EPICS
KIDS PLAY GYM BLOOMINGTON, INDIANA

WORK HARD, PLAY HARD

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Source: Erin Blasingame, Nov. 2022
PLAY Team members at Kids Play Gym

KIDS PLAY GYM – PLAY TEAM INTRODUCTION

Kids Play Gym is an organization located in Bloomington, Indiana that strives to provide young children with autism an environment and resources to grow their life skills and encourage development. Kids Play Gym provides Applied Behavioral Analysis to improve fine motor control, social skills, coordination, and more (*Aba therapy. ABA Therapy : Kids Play Gym).*

Purdue's Engineering Projects in Community Service (EPICS) program's PLAY team partners with Kids Play Gym and owners Kat and Andy to create or improve resources that encourage the growth and readiness goals for the kids within this organization. Since the beginning of their partnership, the PLAY team has worked on four different projects for Kids Play Gym: Water Table, Backyard, Bubble Tube, and Memory Game.

The **Water Table** project was created in Fall of 2021. Its design objective was to eliminate the use of chemicals in the water sterilization process of a sensory water table.
The **Backyard** project was created in Spring of 2022 for the purpose of creating a stage and theatre area outside where the kids can express themselves through play and imagination.
The **Bubble Tube** project was created in Fall of 2021 with the intent to solve overheating issues and add two modes of interactivity to an existing bubble tube at Kids Play Gym.
The **Memory Game** project was created in Fall 2022 to design a new interactive toy for Kids Play Gym. This team decided to design a memory game that matches the kid's level of difficulty.

Source: Jasmine Luke, Nov. 2022
Team members building a memory game prototype

Source: Munn Patel, Dec. 2022
Bubble tube cabinet with sensor

Source: Andy Rader, Nov. 2022
PLAY Team Members with Kat Rader

OBJECTIVES

- **Water Table**
  - Reduce the use of harsh chemicals
  - Kill bacteria in a 35-gallon tank
- **Backyard**
  - Design a backyard stage for imaginative play
  - Stage and seating must fit within 25 ft x 25 ft
  - Stage must fit within 12 ft by 8 ft
  - Must hold 40 psf live load and no more than 12 inches tall
- **Bubble Tube**
  - Reduce circuit overheating
  - Implement wire management
  - Add 2 modes of interactivity
    - Touchscreen and block sensor
- **Memory Game**
  - Must include shapes and colors
  - Must include positive reinforcement
  - Must last between 3-5 minutes

Source: Hannah Strait, Nov. 2022
Team members building stage benches

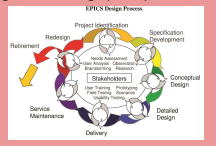
Screenshot of Memory Game Prototype

REFERENCES:

METHODOLOGY

Team Methods
Because this is an EPICS project, our overall team utilizes the EPICS design process, as seen below, to format our project steps and timeline. Additionally, each of the different project teams had slightly different methods based on the type of goal they were addressing, but there were also several team-wide efforts we adopted to ensure quick accurate solutions to these design challenges.
- Bi-weekly partner meetings for feedback from Kids Play Gym
- Weekly Progress, Issues, and Goals meetings to work through obstacles
- A goal of 3 hours of work outside of class to keep progress moving quickly

Water Table Methods
- Collect 5 gallons of river/lake water
- Confirm bacteria is present in water
- Insert UV light in water tank for 24 hours
- Test to confirm no bacteria is present
- Repeat with 35 gallons of water



Infographic describing the EPICS design process (EPICS design cycle).

Memory Game Methods
- Collect design feedback from Kindergarten aged kids
- Develop the game aesthetics alongside technical functionality
- Frequent physical prototypes of design for testing and feedback

Bubble Tube Methods
- Use smaller working prototypes to test functionality
- Scale up to full size design

Source: Erin Blasingame, Feb. 2022
Touchscreen Prototype

Backyard Methods
- Design 2D drawings of stage design
- Run risk assessment and structural analysis
- Begin physical construction of benches
- Outsource large stage construction to contractor

IMPACTS

3 of our projects, Backyard, Memory Game, and Bubble Tube, are aiming to deliver their project at the end of this semester. These projects aim to provide various types of enrichment and development to the 14 children Kids Play Gym serves everyday. Each kid, is typically at the facility for 6 – 8 hours a day for 1 – 3 years on average, and while the kids will not be using the PLAY team's projects for the entirety of this time, our projects will contribute to the 42 hours of Applied Behavioral Analysis (ABA) Therapy a child receives each week.

ABA therapy at Kids Play Gym partners each kid with a therapist one-on-one to implement a personalized behavior plan. ABA therapy strives to help kids learn in a natural environment to enhance their social behavior, language, and daily living skills (*Aba therapy. ABA Therapy : Kids Play Gym*).

Our projects combine the use of shapes, colors, sounds, and imaginative play that appeal to these children and provide enrichment that supports the goals of ABA therapy (Wang, 2021).

Infographic describing the attributes of ABA therapy (Aba: Our Special Story: Singapore www.ourspecialstory.com.sg)

IMPACTS

So far, the Water Table team has been the only team to deliver their project.
Sensory water tables can promote growth in many areas. For example, it can improve motor skills such as grasping and pouring, social skills such as sharing, communication, and cooperation, and math skills relating to stacking and counting. (Moyses, 2023)

Our project partners at Kids Play Gym were concerned about the amount of harsh chemicals being used to keep their sensory water clean and usable. Without a solution to this issue there is a risk that the water table may not be safe for the kids to use.

Our project solution, UV light sanitation, eliminates bacteria present in a 35-gallon tank of water. This solution provides a safe environment for the 7 – 14 kids at Kids Play Gym that utilize the sensory water table each day as a part of their Applied Behavioral Analysis therapy.

Source: Erin Blasingame, Sept. 2022
PLAY team members collecting water for testing

Source: Erin Blasingame, Nov. 2022
PLAY Team members with owners, Andy and Kat

REFLECTION & CONCLUSION

Some challenges our team faced includes time management, knowing the right questions to ask, and a lack of technical skills. Balancing our courses and the 3 hours of out of class work that our team expected was not an easy task. Additionally, our team consisted mainly of elementary education and first year engineering majors, so our team was lacking some necessary technical knowledge. Lastly, we had frequent partner meetings, but we didn't always recognize which questions were most valuable to ask our partner. To overcome these challenges, we implemented extensive planning and weekly goals to keep us on track, reached out to EPICS TA's to teach us new skills, and discussing partner feedback with our advisors before and after meetings to determine what new information did we gain, and what information did we still need. This process taught me, and my teammates the importance of partner-oriented design.

Feedback Form:

Future Plans
Going forward, our teams plan to continue refining their detailed designs prototypes. All three remaining projects plan to deliver their project by the end of the semester.

ACKNOWLEDGEMENTS

The EPICS PLAY team would like to thank our Project Partners, Kat and Andy, from Kids Play Gym for their support and feedback. We would also like to thank our advisors Haley Cutler, Jorge Martinez, and our TA Aparna Karnik for all their advice and support! Lastly, a huge thank you to Henry Poor Lumber company for donating all the materials and labor to build the stage!