Switch-Accessible Tablet Application
HuskyADAPT 2025 RESNA Design Brief

Problem Statement & Background

Play is an important part of cognitive development for children. It offers an opportunity to explore the world, learn new skills, and understand cause-and-effect relationships (Ginsburg, 2007). Unfortunately, play opportunities are not as accessible to children with disabilities who may have limited mobility or visual impairments. In fact, children with disabilities have approximately 9% fewer play opportunities when compared to children without disabilities (Smythe, 2023). This means that children with disabilities are often left behind when it comes to play opportunities. There are significant negative impacts on the overall development and well-being of children who do not have access to play in their early years (Smythe, 2023). In the digital space, switch-accessible games can bridge barriers to play that do exist. However, these games are often too expensive to purchase and not as readily available.

While physical toys adapted with switch technology can be very costly, digital games present a potentially more affordable alternative—yet the current market still lacks reasonably priced, high-quality options. By addressing these gaps, we can provide a vital, cost-effective tool that allows more access to play. This not only makes learning and social interaction more inclusive but also serves as a catalyst for creativity and personal growth. It creates space for all children to experience the joy of play while also developing important motor and cognitive skills.

> **Problem Statement**
> A way to address the lack of accessible and engaging tools for children with diverse abilities so that they can develop motor and cognitive skills through playful, inclusive learning experiences.

Our team worked with educators, clinicians, and children to understand the needs of children with disabilities when it comes to play opportunities in the classroom. Based on our research on this need in our community, our team created a playful and inclusive switch-accessible tablet app that promotes digital equity while also supporting the educational growth goals of children. The switch-accessible app utilizes switches to allow children with different abilities to play games that target different foundational learning goals such as cause-and-effect learning. It also combines these with haptic and sensory feedback by providing different feedback modalities such as sound and visual cues.

The app also has customization features that allow the user to cater the app to their learning preferences. For instance, if users prefer not to have haptic feedback, they can turn off the haptic feedback options in the settings. In the application we designed, we also focused specifically on a range of different learning objectives such as cause-and-effect learning, hand-eye coordination, critical thinking, discovery, and creativity. We decided to focus on these objectives because our research insights revealed that these were key learning objectives that educators at a local school in our community wanted to focus on.

Research – Approach and Solutions Considered

For the development of our research, we utilized three primary methods to gain insights for the project. We began with user interviews, speaking to experts and teachers at a local school in our community to understand the context in which children with different needs are learning. Next, we conducted secondary research using online resources to analyze existing solutions. Finally, we engaged in ethnographic research through onsite classroom observations at a local Seattle school, allowing us to better understand the needs of the children and educators.

Market Analysis

Our market analysis focused on identifying existing switch-accessible games and tools to understand the current landscape. By analyzing competitors and available libraries, we looked to uncover gaps in affordability, functionality, engagement, and inclusivity, providing valuable insights for designing a unique and impactful solution.

The website **Papunet** provides a collection of accessible online games designed for individuals with disabilities. It features a variety of games suitable for different abilities, particularly focusing on switch-accessible games. These games aim to promote engagement, skill development, and fun while being accessible to those with motor or cognitive challenges. The platform offers games that include cause-and-effect actions and can be controlled using a single switch or adapted controls, making it ideal for users with limited mobility.

The **Sensory App House** website offers a range of switch-accessible games designed for individuals with disabilities, particularly those with motor impairments. The games are tailored to provide sensory experiences and can be controlled via switches or other assistive technologies. These games focus on promoting interaction, engagement, and skill development, with options suitable for various age groups and levels of ability. The platform is designed to be intuitive and accessible, ensuring that users with different needs can participate in enjoyable and educational digital play.

The **One Switch** website provides a comprehensive guide to switch gaming, offering a wide range of switch-accessible games, hardware, and resources for individuals with motor impairments. It includes detailed information on various games that can be played using switches, as well as recommendations for compatible switch interfaces. The site also features tips and advice on adapting games for switch use and promotes inclusive gaming experiences for all abilities. The goal is to help users find accessible games that suit their needs and preferences, making gaming more inclusive for individuals with disabilities.

While these websites offer possible solutions, they're difficult to access through other devices such as iPads, which are most commonly accessed by the local school that our team is collaborating with. Additionally, the games that these websites focus on target a very small age range of users. Our app seeks to focus on a broader age range of kindergarten students who already have a preliminary understanding of different learning goals. Additionally, our app is completely free and compatible with different kinds of switches, also allowing for multi-player options that are not often available in the market.

Interviews

The interviews with educators provided an in-depth understanding of the classroom environment and the needs of Pre-K children. We discovered that the educators' daily routines combine structured group learning and free play, with therapists focusing on motor skill development and creating supportive environments. A key takeaway is the need for an app that aligns with these goals—offering customization like larger buttons for accessibility while maintaining consistency in the interface to reinforce motor learning. Communication development is central, with a focus on confidence, sharing, and turn-taking. Teachers emphasized that each child's developmental milestones are unique, and the app should support their progress without imposing rigid expectations. Additionally, it's crucial for the app to encourage physical engagement, targeting motor areas that are often underutilized. This input guided the app's design to be an inclusive, educational, and empowering tool for children with special needs.

When designing our app, we decided to incorporate a multi-player option because collaborative play was emphasized in our interviews with educators. The app should promote collaboration between students while also offering unique customization options that address students' learning preferences. For example, the app offers story-based games for students who prefer learning through storytelling and cause-and-effect games for students who enjoy learning through haptic feedback.

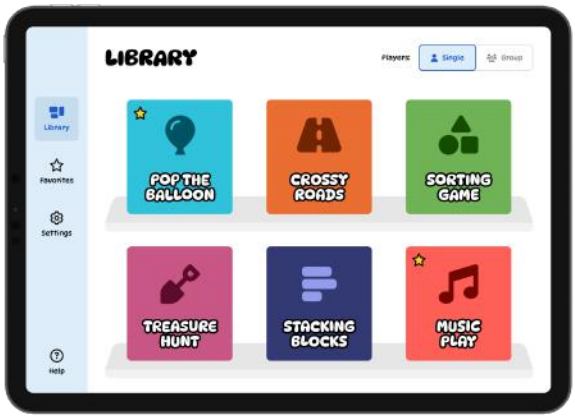
Ethnographic Observations

Our ethnographic observations at a local Seattle school were conducted to understand how technology is used in classrooms and to identify opportunities for a switch-accessible tablet app. This methodology provided real-world insights into the classroom dynamics and informed our understanding of the children's needs. We focused on children's interactions with their environment, peers, and caretakers, noting any challenges they faced with existing technologies, like iPads.

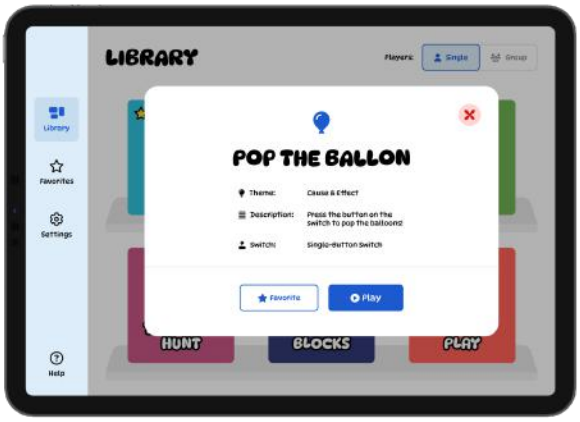
Through our observations we learned that "playtime" is a key element of the schedule, offering children opportunities to explore, interact, and engage under the supervision of caretakers. However, the use of technology, particularly iPads, is constrained by a lack of available devices, limiting its application in the classroom. When utilized, iPads primarily support group activities, fostering collaboration among children. In individual settings, children face challenges with small buttons and distinguishing between images, highlighting accessibility issues. These observations emphasize the need for technology solutions that address resource limitations and improve accessibility to better support both group and individual learning experiences while aligning with a focus on play-based education.

Final Approach and Design

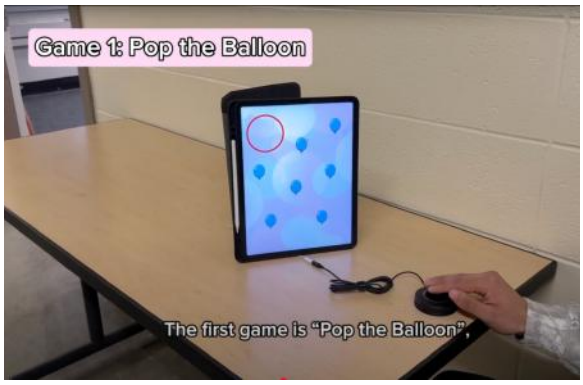
Our final design is an iPad application featuring a variety of user-accessible screens. The primary dashboard serves as a library to organize multiple games, enabling educators or other facilitators to set up games for children. Each game is switch-accessible and incorporates physical feedback such as sound effects, vibrations, and engaging visuals. These games also fall into different categories: storytelling, music, discovery, and artistry. We focused on these categories because our conversations with educators highlighted that these were the areas that were most engaging for students and offered the greatest possibility for targeting learning milestones. These categories are designed to target different aspects of learning and play in an engaging manner. For example, a discovery game, like a treasure hunt, could help children develop their problem-solving skills, encourage curiosity, and provide a sense of accomplishment.



Home library screen containing games



Information displayed when a game is selected



Demonstration of a game utilizing a switch

Demonstration of an alternative switch

Outcome & Next Steps

Simple games with themes like shapes, colors, or animals can introduce concepts in a fun and accessible way, allowing children to learn through play without feeling overwhelmed. For example, a paint splattering game can teach children different colors, and a tower stacking game could teach children hand-eye coordination. We also came up with games that could be played by multiple children, encouraging collaborative play among children. Simple games that use switches, like pressing a button to trigger a light or sound, are also great for helping kids develop hand-eye coordination and cause-and-effect understanding. In the future, we plan on testing our prototype with children using the switches, allowing us to observe how they interact with the digital games in a natural setting. By gathering real-time feedback we can refine the prototype's functionality and accessibility to better meet the needs of the children and educators. We also wish to conduct more interviews with teachers and occupational therapists using our prototypes paired with the switches.

Significance

Our research has provided deep insights into the needs of children with disabilities, directly informing our mission to empower young learners with engaging, accessible technology. We have conceptualized a platform that offers customizable, switch-accessible games designed for both individual and team-based play. These games emphasize cause-and-effect interactions, independence, and collaborative learning, ensuring that our solution caters to a broad range of abilities and developmental stages while promoting motor, cognitive, and social growth.

The significance of this project extends far beyond app development—it serves as a vital step in raising awareness about the need for inclusive digital tools in the accessibility community. By creating a platform that provides children with disabilities a space for both independent exploration and social interaction, we empower them to gain confidence and a sense of achievement. This initiative not only aligns with our mission of fostering meaningful growth through accessible technology but also contributes to broader conversations about designing technology that truly meets the diverse needs of all users.

Acknowledgments

We would like to express our sincere gratitude to Mia Hoffman for her guidance and feedback throughout our project process. Her insights helped shape our approach and refine our design and prototype to better meet the needs of our target audience. We also deeply appreciate the teachers at our local community school for welcoming us into their classrooms, allowing us to observe children in their learning environments, participate in interviews, and share resources that greatly informed our work. Their generosity and expertise were instrumental in helping us create a more thoughtful and impactful solution.

References

Ginsburg, K. R., and the Committee on Communications, & and the Committee on Psychosocial Aspects of Child and Family Health. (2007). The importance of play in promoting healthy child development and maintaining strong parent-child bonds. *Pediatrics*, *119*(1), 182–191. https://doi.org/10.1542/peds.2006-2697

Papunet » game pages » games. (n.d.). Game Pages. Retrieved February 18, 2025, from https://papunet.net/gamepages/games/.

Smythe, T., Chen, S., Rotenberg, S., Unger, M., Miner, E., Seghers, F., Servili, C., & Kuper, H. (2023). Do children with disabilities have the same opportunities to play as children without disabilities? Evidence from the multiple indicator cluster surveys in 38 low and middle-income countries. *EClinicalMedicine*, *67*, 102361. https://doi.org/10.1016/j.eclinm.2023.102361.

Sensory App House “Sensory Apps for Early Learners with Complex Needs - Home.” *Home* -, 3 June 2021, www.sensoryapphouse.com/sensory-apps-for-early-visual-engagement-tracking-vocal-development-for-early-learners-with-complex-needs/.

Switch games—Home. (2021, March 5). https://www.sensoryapphouse.com/category/type/switch-accessible-games/.

Switch gaming. (n.d.). OneSwitch.Org.Uk. Retrieved February 18, 2025, from http://oneswitch.org.uk/page/switch-gaming.