Prototyping Physical Interaction

User Study Design and Protocol *and*

Transcript as Appendix

Alex De Martin 12569618 . Paul Inzon 12931008 . Brian Ryu 13263429 . Qianning Gong 12712699 . Mahinda Viryanata 99178648

Lecturer: Sam Ferguson

Introduction

After many weeks of trial and error, the team has finally built a working prototype. As part of the ongoing development process, the team now moves into what is called the 'User Study' phase where our potential users can actively test the prototype and provide qualitative feedback for further improvements. We see this phase as being crucial to our product development process because we strongly believe that by directly listening to, observing and asking our end users, we can immediately point out the mistakes that are otherwise harder to do so. This report outlines a product summary, the target audience, our users, user recruitment plan, the details of user study testing such as context of user testing, interview questions, as well as a method of following up after the interview.

Our Product

Our product is an exciting plush toy bear, programmed to produce synthesised musical patterns depending on its physical orientation. Each physical orientation of the bear reflects a particular activity that the bear is assumed to be partaking in with the child. Depending on its orientation, the bear will play a synthesised musical pattern that reflects the mood of the child's activity. For example, in its current state, the bear has three modes. When the bear is laid down on its back, it is assumed that the child is sleeping or laying down with the bear. This triggers the bear to play a gentle musical pattern, considered to be a soft lullaby for calming purposes or to help the child fall asleep. When the bear is positioned upright, it is assumed that the child is awake and active. This triggers the bear to play a slightly faster and more energetic musical pattern. When the bear is upside down, it plays an even faster, higher pitched melody, intended to either evoke laughter in the child. Finally, the bear emits a child laughing sample as additional, emotional stimulus.

Product Potential Purpose

In future, the bear has potential to be connected to a wireless Bluetooth speaker which is placed in the location of a parent or a guardian. Because the bear plays different musical patterns depending on its physical orientation, the parent or guardian can use the bear as an indicator of the child's activity status. As the parents become familiar with which musical pattern corresponds to which orientation of the bear, they can use it as a rough gauge of the status of their child. For example, if the lullaby-type musical pattern is playing, the parent will know that the child is most likely laying down somewhere (e.g. sleeping) or the child has abandoned the bear and walked elsewhere. If the upbeat musical pattern is playing, the bear is assumed to be in an upright position, meaning that their child is most likely in an awake and active state.

Target Audience

Our target audience are male and female children aged between 3 and 5 years of age. Our ideal users are children who love toys, particularly soft, plush teddy bears. These children will consider this bear to be their personal companion in life, doing just about everything together from eating, sleeping, reading, walking and exploring the world. However, due to the objective of this user study, which is to gather qualitative information on what the user likes and dislikes about the prototype to improve it, we've decided that the bear be tested beyond our target audience. These users include parents, teachers, colleagues and experts who are, to a certain extent, knowledgeable in early childhood learning and can provide useful feedback. The reason for this decision was because we were concerned about the quality of feedback that children aged between 3 and 5 would give us after testing our prototype. The team plans to listen to and discern all these different users and their outcomes.

User Recruitment Plan

The team will first look for easily accessible user testing participants that include those who are close friends or families who have children aged between 3 to 5 as part of their families. The team will also ask close relationships to see if there are any teachers or experts who are familiar with early childhood learning. In the case that there are none, the team will research nearby schools or day-care centres and visit them in person to politely ask if a few user tests can be performed. This will be done according to correct procedures as stated by our lecturers and the general user research society.

Preparations for Conducting User Study

Once the users have been recruited and confirmed, meaning that they've signed the consent form and understood what is to happen, the team will have to prepare before conducting the user study. This includes:

- Storing the prototype bear in a safe place where no damage can be done to it.
- Maintaining the prototype bear in its working condition so that it's ready for user testing.
- Making an appointment with the user testing participants beforehand.
- Bringing all materials and equipment necessary to conduct a successful user test; These include the prototype bear, consent forms, notepads or personal computers for taking observational notes and a voice recorder to record the interview.
- Making sure all team members are present during the user test, due to time limitations.
- Preparing the relevant interview questions to be asked at the user testing participants.

Goals

The goals of the user test and study are to evaluate the level of interactivity associated with the toy bear, measure the children's level of engagement whilst they interact with the bear, recognising any flaws in the functionality of the bear, identify any dangers/hazards associated with the bear, given the target demographic of the product and discover potential improvements and/or enhancements to the bear that will improve its functionality and engagement factor. We also want to make sure that the whole process is fun for the participants and all of those who are involved. And lastly, as a team, we need to communicate clearly to participants what the project is about and where they come in as users testing our prototype.

User Testing Approach

It is expected that each participant will take approximately 1-10 minutes to test the prototype bear. The bear will be tested in various scenarios, including at home within a child's typical playing environment, while they are active and moving around, as well as while they are laying down either in bed or somewhere in the comfort of their own home. This will ensure the child is comfortable during the testing process and does not feel pressured. However, non-child testers will not be bound by these testing conditions.

These approaches will enable us to test the various modes of the bear to ensure they function according to our intended design. Given the time limitations, it may not be possible to test how the bear functions over extended periods of time, i.e. while a child is sleeping. Ultimately, we believe that research should be done in these ways to weigh the outcomes as best as possible.

Project Schedule

The team will get together for one day during week 11 of the subject to test the prototype with various users. The location of testing will be conducted in various locations, particularly in the user's home, specifically where they usually play with toys.

Questions

*The interview questions for user testing **non-children** participants are as follows:*

1. What are your opinions on the current size of the bear? Is it too small or large? Or is it just right?
2. How well do the musical patterns correspond to the different positions of the bear? e.g. Does it make sense?
3. Is the interactivity associated with the bear clear and obvious?
4. How would you rate the level of interactivity of the bear?
5. What are your reasons for rating this level of interactivity of the bear?
6. What emotions does the bear evoke when you play with it?
7. What are some flaws, both technically and aesthetically, in the bear's design in its current state?
8. Are there any other types of plush toys that might be appealing? e.g. a sloth (show user). Which one would you prefer?
9. Have you ever seen or played with similar toys like this before? Is ours distinctive?
10. How long do you think you'll want to play with this bear before it loses its appeal?
11. Do you have any suggestions for improving the bear?
12. Do you find the bear's physical appearance appealing? Does it fit the interaction?
13. What is your opinion about the suitable range of ages?
14. Do you think that the constant sound/music might irritate those around it?

*The interview questions for user testing **children** participants are as follows:*

1. Do you like bear?
2. If yes, why? If not, why not?
3. What do you like about the bear?

We expect the questions for children participants to naturally occur as we interview them in a casual manner. This is because we most likely expect children aged from 3 - 5 to take some time warming up to us. We also believe that a considerable amount of data will be collected from our observational notes, more than the interviewing itself.

Consent Form

Activity:

The child will be provided with the toy bear and observed as to how he/she interacts with it. Information to be gathered will include:

- Measuring the child's level of engagement with being introduced to music
- Level of response to the change in music
- Parent/Guardian's feedback on how the product can be improved

I hereby give permission to the Protosquad© group to use and publicly share the information gathered with regards to the observational experiment done on 31/05/2018 involving my child.

_____
Printed Name of Parent/Guardian

_____
Signature of ProtoSquad Rep

_____
Signature of Parent/Guardian

Reference to the National Statement on Ethical Conduct in Human Research (Updated 15th of May 2015) involving Child Participants:

4.2.4 When children and young people are not of sufficient maturity to consent to participation in research, it is justifiable to involve them only when:

a. it is likely to advance the knowledge about the health or welfare of, or other matters relevant to, children and young people; or
b. children's or young people's participation is indispensable to the conduct of the research.

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Prototyping Physical Interaction

Assessment 3 –
Study Prototype with Users

12931008
Paul Inzon

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Introduction

The objective of this analysis report is to understand how our product can be improved through a process of reflection and proposed refinement. The information Protosquad recorded during the user-study period will be used as material to be interpreted, as this report outlines the potential improvements with emphasis on user needs.

There will be a focus on distinct themes that the feedback we received will be classified in.
These themes will commandeer the different sections of this report; and are listed as follows:

- Sound Module
- Aesthetics & Physical Design
- Physical Interaction
- Extra features/New Ideas

Four user studies were conducted. The interviewees are listed as follows:

- User study 1 – Jenny (Mother) & her 4 year-old son Josh
- User study 2 – Prototyping classmate 1
- User study 3 – Prototyping classmate 2
- User study 4 – Prototyping classmate 3

The Bear so far

The bear is a normal cute plush teddy bear that is small to medium sized.
It has a Raspberry Pi 3, sense hat, mini speaker and power bank in it.
The Pi provides it with a musical function: when the bear is upright, the sound plays an upbeat variation of the synthesized musical pattern. When the bear is laid down on its back, it will play at a slower rate and with lower pitch, aimed at lulling the baby/toddler to sleep. When the bear is tilted to its side, it plays a slight cute and friendly laugh.

Themes

Sound Module

Sound design

User study 1 (Jenna) –
"The sound design matches well with the position of the bear, but the volume of the sleeping position is quite soft. Also, it's quite easy to use."
--
"If you could make it play official nursery rhymes, maybe it would be more engaging."

User study 3 –
"Maybe a nursery rhyme, but for now I think it's good at this stage."

Perceived user needs:
- Volume is too soft when bear is positioned on its back
- Common nursery rhymes to be played
- Improved engagement when sound is an official nursery rhyme

Refinements:
Jenna made the interesting point with the volume's lack of gain at a certain position. For compensation, the volume will be adjusted gradually as the bear gets to certain positions. Jenna also proposes that the music would be more engaging if official nursery rhymes were used in lieu of the generated music (User study 3 slightly suggested it too). To follow in this regard, the best method of pursuit will be to play nursery rhyme notes as opposed to playing actual samples as they would be distorted through the sound effects.

Speaker

User study 1 (Jenna) –
"I think maybe the speaker is a bit too harsh? Maybe adding some padding around it will dull the sound and make it a little easier on the ears?"

Perceived user need:
- On closer inspection, the speaker can sound tinny

Refinement:
A sock material will be used to wrap around the mini speaker in order to soften the sound. Further inspection will be done on this application. There is concern for gain loss depending on how thick the material is, but there will be compensation.

Maintenance

User study 1 (Jenna) –
When asked about its flaws, Jenna asked us,
"Does it have an off button?

User study 1 (Jenna) –
"I just don't want it to run all night while it's next to Josh"

User study 2 –
When asked about the implications of the constant sound:
"I think parents will probably be ok with it, but if they have guests over it may get irritating if it goes on for too long."

User study 4 –
"Maybe the parents would like an on/off switch though as the constant music may irritate people around them. But at the same time, the sound isn't so domineering or annoying, like it's not a screechy voice or anything like that which is good – it's a very soothing sound"

Perceived user needs:

- On/Off button
- Music Timer for automation

Refinements:
An on/off button was suggested as to allow the user to turn the function off when not in use. An external On/Off button will be a worthy addition to the bear. According to our user study 4, the sound is quite soothing. It should be noted that a timer be added onto the music function as to allow the parent/guardian to leave the bear with the child and they would not have to shut the bear down manually.

**
User study 1 (Josh) –
When asked what he likes about the sounds:
"It sounds good and it makes me happy"

Refinements:
Known nursery rhymes portray a different feeling, but taking into account 4 year old Josh's point of view, it should be noted that he is happy by the computer generated notes (in a chord). This cements the idea that the music is soothing.

Laughing function

User study 2 –
When asked if the musical patterns correspond with the positions:
Yeah, I think when it's upside down, it's very exciting, which makes sense. Except for the laughing for when it's titled left and right – I'm not sure if that corresponds well.

Perceived user needs:

- Laughter from the bear may not be suitable for the tilting interaction

Refinements:
Taking into account prototype classmate #1's thought, there are prominent flaws with the interaction design. When the bear is laying on its side next to the child, we likely do not want it to laugh continuously until the timer stops the sound as to not spook the child. The function will be reassigned to another interaction, if not scrapped. The laughing feature is mentioned again in the 'Physical Interaction' segment of this report.

Aesthetics & Physical Design

User study 1 (Jenna) –
"I do like how it looks, but if it could be soft the whole way around the bear, so without Josh having to feel the little computer, that would make it immensely better!"

User study 1 (Jenna) –
"I reckon a slightly bigger teddy bear may be better for older children, but for my child, it's a perfect size." (Contrary to Josh's opinion!).

User study 1 (Josh) –
When asked how he wanted the bear to be:
"Uhmm, maybe if it was bigger so I can fall on it"

User study 2 –
"Maybe just cover the back somehow because the wiring and insides are a bit exposed"

User study 3 –
"leaving an exposed charging port might be a bit of a hazard, unless it's tucked away somewhere."

User study 4 –
"I was thinking with the bear, if it was bigger, the hardware would be less conspicuous [visible] maybe. Because as I'm holding it, the squareness of the Pi is quite noticeable."

Perceived user needs:

- Allow the user to safely land their body on the bear and feel comfortable
- Hide the wiring and processing machines
- Fix electrical and choking hazards
- Seamless toy bear experience

Refinements:
Most of these problems will be fixed if not assisted by the acquirement of a bigger bear body. Maintaining the same aspect ratio, getting a wide surface area for the bear creates an easier landing spot for the child if he/she ever decides to fall on it. With a bigger bear, it will be possible to envelope the processing machines and the wires, allowing access to them only through conscious tinkering in the fabric. There is a possibility that children spill liquids on their toys, so as to conceal the charging port, a fabric flap will be attached to the bear.

[Note: consider keeping processing machines inside the bear]

When asked if they can pick up a technical flaw:

Physical Interaction

When asked for suggestions on improving the bear.
User study 1 (Jenna) –
"Maybe you could add more variations in the movement of the bear."

User study 3 –
"I think a shaking feature would be appropriate because kids may like to run around with it"

Perceived user needs:
- Additional interaction with the bear
- Usage of the shaking interaction

Refinements:
According to Jenna and prototyping classmate #2, they want more interactions with the bear. Children now and then hold the bear by the arms, and so is an appropriate interaction for a sample to be played. The sample can be a smooth toned, "let's go!"

Prototyping classmate #2 suggests a shaking interaction which can be used for the aforementioned 'Laughing' function. The idea thematically works as it is somewhat synonymous to how humans would react to the interaction. E.g. When children are tickled or their parents are blowing on their stomachs (comical), they would most likely laugh. The laugh will be soft and innocuously toned as to fit to most situations for when the child may want to hug the bear.

Extra features/New Ideas

When asked: Do you have any suggestions for improving the bear?

User study 1 (Jenna) –
"since it's a technical bear thingy, could you maybe double it up as a baby monitor?"

User study 2 –
"you can get an idea of what the child's doing."

User study 1 (Jenna) –
"I think a microphone would work quite fine."

Perceived user needs:
- Baby monitor as a new function

Refinements:
A baby monitor is a good function that works well with the bear as the bear usually stays with the child. This function can be done by allowing the bear to carry a microphone connected to the Pi. The Pi when possible would stream the recorded data to an external speaker in the parent/guardian's room. Alternative processing machines to the Pi may be used such an *Orange Pi Zero* as it has wifi features and a built in microphone.

Visual improvement

User study 2 –
"I guess if you want to make it more appealing, adding some visual effects like flashing lights or something similar, like a flashing love heart on the front depending on the position of the bear."

Perceived user need:
- Sensehat visuals
- Flashy effects

Refinement:
Allowing the sensehat to display data would be appropriate as it is eye candy for the child and is good for entertaining. It is flashy, but would also cost a lot of electricity (bigger power source). It is possible to link input data from the gyro and accelerometer in order to create an interactive graphic. It should be noted that not every child appreciates the same graphics. For e.g. girls and boys may appreciate a heart or a lightning better, so a switch can be integrated as to allow the child to choose what type of graphic(s) they want to see.

Conclusion

There will be some users out there that believe the current iteration of the bear has enough interactivity, as can be interpret from Jenna's perspective, "Judging by the age group, this seems to be enough to entertain the masses of babies, or toddlers as you said". There are also some out here that believe that there can be more functions to this bear, such as the being able to shake the bear and returning a reaction. Overall the user studies were successful as to allow for effective reflection and creative alterations. Utilizing themes allows for a better understanding of user needs in their respective area of work.

Appendix

User study 1: Mother (Jenna) & her 4-year-old son (Josh)

(Bold text = interviewer, Non-bold = interviewee**)**

What are your opinions on the current size of the bear? Is it too small or large? Or is it just right?

I reckon a slightly bigger teddy bear may be better for older children, but for my child, it's a perfect size.

Cool! Moving on to the musical aspect then, how well do you think the musical patterns correspond to the different positions of the bear? Does it make sense?

The sound design matches well with the position of the bear, but the volume of the sleeping position is quite soft. Also, it's quite easy to use.

Ohh that's good to hear, so would you say that the interactivity associated with the bear is clear and obvious?

I suppose it isn't clear and obvious at first, because when he (talking about her son) fiddled around with the bear at first, he probably thought it was randomly tuned. I think he understands how the different orientations work now, *laughs*.

Awesome, so how would you rate the bear's level of interactivity?

I think the bear's got a good amount of interactivity. Judging by the age group, this seems to be enough to entertain the masses of babies, or toddlers as you said.

Alright, are there any more reasons that impact how you rate this level of interactivity of the bear?

Not really, it kind of makes sense that you don't overload the bear with too many gadgets and sounds and buttons. Maybe if you made the target audience a little older then maybe it'd make more sense.

What emotions does the bear evoke when you play with it?

Is this for me or for Josh? *(we share a laugh, we tell her both)***.** I think the sound is quite melodic despite it being all seemingly random notes. It kind of makes you sleepy doesn't it? I know if I laid this down next to Josh he'd quickly get lulled to sleep which definitely has its uses. I think he's actually falling asleep now.

We are glad to hear that! In saying that, have you noticed any prominent flaws, both technically and aesthetically, in the bear's design in its current state?

Uhh, yes, I think maybe the speaker is a bit too harsh? Maybe adding some padding around it will dull the sound and make it a little easier on the ears?
Does it have an off button?

It does not.. not yet!!

Ohh okayy, I just don't want it to run all night while it's next to Josh. Maybe even a timer will do.

Do you have any suggestions for improving the bear?

Maybe you could add more variations in the movement of the bear.
If you could make it play official nursery rhymes, maybe it would be more engaging. *(consider bedtime rhythms).*
OOH and since it's a technical bear thingy, could you maybe double it up as a baby monitor?

With just a microphone you think? Or with a camera too?

I think a microphone would work quite fine.

Noted, wow thank you so much - your answers are amazing.

Ohh, well you've got amazing questions yourself.

Oh stop it

So anyways, one last thing we wanted to ask, do you find the bear's physical appearance appealing? Would you reckon it fits the interaction?

I do like how it looks, but if it could be soft the whole way around the bear, so without Josh having to feel the little computer, that would make it immensely better!
[Note: consider keeping processing machines inside the bear]

The interview questions for user testing children participants are as follows:

Do you like the bear?

Yes

What do you like about the bear?

It's soft and it makes sounds.

Oh yeah? What do you like about the sounds?

It sounds good and it makes me happy

That's good to hear! If there was anything you'd like this bear to be, what would you say?

Uhmm, maybe if it was bigger so I can fall on it *(consider bigger bear).*

END OF TRANSCRIPT

User study 2: Prototyping classmate 1

(Bold text = interviewer, Non-bold = interviewee**)**

Okay so do you kind of get how it works?

Yeah yeah. It makes sense how you tilt it.

We recently added another feature but it's like kind of dodgy.

It's kind of… It's supposed to laugh when you tilt it in another way but for the most part it's just making music and stuff.

(Bear plays music in the background)

It's more just like… positions

Yeah. But so… But if you do it really quick it doesn't really pick up the changes. I feel like if you tilt it this way *tilts bear* it picks up one input, but not others, so sensitivity is a bit of an issue. And does this work? The rotating part?

Yeah. It's supposed to trigger the laughing but we're still trying to figure out the threshold.

Right, right.

As in like what the input values should be

Oh you mean the range?

Yeah the range.

Okay, enough to be there. It laughs sometimes which is good. But are those the only two directions it works in? *Tilts bear up and down, left and right*

Yeah. So the upside down where it makes the fast theme -

Ohhhh.

And when it's lying down, it makes a..

Yeah, more peaceful tune

Because like… the bear is like lying down with the child.

Is there anything for like… upright? (puts the bear upright and makes a particular sound)

Yeah yeah. Just like that. It's kind of really simple.

Yeah nice. Cool man. I really like it.

Yeah, its kind of different from the normal toys where you press buttons on it.

YEAH YEAH. I mean it's good if you want to sort of have like a… a sort of like a baby monitor, I guess? Like depending on how the child holds it, you can get an idea of what the child's doing.

Yeah that's fair enough. I'll just get the questions up if you want to answer those. Alright so… So actually, what are you opinions on the size of the bear?

I think it's good. I guess, what's your type of user?

It's sort of ages from three to five.

It should be fine. Maybe if it's for babies a few months old, it'll probably be too big. If it's three years and older, it should be fine.

Fair enough. How well do you think the musical patterns correspond to the positions? Does it make sense?

Yeah, I think when it's upside down, it's very exciting, which makes sense. Except for the laughing for when it's titled left and right – I'm not sure if that corresponds well.

Yeah. That's something to work on. Fair enough. Is the interactivity of the bear clear and obvious? Does it take a while to figure out?

Nah nah nah. It's clear what it does. I guess what's not clear is what noise it makes. Maybe if you're just a couple of degrees off, then you might make a different noise. But it makes some noise and it depends on the rotation which you get straight away.

Yeah, within a couple of seconds. Fair enough. So what are some flaws that you immediately notice, technically or aesthetically?

Maybe just cover the back somehow because the wiring and insides are a bit exposed. Like I said before, the speed. Maybe it struggles to pick up the position if you tilt it too quickly. Other than that, I didn't really notice other problems. Makes noise depending on the position, which is simple enough.

Yeah. Um. Are there any other plush toys that you might find more appealing?

Probably, bears are most common and applicable.

How long do you think the child might want to play with this before they get bored of it?

Uh. It probably depends on the age. I guess the older they get, the less patience they have for it, maybe? That's what It comes down to.

Do you have any suggestions apart from what you've mentioned already?

I guess if you want to make it more appealing, adding some visual effects like flashing lights or something similar, like a flashing love heart on the front depending on the position of the bear.

Yeah, we'll try to map a sense hat or something like that. What is your opinion of the age range of the bear?

I guess if you make it a little smaller, then it could be for any range, going up to even five or six years old. But right now the range is more limited because of the size. Also, I think because sometimes kids hold bears like that *holds arm of bear*, just off the arm. So adding a feature to limbs might also be an interesting feature.

Fair enough. Cool. And just lastly, do you think the constant sound would irritate people around?

I think parents will probably be ok with it, but if they have guests over it may get irritating if it goes on for too long.

Yeah. Alright cool. Thanks for your input, appreciate your feedback

END OF TRANSCRIPT

User study 3: Prototyping classmate 2

(A = Interviewer, I = Interviewee**)**

A: So, do you kind of get how it works?

I: Kind of, is there like buttons inside that you need to press or just like move it?

A: Just the accelerometer. It's like, this way, (show how the bear work) – like there's different positions, that sort of thing.

I: Yeah cool. (Playing with the bear) So is it only limited to tilting backward and forward?

A: Yeah, it's just based on the accelerometer value, when the child is laying in bed, the bear sits flat, and then when the bear is sitting upright, there is more joyful music, because they are walking around with it - that sort of thing.

I: (shaking the bear)

A: shaking is not a feature yet. It might be something we can add.

I: Yeah, because it's programed for kids right?

A: Yeah, exactly

I: Well I think a shaking feature would be appropriate because kids may like to run around with it. They may like to shake the bear from time to time while they're holding it. Yeah, so maybe shaking the teddy bear can be another feature. Maybe adding familiar songs would also be appropriate. I am not too sure about what kind of song. Maybe a nursery rhyme, but for now I think it's good at this stage.

A: Yeah right. Awesome, thanks.

A: It's still early stage of the design, so as I sort of learn the code a bit of more, I will try to add more features.

I: Cool.

A: So, I will just ask you some of our questions if you don't mind?

I: Yeah, sure.

A: So, the current size of the bear, what is your opinion on that? Is it a good size, should it be bigger or smaller?

I: I think the current size is fine. It's good for most kids.

A: Fine size? Ok great

I: Yeah. By the way, is there an on/off switch?

A: No, there's no on off button yet. It's something we are looking to implement later in the bear.

A: How well do you think the musical patterns correspond to the different positions of the bear? i.e. Does it make sense or not really – is it too random?

I: (playing with the bear). Yeah, it makes sense after playing with it for a while. Because when you want your child to sleep, you don't want to have a fast song

playing. But if children like to drag their toys around like this bear, and they're running around with it, the music goes well with it.

I've seen some teddy bears, like the one my mum bought for my nephew - there are buttons on the bear's foot. One here and one here. Pressing one says a world like 'I love you' or something like that, or even a story. Adding a feature like that would be nice as well. But yeah, at this stage for prototype I think it's good and it makes sense.

A: Yeah, awesome. There's always room for expansion. But, a few more questions - How would do you rate the level of interactivity of the bear? Do you think they will get broad after a short time?

I: Hmmm. Well maybe I'd say kids from 1 to 3 or 4 years old, will have lots of fun playing with this. But once the child grows up a little bit, they will probably get bored of it. So, I think it's not going to last very long with older kids in my opinion. So I think it'd be best to target 1-4 years old kids. But it's fine, they can pass it along to their younger siblings after they've had enough of it

A: Awesome, so do you have any other suggestions for us other than what you've mentioned? Do you maybe think the constant music pattern might irritate other people around?

I: I think if they hold it upside down and it plays the fast, happy music constantly, it may get annoying. But for the most part I think it's fine. The music kind of reminds me of the sort of music you hear in an arcade when you hear those carousels. So personally, I don't get annoyed by it, for me it's fine. On the other hand, if you hold it like this for 5 minutes it may be pushing it, haha.

I: Yeah, haha that's true. Well we'll keep that in mind, but that's good to know. Ok so in terms of hazards, are there any obvious problems that you can see will need to be addressed?

I: Well after you've sewed it up, I don't think it'll be a problem. But in terms of wiring, that may be an issue. Like what are you going to do about charging, is there going to be an exposed charging port or something?

A: Yeah it will be a little USB connection

I: To charge a power bank or something?

A: Yeah, a port to charge the power bank.

I: Oh ok, well leaving an exposed charging port might be a bit of a hazard, unless it's tucked away somewhere. But, for the most part, it shouldn't be too much of an issue.

A: Ok great, thanks for your time answering these questions, feedback was awesome.

END OF TRANSCRIPT

User study 4: Prototyping classmate 3

(Q = Interviewer, A = Interviewee**)**

Q: Ok so I'll just ask you a few of these questions. First off, in terms of the bear's size – do you reckon it's a good size?

A: Yeah that's a good size. Can't complain about that.

Q: How well do you think, like the musical patterns correspond to the different position? Does it kind of make sense, was it clear or not so much?

A: Um, it's not so clear to me straight away, but oh hang on, so like if the bear is inverted it's a bit more of an alarming sound. But yeah it takes some time to understand it. And am I hearing some laughter in there too?

Q: Yeah a little bit. **So yeah the idea was when the bear is lying flat, it's assumed that the child is sleeping in bed sort of thing, so yeah.**

A: Oh yeah that makes sense, so it's in like a resting state *plays with bear a little longer*. Yeah, I like it.

Q: Awesome. So, are there any sort of flaws that you can immediately notice, or maybe hazards associated with the bear?

A: I was thinking with the bear, if it was bigger, the hardware would be less conspicuous [visible] maybe. Because as I'm holding it, the squareness of the Pi is quite noticeable. But in a bigger product you can sort of embed the Pi more inconspicuously to make it less noticeable.
But in terms of hazards, not really anything, I mean I assume you will sow the back up right? Like these things won't spark, ahaha, so it shouldn't be an issue

Q: Yeah, I have noticed it gets a bit warmer after a while, so that's something to think about later.

A: Actually yeah I noticed that too. Maybe there's like a heatproof enclosure for the hardware, but it's not a big deal. Overall no immediate hazards.

Q: Yeah, that's good. Um, how long do you think it will be before the bear loses its appeal, like uh, you know, before the child might get bored with it. Do you think there's a time limit before it loses its appeal to a young child?

A: Wow I'd have to put myself in the mind of a child because they find the most benign stuff endlessly fascinating. To me there not interesting obviously, haha. But what's cool is that every kid more or less is attached to their teddy bear so um it's kind of like a companion anyway, regardless of the tech inside. So I don't think it'll lose it's appeal. Let's hope it doesn't but, if the novelty of the sound wears off, they will still like the artifact as a whole, like the bear itself.

Maybe the parents would like an on/off switch though as the constant music may irritate people around them. But at the same time, the sound isn't so domineering or annoying, like it's not a screechy voice or anything like that which is good – it's a very soothing sound. It's NOT a sound that you hear and immediately think is annoying, so it won't get on people's nerves for that reason.

Q: Fantastic, that's really deep! So in terms of the toy itself, do you think the bear is the best toy for a child or are there other plush toys that might be more suited for this type of product?

A: Um, I think that the bear is like an archetype for the kids, particularly for the baby to toddler age group, which I would imagine is the age group for this sort of toy. So I think it's fine - every kid from a baby and toddler to a child would love it.

Q: Ok on that note, what do you reckon would be the most appropriate age range for this sort of toy?

A: I'd say like – not a new-born – maybe 1 to 3 years or really whatever, because some kids hold onto their bears for longer, so 1+ years.

Q: Ok fantastic. Lastly, are there any sort of suggestions or enhancements that you think might extend the novelty of the bear so to speak?

A: I mean, I like the idea of the bear saying phrases depending on how it's interacted with, so maybe like if you were able to squeeze it, it could say something like 'hey don't squeeze me!' But given the constraints of the hardware, I understand it may not be possible. Overall I think you've come up with a very elegant solution – I really like how you've blended the musical component with the laughing element – it's a step in the right direction.

Q: Awesome, well thanks for your input, it'll be a great help. Cheers!

END OF TRANSCRIPT