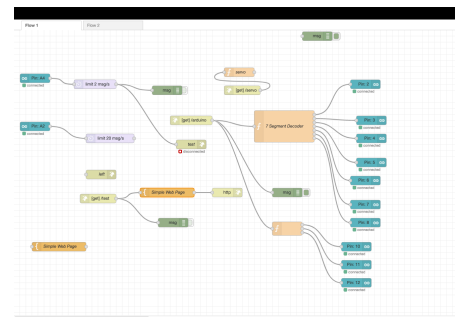
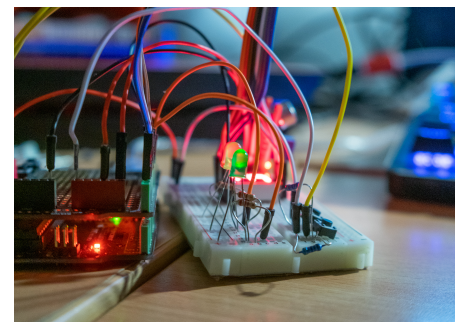
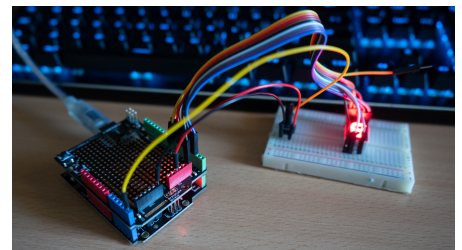
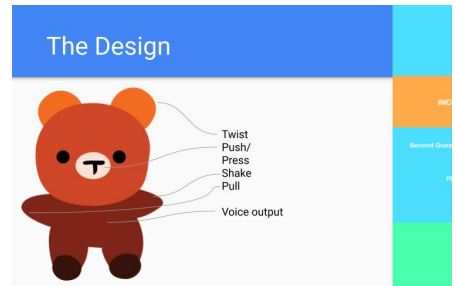


ITSY

Interactive Learning Experience for Children

- Concept and Problem space
 - Our concept is a tangible learning toy that helps young children with develop better motor skills and allows for a synchronized development of the brain. We names the toy “ITSY” as it is a very simple pronunciation and has a comforting tone. We want to incorporate touch , sound and lights into this toy so we can maximize the interaction between the user and ITSY. I am focusing on the sound and touch part. Where the user will be given auditory prompts and then they will respond with a touch mechanism. In my prototype it is buttons representing ITSY’s hands; both left and right.
 - The problem space we are focusing is the lack of physical learning in younger children. Due to the widespread adoption of touchscreen devices as learning devices for children, they are incorporation fewer motor skills into their daily lives. There have been studies showing the benefits of a 3D learning environment compared a 2D one.
- Key related work – literature, solutions etc
 - There are some toys that exists such as Bop it and Leap Frog
 - Bop it is very interactive however it is not recommended for children younger than 8 years old, and we are targeting children around the 5 - 6 years old range.
 - Leapfrog is well designed for kids but not very interactive.
 - The literary paper , UI is Communication states that it is not enough to have a product do a function, it needs to be able to have a emotional bond with the user for efficient learning to happen.
- Relationship to team concept/problem
 - My concept is just one part of the whole interaction, it can be used with the other modes of interactions that my team is working on. Such as colour detection And helping to do simple arithmetic.



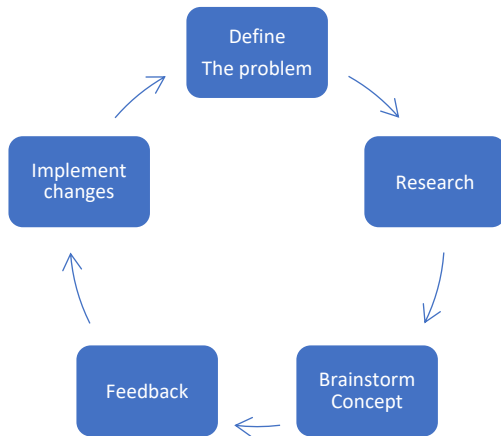
ITSY Level: Question:

Completion



<https://youtu.be/nfMyKsjrUtl>

Design Process



- Define problem
 - Lack of interactive learning in young children
- Research
 - Benefits of interactive learning
 - 3D > 2D
 - Ways to make learning more efficient
- Concept
 - ISTY
 - Friendly plush toy
- Feedback
 - Make interaction less aggressive
 - include friendly tones

Above is our initial design process, since then we have gone through few iterations and adapted the problems each time. We went from

“Lack of interactive learning in young children with learning disabilities”

to *“Lack of interactive learning in children”*

then finally we decided on *“Lack of interactive learning in younger children”*

Here are some of the changes I made to my design and some of their justifications

Changes:

Removed mic: Children's voice and speaking was much harder to recognise compared to adults.

Added lights: Lights going green when they are correct and light showing red when they are wrong.

Added a level counter: For my version I put in a level counter on the website itself and on the prototype itself. This it to help the user having a sense of accomplishment.

For my design process I started with some interviews with my cousins. She is 5 and her brother is 11, with the parents' permission I decided to get her to do some tasks. To test the voice recognition, I ask her to use Google Voice Assistant on my phone and

that's when I realised Google was not 100% accurate when detecting her voice. Later this led me to remove the use of a microphone and only have auditory output and not input. We could potentially integrate this back in later when the technology has advanced further.

Secondly to test the level counter I asked her to play a simple game (Jetpack Joyride) on my phone and I put masking tape over the top so she could not see the levels. What I observed what she was much more frustrated that she could not see what was going on. I ran that same test on her older brother who had the same response.

I also talked to my partner who is a coach at Girl Guides Clayfield and she stated many of the parents who join their kids to Girl Guides do it because they want them to learn more actively and develop a wide range of skills which they would not get from doing thing is just at home.

Design Process

After all the interviewing and data gathering process, I proceeded to start making a prototype. I started by configuring my Arduino to work with node JS using the node red platform this allowed me to control my Arduino using JavaScript and take in input from the Arduino and display it on a web page and send information from the web page back to the Arduino to display it on the components. initially I started with seven segment display to show the levels. then later after I finish programming the game, I added LEDs to indicate if they got an answer correct or incorrect .and for inputs I am using two buttons representing left and right hands of ITSY.

Interaction Plan

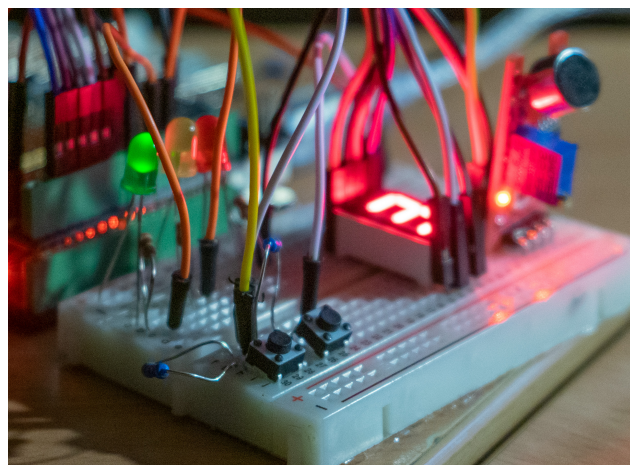
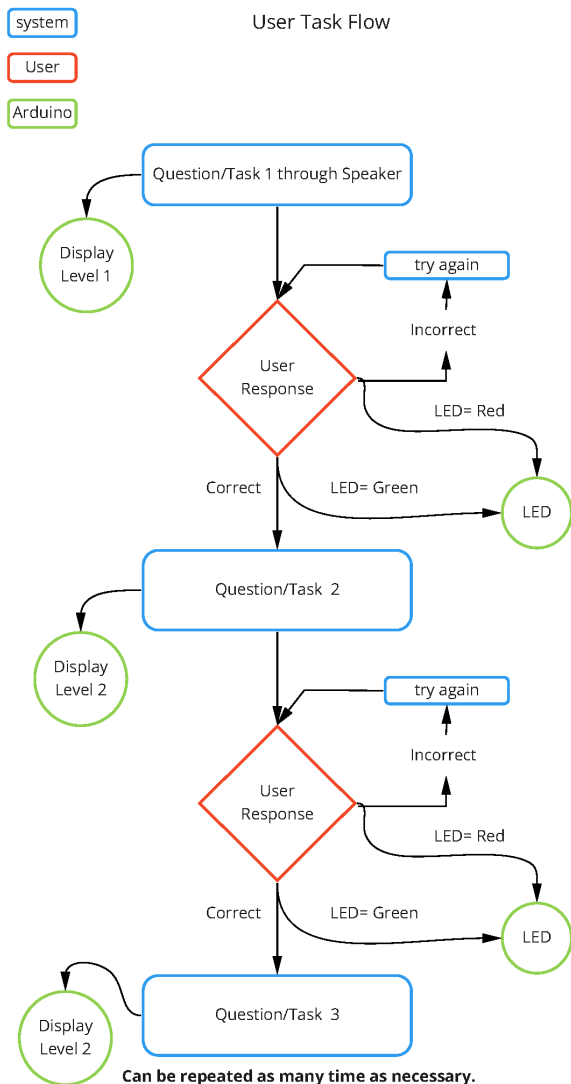
My chosen interaction paradigm our sound and touch however my prototype is not limited to just those two I also have vision. The user will be able to use these as their inputs and the system will be using them as their outputs.

The Arduino will prompt the user using pre-recorded voices through the computer speakers. For the inputs I am using buttons representing the left and right hands of ITSY, LEDs to show the user when they have a question wrong or right and 7-segment display to display the level to the user.

Here is the user task flow and interaction with the system.

This prototype allows the user to interact with the buttons while listening to the prompts from the computer allowing them to use their auditory touch add vision senses to complete the task.

The computer would ask a question or prompt a task and the user can answered that question or do that task using the buttons and, in this case, they will be representing left and right hand of ITSY. The user will receive a visual and auditory feedback depending on if their answer is correct or not. that user response can be adapted to use my other teammates' methods such as colour detection or shape detection or any other form of inputs that we might discover in the future. This allows this whole platform to be much more versatile and adaptable.



Left and right buttons representing holding each hand of ITSY.

Here are some use cases of itsy:

Teachers can utilise ITSY to assist and better perform their work, such as teaching math by physically counting the Lego blocks and ITSY will give children feedback about their answers.

Parents can also let children learn colours and vocabularies by ITZY telling the questions and the kids can point out and speak up the items with the colour ITZY mentioned.

Project Objectives and Success Criteria

Some of the project objectives I want to achieve is to have a prototype that children can use intuitively without then asked how to use it first, they can do the tasks only from the prompts given by ITSY. Teaching them something new through ITSY and recording if they remember the information after a time. If I am successful in all three of these criteria. I would count my prototype to be successful.

To measure the first criteria, I will record how many questions they ask to explain to them how to use it, 0 Being the best-case scenario and 5 being the worst-case. To measure the second criteria I will measure how many times they stop to ask around for help, similar to the previous one 0 being the best-case scenario and 5 being the worst-case. For the third criteria I will try teaching them few small phrases then after doing a different activity I will ask them and cheque how many they can recall 3 being the best at 0 being the worst. Look at the table below to see the assessment criteria.

Overall if I manage to get over 50% for each criterion, I will consider this project to be successful. The closer to 50 the more changes and improvements we need to make it to get to 100%.

Intuitiveness		Understanding prompts		Retaining Information	
5		5		0	
4		4		1	
3		3		2	
2		2		3	
1		1			
0		0			