

## Contribution Statement

Sarah (25%) - Drew Storyboards

Daniel (25%) - Wrote out Written Scenarios

Mitali (25%) - Formatted document, Rewrote Parts 1-6 & Wrote Main Changes Section

Moein (25%) - Wrote Proposed Design Sketches

## CSE 440 Section AB, Winter 2018

# NanSee: Final Report

A virtual reality based immersive experience for interacting and spending time together with your child as you work

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## Team

*Sarah - Prototyping, drawing storyboards/sketches, conducting user research*

*Daniel - Project Management, Conducted and analyzed research, Facilitated discussions*

*Mitali - General Project Management, task analysis, writing assignment tasks*

*Moein - interviewing participants, doing research, writing text*


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## Main Changes

During section yesterday, we spoke with Nigini and Ashish about our final design solution which had initially consisted of a voice assistant based system that connected with both a real-time video capturing drone and a calendar based schedule organization tool. However, they immediately expressed some serious concerns regarding our solution such as it being too passive, constant recording meant major privacy concerns as well as what we were building was similar to what solutions already exist. As such, we felt that it was necessary that we rebuild our solution and think about our problem statement in more depth. In this report, we come up with a new final solution that hopefully is one step in the right direction to targeting these concerns.

## Problem and Solution Overview

The problem that we are attempting to solve is reducing the parents feeling of guilt and fear of missing out on raising their child after they return to their careers / work post maternity and paternity leave. More specifically, we think about **how might we help parents spend time / interact with the baby while they are away to reduce the feelings of guilt.** The solution that we propose is a virtual reality based solution that contains an immersive experience for both parents and children. For parents, we create a holographic system that projects video capture onto their surroundings for visual feedback and use earphones for audio feedback. For the child, we create a projector based systems that is placed at a close distance so that children are able to view their parents. Both parents and the children can interact with each other for the purposes of reading a book, singing a song, talking to each other etc. Moreover, parents also receive kinesthetic feedback from their baby's as parents receive information about their child's vitals such as heart rate etc. which can be used to derive information about whether the baby is happy, sad etc.



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voice assistant that can act as a bridge between a parent and their child's life while they are physically apart from their child. The voice assistant would be a more humanized interface for connecting to tools such as video capture systems to check in visually on their baby and a calendar that can coordinate the baby raising efforts of all those involved in the baby's life.


## Design Research Goals, Stakeholders, and Participants

For our research we chose to use interviews as our primary method as we believed it would be the most effective way provide relevant information for us to gain insight into the lives of our target group and other stakeholders. Our target group was parents who had returned back to work / school after having a baby. Since our problem is an extremely personal and emotional experience, we believed that the best way to learn about their experiences would be through crafting directed questions that would prompt parents to recount and reflect upon their personal experiences and decisions. We also felt this method was not as intrusive as other potential options. We wanted to use these interviews as a means of eliciting very specific and detailed stories regarding their experience so that we can understand the deeper emotions that exist underneath.

The participants we interviewed were parents who recently had a newborn baby and had the transition process of adjusting to having their lives revolve around their baby fresh in their memories. This way we could get an accurate picture of what parents feel as they make this transition. The participants we interviewed are described below.

### Participant 1

Our first participant is a father who has not taken paternal leave, and is a graduate student, who currently has a son who is 1 years old. Participant 1 helped us learn more about the importance of developing a strong relationship between parents and children early on.



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## Participant 2

Participant 2 is a user experience designer and researcher. We interviewed her over the phone, since she is very busy with her job and taking care of her son. She gave birth to her first child about one year ago. At the time she did not qualify to take any maternity leave because she had only worked one month at her job prior to giving birth. However, she was able to take 4 weeks of unpaid leave and returned to work when her son was one month old.

## Participant 3



Participant 3, is a new mother as well as a software developer for a startup tech company. She took about a month off prior to giving birth, and then took a three month paid maternity leave. We interviewed her about a month after her return to work so we were lucky enough to gain insight into her transition while it was fresh in her memory. We interviewed her in-person on a typical workday during the week at her office.

## Design Research Results and Themes

The interviews we conducted made it obvious to us that postpartum parents are faced with many problems after returning to work from feeling overwhelmed by the sudden change in pace of life to feeling emotionally distressed from being separated from their newborn baby.

### Missing one's child while at work / school

Many parents recount how they miss their child while at work and fear that they are missing out on important moments and emotions in their child's life. For example, one participant stated that every day she video calls her child while at work and talks to him because she misses him and wants to ensure that she is able to devote as much time as possible to raising her child. This suggests that we could potentially explore some way for parents to always remain in contact with their children so that they do not feel like their careers come in the way of raising their child.



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## Interacting with the Baby Despite the Physical Distance

As we conducted our user research, we realized that a common theme that parents use to cope with the fear of missing out is seeing photos and videos of their baby or evening video chatting with them. From this we realized that parents want to interact with their baby's even when they are at work / not physically with them.

## Tracking the Baby's Physical and Emotional Development

Through our user research we also realized that many parents are worried that their child might not be meeting development goals as well as they are not as emotionally satisfied as they could be if their baby had them present with them. As such, we realized that it would be interesting if the parents were able to have access to indicators that measure the baby's physical and emotional state so that they might be able to act on this data if necessary. This way parents might feel less guilty of not being physically present with their children all the time.


## Irregular Schedules Due to Their Children

Another important point that our research participants often stressed was how much of an impact having a child has on your daily life and schedule because of all the attention they required. This impact is really important because uncertainty and irregularity in schedules can often be the cause of increases anxiety and stress among parents. Moreover, if parents are unable to make something because of their work or careers, this might create a sense of "fear of missing out" or sense of guilt among parents, one of our main pain points with parents returning to work post parental leave.

## Answers to Task Analysis Questions

### Who is going to use the design?

The users of our design will be parents of newborn children who have returned to work / school post paternal leave. We are focusing on ensuring that parents are able to interact with their



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baby's in an immersive way as being away from your child while at work can be an extremely emotional experience.

### What tasks do they now perform?

The main tasks that our users currently perform are related to checking in on their baby while they are at work as well as worrying about what the physical / emotional state of the baby when they are not physically with their child. They perform these tasks by communicating with the person currently in charge of the baby through texting, phone calls, video calls etc.

### What tasks are desired?

Certain tasks that we think are desirable are potentially tools that may improve tasks above. For example, we might want a more immersive yet seamless method of interacting with the baby while you are not physically with him / her. Another task would be ensuring that the baby is emotionally and physically okay as well as performing activities that improve the baby's physical and emotional state if needed.

### How are the tasks learned?

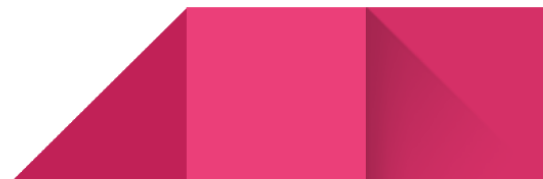
The tasks related to communication are often already learned from other aspects of life and they are merely applying the use of such tools to their childcare. Using a resource to collect information is also something that parents have generally learned to do as a basic skill.

### Where are the tasks performed?

The tasks will be performed while parents are at work or out running errands such as shopping and want to communicate with their child's caregiver. The tasks can basically be performed whenever the parent is not present with their child.

### What is the relationship between the person and data?

The relationship between the person and the data is directly obtained from parents through their own personal experiences. Information regarding care of their specific child may cross many



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different pipelines of communication as parents are likely to be owners of various devices used to communicate with one another. They might also be using certain technological tools such as nanny cams to be tracking their baby in which case certain information is transferred through the cam system. However, due to the fact that we are dealing with personal information, security might be important to consider in future solutions that involve moving around data of child.

### What other tools does the person have?

The tools the person may have include their technology which includes: phones, tablets, smart watches, computers. Informational data such as books, blogs, and articles. Relationships with other friends who may have become new children, as well as doctors.

### How do people communicate with each other?


People will be able to communicate with each other through instant messaging, calling on the phone, video chatting, sharing moments with other caretakers, family members and friends, as well as talking to coworkers. In addition, communication can come in the form of trackers/getting data about the child, where information is transferred through some device.

### How often are the tasks performed?

These tasks are performed on a daily basis, and probably at hourly intervals during the day, and even at night. Parents and caretakers are either directly involved with the child by taking care of him/her, or are periodically checking for updates from whoever the current caretaker is. Frequency of interaction among parents about their baby may vary based on day and based on the nature of work and childcare dynamics.

### What are the time constraints on the tasks?

One of the most important things to consider is allowing these tasks to not interfere with the parents daily lives. We hope to integrate childcare into a parents lives as seamlessly as



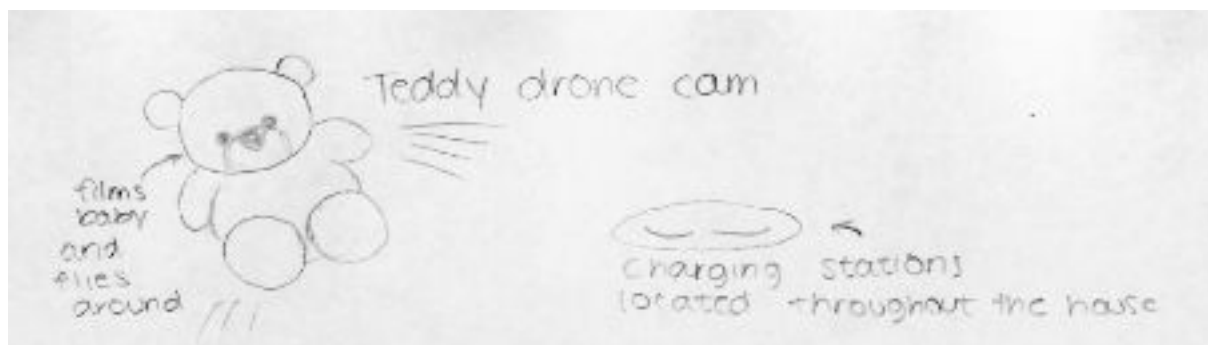
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possible, and our goals are to ensure that having a child will not have an impact long-term on a parent's careers or life long goals.

### What happens when things go wrong?

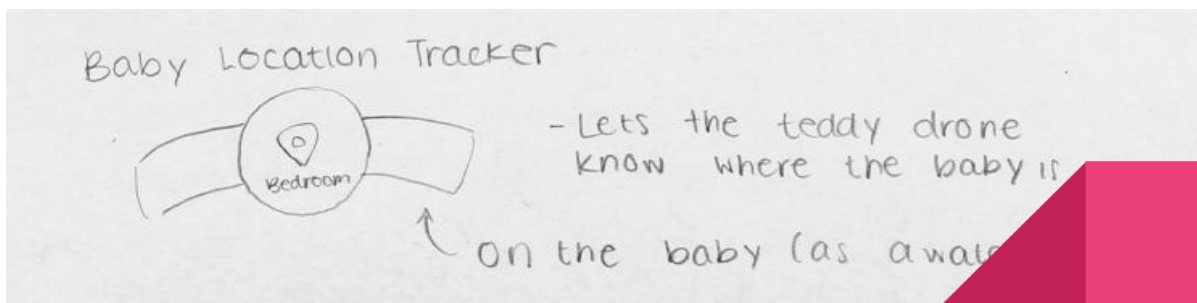
Because childcare is such a personal topic, it can cause for tension, anxiety or worrying among parents. Emotional stress and tension is common among new parents. Finding a good balance between taking care of your child as well as taking care of yourself and the rest of the family is often difficult for new parents. Swaying from either end of the spectrum can lead to feelings of a lack of emotional connection that cannot be compensated for or the fear of missing out on a child's growth. This may eventually result in failure to output satisfactory work and perhaps even harm parents' ability to effectively raise child.

### Proposed Design Sketches - 3 x 4



### TeddyDrone

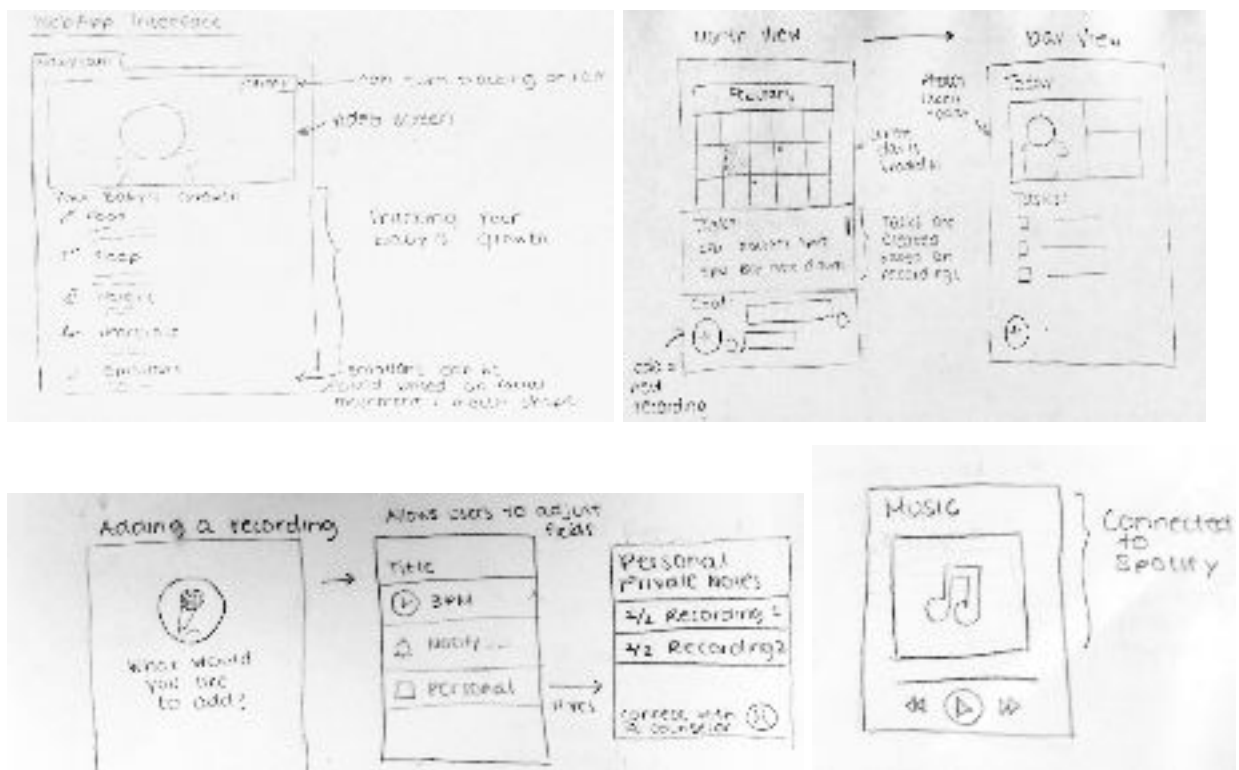
The TeddyDrone follows your child around and allows you to have access to real-time video of him/her. The drone is equipped with a baby locator wristband that you wear on your child so that it can locate him/her. It can either be active, flying around your child, or stationary, sitting on the charging station, depending on the situation. Even if the drone is stationary you still have





access to your child's real-time video. Through the wristband and facial recognition, TeddyDrone keeps a log of your child's food consumption, sleep patterns, weight, heart rate, emotions, and allows you to speak to your child. TeddyDrone also recognizes key moments of your child's development and creates a scrapbook for later viewing. This design supports the tasks of Enabling Communication between parents to Coordinate Child Routines by Allowing multiple people to communicate through the device, experiencing Key child milestones by recording child's milestones and saving them, easing emotional distress at Work by being able to view your child, and tracking development of child by keeping track of child's development and analysing it to make sure the child has a healthy development.

## Mobile App

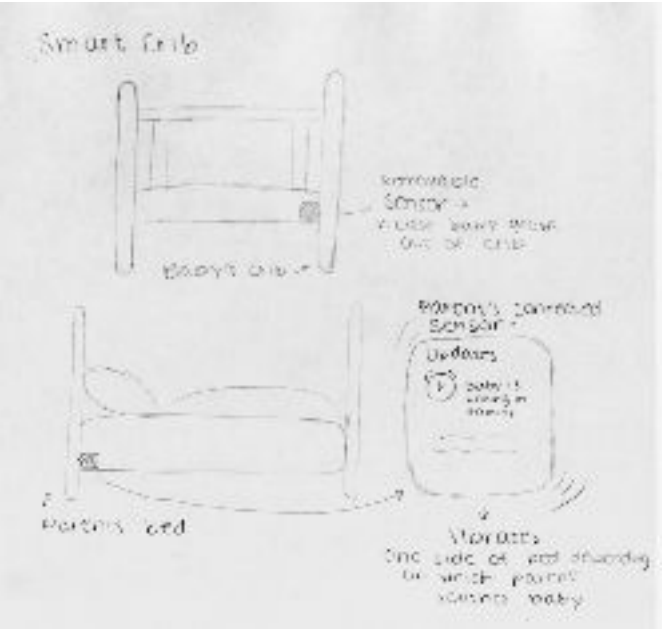


This design revolves around creating a smartphone app for parents/caretakers/extended family with the main aim of reducing their emotional stress as well as helping them organize their

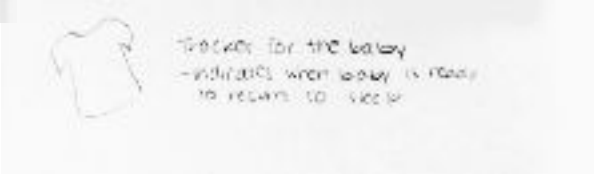
responsibilities. A calendar view feature allows users to organize their commitments and plans ahead. A day view feature enable parents to see their schedules for a day in advance. Additionally, parents can also log important milestones that of their child and thus use this as a digital album of key milestones that their child may be going through. Another feature, allows parents to communicate with counselors and talk through their feelings, and also communicate with other parents regarding what they might be going through. The App also provides calming music to help parents' distress. Through all these features the app supports tasks of enabling communication between parents to coordinate child routines, experiencing child milestones, easing emotional/physical distress at school/work, tracking development of child, and tapping into shared online knowledge and resources.

### Smart Crib

The third design solution is to create a simple ecosystem of IoT devices that would smooth out the process of tending to wake infants and putting them back to sleep. The motivation behind this solution is the issue of sleep deprivation that parents endure in the early stages of childcare. Babies will wake up multiple times during the night when the parents need quality time to sleep. There is a sensor that will rest on the baby's crib and track the infant's movements and status as he/she sleeps. The device will be used to recognize when the baby is about to emerge from a cycle of sleep. Parent



Beds also have a Sensor and a Smart Alarm that would similarly provide the functionality of



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tracking the sleep patterns of the parent each night. This device would also have the capabilities of waking parents gently. A Baby Smart Sleep Shirt would be used to detect physiological indicators that the infant is prepared to sleep. This design supports the tasks of enabling communication to coordinate child routines, easing emotional distress, reducing physical stress, and tracking the development of child.

### Selected Design

Our final design incorporates a virtual reality projections system for the child and a voice assistance system that the parent uses. The projector is equipped with cameras and microphones in order for the child to interact with its parents. This device will also collect health statistics of the baby and can send them to the parent if necessary. The voice assistance on the parent's end is also equipped with cameras and microphones in order for the child to see and hear its parents via the built in display. Through this device, parents are able to read books, sing songs, have a conversation, or simply view their child. While the parent is reading to the child the projector will display the book and the parent's face close to the child's face. At the same time, the voice assistance device is showing the book and the child's face to the parent. Through the vital tracker, the projector is able to recognize if the child is happy, sad, hungry, or sleepy and will send the information the parent so that the parent can make smarter choices. For example, if the child is sleepy, the parent could stop reading and allow the child to sleep. The other features of the device are similar, for example, if the parents want to have a conversation with the child he will be able to see the child on the voice assistance device and, in turn, the child will be able to see the parent via the projector. The voice assistance can be turned on through the parent's fingerprint in order to protect the family's privacy. Our device supports the following tasks. It allows parents to interact with their child despite the fact they are not physically with the child. Also through the data that the device stores about the child the parents will be able to assess their child's physical and emotional development and make adjustments to their lifestyles if necessary.

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## Written Scenarios

### Story Time

Lucia is a mother of a three month old infant, Robert, and she has just returned to her work as a software developer at a fast-paced startup. She has been feeling guilty for potentially missing out on a significant portion of her newborns life while she is away at work. In order to **keep up with her baby's life while at work**, Lucia takes a short break from her work and calls out to her voice assistant, "NanSEE, I want to start a story time session with Robert".

"OK, Lucia. Right now seems to be a great time for a story time. It is right after lunch time for Robert and he has a lot of energy."


A calling dialogue appears on NanSEE visual interface and within seconds Lucia's baby and Lucia's mother-in-law, Maria, appears on screen with a wide smile on his face. Lucia's face brightens at the sight of Robert and feels much joy just to see her baby.

"Are you ready for storytime, Robert?"

Robert giggles and nods his head.

NanSEE pulls up a short list of stories on her visual interface, "Lucia, I've found some stories that are a little more challenging than yesterday's in order to improve Robert's language development." Lucia looks through the titles then says, "Let's read *Green Eggs and Ham* by Dr. Seuss."

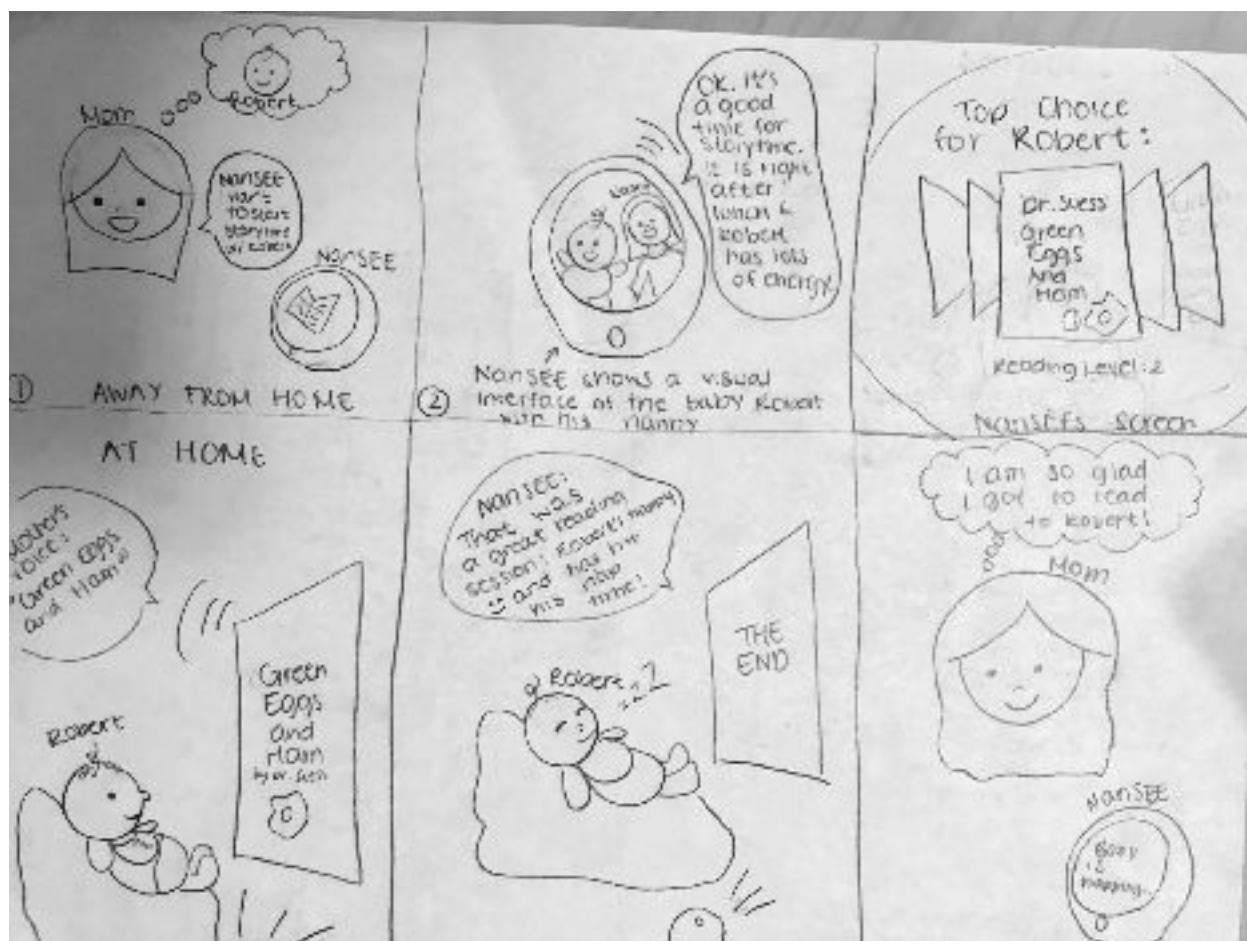
Lucia reads the story through her NanSEE device and Robert follows along on his NanSEE at home. As the story nears its end, Robert's eyes start to droop as he yawns. Once Lucia finishes the story, NanSEE suggests that Robert is content and ready for a nap. The story time session ends and Maria takes Robert to his room.



"That was a great story time session. Robert expressed much happiness and he hit his nap time right on schedule. This story time has made a great contribution towards his language learning skills" encouraged NanSEE.

"Terrific! That's all for now, NanSEE" replied Lucia.

"Have a great rest of your workday, Lucia". NanSEE then put her display to sleep mode and Lucia returned to her work feeling much better about her day.



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## Baby's Development Timeline

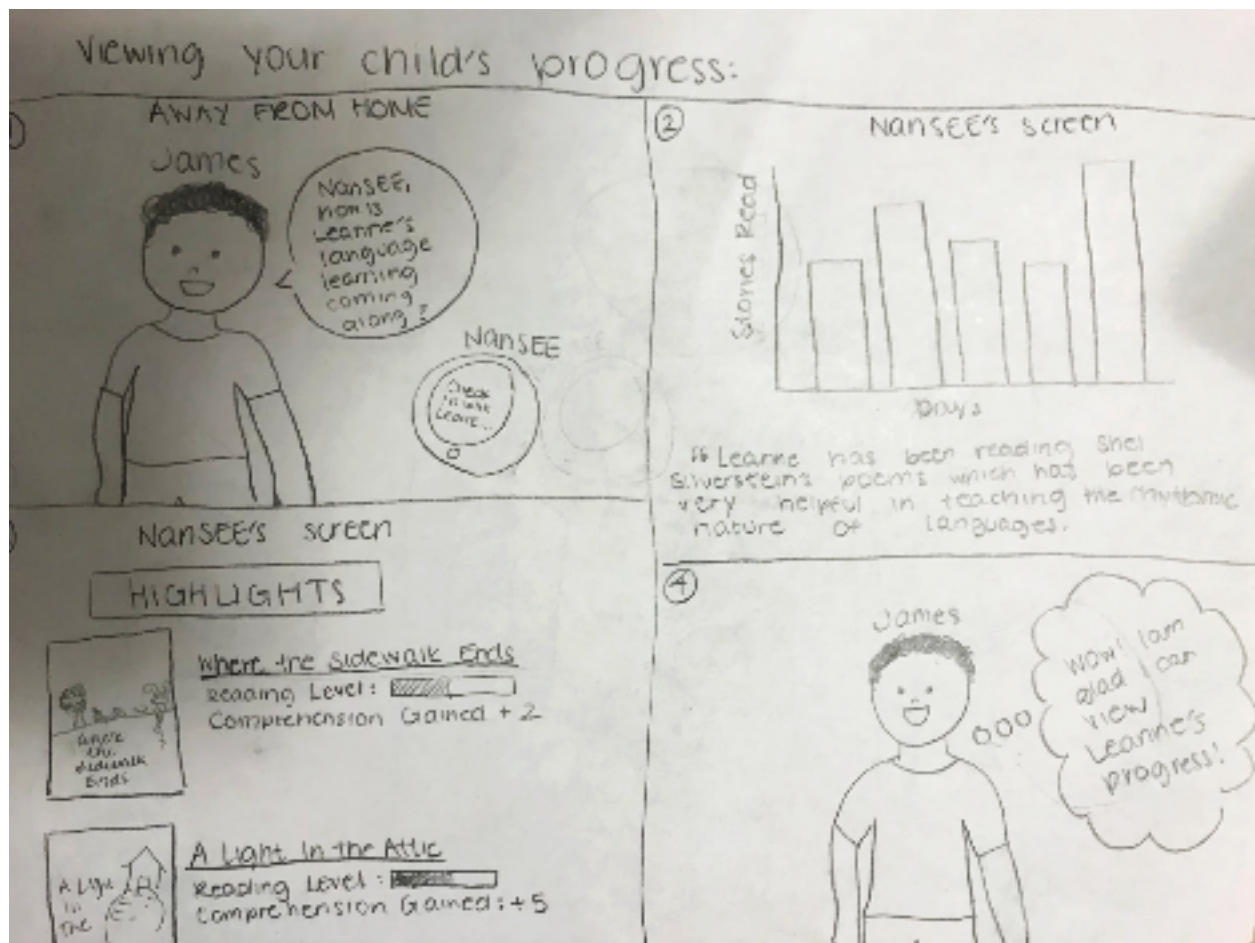
James walked at a brisk pace back to his desk after a lunch break with his coworkers. He had about ten minutes of down time before he needed to rush into four hours of meetings to finish his work day. However, the onslaught of meetings was the least of his concerns. He was thinking about his two month old daughter Leanne's language development. One of his coworkers, during the lunch break, had bragged on and on with pride about how his nine month old son had already started to speak his first words. Now James was worried Leanne might be behind other children.

"Hey NanSEE, how is Leanne's language learning coming along?" he asked the device sitting on his desk.

"Leanne has really enjoyed listening to yours and Martha's (his wife) readings of Shel Silverstein's poems. These poems are very helpful in teaching the rhythmic nature of languages and Leanne seems to be showing rudimentary beginnings of comprehension," NanSEE responded matter of factly, "Here are some highlights of Leanne's story times from the previous week with descriptions of some key milestones."

He quickly scanned through a nice timeline of some features NanSEE had seen from his story time sessions with Leanne that indicated what was just explained. In addition, there were reassuring remarks of how she was actually doing better than the average baby development, and James felt a burden lifted from his chest. He got up from his desk and headed for his meeting with five minutes to spare.





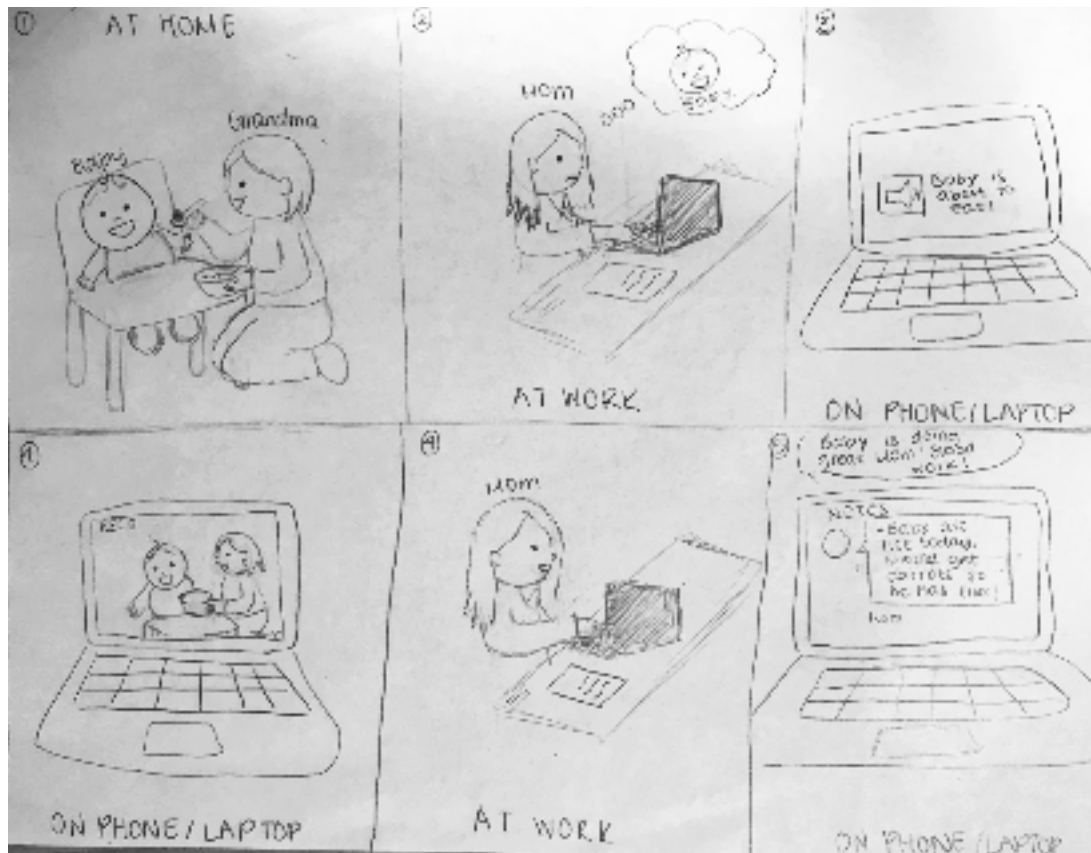
## Storyboards of the Selected Design

### Task 1: Story Time

NOTE: These annotations have not been included in the storyboard for the sake of clarity.

1. Baby is at home with his grandma and has begun to eat a meal.
2. The mother is at work and is starting to miss her child.
3. Voice assistant turns on and tells the mother that her baby is about to eat.

4. The mother watches the video feed and is inspired to save this memory and write a little about the experience.
5. The voice assistant says some encouraging words back to mother about how baby seems to be doing great in his development.



### Task 2:

NOTE: These annotations have not been included in the storyboard for the sake of clarity.

1. Weeks ago, the mother had scheduled an appointment for the doctor's office for their baby's monthly check up.
2. She speaks to the voice assistant and tells her to add it to the calendar



3. Today, the mother ran to work in the morning since she had an important meeting that she was late for.
4. The father is getting ready for work as well.
5. The father gets a notification from the voice assistant that they have a doctor's appointment today.
6. He did not know about this doctor's appointment because his wife forgot to tell him about it.
7. He looks at the calendar and sees that his wife cannot make it.
8. He then clears his own schedule and takes the baby to the doctor's appointment
9. No longer afraid that their baby is not reaching growth and development milestones.

