the game introduced. Ignite provided feedback to the children after each round to support their learning process. These rounds are designed to support children's purposeful practice and assess their understanding of the concept.



Engagement Measurement

To measure how engaging Ignite was for children, researchers tracked children's eye movements during gameplay. Specifically, they observed whether children kept their eyes on the screen or looked away during each of the five rounds of the game. For

each round, researchers noted whether the child's gaze remained on the screen or diverted elsewhere. Based on these observations, children's engagement was rated on a scale from 1 to 5. A score of 1 was assigned if the child's eyes were off the screen for parts of every round, a score of 3 was assigned if the child's eyes were on the screen for most of two rounds, and a score of 5 was assigned if the child's eyes remained on the screen throughout all five rounds of the game.

Retention and Recall Measurement

To assess how well children remembered the educational content from each game, researchers asked children to reflect on their play experience immediately after finishing each Ignite game. Once a game was finished, children were asked, "Can you tell me a little bit about the game you just played?" As they began to respond, they were prompted with additional open-ended questions, such as the following:

- "What did you do in that game?"
- "What did you see?"
- "What did you have to do to win the game?"

Researchers recorded the children's responses verbatim. Following this assessment, researchers evaluated whether the children's reflections included relevant information about the educational content of the game. As a thank-you gift, all children received a sticker after completing their reflection.

Teacher Survey

At the end of the STP, GA DECAL administrators distributed a survey to all participating teachers to gather feedback on their experiences with Ignite. The survey was designed by the Hatch Early Learning research team and included several questions on teachers' perceptions of and attitudes towards Ignite. Given this study's emphasis on Ignite's immediate educational impact, we focused on the two survey questions regarding children's learning from Ignite. The first question asked teachers to rate how much Ignite contributed to their students' summer learning goals, with answer options ranging from "not at all" to "a great deal." The second question invited teachers to describe how Ignite impacted individual children's learning, either positively or negatively. The responses to the second question were analyzed using AI to identify common themes in the feedback. A researcher then reviewed these themes and categorized the responses accordingly, counting the number of responses within each theme. This survey process provided insights into the perceived effectiveness of Ignite in supporting children's learning during the STP.

Results

Engagement Results

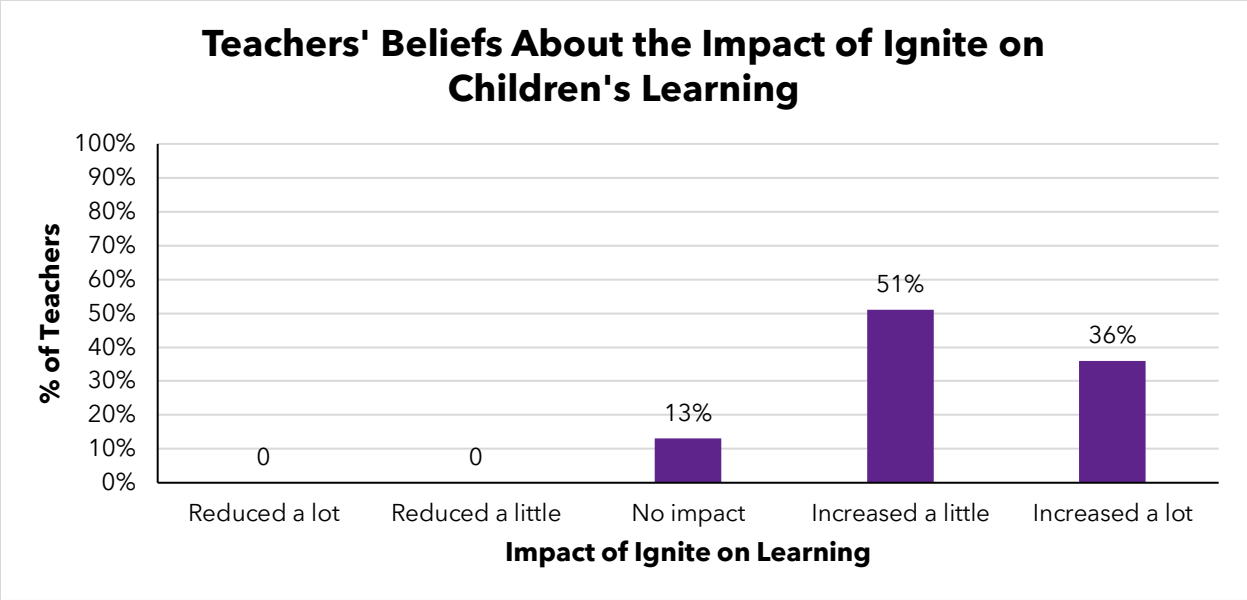
The engagement measure showed that, overall, Ignite captures and holds children's attention. On a scale of 1 to 5, the average engagement score was a 4.5 across children's play with each Ignite game. This score indicates that children remained highly engaged throughout most rounds of the Ignite games.

Retention and Recall Results

The analysis of children's reflections on their Ignite game experiences shows that Ignite effectively supports children in remembering the math and literacy skills they were exposed to during play. In their reflections, 62% of children, on average, who played each Ignite game mentioned the key math or literacy concept they were intended to learn and practice. For example, one child reflected on their experience with Number Sequencing 2, stating, **"It was telling me numbers—put the numbers on the tablet. I know how to count. 0, then 1, then 2, then 3."** This response demonstrates the child's retention of counting skills practiced during the game. Another child applied the concept of comparing sizes learned in Measurement 2, saying, **"My mommy is longer than me, so is my dad. They are gigantic!"** Similarly, a child who played Patterns 2 accurately described the task, explaining, **"To complete the patterns, put this in the right order."** Finally, after playing Segmenting 2, a child illustrated their understanding of compound words, noting, **"Which ones sound the same, treehouse, so it is a tree and a house."** These reflections collectively highlight that Ignite games successfully foster children's memory of essential academic skills.

Teacher Survey Results

Teachers' feedback on Ignite's impact reveals a strong consensus that Ignite supports children's learning. According to the STP teacher survey data, 87% of teachers reported that Ignite enhanced children's learning, with 51% noting a slight increase and 36% observing a substantial boost in learning outcomes.



Analyzing teachers' qualitative responses, three major themes emerged regarding how Ignite supported learning. First, a significant group of teachers (38%) highlighted that **Ignite enhanced children's engagement and enjoyment in learning**. One teacher remarked on this outcome:

> From what I observed of student usage, Hatch is a great resource which keeps students actively engaged, and they are not easily able to go off task. At times, some want to stay on and continue working. Hatch has games which allow students to play while learning, and it gives you immediate feedback and suggests resources to reteach the lesson in which students may require more help with.

Another teacher explained how Ignite helped their students enjoy learning:

> I absolutely love Hatch! The generation of students we are bringing up now are truly technologically forward, and being able to use Ignite during the summer was well within their comfort zone. It truly enhanced their learning abilities and focus, making learning exciting.

Second, a quarter of teachers (25%) observed that **Ignite contributed to improved learning outcomes in specific skill areas**. One teacher highlighted the program's impact on listening, language, and literacy skills:

> The Hatch program impacted my children's learning by giving them a sense of independence. Each child was able to independently work with an electronic device and navigate the software with ease. It improved listening skills because each child had to listen to [and] answer questions or complete activities. It also

enhanced interaction in the Language and Literacy area, making it more engaging and inviting.

Another teacher praised Ignite's role in reinforcing specific skills, noting, "The rhyming was beneficial as well as all math."

Third, about 22% of teachers appreciated **Ignite's ability to provide data for personalized instruction**. One teacher noted, "Being able to see the specific skills that students needed support with and activities that aligned with those needs helped us individualize instruction and group activities." Another teacher described the utility of the data for planning: "Hatch positively impacted learning by providing data for lesson planning. I used the data to teach my small groups." Additionally, teachers used the data to identify areas needing support and plan targeted activities. One teacher explained, "As an instructor, I used the Hatch data to determine in which areas my students needed more assistance and to plan my small-group and individualized activities each week." Another teacher added, "I found that many students needed support with positional words, so I incorporated whole-group activities to address this. For students needing assistance with subitizing and number recognition, I created small-group activities."

Together, these insights underscore Ignite's positive influence on children's learning experiences, highlighting its role in fostering engagement, supporting skill development, and facilitating data-driven instruction.

Conclusion

The results of this study of the 2024 GA DECAL STP demonstrate that Ignite has a positive short-term educational impact across three key areas of the learning process. First, Ignite effectively captures children's attention, a critical prerequisite for learning. Second, children can recall important academic content immediately after gameplay, which is a strong indicator that Ignite supports retention and learning. Finally, teachers report that Ignite enhances classroom learning by increasing student engagement, building knowledge in specific content areas, and providing valuable data to inform instruction. Collectively, these findings confirm that Ignite positively influences children's short-term educational outcomes, supporting kindergarten readiness.

With the increasing pressure on pre-K classrooms to prepare children for kindergarten, having effective tools to support the practice and learning of kindergarten-ready skills is crucial. When children develop these skills by the end of pre-K, they are not only prepared for kindergarten but also better equipped to avoid falling behind in elementary school. This research suggests that Ignite has the

potential to help classrooms meet these growing expectations and contribute to children's readiness for the challenges ahead.

References

Acosta, D. I., Polinsky, N. J., Haden, C. A., & Uttal, D. H. (2021). Whether and how knowledge moderates linkages between parent–child conversations and children's reflections about tinkering in a children's museum. *Journal of Cognition and Development*, *22*(2), 226–245. https://doi.org/10.1080/15248372.2020.1871350

Anderson, D. R., Lorch, E. P., Field, D. E., & Sanders, J. (1981). The effect of TV program comprehensibility on preschool children's visual attention to television. *Child Development*, *52*(1), 151–157. https://doi.org/10.2307/1129224

Benjamin, N., Haden, C. A., & Wilkerson, E. (2010). Enhancing building, conversation, and learning through parent–child interactions in a children's museum. *Developmental Psychology*, *46*(2), 502–515. https://doi.org/10.1037/a0017822

Calvert, S. L., Huston, A. C., Watkins, B. A., & Wright, J. C. (1982). The relation between selective attention to television forms and children's comprehension of content. *Child Development*, *53*(2), 601–610. https://doi.org/10.2307/1129371

Eberbach, C., & Crowley, K. (2017). From seeing to observing: How parents and children learn to see science in a botanical garden. *Journal of the Learning Sciences*, *26*(4), 608–642. https://doi.org/10.1080/10508406.2017.1308867

Flynn, R. M., Wong, K. M., Neuman, S. B., & Kaefer, T. (2019). Children's attention to screen-based pedagogical supports: An eye-tracking study with low-income preschool children in the United States. *Journal of Children and Media*, *13*(2), 180–200. https://doi.org/10.1080/17482798.2019.1575887

Haden, C. A., Cohen, T., Uttal, D. H., & Marcus, M. (2016). Building learning: Narrating experiences in a children's museum. In D. M. Sobel & J. L Jipson (Eds.), *Cognitive development in museum settings: Relating research and pedagogy* (pp. 84–103). Routledge/Taylor & Francis Group. https://doi.org/10.4324/9781315667553

Hatch Early Learning. (2021). *Criteria report: Research-base for Ignite by Hatch™*. https://7803303.fs1.hubspotusercontent-na1.net/hubfs/7803303/Criteria_Report_May2021_Formatted8-2-22.pdf

Hill, H. C., & Chin, M. (2018). Connections between teachers' knowledge of students, instruction, and achievement outcomes. *American Educational Research Journal*, *55*(5), 1076–1112. https://doi.org/10.3102/0002831218769614

Hirsh-Pasek, K., Zosh, J. M., Golinkoff, R. M., Gray, J. H., Robb, M. B., & Kaufman, J. (2015). Putting education in "educational" apps: Lessons from the science of learning. *Psychological Science in the Public Interest*, *16*(1), 3–34. https://doi.org/10.1177/1529100615569721

Lorch, E. P., & Castle, V. J. (1997). Preschool children's attention to television: Visual attention and probe response times. *Journal of Experimental Child Psychology*, *66*(1), 111–127. https://doi.org/10.1006/jecp.1997.2372

Ocular, G., Kelly, K. R., Millan, L., Neves, S., Avila, K., Hsieh, B., & Maloles, C. (2022). Contributions of naturalistic parent–child conversations to children's science learning during informal learning at an aquarium and at home. *Frontiers in Psychology*, *13*, Article 943648. https://doi.org/10.3389/fpsyg.2022.943648

Pagano, L. C., Haden, C. A., & Uttal, D. H. (2020). Museum program design supports parent–child engineering talk during tinkering and reminiscing. *Journal of Experimental Child Psychology*, *200*, Article 104944. https://doi.org/10.1016/j.jecp.2020.104944

Pagano, L. C., Haden, C. A., Uttal, D. H., & Cohen, T. (2019). Conversational reflections about tinkering experiences in a children's museum. *Science Education*, *103*(6), 1493–1512. https://doi.org/10.1002/sce.21536

Pempek, T. A., Kirkorian, H. L., Richards, J. E., Anderson, D. R., Lund, A. F., & Stevens, M. (2010). Video comprehensibility and attention in very young children. *Developmental Psychology*, *46*(5), 1283–1293. https://doi.org/10.1037/a0020614

Sobel, D. M., Stricker, L. W., & Weisberg, D. S. (2022). Relations between children's exploration in a children's museum and their reflections about their exploration. *Child Development*, *93*(6), 1804–1818. https://doi.org/10.1111/cdev.13821