ASSIGNMENT M3

Kalpana Baheti
kbaheti3@gatech.edu

***Abstract*—This series of qualitative and quantitative studies will cover different stages of interface understanding, design, and evaluation for a mood-reading music player which has its controls governed by an app on a phone. The music player is meant for a playroom at home or at a school where children spend significant amount of time. Music has a long-standing effect on children's cognitive and emotional capacities; this device will be responsible for deciding what to play and when with a desired ambience/accomplishment as a goal. The music auto-playing system has two components – the environment-reading music device and the phone app which controls this device. We will be studying the interaction of the user (the educator/parent/guardian) with the app's control panel given fixed assumptions on the manner in which the settings will regulate the environment-reading device's input and output.**

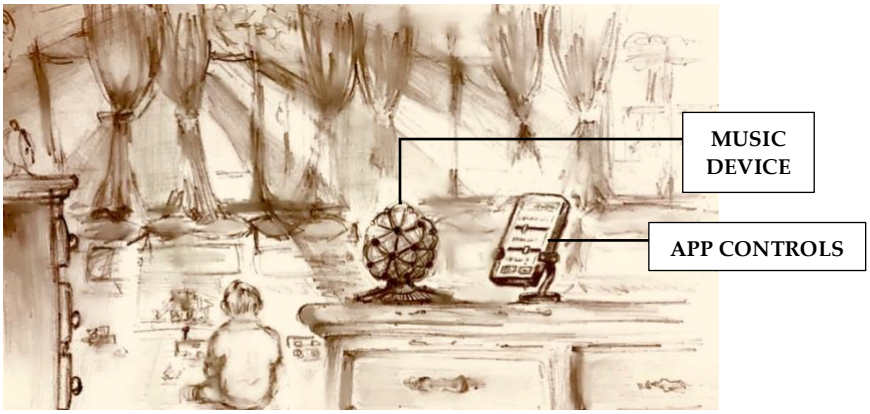

Figure 0 - My Original Sketch

BRAINSTORMING PLANS

1. Break down the core problem into requirements.
2. For each part the to be solved, write it down in the form of –
    a. Assumed technical functionality
    b. Input modes
    c. Output modes

3. For each input and output mode, in two three words, describe the gist of what this UI would be – how and to what end.
4. Constraints –
    a. Do not take more than 30 minutes to do this whole process.
    b. Consider all modes and options in case-completeness.

BRAINSTORMING EXECUTION

Assuming there existed an introduction page of the app, that explained to users what the app was for, we now move to the app control panel –

1. **Personalization Controls**
    a. **Child-related controls (Necessary to be set)**
        i. **Child growth goals**
        Functionality: To allow the user to select growth goals for the children and send it to the AI system for a search.
        Input: Ordered options listed | Natural language input | Extent of focus given for each goal (using sliders)
        Output: Tick/Numbered options | Acknowledging NL input through summarizing into points | Moved slider
        ii. **Base constraints on music played**
        Functionality: To allow users to enforce vetoes and non-music related preferences for children
        Input: On-Off switches for binary choices, discrete sliders for extents, options for multiple choice vetoes
        Output: Switch turning red/colorless to green, magnetic movement of sliders, ticked choices to show that choice is selected
    b. **Music-related controls – Basic**
        i. **Explicit music aspects – tempo, volume, permute, octave, cycle, starkness**
        Functionality: This is so that users can directly manipulate music in real-time for their child.

Prerequisite: This stage must have an explanation of how these controls work – either written or demonstrated

Input: Magnetic discrete slider bars – vertical or horizontal | numerical scores selection| question marks at the corner of each aspect to understand it | ordinal options

Output: Movement of slider marker | Display of numerical score selected | popup message on clicking the question mark | tick on ordinal option box to show selection

ii. **Aspect learning by example – provision of example instrumentals from user**

Functionality: This to allow the user to input a song/instrumental as an example (perhaps successful previously with child) and let the AI assimilate necessary aspects.

Input: MP3 upload button | URL link to a YouTube, Spotify, or Apple Music | Select from sampled collection

Output: Upload complete/URL link assessment complete | perhaps display qualities of example song and the generated new song too.

2. **Privatization Controls**
    a. **Selection of modes and times of information intake**

    Functionality: This is to ensure the child is only observed in parent consented ways and at permitted times.

    Input: Options for audio, thermal and visual choices of intake | Time interval selections for time of day

    Output: Show tick mark when selected, move time interval sliders, allow additional sliders.

SELECTION CRITERIA

Based on the following requirements from the user need-finding phase –

1. Information intake mode and time must be as flexible as possible so as to adhere to each parent's privacy preferences.
2. Growth goals and base preferences should be easily selectable.

3. Music should be adjustable by adults (since tempo and volume were preferred heavily).
4. We settled on 8 controls from previous need-finding so the total controls should not exceed 8.

Based on conveniences for the design and future development team –

1. Natural language inputs and outputs are excluded since the development is too complex to tackle at this stage.
2. Any assimilation of music that requires parsing different webpages is also too much a wild shot software-wise and will be excluded for now.

Based on this we choose three ideas –

1. Idea 1 –
    a. Personalization: Unordered options for child growth goals (equal weightage to each), adjusted (as per description above) selection panel for base constraints, ***there will be no selection for advanced musical aspects (just tempo and volume included in base).***
    b. Privatization: Default set to audio information intake and afternoon time, option lists and time interval bars used for this respectively.
2. Idea 2 –
    a. Personalization: Ordered options for child growth goals, adjusted (as per description above) selection panel for base constraints, continuous horizontal sliders – provision of automatic examples upon setting music aspect.
    b. Privatization: Default set to audio information intake and all-day observation, option lists and time interval bars used for this respectively.
3. Idea 3 –
    a. Personalization: Ordered options for child growth goals, adjusted (as per description above) selection panel for base constraints, numerical selections for provision of automatic examples upon setting music aspect.
    b. Privatization: Default to base constraints alone – no audio, visual, thermal selected, full day observation of child, option lists and time interval bars used for this respectively.

c. Both of these on separate app pages – so more spaced out.

PROTOTYPE 1 – TEXTUAL (Based on Idea 1)

Description –

Personalization Section…

Placement of buttons: On the upper half of the page with some space left from the title *Personalize* above. The buttons would be one below another. If the screen is in dark mode, the button fill-in color would be a light color with black lettering, else it would be a darker color with lighter lettering. The font size would be as big as possible while still leaving some space on the top, bottom of the button, and more space on the left and right. The font style will be block letters – not bold, but well-spaced out and easily readable.

Upon selecting the Child Growth Goals button, a temporary popup page opens up (taking up center and major part of the screen), with the following options listed out as multiple choice (may select more than one option) –

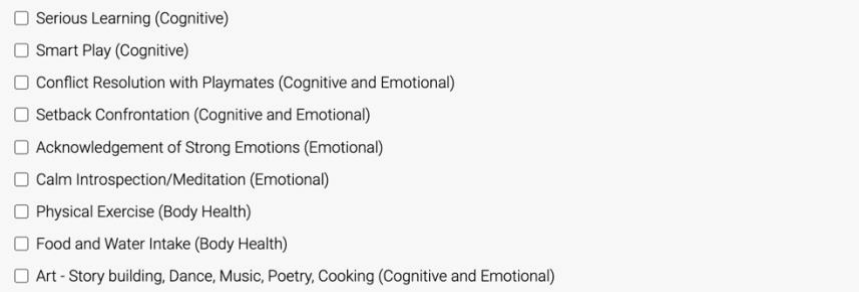

Figure 1 - Child Growth Goal Popup Selection

Upon selection, the box turns green – to indicate the option was selected. There will be an OKAY button at the end of these options to exist popup.

Upon selecting Base Constraints, a new screen opens up such that the old screen slides left and out of view entirely. In the new screen the following information is received from user –

1. Music Aspects

The music aspects will have the tempo and volume set to numerical values out of 10 for maximum permissible value. When it is set, a brief example is quickly played upon pressing a play button next to it.

2. Playroom Ambience (Requires visual and audio allowance)
   This is an on-off switch. Turns blue when switched on.
3. Observation of Activity of Child (Requires visual and audio allowance)
   This is an on-off switch. Turns pink when switched on.
4. Disability that the child struggles with (if any)
   This is an expandable multi-select menu like the Child Growth Goals.

Privatization Section…

In this section, there will two sets of controls.

Under [Mode of Information Intake] – there will be a multiselect list of three choices - Audio, Thermal, Visual. If Visual is selected, Thermal will automatically be selected. Audio will be selected by default.

Under [Time Intervals] - this will have a timeline with a two-default start and end markers that can be moved with the finger. Below this, there shall be two buttons – [Add Duration] and [Set Repeat]. Add Duration will place a new start and end marker – with the start slightly after the end of the previous selection. And the Set Repeat will pop up a page with the name of all days of the week.

Evaluation –

This description addresses the following requirements for parents with good haptic control and eyesight and fair cognitive ability (the key demographic) –

1. Growth goals selection
2. Privacy concerns and time durations to play music in
3. Explicit preferences for child such as room ambience, disability, etc
4. This has around four major controls and collects minimal information

PROTOTYPE 2 – WIREFRAMING (Based on Idea 2)

Description –

For the sake of brevity, we will not be covering the popup for growth goals and base constraints since this is covered in the card prototype. Here we shall cover the spatial arrangement and feel.

Figure 2 - Basic Control Panel

Figure 3 – Clicking Question Mark

Figure 4 – Expanding Privatize

The user can click on the child growth goals and basic settings and can toggle the music aspect slider and even play a sample at the end. The question mark pops up an explanation. Privacy and time controls are also intuitive.

Evaluation –

1. This ensures that the screen is not too painful on the eyes and has abided by a pastel-like color theory which is very popular.
2. The controls are sliders that have preferred by many. Parents who are very passionate can experiment with these. The **?** button next to [Music Controls] explains the music controls and a sample can quickly be played to check. IMPROVEMENT: One thing that can be added is back-to-default mode, so the controls are automatically regulated.
3. Privatize allows parents to be able to set time durations to play in. While a 24 hour clock will take time to get used to, it allows for multiple time interval selections in a compact graphical manner.
4. This supports all personalization and privacy functionalities.
5. Amounts to 10 controls – a little more than what the users wanted.

PROTOTYPE 3 – CARDS (Based on Idea 3)

Description –

This is brief card-based description of the pathways based on button clicks.

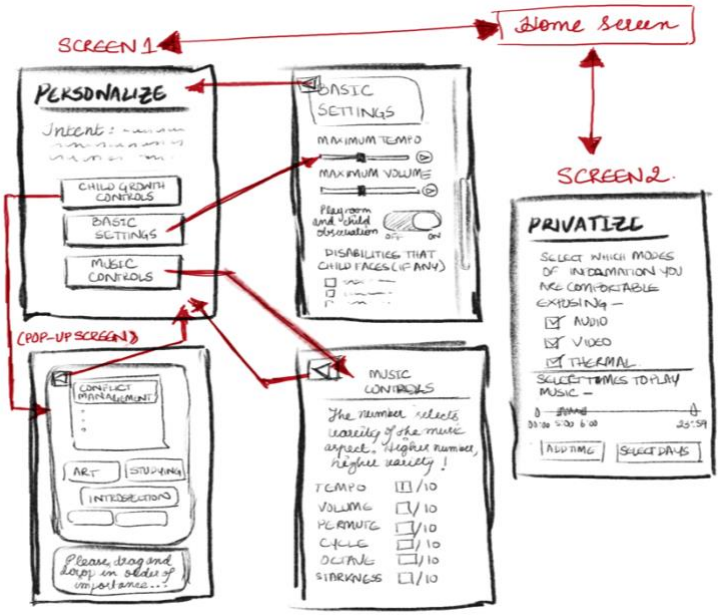

Figure 5 - Card Prototype

Evaluation –

This covers the requirements for parents in a different way –

1. The privacy and personalization options that users requested – information intake controls, time durations, order in which growth goals should be prioritized, explicit base settings – they're all covered.
2. The total number of controls amounts to exactly 8 – growth goals, tempo and volume setting, playroom observations, disabilities, music fine-tuning, data intake, and time duration selection.
3. An advantage here is that the time duration selection is not from a 24-hour clock but a straight timeline – which may be more intuitive.

REFERENCES –

1. The Ed Discussion lectures, the extra readings, and creative commons icons for free use.
2. Color Theory Reference: https://www.colormatters.com/color-and-vision
3. Powerpoint Slides tooling for wireframing