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UNIVERSITY OF CALIFORNIA,
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# VidCoach: A Mobile Video Modeling System for Individuals with Autism

THESIS

submitted in partial satisfaction of the requirements
for the degree of

MASTER OF SCIENCE

in Information and Computer Science

by

Van Erick Custodio

Thesis Committee:
Professor Gillian R. Hayes, Chair
Professor Gloria Mark
Professor Erik Linstead

2016

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# ABSTRACT OF THE THESIS

Vidcoach: A Mobile Video Modeling System for Individuals with Autism

By

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Master of Science in Informatics

University of California, Irvine, 2016

Professor Gillian R. Hayes, Chair

Autism Spectrum Disorder (ASD) is often characterized by a challenge in social skills, including the ability to interview successfully for jobs, a key hurdle in transitioning towards independent living. Employment interviews require mastery of a variety of skills that can be challenging for transition age youth with ASD. Building on previous work that suggests video modeling as a viable approach to teaching vocational skills, I evaluate the efficacy of peer and self-modeling for employment interviews across a variety of industries. I also study the impact of persuasive design on motivation and technology use. In this thesis, I present results from an iterative study of the feasibility and use of VidCoach, a prototype video modeling application. Results of the efficacy study indicate that use of video modeling can produce some improvement in interview performance. The use study produced deep understanding of use as needed in the specific context of mobile technologies for transition age youth with ASD. Persuasive design showed promise in motivating and positively impacting use of the VidCoach system for job interview

preparation. Both studies exhibited the potential of a video modeling system to promote behavior change, but additional work should be undertaken to determine the actual impact and present evidence to that effect.

# Chapter 1. Introduction

Persons with autism can experience deficiencies in reciprocal social communication and social interaction ("Neurodevelopmental Disorders," 2013). They can also demonstrate behaviors that are restrictive or repetitive. The severity of this condition can vary and so autism is often described as a spectrum, or ASD (Autism Spectrum Disorder). ASD can impair a person's ability to function in social and occupational settings. Transition age youth (16-25) with autism face substantial barriers to employment (Mawhood & Howlin, 1999; Müller et al., 2003). Although transition and vocational rehabilitation programs work to ameliorate some of the effects of their disabilities on their ability to achieve full employment (Taylor et al., 2012), research indicates that few participate in employment (Hendricks, 2010) and even fewer are competitively employed (McDonough & Revell, 2010). Transition programs seek to teach important vocational skills, such as interviewing, which build on foundational instruction in social skills, interpersonal communication, and self-advocacy (Bobroff & Sax, 2010). Specific employment skills, such as those required for successful interviews, can help students act more autonomously in future job searches as well (Lee & Carter, 2012).

Employment interviews act as a gating function for procuring employment and as a chance to meet the manager, see the worksite, and get a sense of the job before beginning to work. A successful interview, however, requires development of key interview skills. Many activities are used to teach interviewing skills through

transition programs, including role-playing, community-based instruction (CBI), and the writing and practicing of scripts (Kellems & Morningstar, 2010; Strickland et al., 2013). However, these activities are all time and human resource intensive. Additionally, CBI requires funding to travel into the community for practice sessions. In the face of many other activities, such as developing job skills and resumes, conducting searches for potential employment, and completing job applications, there are limited time and resources to devote to the important act of interviewing.

Video technology, such as video modeling and video prompting, can be a solution to teaching interview skills in resource constrained environments, like schools and transition programs. These approaches have been shown to be effective in supporting children with ASD (Ayres & Langone, 2005; Bellini & Akullian, 2007; Delano, 2007; McCoy & Hermansen, 2007) and adults with developmental disabilities (H. Cannella-Malone et al., 2006a; Goodson et al., 2007; Rehfeldt et al., 2003). However, most of this work was done with older technology including VHS and early models of mobile devices. Many used video modeling in a classroom. Antiquated technology was bulky and time consuming to use. This work leverages advances in video and mobile technologies. Contemporary devices are compact and easy to carry. High definition cameras and high capacity drives typically come standard in devices sold in the marketplace at the time of this work. While video modeling has been proven to help people with ASD learn and retain social skills, little work has been done to test its efficacy with modern technologies. With the

increased accessibility and technological innovations, researchers have an opportunity to revisit video modeling and study how it may have changed in efficacy and use.

Video modeling has been used in vocational settings to support transition students in performing work tasks (Burke et al., 2013; Van Laarhoven et al., 2007). Learning how to perform work tasks is important for the student once they have secured the job. Obtaining employment in the first place can be a more challenging prospect. A person has to learn on-the-job skills as well as how to communicate those skills in a job interview. Stress and trepidation can accompany the process of preparing for a job interview as well as the interview itself. In a job interview, the applicant is evaluated on their job preparedness based on the conversation and rapport between the applicant and the employer. Higher stakes and difficulties with social communication can add confusion, anxiety, and frustration to the process of job interviews. VidCoach squarely focuses on the activity of preparing for job interviews and aims to develop familiarity and instill confidence in potential applicants.

Video modeling has even been used to teach students to use the kinds of technology one might use for video modeling (*e.g.,* the iPod) (Hammond et al., 2010). With the steep growth of mobile devices and smartphones, it is very likely that young people with ASD today have exposure to and familiarity with interacting with mobile applications. Even though mobile devices are relatively less expensive now, they are still out of reach for many. The students studied in this work regularly attend

workshops that teach them how to use technology in and for the workplace. Many students that attend these workshops had to be issued a device through their transition programs.

Video modeling allows for the presentation of concepts and instruction in engaging visual ways (Goldsmith & LeBlanc, 2004) that leverage the visual strengths of individuals with ASD (McCoy & Hermansen, 2007) and can be used to facilitate observational learning (Corbett, 2003; Shipley-Benamou et al., 2002). The key factor in designing for video modeling is focusing on the user interaction in the application. Especially for students with ASD, it should not be taken for granted that video as a visual media would simply generate the desired outcomes.

Building on this work, I was interested in understanding how a combination of video modeling and video prompting, delivered via mobile device, might support the important but often neglected vocational skill of employment interviews. To test this potential, I designed and developed a mobile iOS application, VidCoach, which allows individuals to watch peer model videos as well as record their own videos in response to system-delivered prompts. This work then tests four major research questions. First, if not required, would people use a video modeling system to practice employment interviews, and if not, why not? Second, would use of such a system improve performance in employment interviews? Thirdly, what motivators and barriers exist in job interview preparation? And finally, how does persuasive design impact or encourage regular use of a video modeling system for transition age youth?

In this thesis, I present the body of my work based on two mixed method studies I conducted with the VidCoach prototype. This project was a collaborative endeavor through which I worked with a team to develop the first prototype and run the first study. I worked in requirements elicitation, design iteration, programming, and data analysis. In the second study, I was the sole designer, programmer, and researcher. In chapter 2, I will discuss related work in the areas of video modeling and prompting. In chapter 3, I describe the design methods and guidelines used to develop VidCoach. These chapters provide detail of the work done to find out what video modeling means to transition age youth and their caregivers. I also talk about how they use it and their motivation and goals in using it. This chapter will also cover the design process involved, such as scenarios, storyboards, and mockups. Furthermore, I recount the process of materializing the user needs in the interaction design performed for the development of VidCoach. In chapter 4, I outline the methods and results of the first deployment study focused on the efficacy of VidCoach. In this chapter I also detail VidCoach as it was implemented for that study. Chapter 5 discusses the second deployment study focused on the use of VidCoach as a result of persuasive design. This chapter follows a similar structure as chapter 4. Finally, in chapter 6, I conclude and provide some ideas for future design and development of a video modeling apps for individuals with autism. Here I also explore how the scope and functionality of VidCoach can be extended.

# Chapter 2. Background and Related Work

In the previous chapter, I introduced the concept of video modeling. I made the case for this work in relation to the prior work done in video modeling. This chapter describes in detail what video modeling is and reviews applications that have been developed based on research.

In 2005, Ayres & Langone conducted a review of existing video modeling research with students with ASD. They found fifteen articles featuring video modeling as an approach to address social and functional skills. Most of the work yielded positive results. Based on their review, they concluded that what they found was "much less than what we want to know and what we need to know." (Ayres & Langone, 2005) They pose some topics that require further investigation, such as the real world integration of video modeling by teachers and the definition of key aspects of video modeling that make it work.

## 2.1 Video Modeling

Video modeling typically involves watching recorded videos of oneself or others modeling ideal behavior (Bellini & Akullian, 2007). Peer modeling specifically refers to viewing an ideal example, performed by a peer or actor with similarities to the person learning the new skill. Self-modeling allows people to see themselves successfully completing a task. Self-modeling offers opportunities for self-evaluation and visual progression of personal growth. Additionally, some researchers have used video modeling as "video feedback," encouraging students to view videos after repeated errors (Van Laarhoven et al., 2007).

Video prompting is similar to video modeling in that it involves the teaching of a skill through video segments. However, in video prompting, students watch a segment, do the step in the task that the segment showed, then watch another segment, and so on with feedback given at varying intervals depending on the needs of the student and protocol being followed. This technique has been successful for teaching dishwashing (Sigafoos et al., 2007), microwave popcorn preparation (Sigafoos et al., 2005), and other cooking tasks (Mechling et al., 2009). Generally, video prompting appears to be more effective than video modeling, particularly for people with more profound disabilities (H. Cannella-Malone et al., 2006b; H. I. Cannella-Malone et al., 2011). Key factors cited as to why video prompting was better were the duration of the videos and the perspective of the video. Perspective in this case is meant to describe the point of view from which the video was recorded. An observer or third party perspective shows the model in the video performing the task. The first person perspective shows on the screen what the model sees as if the viewer of the video were seeing through the eyes of the model. If the task required the use of hands, one would see hands extend from the bottom of the screen as if they were the hands of the viewer.

Verbal prompting appears to perform better than video modeling for teaching vocational skills (Allen et al., 2012). In this case, the video modeling was delivered in one viewing outside of the context of the task to be performed, an issue the others note as a limitation. The ability to replay videos and watch them in context may be a consideration that would be important to take away from this work when designing a video modeling system. Also, only viewing a model can be limiting. Self-modeling

may be an additional component to seriously take into account. It also should be noted that this study had a very small sample size.

Video prompting, perhaps unsurprisingly, has been shown to be more effective than still image prompting (Laarhoven et al., 2010). The time consumed with creating still image prompting was noted as a major deterrent. The authors do point out that a mobile delivery of video modeling would be preferred to having to sit down in front of a computer to view the models. The study highlights the contrast between the fluidity of interaction with video modeling and the disjointed experience when working with still images.

Video based teaching techniques are effective, at least in part, because requiring someone to look at a small spatial area and to listen to specific necessary language forces them to direct their focus to relevant stimuli (Shipley-Benamou et al., 2002). However, traditional video modeling may not always be available at the time and place needed by students. The ubiquitous nature of mobile technologies provides an opportunity to make video modeling more connected to the activities users are trying to accomplish. Thus, researchers have begun to examine video modeling on mobile devices, such as the iPod (Mechling et al., 2009), to teach a variety of everyday living and vocational skills (Burke et al., 2010, 2013; Davies et al., 2003; Laarhoven et al., 2009). A prominent finding is that video modeling acts as an activity that prepares the viewer to respond a certain way to an event that may occur in the future. Students preparing for job interviews would likely benefit from being aware of possible questions before the interview itself. Anticipating the

questions that would be asked would be helpful, but, there may be challenges with simulating the spontaneity of social conversation. For example, a response to a question may simply be memorized or a question may arise that was not anticipated. Likewise, video prompting has been shown to be effective in employment settings when used on a mobile device (Laarhoven et al., 2009). A notable result from this study was a reduction in prompts needed to correct for errors and encourage technology use.

## 2.2 Review of Video Modeling Applications

A survey of the mobile application marketplace for video modeling apps may shed some light on the relevance of a video modeling system. I, therefore, conducted a search for mobile apps that use video modeling for autism that are currently available on the market. Each one had a different approach to how the user interacts with their videos. Many of them have good consumer reviews and research backing. They also vary in complexity and context. These approaches have their benefits but do not use video modeling in the fullest sense, in my opinion. I describe notable applications and areas how they use video modeling. This serves to highlight the novel means taken with my team's application and how it is a more comprehensive implementation of video modeling.

The My Pictures Talk App (Johnson, 2011) allows users to easily record and catalog videos. It emphasizes the ability to build and create a video library for easy access. The interaction is designed for parents to record, name, and organize the videos. The app does not include a library, meaning all content must be user generated.

AutisMate uses video modeling within the context of social stories and visual scenes. Videos as well as other multimedia can be embedded in a "story" within a "scene." AutismMate uses video modeling and social stories (Sandt, 2008) within the visual scenes presented in their application. Social stories is a method delivering instruction in narrative form through textual and visual information that provides context to the task being taught. AutisMate was used in a study to examine how eye tracking research data points to the effectiveness of technological interventions for children with ASD (Gillespie-Smith & Fletcher-Watson, 2014). This work extends across the domains of video modeling and social stories in visual scenes. Therefore it may be difficult to assess the impact of video modeling alone with this system. Like My Pictures Talk App, it is designed for parents to generate and organize the content, requiring much setup to create the stories.

iModeling (Autism SA, 2011) uses self modeling by parents recording videos of their children. It features separate parent and child profiles. Parent profiles have permission to access and edit videos of one or more child profiles. The app also allows parents to include rewards for viewing videos. This is done by showing a photo taken by the parent on the screen upon completion of a video. For example, a photo of a game may be displayed to indicate that the child will be allowed to play that game as a reward. iModeling concentrates on video modeling rather than video prompting. In other words, it designates only one video per task instead of segmenting the task into smaller components. The developers have reported that studies have been conducted over a three year period in collaboration with the University of Adelaide (Autism SA, 2013). Results were positive in regards to

perceived helpfulness and usefulness of the app.

inPromptu (Malone & Wheaton, 2011) aims to encourage self-prompting with the use of video modeling. The app includes predefined tasks with segmented videos. It allows for non-sequential and sequential viewing. Additional features allow users to organize tasks and set reminders. Minimal interaction is required for setup. However, it does not allow users to record themselves performing the tasks.

Payne et al. conducted a study evaluating the inPromptu app. This study was focused on the effects of video modeling on students with moderate to severe intellectual and developmental disabilities. Methods were designed to test different approaches to prompting while teaching with the aid of video modeling. The researchers were hoping to encourage independent use of the app and address prompt dependency (Payne et al., 2012). Task acquisition proved to be successful due to the prompts. One of the two participants in the study was able to operate the system with little assistance.

These applications raise research questions concerning whether or not a particular implementation of video modeling is more effective than another. It is difficult to examine the effects of video modeling when it is delivered within the context of other learning tools. Requiring a high level of user interaction to create content also complicates this assessment. Video modeling must be delivered in a simple and consistent format while allowing users to generate content for self modeling.

Particular to the context of job interview preparation, the related work around

video modeling leaves some open questions. Video modeling and video prompting have been contrasted in research, but their combination may produce different results. The applications surveyed used either video modeling or video prompting, but not both. What would a system that implemented both look like? More importantly, what would be its effects and how would it be used?

Likewise, peer modeling and self modeling were used in a mutually exclusive fashion. My research team was interested in using both of these approaches in our system and learning what the impact of the hybrid design strategy would be on participants. Job interviews lend themselves to both modes. A user could watch someone answer an interview question as well as answer the question themselves.

Finally, content generation is an issue that is raised by current applications of video modeling. Specifically, how do you create a system that provides relevant video content and allows the user to easily generate their own content? Current systems hamper users with the responsibility of creating new content. Also, provided content may not be relevant to the user.

As my research team and I began the design and development of our system, we considered questions surrounding video modeling, video prompting, peer modeling, self modeling, and video content.

# Chapter 3. System Requirements

To best design a video modeling application for students with ASD, my team and I gathered information about how video modeling is understood and used in context. We then deployed user centered design (Dix, 2009; Norman & Draper, 1986) techniques by creating storyboards, wireframes and mockups grounded in the gathered requirements.

At this stage, the research team was a collection of undergraduate students—myself included—that had teamed up to work on the video modeling project as part of the Undergraduate Research Opportunity Program (UROP) at UC Irvine. I was the first student to start working on the project and three classmates joined me after the first term. A fifth member to the research team was added a year later. This first team took on the tasks of designing, prototyping, and developing the first version of VidCoach.

## 3.1 Requirements Elicitation Methods

We used an iterative process for designing and developing VidCoach. We first conducted observations as part of a three-year collaborative action research project (Hayes, 2011) with six school districts in the Southern California area and two agencies from Orange County, California. This program includes a series of workshops aimed at teaching students and staff in a work transition program to use mobile off the shelf devices to improve student independent living skills. At the time of this study, 61 students (approximately 3/4 with ASD) ranging in age from 17 to 22 participated in the program alongside staff members from across the districts

and agencies (Hayes et al., 2013). The students involved in the program had varying disabilities, including ASD. We assisted and participated in these workshops to gain domain understanding of ASD and technology. In particular, we sought to interact with high functioning students with ASD to see how they used technology for work and what challenges they faced.

I then conducted semi-structured interviews with seven professionals and caregivers of individuals with ASD who specialize in supporting students with ASD in overcoming their barriers to employment (see Table 1). The interviews were conducted in person at their workplace and lasted approximately one hour each. Audio recordings and notes were typed for each interview. During these interviews, I asked if they were familiar with or had previously used video modeling as a tool in their work. I also gathered their suggestions and recommendations for using video modeling as an assistive tool for individuals with ASD. The interviews were transcribed for qualitative analysis.

| Participant ID | Role |
|---|---|
| DG1 | Program Director |
| DG2 | Program Manager |
| DG3 | Special Education Teacher 1 |
| DG4 | Special Education Teacher 2 |
| DG5 | Director of Support Services |
| DG6 | Case Manager |
| DG7 | Job Developer |

**Table 1. Requirements Elicitation Interview Participants.**

The research group held regular meetings with the faculty advisor to discuss design

decisions and share sketches, scenarios, and storyboards. All members read and wrote summaries for existing research related to video modeling, autism, and technological interventions for autism. This helped in gaining domain knowledge by understanding the theories and principles that led to the development of the concept of video modeling and the particular issues that video modeling can address in regards to ASD.

## 3.2 Requirements Elicitation Results

Our results indicate that video modeling, while prevalent in the research literature, is underexplored and underutilized for individuals in transition programs. Additionally, staff reported a variety of challenges in using these approaches. In this section, we describe the limited knowledge people had about video modeling and the design guidelines needed to improve the use of video modeling in this context.

### 3.2.1 Knowledge of video modeling and current use

Most of the participants interviewed were familiar with video modeling from a conceptual perspective, but only a few actually used it with their students. One teacher edited videos for her students to model events and interactions through the course of a day that would be qualified as 'good'.

*DG4 : We used it more in the format of, 'This is modeling a good day and look what happens when I have a good day.' It would be almost a 5 min video sometimes and they would watch it every single day.*

This approach appears to be time consuming. It would take time to edit these kinds of videos and it would likewise take time to view them with each student. The daily

repetition was an interesting approach as each day the teacher would reinforce and show models of desired interactions. It highlights the importance of making videos easily accessible and replayed.

A program director shared with us how video modeling was used by her teachers.

*DG1: It's been used a little bit in the programs...and if there's specific tasks that she wants them to learn how to do that has multiple steps in it she will tape the specific activity and then break it in into segments so the students can go back and look at it, see how it works and kind of learn that way so they kind of do chaining where they'll learn the first part of the activity, maybe one or two steps, watch on the video, go and practice, come back, watch the video again...*

The 'chaining' that she refers to is an incremental approach to learning a new skill or task that may be difficult to perform or remember due to the multi-step process involved. Chaining the segments of videos was a differnt approach to using video modeling that allowed an individual step to be viewed out of sequence. This reflects the flexibility of the medium. A teacher can return to the video at any time to focus on a particular action that the student may need to work on.

The same program director also mentioned that there are teachers in her program who do not use video modeling. "Other teachers aren't using it at all. And I think it's because they don't know how to (DG1)." Training teachers to use technology with their students can be a challenge. It takes time to learn how to use the devices. It also takes time to determine how to instruct the students with technology. This

could delay or stop progress with the students, especially if they are not accustomed to this mode of learning.

### 3.2.2 System Suggestions, Considerations, and Barriers

#### *3.2.2.1 Suggestions for Implementation*

Interviewees were also asked about their recommendations for how best to use video modeling and the best contexts for its use. A program manager explained how video modeling could be used within the context of preparing for a social interaction, such as a doctor appointment.

*DG2: You can take this device and privately go in, I could take my earbuds and privately sit and,'Oh my gosh, I'm going to the doctor and I didn't plan on going to the doctor, what do I do, what do I say, what does that look like?*'

Video modeling was mostly being used in the classroom with other students. Making it mobile can remove the time gap between watching the model and the actual interaction. This connection could allow the user to more readily apply what they just viewed. In addition, the user may feel more comfortable watching the models without others around them taking notice.

The concept of video self modeling was also articulated in our interviews. While the literature shows the effectiveness of video self modeling (Bellini & Akullian, 2007), it was interesting to see how much it was stressed in the interviews based on experience.

*DG3: I think it's effective when the students themselves can be part of it. Obviously, you know, they'll pay more attention, there's more motivation.*

What was “obvious” to the teacher was that a student would be more engaged in video modeling when they themselves are directly included in the activity. Self modeling brings the person into the process. When a student records themselves they play more of an active role in video modeling compared to one of a passive viewer. Additionally, watching back that video of themselves shows them actually performing the task as opposed to watching someone else and having to imagine themselves performing that task.

“They like watching themselves and they understand it if it is them (DG5).” This director of support services saw understanding come about when her students observed themselves in a video. This highlights how video self modeling encourages self-efficacy by instilling confidence from seeing oneself perform a task successfully.

*DG5: It’s almost rules based, you know, creating the rules of when and where you use things broken down into really little segments...break tasks down into really small objectives and sequentially...*

Another suggestion made by DG5 was to present tasks as a collection of smaller, more manageable components. Remembering the many steps of a task can be difficult for a person with ASD (MacDuff et al., 1993) and watching models in an incremental fashion can help overcome that.

*DG4: I have five kids with autism in this room. They’re all different, completely different, I would never use the same model on all of them because not only are they different on their skills that they are needing to work on, they’re at different levels.*

ASD is expressed in a variety of ways. As the same teacher pointed out,

*DG4: You're taught that, you know, '[If] you've seen one kid with autism, you've seen one kid with autism.'...They're all so completely unique.*

This means that a system built for students with ASD will have to be flexible enough to cater to different levels of engagement and use.

The effects of video modeling as told to us in our interviews can lead one to think that it should be used for learning every task. "Typically video modeling yields such awesome results that you want to do it for everything (DG4)." While video modeling is only one tool of many that she and other caregivers rely on to help their children, she is so pleased with the results of video modeling that she expresses her desire to use it in every aspect of her teaching. Some interviewees mentioned using other tools for learning, such as social stories comprised of still images to illustrate a sequence for a social interaction. *In vivo* modeling may at times be necessary, especially in cases of severe disability (Payne et al., 2012).

#### *3.2.2.2 Considerations*

Teachers and caregivers at times experience their students in a different way than the parents. Students' behaviors may vary by context, such as acting differently between home and school. Because of a student's changing behavior, certain abilities or barriers may not be as apparent. This was expressed in one interview.

*DG1: I think what we've seen that's made a difference is working with parental expectations of their students and with the videos what they've been able to see is*

*abilities maybe that they hadn't perceived their children to have in the past.*

Here the program director sees how video modeling can help parents realize what their children are capable of. Not only do the children benefit from watching videos of themselves but also the parents. This reinforced our vision of the application being used by the students in tandem with teachers, job coaches, caregivers, as well as their parents.

When introducing a new technology that requires a certain interaction, learning how to use it may or may not be a challenge.

*DG1: I think first of all, all of the teachers need to be trained on how video modeling can help them in their classrooms and so that's one thing. Training is one aspect that will be critical. The other thing is to make sure that everybody has the appropriate equipment...*

This depends on the approach taken in design. The interviewee is talking about some common issues that arise in the classroom when attempting to adopt a new technology. Time taken to learn and resources to provide devices, for example, are not luxuries that many classrooms have. This is especially the case in classrooms that serve students with disabilities. This concern emphasizes the importance of good, well thought out design that could lessen the need for training. Making the application a free mobile app instead of a desktop solution takes advantage of the existing mobile devices that students have in their possession and removes the need to acquire new equipment.

#### *3.2.2.3 Perceived Barriers and Challenges*

Learning how to use a video modeling system may pose challenges in the actual use of the system. This barrier may have been more challenging to overcome when video modeling was deployed with older, antiquated equipment.

*DG1: And if you don't know how to use the system that well, forward and reverse may be something like, 'Oh my gosh, I wish I knew how to do this a little bit better.'*

The interaction of 'scrubbing' through the 'tape' is an artifact of older analog systems that required manual control and taking note of timecode to index a tape. Another interviewee mentioned using video modeling with a system like this only to abandon it because of the time it took to use and teach with.

*DG3: ...back when I had one of those VHS kind of cameras. I stopped doing it simply because it became too time intensive for me to, say I would videotape and then each student had their own video and it got to be a lot of hassle.*

Video recording and replay has since gotten much easier. Videos can now be stored in digital files and the bulky mechanical equipment used to view them has been replaced with mobile devices. It is now common to find digital cameras on phones that fit in one's pocket with the ability to store hours of video in high definition. In addition, videos are now recorded in short snippets, which replaces the work of indexing a long 60 minute tape and scrubbing through it to find a recording.

With all the advances in video technology there still remains the work to organize, plan, and edit the recordings. The program director was concerned that teachers

would still refuse to take time use to video modeling despite some of the technological conveniences.

*DG1: And maybe the other piece is convincing them that they have the time to use it because the time element may be an issue for them...because it does take a little bit of structured thought to figure out...*

Advances in technology have simplified the video editing process, especially when editing systems turned to computers and digital video. However, the main challenge that the program director sees is the time it takes to create a relevant script for the task to be modeled, record it in a way that is viewable for their students, and edit the videos. These are only some of the tasks that "structured thought" would refer to. In other words, newer and faster technologies still do not eliminate the time needed to produce a series of videos for students with ASD.

A teacher mentioned the challenge of editing even in digital form on a mobile device.

*DG4: I would love to make individual video models...but it takes time, it takes editing which I'm not great at using a little ivideo or whatever...*

These issues can be addressed through deliberate design. These results indicate that a video modeling application should be pre-structured and formatted in a way that makes the action of recording the predominate interface. This design must not require the user to organize or edit their videos.

One of the limitations in using video modeling is its inability to model the

unexpected. There would be too many possible outcomes for any particular model. Persons with ASD can be known to have a greater challenge with unplanned circumstances or sudden and abrupt changes (Carter & Grunsell, 2001; Chiang & Carter, 2007).

*DG6: You can't control what other people are gonna do...There's always gonna be that where you create the video modeling but then have those captions at the end like what are things that are going to occur that, you know,...like all those other situations that you can't predict.*

Differences between what is shown in a model and what is actually experienced could create additional challenges. Students with ASD may be distracted by these differences or end a conversation completely due to this issue, as noted by a job developer in our interviews.

*DG7: Let's say you're showing a video of an interview and they're sitting across a table. Well, they go into the room and the table looks different. That's all it takes to totally, 'Oh wait, this wasn't what I just watched.' Some of our students are that sensitive.*

## 3.3 Design Issues

Based on the requirements that were gathered, we targeted design issues that needed to be considered for the development of our system. Here I detail what impact these requirements have on designing a video modeling application.

### *3.3.1 Using the system should not be time consuming*

Both traditional and modern applications of video modeling can take time to learn and use. A video modeling system should display an interface that requires minimal

training and is intuitive for the user. For example, recording a video as a response to an interview question should be experienced in a way that models natural conversation. The user should not have to be burdened with editing videos or managing a video library. Another time consuming activity is the creation of videos. Relevant modules that are well thought out and of professional quality should be developed. This minimizes the need for teachers to build scripts and trouble with video equipment.

#### *3.3.2 The system should allow access to individual steps*

Particular to job interviews, consideration should be given for designing for the ability to watch individual job interview questions. Some tasks require learning steps in a sequential manner, such as washing the dishes. Social interactions, however tend not to follow a certain order. Thus, we would need to design for an implied chronology of interview questions but allow the user to watch any question in any order. Access to specific job interview questions would likewise be useful for recording a response to a question that a student may have trouble with. A design that allows interaction with individual questions gives teachers and students the freedom to have a more targeted job interview preparation strategy.

#### *3.3.3 The interview structure and presentation should be flexible*

A job interview is a conversation that can have interactions and questions that may not have been anticipated. This made us think about designing questions in a way that takes into account the different answers that an interviewee could give as well as the different responses to those answers that the interviewer could give. Programmatically structuring an interview like a decision tree with different

outcomes for each question may or may not address this limitation. Conversely, scripting more broadly and using prompts to prepare the user for situations could be enabled with conditional language. For example, “If an interviewer asks for your resume, then you should hand them one.”

Another unanticipated variable could be the interviewer or the room where the interview is conducted. Some creative ways of addressing this limitation would be to programmatically change the background behind the interviewer. Foreground objects could also be introduced into the frame, such as a lamp or a mug. Another approach is to record several versions of the same questions and responses and have the application randomly swap them out.

Video self modeling can help establish visual consistency. Presumably the user will not dramatically change in appearance between modeling sessions. In addition, they may be more focused once they recognize themselves in the video.

If using real people might be too memorable for the student, perhaps animated or comic book style characters can be used. Students may then not expect the real life interview to be exactly like the cartoon or comic that they used to practice.

### 3.4 Design Methods

Members of the research team individually drew use case scenarios for the application in storyboards. These sketches were reported and shared at the meetings (see Figure 1). Iterations or redesigns were also discussed in the meetings. The same process was undertaken with wireframes and mockups (see Figure 2). The team also conducted several feedback sessions going over scripts for the video

models that would be recorded for the system (see Figure 3).

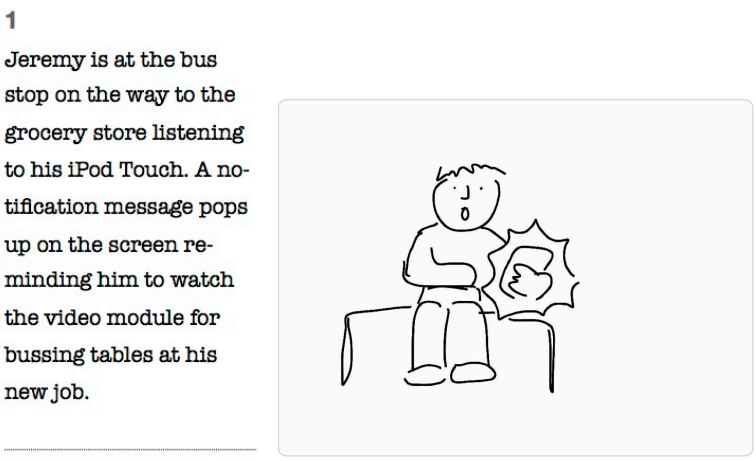



**Figure 1. Excerpt of a storyboard.**




**Figure 2. Excerpt of a mockup.**

***Student with Work Experience- Retail***

**Employer**: "Hello, nice to meet you. Please, have a seat."

Student shakes hands with employer.

**Student**: "Nice to meet you too."

Student sits down.

**Employer**: "So, I see here that you have some work experience. Tell me about some of your main responsibilities at your most recent position."

The student should limit their answer to one or two examples. The student should be as specific as possible, and relate their previous experience to the responsibilities of the job they are interviewing for.

**Figure 3. Excerpt from early version of job interview script.**

# Chapter 4. Efficacy Study

This work presents an interpretation of the results of two studies that explore the effects of a video modeling system we developed called VidCoach. The first focused on the efficacy of the approach of the system and the second looked at the use of the application. For the efficacy study, I and four other researchers conducted an experimental evaluation using mock job interviews to test the effectiveness of VidCoach.

## 4.1 Efficacy Study Method

To test the effectiveness of video modeling and video prompting, we used a pretest-posttest design. Potential employers were brought into the lab to interview participants. In between tests an intervention was introduced to a randomly selected subset of the participants. Randomly selected participants used VidCoach for a month. At the end of the month, all participants were interviewed again. The results of the pretest mock job interviews were compared with the results of the posttest mock job interviews.

### 4.1.1 Participants

Study participants were students receiving transition services from a public school system. All participants but one were 18 years of age (one was 17), and 13 were male, 2 female. A total of 15 students participated in the study, with 14 completing all research procedures (see Table 2). One participant missed one research interview (P6) during the pre-intervention condition, because he had to leave the session early to make another appointment.

| Participant ID | Group | Sex |
|---|---|---|
| P1 | Control | Male |
| P2 | Control | Female |
| P3 | Intervention | Male |
| P4 | Intervention | Male |
| P5 | Control | Male |
| P6 | Intervention | Male |
| P7 | Intervention | Male |
| P9 | Intervention | Male |
| P10 | Control | Male |
| P11 | Intervention | Male |
| P12 | Intervention | Female |
| P13 | Control | Male |
| P14 | Control | Male |
| P15 | Control | Male |

**Table 2. Efficacy Study Participants.**

#### 4.1.2 Setting

The study took place in a 600 square foot academic facility that included five individual rooms, each between 52 and 64 square feet in size, all equipped with video and audio recording equipment, and a waiting area. Each room included a table with two chairs. Four rooms were used for conducting mock employment interviews simultaneously with one room used for conducting research interviews. All interviews were recorded from a control room that allows for remote pan/tilt/zoom of cameras, feed recording to a DVR, and remote communication with the individual rooms through intercom. The waiting room was equipped with several chairs and a table that held snacks and beverages for students awaiting their interviews.

#### 4.1.3 VidCoach as Implemented in Version 1

The interview videos were loaded into a prototype software system, named

VidCoach, that was developed for iOS5 using Objective-C with a SQLite Database (See Appendix C for system architecture). The VidCoach software was designed in consultation with transition specialists, job coaches, and potential employers through a long-term action research (Hayes, 2011) project focused on technologies for transition. During the design phase, we engaged five domain experts on our design team with the five design researchers. The work of development of the app was divided among the four researchers that possessed skills in programming. My role in development dealt with front-end and back-end work. For the front-end I placed the visual elements on the interface of the app and connected it to the back-end logic. I was mainly responsible for programming the video playback functionality and the hand-off of data as the user progressed from screen to screen. The latter refers to information that needs to be saved or displayed based on what the user selected in the previous screen. Beyond just a shell program to hold the custom videos, VidCoach is a mobile video modeling and prompting application to support students with ASD in learning interview skills. VidCoach was explicitly designed with a focus on mobility and customizability as well as the core functionality of peer and self-modeling. Students in the treatment condition were given the option of using VidCoach on their own iOS devices (n=2) or on an iPod touch provided by the researchers (n=6). VidCoach could be used at home, at school, directly before a job interview, or at any other time desired.

Another important part of the design was to script the videos that would be used in the app. We looked at appropriate questions to be asked in the videos as well as by the app itself. We collected six job interview question sets from prospective

employers in Southern California who had all previously committed to working with individuals with disabilities in transition and vocational training programs (see Table 3).

| Question | Candidate Response | Rating |
|---|---|---|
| Tell me about a time when you wentout of your way to help a customer?<br><br>What did you do?<br><br>OR<br><br>*If candidate is a student without work experience ask:* Tell me about a time when you went out of your way to help a classmate with a project? | Customer Service<br><br>Initiative<br><br>Make Suggestions<br><br>Exceed Customer Expectations | |

**Table 3. Excerpt from employer interview question set.**

Likewise, we collected two evaluation forms from employers used to assess candidates participating in interviews, which provided us with a basis for understanding the criteria by which answers to the collected questions sets might be evaluated. Using these questions and evaluative criteria as a foundation, we first developed a general interview script. This general script was recorded and reviewed using members of the research team as actors. Scripts that were specific to particular workplaces were then created. Six scripts were created with two versions each, one for interviewees with experience and one for interviewees without experience, with the exception of the general script, totaling eleven unique scripts.

Six interviews from this set were then recorded using twelve volunteer actors and loaded into the application:

- General
- Food Service
- Healthcare
- Hospitality
- Retail with experience
- Retail without experience




**Figure 4. Overall menu structure of VidCoach (Version 1)**

The VidCoach application supports peer modeling and self-modeling functionality with both videos and prompting to support learning goals. Specifically, two types of prompts are available through the VidCoach system: pre and post. *Pre-prompts* or

*cues* provide instructions, such as "Hand the interviewer your resume." *Post-prompts* ask questions about a task or behavior, such as "How long should you shake hands?" Depending on whether or not users answer the post- prompt correctly, they receive colored feedback in the form of pop-up alerts: green for correct answers and red for incorrect answers. These color-coded components in VidCoach were designed to help students make visual associations and reinforce their learning (Quill, 1995). These prompts help the user reflect upon the behaviors they are trying to learn and model (Goldsmith & LeBlanc, 2004). As capabilities improve, the prompting can be turned off.

Upon opening the VidCoach application, users are presented with an interface through which they can select a category of videos to watch and practice (see Figure 4).

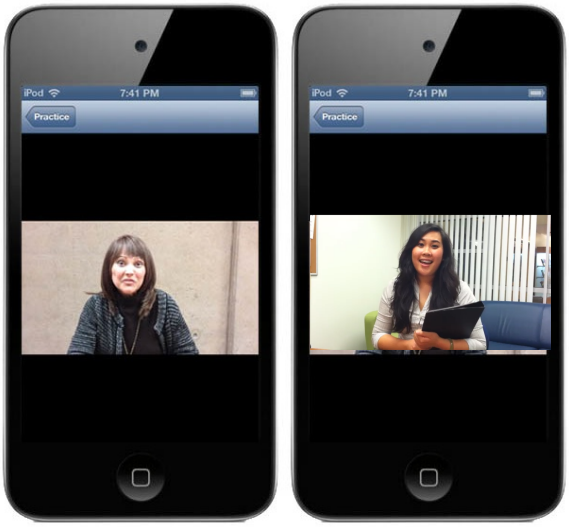



**Figure 5. (left) An interviewer asks questions, which a peer model answers (right).**

After selecting the category and video to view and/or practice, the user is presented with a selection of three activities: “Watch Model,” “Practice,” and “Watch Practice”.




**Figure 6. A post-prompt, which typically asks the user to answer a question about the task they just watched.**

Each video is broken into smaller segments or sub-tasks, which are questions asked in the interview. Users can choose to watch a video in its entirety, or choose to watch a single segment.

The “Watch Model” option supports peer modeling (see Figure 5) by allowing users to watch individuals like themselves in age and appearance modeling appropriate interview behavior. After the interviewer asks each question, a cue appears informing the student about the appropriate response. The model then appears and completes the task. After the user watches the model complete each task, a post-

prompt asks the user to answer a question about what they just watched (see Figure 6).

The "Practice" and "Watch Practice" modes support self-modeling by allowing users to watch the interviewer side of the video and then self-record their responses to the tasks presented in the video with the forward-facing camera. The VidCoach application allows users to re-record a response immediately or to record a new interview at some other point in the future. After recording their responses, users see a post-prompt asking a question about the task they just recorded themselves completing, just as in the peer-modeling scenario. Once a self-modeling video has been created, users can select the "Watch Practice" option from the main user interface to watch the video with all of their recorded responses. Giving users the ability to watch their recorded responses allows them not only to see themselves successfully completing tasks, but also to monitor their progress. If after watching themselves, users think they can improve, they can return to the "Practice" option and select an individual segment to record again or choose to record the entire interview again.

#### 4.1.4 Procedure

Participants were randomized into a treatment or control condition. At the first visit, participants consented to participate in the study, and completed two mock job interviews and a research interview. The treatment group then received a mobile video modeling application, VidCoach, to use for one month. Both groups returned

for a second visit one month later, during which they again completed two mock job interviews and a research interview. Students in the treatment group returned the iOS device at the end of the study. To allow students to benefit from use of the app outside of the study, those who had their own iOS devices in both the intervention and control groups were given—or allowed to keep using— the app at the end of the study.

All usage of VidCoach was logged (See Appendix E1 and E2) in local files on the iPods and iPhones used during the intervention. These logs were retrieved at the end of each student's participation in the study. Two kinds of use information were logged on each device. When a participant viewed a video, the interview the video was associated with and its number were recorded with a timestamp. When a user recorded a video, the name of the recording file is saved. The recording filename is comprised of the name of the interview, the sequence number of the question in that interview, and the timestamp of the recording. These logs were computationally processed to create descriptive statistics for participant use as described in the results section.

Seven employers volunteered to interview the participants. Three of the employers were from retail companies. The other four represented healthcare, hospitality, food service, and a non-profit organization.

Each employer assessed each interviewee across six categories using a scale from 1 (Poor) to 4 (Excellent). The range of categories included: Presentation, Preparation for the Interview, Verbal Communication/Content of Answers, Interpersonal Skills,

Desire/Interest, and Skill Level (see Appendix E3).

All mock employment interviews (59 interviews) and research interviews (30 interviews) were video recorded. The mock employment interviews were analyzed for interviewee behaviors. I and another research team member compiled operational definitions of interviewee behaviors in the mock employment interviewer (see Appendix E4). We coded 12 interviews to establish inter-rater reliability. The two of us then proceeded to code the remaining 47 interviews, 23 of which I coded. Research interviews were then transcribed for qualitative analysis. The task of transcription was divided evenly across the five members of the research team. All members of the research team read the interview transcripts from all participants so we as a team would have working knowledge of the data we collected. Our overall analysis was a mix of inductive and deductive approaches. From this point, we analyzed the research interviews. We examined the interview transcripts for data related to our initial hypotheses surrounding the potential feasibility and efficacy of a mobile video modeling and prompting tool for teaching interview skills. Additionally, we looked for explanatory interview data to help unpack the trends we saw in the quantitative results. In terms of inductive analysis, we used coding, memoing, and affinity diagramming through the analysis process (Charmaz & Belgrave, 2002).

During the first round of open coding, codes focused on reactions to VidCoach and its videos, understanding of student behaviors around practicing of interviews, and responses to both watching and recording videos. One researcher drafted multiple

memos describing her analysis of the interview data to serve as the basis for discussion with the rest of the research team. Based on the first round of coding, an additional round of coding and analysis was conducted to examine further the challenges and opportunities of teaching interview skills through video modeling and prompting. That same researcher then aggregated themes related to these challenges, drafting a discussion of these results for the rest of the team who engaged with these concepts and the original source data to finalize the findings.

Mock employment interview videos were scored according to a rubric developed over the course of several weeks (See Appendix E3). Based on the scoring guides used by employers that had been collected in the first phase of the project, we first categorized large chunks of behaviors, such as physical appearance, facial expressions, body language, and spoken answers. We then broke these down into smaller variables for which we could develop operational definitions. Four of these variables were scored one time for an entire video: professional and appropriate dress and appearance, hygiene and hair care, handshake, and ability to ask an appropriate question. Although the last one could occur multiple times in an interview, in practice, interviewees are only ever asked if they have any questions once per interview. Thus, we scored this variable only once. The remaining 15 variables were scored once per minute for the entire video and included: reading from notes, inappropriate use of food or beverage, fidgeting, rolling in chair, showing appropriate posture, monotonous speaking, inability to understand questions asked, use of correct grammar and vocabulary, clear speaking, logical and succinct presentation of ideas, smiling, frowning, interruption, tone of conversation

(professional v. casual), and licking lips or sticking out tongue. Once the initial operational definitions had been developed, three researchers scored one video and then discussed any disagreements. This enabled us to develop clarity around the coding scheme, adjusting the operational definitions as needed. This process continued iteratively for four more weeks.

Once the operational definitions were finalized, twelve interviews of the 59 (~20%) were coded by two coders to ensure inter-rater reliability, which was very good with Cohen's kappas for the variables ranging from 0.882 to 1 and agreement percentages for the variables ranging from 94.6% to 100%. One variable, inappropriate use of food or beverage, initially received an unacceptable kappa of 0.664, but the coders reviewed the video footage and reached agreement on the behavior instance in question so that they would properly code future videos. After reaching agreement, the remaining interviews were coded by only one coder.

Welch's two sample t-tests were performed to evaluate whether performance was significantly different between time periods and between groups.

### 4.3 Efficacy Study Results

During interviews, all participants regardless of condition, reported feeling more relaxed and/or confident in their interview performance during the post-test mock employment interviews, such as described in the following interview excerpts all from participants in the control condition.

*P2: I felt more comfortable...Because it was easy to answer all the questions*

*P6: Because the first one [baseline] I wasn't elaborating the answers – I wasn't elaborating the answers. I was making short answers and kept talking about customer services, because I was a bit nervous. I did well, but this time I did better.... [I was] Calmer and confident*

*P10: Like, I didn't get like caught in a question that I couldn't answer or a question that I couldn't ask.*

*I: Oh okay, so you didn't get "stuck" this time?*

*P10: Yeah, I didn't get "stuck" that's what I mean.*

*I: Okay, that sounds good. Um, how did you feel?*

*P10: Um, I felt pretty calm.*

Given that the participants were seeing the interview location and going through the process of waiting in our waiting room and then being interviewed for the second time, this result is not surprising. Four participants each had one employment interview with an external potential employer in the month in between, and one had two interviews. So, some of the improvement might also have been related to that experience. However, the other ten participants had no external employment interviews during that month.

In terms of employer assessment of interview performance, the intervention group students were assessed notably higher by interviewers in the second set of

interviews, $t(158) = 3.91$, $p < .001$. In the control group, interviewers' assessment of students did not change from the first set of interviews to the second, $t(157) = 1.31$, $p = .19$ (see Table 4).

| | Control group | | | Intervention group | | | |
|---|---|---|---|---|---|---|---|
| Variable*** | Pre-mean | Post-mean | Difference | Pre-mean | Post-mean | Difference | Difference in differences |
| Professional appearance | 3.214 | 2.929 | -0.286 | 2.571 | 3.286 | 0.714† | 1.000 |
| Prepared for the interview | 2.643 | 2.571 | -0.071 | 2.286 | 2.857 | 0.571† | 0.642 |
| Good communication & answers | 2.571 | 2.857 | 0.286 | 2.357 | 3.036 | 0.679† | 0.393 |
| Showed engaging demeanor | 2.714 | 3.000 | 0.286 | 2.643 | 2.964 | 0.321 | 0.035 |
| Showed interest for position | 2.714 | 3.000 | 0.286 | 2.571 | 2.857 | 0.286 | 0.000 |
| Possessed required skills | 2.143 | 2.808† | 0.665 | 2.357 | 3.154 | 0.797† | 0.132 |
| **Total** | **2.667** | **2.861** | **0.194** | **2.464** | **3.026** | **0.561**** | **0.367** |

***See Appendix E3 for variable definitions † p<0.10 * p<0.05 ** p<0.01 (Welch two sample t-test)

**Table 4. Mean Mock Interview Scores in the Control and Intervention groups, difference and comparison between pre- and post-mean values.**

To understand which specific behaviors might be improved using VidCoach, we also tested the researcher-produced scores of interview performance. Results showed that for certain behaviors, VidCoach usage resulted in a measurable improvement in interview performance. In the intervention group, differences were calculated between pre-intervention interview performance and post-intervention interview performance, while in the control group, differences were simply calculated between interview performance in the first two sessions and interview performance

in the later two sessions (see Table 5). Welch's two sample t-tests were performed to evaluate whether performance was notably different between time periods. Three variables showed notable improvement in the intervention group but not in the control group: participants who used VidCoach fidgeted less often, $t(316) = 2.31$, $p = .022$, presented ideas logically and succinctly more often, $t(332) = -2.64$, $p = .009$, and showed improvement in hygiene and hair care, $t(23) = -2.11$, $p = .046$. Surprisingly, one variable showed a notable improvement in the control group but not in the intervention group: participants in the control group were more likely to use correct grammar and vocabulary than participants who had used VidCoach, $t(267) = -3.44$, $p < .001$. Although we cannot be sure what the underlying mechanism for this difference is, we note that the scripts used in VidCoach were intentionally casual. In addition, the researchers used informal language to communicate with the participants during the study. This approach was likely motivated by our desire to help the students not be overwhelmed by the laboratory setup. For example, we provided a separate room with snacks and drinks for the students and mingled with them. These influences could have impacted the perception of formality during the mock interviews.

Due to the small sample size, a closer look at possible outliers is warranted. In the intervention group, P9 and P3 made the biggest improvement in employer scores (+1.55 and +1.46, respectively) compared to the others whose improvements ranged from -0.25 to 0.42. For both participants, the score increase was due mostly to better posttest scores in verbal communication and skill level. P3's score was additionally helped by a marked improvement in personal presentation. P9's coded

behaviors reflect a notable improvement in professional appearance and the presentation of ideas in a logical and succinct manner (more by 35%). P3 also improved in professional appearance, but the other behaviors that faired better in the posttest were fidgeting (less by 25%) and using correct grammar (more by 20%). Communicating well either conceptually or clearly scored high in both employer evaluations and behavior coding. Looking at these two outliers point to the possibility that communication skills could be a key factor in job interview success. Increasing the sample size in future studies may help to better test the impact of communication skills. We can see that the small sample exhibited wide variance. Simply increasing the number of participants might not be sufficient. Perhaps controlling for pre-existing behaviors would help strengthen the claims from future results. For example, we could group students by levels of communication skill and observe the changes within the subgroups from the intervention.

Professional appearance was scored once per interview when coding for behaviors. Only P9 and P3 out of both intervention and control groups improved in their professional appearance. Eight students (both groups) had professional attire for pretest and posttest. Three were not professionally dressed for both pretest and posttest and one actually worsened in professional appearance in the posttest. An improvement by two participants who happen to be in the intervention group likely skewed the results. Additionally, the one-time coding of behaviors gives them greater weight over behaviors coded for each minute. A weighted scale would have balanced the coding of the behaviors.

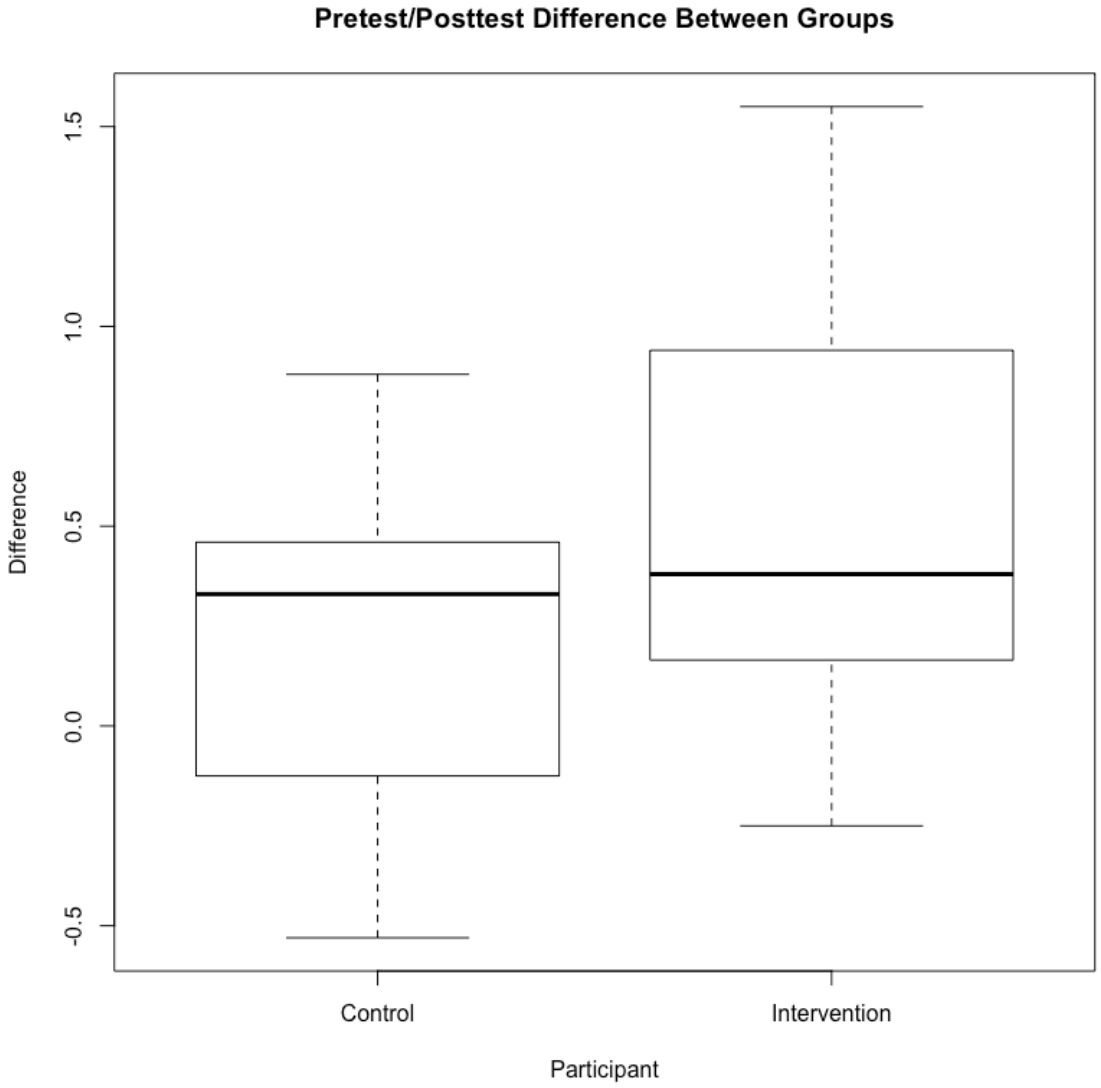



**Figure 7. Difference in scores from pretest to posttest.**

The control group, likewise, had participants whose low scores may have exaggerated the difference between groups. P15 improved by only +0.88 in employer score, which is the largest improvement in the control group. That is almost half of the amount of improvement of P9 in the intervention group. Also, P5

of the control group decreased in employer score by -0.53, which is about double that of the largest decrease of anyone in the intervention group (P11: -0.25). The coded behaviors for P15 and P5 show the most notable improvement in speaking clearly. From this, it appears that speaking clearly may not necessarily mean that the ideas and concepts they are presenting are fully understandable. The generally low employer scores of the control group reflect this. On the other hand, there may be a relationship between the ability to present ideas in a clear manner and higher employer scores, as was noted with the intervention group outliers. A small sample size prevents a correlation or regression analysis to be conducted on these factors.

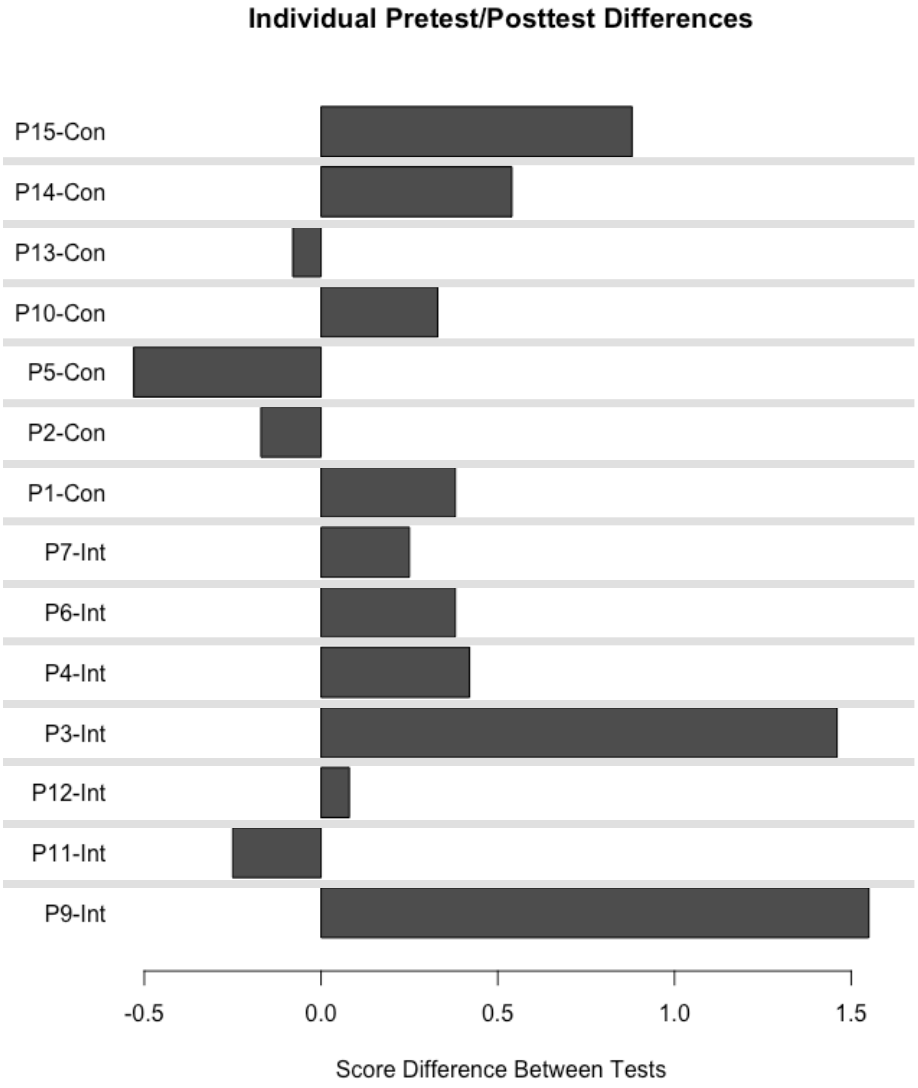



**Figure 8. Individual differences in scores from pretest to posttest.**

The effect size of improvement in fidgeting, hygiene, and presenting ideas logically and succinctly are marginal (Cohen's d = 0.29, 0.33, 0.39 respectively). This may mean that there are likely other factors that should be considered. Had the study worked with a larger sample of participants, we would have seen a more normal

distribution of scores and more accurate sample means between groups. Despite similar variances between the groups and a promising effect size in the mock interview scores (Cohen's d = 0.61) a larger sample would have been more desirable and would likely result in more conclusive outcomes.

Examining the outliers individually help us to see what factors may have impacted their "extreme" results relative to their respective groups. The point here is not to generalize these findings. In fact, for this population and the wide variety across ASD, it would be wise not to. Also, the small sample size prevents the broad application of the study's statistical claims. The focus then becomes how these particular individuals were influenced by the intervention.

A single case design could have resulted in more impactful results, but would require heavy reliance on qualitative measures. We were interested, too, in observing groups in this intervention. It was also important for us to offer the intervention to as many students we could find.

Each student is so unique in their expression of ASD. Even if the sample size were doubled, it is likely that the variance would still be high. Also, recruitment from this population is very challenging. Since each student is unique, they each have their own schedule and plan for education and there rarely is overlap.

| | Control group | | | Intervention group | | | |
|---|---|---|---|---|---|---|---|
| Variable *** | Pre-mean | Post-mean | Difference | Pre-mean | Post-mean | Difference | Difference in differences |
| **Good hygiene and health care (+)** | **0.786** | **1.000** | **0.214†** | **0.500** | **0.857** | **0.357*** | **0.143** |
| Used handshake (+) | 1.000 | 1.000 | 0.000 | 1.000 | 1.000 | 0.000 | 0.000 |
| Asked appropriate questions (+) | 0.571 | 0.500 | -0.071 | 0.571 | 0.643 | 0.072 | 0.143 |
| **Did not fidget (-)** | **0.481** | **0.413** | **-0.068** | **0.476** | **0.352** | **-0.124*** | **-0.056** |
| Did not understand questions (-) | 0.173 | 0.180 | 0.007 | 0.180 | 0.110 | -0.070† | -0.077 |
| Used correct grammar and vocabulary (+) | 0.892 | 0.980 | 0.088** | 0.926 | 0.952 | 0.026 | -0.062 |
| **Presented ideas logically and succinctly (+)** | **0.778** | **0.820** | **0.042** | **0.794** | **0.897** | **0.103**** | **0.061** |
| Eating or drinking during interview (-) | 0.000 | 0.000 | 0.000 | 0.005 | 0.000 | -0.005 | -0.005 |
| Smiled during interview (+) | 0.405 | 0.493 | 0.088 | 0.487 | 0.414 | -0.073 | -0.161 |
| Used formal language (+) | 0.957 | 0.987 | 0.030† | 0.963 | 0.979 | 0.016 | -0.014 |

***See Appendix E4 for variable definitions  † p<0.10  * p<0.05  ** p<0.01 (Welch two sample t-test)

(+) Positive behavior  (-) Negative behavior

**Table 5. Mean of variables in the Control and Intervention groups, difference and comparison between pre- and post-mean values.**

### 4.3.1 Acceptance of Video Modeling and Video Prompting

Nearly all participants reported at least some practicing of interviews between sessions, but few described practicing a lot. These reports were backed up by the teaching staff who reported holding practice sessions in their classes once every week or two as well as by examining the VidCoach logs, as described below. Interview practice between sessions generally included role-playing with teachers, writing and vocalizing scripts at home and at school, and using VidCoach for those in

the treatment condition.

*P2 (control): We do the role playing with other students in the class and we ask each other interview questions and stuff.*

*P14 (control): I practice at home with my parents like when it comes to a real job interview and when it comes the big test I, I make sure that teeth are clean, my face is not dirty and I wear the right clothes and pretty much everything.*

*P6 (intervention condition, describing practicing on CBI): Well we ask for application and we go somewhere to eat. We talk about socializing. We teach others about socializing. We talk to people about strangers and we just practice ourselves at the [community college] library and that's it.*

Students in the intervention condition used VidCoach on average 2.02 times per day over the course of the month, with the average increasing to 4.14 times per day in the three days preceding the second set of mock employment interviews.

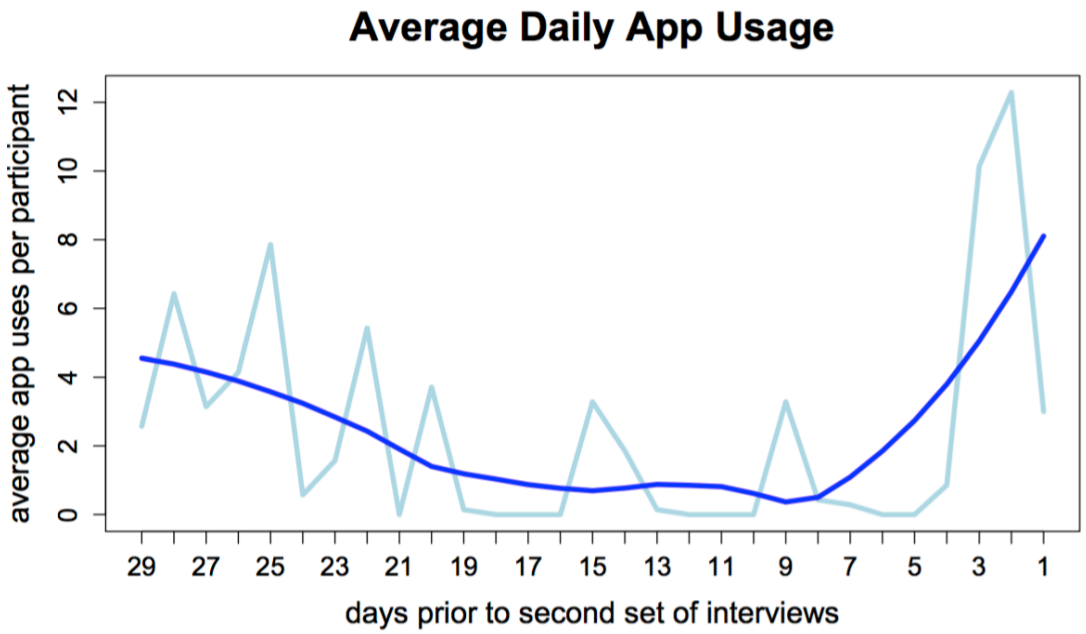



**Figure 9. Participant app usage by number of days in study.**

Despite this limited use, students tended to describe VidCoach as useful for providing experience and increasing comfort levels, particularly noting their enjoyment of the ability to interact with the interviewer in the video by answering in their own practice videos:

*P4: [Using VidCoach] was interesting. It was helpful. It helped me relax [Laughs].*

*P12: [VidCoach] gives me more experience and what to do in the interview.*

*P7: Last month, I didn't really get to use it but – it was pretty useful. It gave me the all the feelings that I would have in a real interview.... [I liked] how I can interact with the videos.*

Research indicates that self-modeling can be helpful to improve performance for a variety of tasks (Dowrick, 1999; Marcus & Wilder, 2009; Sherer et al., 2001). Watching oneself make mistakes can help to identify areas for improvement while watching oneself do something well can help to reinforce that behavior.

*P7: [Watching myself] showed me what areas I did do on some of the questions. What I need to put a better effort into it*

*P11: I thought it was very helpful. Seeing the interview was the most helpful part of it.*

As shown in the above quote, many participants recognized this benefit and some even corrected their behaviors immediately with a video "retake" as described by both P9 and P6:

*P9: Well, I liked the practice part and watch practice part. The practice part because... [mumble to self] Practice because you can do what they said and watch practice you can watch yourself. So I liked that you can do it and see what you did*

*I: So you like to do what they did and watch yourself. Did you find any changes when you practiced? Like after practicing and watching did you feel like – "I want to try this again"?*

*P9: Yes. There's retakes. If you mess up, it lets you retake.*

*P6: [Laughing] I did it with the top of my head. I took like 20 or 40 or I don't know, countless retakes. Because I was getting the question in the top of my head and with the camera and everything it was like a movie – a movie set. And it was frustrating*

*forgetting your lines. Just like 32 or 20 retakes on General and Retail Services.*

However, for many participants—even those who noted how beneficial self-modeling can be, recording and playing back one's own image/vocalizations was seen as inherently unappealing, noting "my voice doesn't sound good" (P4) or "to watch myself, it's a little embarassing" (P3). Although we initially hypothesized that self-modeling, with associated reflection on performance, would be perceived to be particularly useful for teaching interview skills, peer modeling provides substantial benefit without the discomfort that may be associated with self-modeling. Students described that watching models was generally more appealing than watching oneself. The logs confirmed this finding with students viewing 275 videos over the course of the study and only recording 235.

*P6: I do more watching before practicing, because that's a good practice for me to remember all the things that they say.*

*P11: Like I would look at something that I had no idea how to answer. That had something about it that I don't know how to answer. Like retail without experience, I would watch the model do whatever it is.*

Perhaps more surprising, however, was the use of the practice videos to share with others:

*P3: I sort of like it because it's a little bit embarrassing to watch practice. Watch practice makes me a little embarrassed. It lets other people watch it. I like to let other people watch it....I let other people see it to check how good it is. And they say its very*

*good. I show it to [list of school staff] and also the rest of it and also including and I showed it to [another teacher].*

*I: You just don't like watching it to watch yourself.*

*P3: Yeah to watch myself, it's a little embarrassing.*

Likewise, practicing with other people was seen as an essential part of improving as an interviewee. Participants reported wanting to have someone else hold the iPod when practicing or even to have a parent, teacher, or other trusted adult conduct a practice interview first to model using the video modeling software. For example, P3 described using VidCoach at school while P9 described recording videos with the iPod outside of the study, prior to having VidCoach available:

*P3: I go show them VidCoach. I show other people the VidCoach. Go to VidCoach and press the – I first watch the model. Then second practice and third watch practice. Finally watch practice. Finally...and I practiced with [Teacher 2 Name], I practiced with some students and I also practiced with [Teacher 3 Name] which is my former job coach.*

*I: How would you practice with her?*

*P3: I would say "Hi name is" and she would say "Hi my name is [Teacher 3 Name]" I say "Hi my name is [Participant Name]" I record her and I say my name*

*P9: My mom. ... She would do it a lot with me... I hold it in the front. And then she gives me comments.*

Of course, the need to have other people present to practice interviewing creates challenges. Teachers and family may not have the training or time to support this kind of skill development. As P3 notes, he would like to practice at home, but his tutor is the only English speaker available to him at home and views anything not directly related to English tutoring as out of scope for their sessions.

*P3: I usually don't do it at home...I tried to do it with my [English] tutor but it wastes time... I do not want to waste tutor time... I don't have time. But I will practice with other people. But some people in my family don't speak English.*

Practicing without needing another person was one of the primary motivators for using interactive mobile video modeling. However, this interest in having others involved indicates that additional solutions and designs should be explored either to connect students to one another at a distance or to encourage practicing without another live person.

Video related prompting, in which helpful information is supplied alongside videos, can be one way to address the need for human intervention alongside video modeling. The computer, in this case an iPod, can supply the prompting that a person might normally. Prompts were universally reported to be helpful by research participants.

*P4: Like it's so easy. Like the prompts, you know the prompts, I like to answer the question.*

*I: Oh that's good. So which prompts helped you?*

*P4: Like how many seconds the handshake. I like how it tells me the wrong answer. If it's too quick.*

*P7: They are pretty easy common questions and but those are the kind of questions that you forget in the middle of the actual interview.*

*P9: Oh! Yeah, I just kept them on. I know I can turn them off but I didn't want to do that so....It helped me. If it says "If the interview extends their hands, shake their hand for about 2 seconds" than it tells me oh, shake their hands for about 2 seconds.*

Despite the benefits reported by participants, however, VidCoach was not used as much as might be desirable in an intervention. One of the research questions to be answered in this work was: if not required, would people use a video modeling system to practice employment interviews, and if not, why not? A variety of challenges impeded use of VidCoach, which can be addressed through design. For example, student participants reported wanting there to be a "right" answer, but the teaching staff and employers with whom VidCoach was developed worry that their answers can be too systematized when using scripts or video models. Thus, showing variability in questions and answers might be a compromise solution for future designs.

Also, infrequent use may be related to motivation. In the study we relied on verbal prompting and reminders from teachers and caregivers to encourage use of VidCoach. Additional features to remind the users or provide incentives for use could be a design strategy to promote more use.

### 4.4 Limitations/Discussion

A major challenge in any video modeling approach is collection and creation of appropriate high quality video models. To prepare for an employment interview, a student might need to learn about and adjust to numerous domains (e.g., hospitality, healthcare, and so on). To address this need in a controlled research setting, we ensured that a video was available that corresponded to every possible scenario given the employers whom we had acting as voluntary interviewers. Additionally, every video model and mock interview in our study assumed an entry-level position. In practice, however, industries and jobs would likely be more varied. In one case, a student participant identified this discrepancy:

*P6: Like practicing other addition questions. Because they might ask different questions like really powerful job sites in LA. One of those tall buildings there, they have really powerful jobs there and the interviews can be really rough.*

Likewise, a limitation of the empirical study itself is the "fakeness" of the mock employment interviews and even of the vocational rehabilitation program from which the students were drawn. In this program, students are often placed in jobs without the need to interview, potentially reducing motivation for learning these skills. Additionally, students were aware they were in a research study and not actually interviewing for a job. Although most reported treating it like a regular interview, some noted the differences as impacting their responses:

*I: Were you nervous last time?*

*P11: Not really, because it's not a real interview.*

Additionally, one key limitation exists in the analysis of the statistical data presented in the results section. Although the randomization of the experiment should have theoretically eliminated all confounding variables, resulting in no significant differences between the control group and the intervention group in the first stage of the experiment, this did not occur for some behaviors. For several variables, the control group and the intervention group were significantly different before applying the intervention. These variables include professional and appropriate dress and appearance, rolling in chair, poor posture, monotonous speaking, speaks clearly, frowning, licking lips/tongue, reading from notes, and interruption. Due to the variation between groups prior to the experimental condition, we removed these variables from our analysis. The difference seen between the groups is likely the result of a small sample size, and the individual characteristics of the particular participants in our sample with regard to these particular behaviors. The variables that we report in Table 5 are those for which there was no significant difference between the control group and the intervention group at the beginning of the study, which allowed us to test the difference in groups after the experiment was conducted.

# Chapter 5. Use Study

After the first study, we wanted to address the question of how to promote regular use of VidCoach. While results from the efficacy study (see chapter 4.3) indicated that the video modeling and prompting did help the students prepare for job interviews, the logged data of use reflected little use during the study with peaks at the beginning of the study and at the end before the posttest mock interview. To address the questions I had from the previous study, I implemented elements of a persuasive design framework (Consolvo et al., 2006) aimed at supporting behavior change. In particular, progress tracking and a rewards system were added to VidCoach. Therefore, my hypothesis is that persuasive design elements would increase use and promote regular use of VidCoach.

## 5.1 Use Study Method

While the first study was conducted in collaboration with a research team, I assumed all research duties in the second study. After re-programming VidCoach to add features I hypothesized would promote regular use of the app, I conducted a deployment study focused on use. The study launch was held at a monthly seminar workshop where students in transition programs are given training in technology use. This was the same group of teachers from the first study for the most part. However, these were all different students. Students in this program are guided towards independent living through assistance with life skills and gaining employment. At the workshop, participants were given training on the features of the app and were consented to participate in the study. Participants were invited to install VidCoach onto their own iOS devices. Additional iOS devices were lent to

those that wished to participate but did not have a device. 54 participants used Vidcoach for one month after which I held research interviews with 10 students and 5 teachers. Table 6 describes the participants who were interviewed in the use study. Three of the students were female and seven were male. All of the teachers were female. Interviews with each students lasted on average about 15 minutes. Interviews with the teachers took about half an hour each. Three of the four schools had a traditional classroom environment with desks and white/chalk boards. Schools A and C organized their program as a extracurricular activity that would be attended on certain days after the students' classes in their respective schools. School B did not have a dedicated classroom, nor did it have a regular schedule with the students in their program. Their students were on different class schedules. As a result, the teachers at school B would work with a student on an individual basis as the schedule would allow. School D had a more dedicated schedule compared to the other three schools. Since they had lower functioning students in their classroom, they conducted a hands-on regiment where the students were under their care everyday and on an organized schedule. School A was a mixture of high and low functioning students. The three females in the study were at school A and were more cognitively impaired.

| Participant ID | Type | Sex | School |
|---|---|---|---|
| A0 | Teacher | Female | A |
| A1 | Student | Male | A |
| A2 | Student | Male | A |
| A3 | Student | Male | A |
| A4 | Student | Female | A |
| A5 | Student | Female | A |
| A6 | Student | Female | A |
| B0 | Teacher | Female | B |
| B1 | Student | Male | B |
| C0 | Teacher | Female | C |
| C00 | Teacher | Female | C |
| C1 | Student | Male | C |
| D0 | Teacher | Female | D |
| D1 | Student | Male | D |
| D2 | Student | Male | D |

**Table 6. Participant ID codes for use study.**

In this study, the usage was logged real-time onto a secure online database (see Appendix E5). In situations where VidCoach was used without a network connection–wifi or cellular–the use log would be cached until a connection was reestablished. At that point, the cached log was uploaded to the database. The data was also processed to create statistics for participant use (see Appendix E6). The data was visualized prior to the interviews so that I could show participants their use log and ask questions related to their use (see Figure 8).

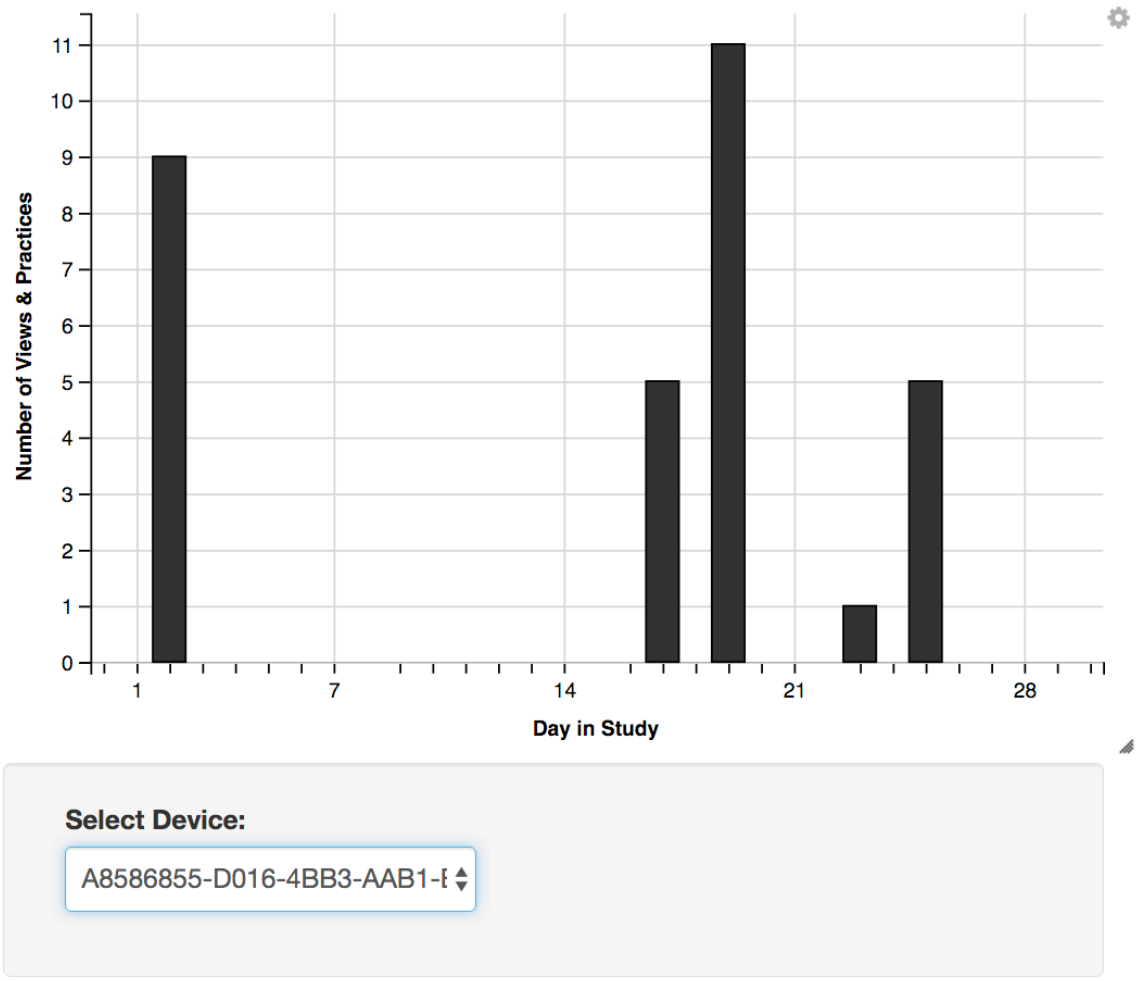


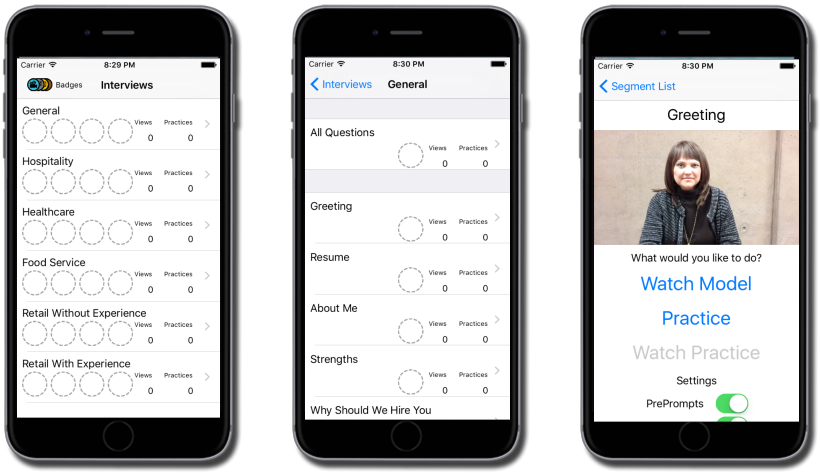

**Figure 10. Use Study Visualization for Participant Interview.**
This is an interactive table used to aid the discussion of use during interviews. A specific device identifier is selected from the dropdown option underneath "Select Device: " and the use data for that device is populated in the table.

Similar to the first efficacy study, the results of the deployment study were analyzed with inductive and deductive approaches. The research interviews were transcribed for qualitative analysis. Using my hypotheses regarding use and persuasive design, I examined the interview transcripts. The interview data was examined for patterns and common themes.

## 5.2 VidCoach as Implemented in Version 2

Between the first and second versions of VidCoach, four major updates to the iOS system occurred. To make sure VidCoach was compatible with the current operating system as well as newer devices, version 2 was a complete re-write of the codebase in Swift2 and optimized for iOS9. Another requirement for the use study was to be able to access use data during the deployment. This was because the data would be needed to be visualized and analyzed at a low level prior to the exit interviews. To do this, instead of a local SQLite database, Firebase was used to save log data in JSON form on their secure online server. One major advantage to this approach is that it automatically caches log data when the device loses network connectivity. When the device regains connectivity, the cached log data is uploaded.

The flow and interaction was changed in version 2 of VidCoach. Instead of asking the user to select from the actions, “Watch”, “Practice”, and “Watch Practice” after selecting an interview type, VidCoach shows the option of selecting all or one of the questions of that interview. Then the app proceeds to the action selector (see Figure 9).




a. b. c.

**Figure 11. Updated user flow of VidCoach 2.**
11a. Interview list. 11b. Question list. 11c. Question detail.

This slight reordering of flow in VidCoach follows a typical flow in most mobile apps that model a more hierarchical ordering to the information presented. It was more natural to move from general to detail and prompt for action at the end node. This calls into question the rationale of the original flow design. The fundamental difference between the two designs is the focus that user is directed towards. In the first version of VidCoach, the focus was on the user action. By having the action selection earlier in the process, the user is directed to first think about whether they want to watch, practice, or watch a practice before selecting the specific question that is the object of that action. It was a reasonable approach that, despite breaking away from typical app design, still was effective as evidenced by the results of the first study. Since the focus of the redesign of VidCoach was to encourage regular use, a restructuring of the flow seemed logical. The flow focus of the second version was

on the content. The user would be directed to first think about what question they were interested in watching or practicing.

Once the user has selected a question or all questions, the final detail screen is presented where the action can be chosen. The screen shows a still image of the interviewer as well as the name of the interview. If all questions were selected for viewing or practicing, the top of the screen would be labeled, “All Questions.” Otherwise, the selected question would appear on the screen label.

Although the positioning of the prompt settings are not relevant to the research, it should be noted as another change that came about in the redesign. The motivation behind this change is to facilitate better use flow. Below the action selector are the switches for the pre-prompts and the post-prompts. The first iteration required the user to go to the settings panel to not only change the prompt settings but to also check the current settings. Having the prompt settings adjacent to the action selectors would give the user a persistent awareness of the prompt settings. In other words, it would be inconvenient for the user to be unaware of the prompt settings. Likewise, having to go to a separate settings screen to check the settings could disrupt the user flow. This slight change in design would also give the user an opportunity to quickly change the prompt settings before following through with the selected action.

The order change also gives the user a chance to think about the question before performing the action. Seeing the interviewer image would visually prepare the user. The user could also change his or her mind about the desired action or even the question or interview chosen.

The progress tracker introduced in the second iteration would show a number count for views and practices for each item listed on the screen. For interview types, total views and practices for each interview element–individual question and "all questions"–are displayed. The concept behind showing counts as opposed to percentage complete (Refer to Appendix B9), for example, is to promote regular and repeated use. Showing the percentage complete would likely encourage a cease in usage when an interview is "completed." Instead I wanted the interface to encourage use even after an interview has been entirely viewed or practiced. For the screen that lists the individual questions (see figure 10)–including the "all questions" item–the progress tracker would show the number of views and practices for each item in the list. Showing a tally of views and practices for each question allows the user to compare interactions with questions in relation to each other.




**Figure 12. Individual question showing emoji, number of views, and number of practices.**

The rewards system added to the second iteration of VidCoach gives users badges for four types of interactions:

- TV badge:  Awarded when the user watches one question
- Fire badge: Awarded when the user practices one question
- Finish badge: Awarded when the user watches an entire interview
- Camera badge: Awarded when the user practices an entire interview

| | | |
|---|---|---|
|  | TV Badge | This badge is earned when an individual interview question of one interview is viewed in the “Watch” mode. |
|  | Fire Badge | This badge is earned when an individual interview question of one interview is recorded in the “Practice” mode. |
|  | Finish Badge | This badge is earned when every interview question of one interview is viewed in the “Watch” mode. |
|  | Camera Badge | This badge is earned when every interview question of one interview is recorded in the “Practice” mode. |

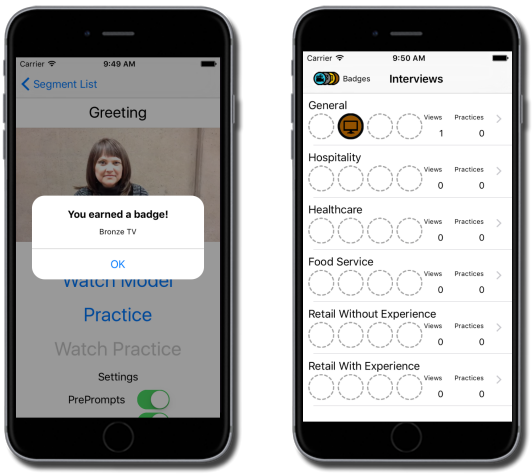
**Table 7. How badges are earned in VidCoach.**

Each badge changes color depending on the number of consecutive days the user performed the interaction:

- Bronze: perform the action for the first time
- Silver: perform the action for 5 consecutive days
- Gold: perform the action for 10 consecutive days
- Platinum: perform the action for 15 consecutive days
- Diamond: perform the action for 20 consecutive days

The user is rewarded the four badges for each interview making a total of 120 possible badge variations earned. If a day is skipped, the internal counter is reset, but awarded badges are still retained.

The main interview list screen displays the four badge types for each interview. When the user first begins interacting with VidCoach, four circles outlined with dashed lines are visible for each interview to signify that no badges have been earned. When a question has been viewed or practiced and the internal counter detects a particular badge has reached a milestone–first time, 5 consecutive days, etc.–a dialog appears on the screen notifying the user that a new badge was earned. If it is the first badge earned for that type, then the dashed circle is replaced with the bronze variation of that badge. As the user earns more badges, that badge type changes in color on the main interview list screen.




a. b.

**Figure 13. Earning a badge in VidCoach2.**
13a. Alert message that badge was earned.
13b. Updated interview list with earned badge.

A complete badge list can be accessed by tapping on the “Badges” button in the top left of the main interview list screen. This complete list allows the user to see all badges earned and all possible badges that can be attained. Badges yet to be earned are greyed out and a dashed circle is present to represent the badge. When a badge is earned, the badge listing is fully visible, the item background is green, and the dashed circle is replaced with the actual badge and respective color.

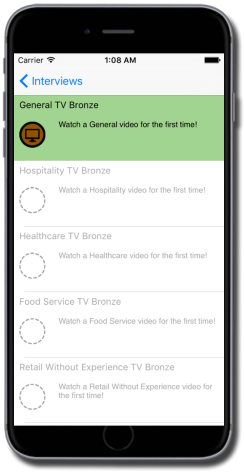
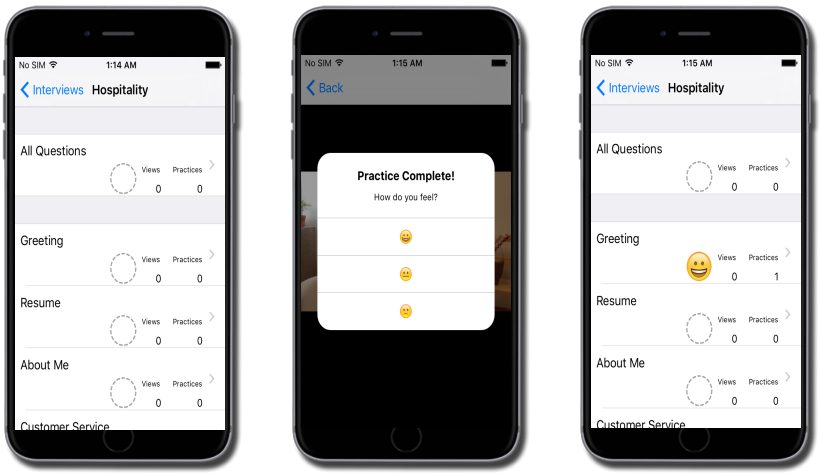



**Figure 14. Badge list.**

Finally, a system for user reflection was added to the latest version of VidCoach. The interaction is modeled after personal health tracking applications that invite the user to reflect on their emotional state immediately after performing a task, such as running a mile. After completing a practice session–during which the user recorded him or herself–a dialog appears to give positive reinforcement and asks the user, “How do you feel?” Three options are given–emoticons or emojis with a smiling face,

an indifferent face, and a frowning face. Emotional encouragement is a factor in promoting behavior change through technologies (Consolvo et al., 2006). The addition of the emoji feature allows the user to give encouragement to him or herself. Seeing an emoji associated with a previously recorded practice could prompt self reflection and motivate the user to perform better or just as well as the last time.

Once the user has selected an emoticon, the question list is presented on the screen and the selected emoticon is displayed for that particular item in the question list. If the user has not practiced a question, a dashed circle is visible and eventually replaced with an emoticon after the question was practiced–similar to the way badges are handled.




a. b. c.

**Figure 15. Selecting emoji after practice.**
15a. Question list without emoji. 15b. Alert message after practicing. 15c. Updated question list with emoji.

## 5.3 Use Study Results

The second study iterated on the first by exploring questions about use that emerged from the empirical study. I conducted a use study to test the new features introduced into VidCoach.

### 5.3.1 Achievement Structure

Achievement reward systems have been shown to encourage certain behaviors in technological systems (Grant & Betts, 2013). I chose this approach to implementing the design framework because it is a common approach used in learning systems that I personally use, such as Duolingo, Codecademy, and DataCamp. I wanted to see if VidCoach users would find this design motivational as they practiced for job interviews.

I defined regular use to mean "at least once a day" and designed the reward system accordingly. Progression through the different levels of badges required daily use. None of the students achieved a silver level or higher, meaning no one ever completed a task five days in a row. The sparse use across the one month deployment is further evidence that VidCoach was used on an as-needed basis rather than as a regular part of the routine of both the students and teachers. The infrequent use of VidCoach was also shown in the first study. The feasibility of the app was not diminished by the lack of regular use. It appears, however, that the design of the badge achievement structure did not encourage daily use.

*A0: With the badges, it was, "Look at how many I got." People like rewards. People like that. It gives them something to strive for.*

Participants still found the badges useful and motivating. Teacher A0 describes the intrinsic nature of rewards. Despite the lack of monetary value or their intangibility, the badges became a real object that could be owned and possessed. Furthermore, the "intangible" badges represent real achievements that reflect progress in learning. Digital possessions can extend a user's sense of self (Belk, 2013). A person would attribute to themselves what the digital possession represents. So, in this case, seeing oneself as accomplished can result from the possession of badges.

"I feel very happy because I get the bronze badges (A3)." Collecting badges in games or learning applications have shown to result in positive feelings (Abramovich et al., 2013; Jakobsson, 2011). To put the achievement into perspective, the bronze badge is the easiest to earn. It is rewarded for watching or practicing any interview or question for the first time. "It was very easy for me because I earn the badges. I try very well to work on it (A3)." For this student to say that she puts the effort into it is telling. For some with ASD, it may well take effort to focus on completely watching a video of a job interview question. There may also be some anxiety about recording oneself. In fact, one teacher from school C recounted the initial resistance she faced when using VidCoach with her students.

*C0: It was like, oh my God, like pulling teeth. And so I paired them up. But they had to go into different rooms. They couldn't be in the same room. They didn't want the others to see them. It's like, 'Come on, you guys.'*

The layout of the badges in the main interview list also served as a prompt that gave the students a goal to reach for. In particular, when the app is first started there are dashed circles that represent the absence of badges for that interview. As badges are achieved, the dashed circles are replaced by the earned badge in the color of the level it was earned (see Figure 11). Four badge types could be earned for each interview. One student saw the four slots as something to be filled by earning badges, "I wanted to get one line (B1)." He saw the "incompleteness" of the visual display and his response was to try to "complete" the image by eliminating all the dashed circles. Several participants responded positively to the badges and expressed feelings of happiness upon earning them.

The dashed circle visualization motivated student B1 to fill the space with a badge. However, once the badge occupied that space, there was no visual prompt like the dashed circle that encouraged replacing the first bronze badge with the other colors. The visualization appeared to work, but only to a certain degree.

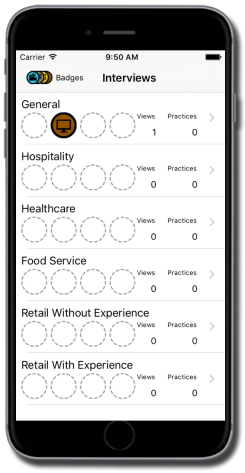



**Figure 16. Interview list with badge and dashed circles.**

"It made me feel accomplished that I know the answers (A2)." This student felt that the badges gave him a sense of accomplishment. Programmatically, the system does not check for the correctness of a recorded video. Likewise, incorrect answers to the post-prompts are not tallied in the system. The efficacy study shows that engaging with video modeling has a positive impact. Tracking the correctness of that engagement was not necessary to achieve those results. It may similarly be the case with the use of badges in VidCoach.

On the other hand, not tracking for correctness may elicit a contrasting response. Another participant noticed that he could potentially game the system. While in practice mode he recorded the water bottle on the table instead of himself. Seeing that VidCoach allowed him to proceed and even gave him a badge, he looked at me

and said, “I got a badge. You can just spam it (D2).” For him, he lost interest after finding out that the badges were, in his estimation, too easy to achieve. Obtaining rewards easily can have a positive, reinforcing effect, but it quickly wears off (Cameron et al., 2001). It was too easy to earn the first badge and the system does not validate the user input.

“I felt like I didn’t deserve it. Didn’t feel like a challenge. Don’t feel achieved (D2).” This participant noticed how quickly he was able to earn badges and it had a rather opposite effect on him compared to other participants. Something earned too easily can give a person the feeling that the reward was ill gained (Cameron et al., 2001). He further elaborated on his point by sharing his experience with games that reward players, such as Pokemon. Based on his video game experience, he expected to perform a commensurate amount of effort in order to gain a reward, whether it be to progress to a higher level or pick up a new skill.

### 5.3.2 Persistent Visibility

There are tradeoffs when designing interfaces for mobile devices. Palm sized digital screens create constraints on how much information can be displayed. Determining an effective balance between too little or too much information being displayed can be challenging. Information capacity (Pousman & Stasko, 2006) describes the amount of space that certain types of information need to convey their intended meaning or message. High information capacity means that the information requires much space to serve their purpose while low information capacity designs only need

a small amount of space to be effective. The badge structure has high information capacity. The 120 potential badges that could be earned need considerable space to list. Because of this, I listed the badges in a separate menu that can be accessed by the badges icon in the top left of the main screen. Hiding the list of badges took away their persistent visibility, or the information's constant visible presence to the user, such as through a taskbar on a computer desktop or a clock on the top of most smartphone screens.

A teacher noted that the location of the badges, "might not be motivating (D0)." She proceeded to suggest that if she had a chart that showed his badges, he would likely be motivated to earn them. The classrooms that I visited had many charts and posters to remind the students of upcoming events or to help them remember certain concepts and ideas. These charts have persistent visibility and the teachers easily reference them by pointing to them in the room. Her response highlights the lack of persistent visibility of the badges in the app. The general practice of teachers and specialists for students in work transition programs is to use large, very visible charts to keep track of student progress and motivate them. Previous research has explored emulating these charts in digital form (Hayes et al., 2010; Hirano et al., 2010) and found that they help students stay focused and motivated on given tasks in the classroom.

While a simplified interface design (Choi & Lee, 2012) may elicit satisfaction, it may not induce motivation. In my interviews none of the participants went to the list of

possible badges (see figure 9) to be earned when showing me how they use the app, despite having been initially shown the list in training prior to starting the study. The lack of persistent visibility may have worked against the developed intention of regular use.

User support through tutorials can be a visibly persistent component that would benefit users. Providing help and documentation is listed as one of the often-cited usability guidelines (Nielsen, 1994). Nielsen does, however, advise giving user support only when necessary. Using the system without documentation is preferred. In general, participants and teachers found VidCoach easy to use. This was also the case during the first study. The core functionality was understood from the first moment of engagement with the app. “The students, they just tapped and away they went (A0).” The badges, progress tracking, and practice emoji features were not as apparent to the participants that were interviewed. This became clear to me while I conducted the interviews. I had to show them the badges list and progress tracker. “Once I downloaded it, I thought there would be some instruction that said, ‘Okay, you start here.’ And there was no instruction (A0).” Students and teachers alike were unclear about the conditions of earning badges and what the progress tracking numbers represented. Once the features were explained, their purpose and use became clear. The infrequent use and short engagement with VidCoach during the deployment may have also intensified the perceived lack of user support.

One feature introduced in the second version of VidCoach had low information capacity. The progress tracker needed little screen space to show the number of views or watches. This feature is also visibly persistent. It is displayed with each interview and question. This feature received varying responses where some found it useful while others ignored it.

The teacher at school D saw the benefit of the progress tracker to her as a teacher. She would use VidCoach as a socializing and communication tool and have her students practice with the app. In particular, she shared a time when she handed VidCoach to one of her students for him to work on by himself. “I could check to see if he was working on his own (D0).” By looking at the numbers in the progress tracker, she would gather information about whether or not her student was working while she was engaged with other students.

“I see the numbers. Never really paid attention (C00),” said a teacher from school C. This teacher, on the other hand, did not need to look at the numbers to see if her students were using VidCoach. Instead she relied on alternate assessment methods, such as having them model the interview question response in person. There could be another reason for ignoring the progress tracker. Perhaps a teacher might not find value in the displayed numbers unless they are associated with a specific objective. The raw number of views or practices may be more meaningful if they were connected to specific goals. For example, a teacher might try to motivate students to reach a certain number or views or watches as part of their

individualized education program (IEP). IEPs are used in special education to outline the customized plan of learning for a student.

*C0: I could see where that could be real helpful if we were to write goals or something as part of their IEPs. To practice that and the app would take instant documentation. I think those things for some students could be very valuable.*

One student, however, was attentive to the progress tracker. "The more views means I'm putting more effort. More practices means that I don't understand (B1)." He understands that the numbers in the progress tracker represent the nature of his engagement with VidCoach. He was alone in his understanding of the progress tracker, though. The other students did not notice the progress tracker. Others yet gave it a favorable review with little enthusiasm. The short and infrequent engagement told me that their positive responses were more from seeing it at that moment. Their responses could not have come from a prolonged interaction with VidCoach.

Persistent visibility can also prompt the user to reflect on their use of the system. The emoji feature was designed to work as a visual reminder that a user gives to themselves. After a student records themselves in a practice, VidCoach presents a dialog asking how they felt about about the practice. Users are asked to choose from three emoji images. Most of the reactions of the participants to the emojis were

positive. “I thought it was a good idea to kinda to let yourself know about how you felt about practicing (C1).”

There were also unintended uses of the emoji feature. Some participants would not choose the emotion that they were experiencing but the emotion that they wanted to have, which was often happy, evidenced by all the happy face emojis on participants’ devices. For example, one student described choosing the happy face particularly when nervous. “I get scared sometimes. I choose the happy face (A3).” While the emotion selected may be interpreted as reflecting the true state of the person’s emotion at that time, it could also be used as a way give oneself encouragement by projecting the desired emotion. Seeing the smiling face in the future would then trigger positive emotions and associate them with activities that originally elicited negative emotions. “I like the emoji on the app. It was a good thing for myself and made me happy (A4).”

### 5.3.3 Social Interaction

Although Consolvo’s framework include support for social influence (Consolvo et al., 2006), I did not explicitly design for social interaction in the digital realm, such as instant messages. However, given that students interact with parents, teachers, and classmates regularly, I was interested in any social interactions that would result from practicing with the system.

*A1: Part of my reasoning of having you come here and talk to the students is so that they could engage in conversation. An interview is just a conversation, and the more*

*they are exposed to people they don't know and they're asked questions whether or not the question is relevant or the same when they are applying to jobs, it's still a question and they have to process it and answer it. So it's all that.*

In my interviews I asked the students if they shared their VidCoach experience with anyone. Most participants showed their badges to their teachers, with whom they typically work one-on-one. One student also described sharing it with others who were also using VidCoach and compared their progress. "They are a lot more disciplined. I saw all their badges (B1)." To him, earning more badges was a sign of commitment and being focused. The badge acted as a validation of work being done. Another student shared the badges he earned with his parents. "My parents said, 'Wow. That's good that you were doing something new (A1).'" He also described interacting with another student in the same transition program. "Yes, I told C about VidCoach because I encouraged him to do well (A1)."

Just as student B1 was impressed by the achievements of his peers on VidCoach, some teachers expect their students to compete with each other. The teacher at school A saw how the badges promoted friendly competition. "Oo, let's see how many I can get. Oo, I'm going to beat you. They get a little bit of competition there (A0)."

*C0: I can see where other guys would be very competitive with it. 'How many badges do you have?' 'I have this many.' 'Well I'm gonna do it right now' So they might have that healthy competitiveness at school. Like, 'Hey did you practice last night?'*

Teacher C0 described how she imagined the badges promoting friendly competition to the extent that questions would arise about when VidCoach was used. This same teacher has students, on the other hand, who did not engage in friendly competition. This could be a result of not wanting to share with others due to social stigma.

*C0: They all have Facebook. Not for school. They don't seem to cross over. These guys are on the ball enough to know they are in a special school and it's not something they want to openly share. That's what they worry about. They are very social in their own circles.*

She also noted that parents might not be as welcoming to their children talking about VidCoach in social media as it might introduce complications. "The other guys, I don't see their families wanting that. That would be one more thing they would have to manage (C0)." Some teachers spoke about how they have students that were considered "conserved." This means that any decisions about the possibility of any information being shared outside the program, such as through social media, needed to be approved by the student's parents.

### 5.3.4 Infrequent Use

As previously noted, VidCoach was mainly used on an as-needed basis. VidCoach was used if a student had an approaching job interview or if a career fair was drawing near. Also, teachers held one-day classroom sessions for vocational training, which included VidCoach, as part of their broader curriculum. To some degree this is in line with predicted uses. One of the challenges with traditional video modeling is the limited contexts in which videos might be used. Most use occurred in the classroom at the behest of the teacher. Practicing for job interviews was an activity that was treated as one among many objectives in the various transition programs I surveyed. However, the other goal of a mobile system was to provide just in time support near to interviews or allow students to access content during "down time." Neither of these uses is evidenced in the data.

I asked the teachers if they encouraged their students to use VidCoach outside of the classroom.

*C0: These guys, they won't. These guys are too cool. So when they are inside the four walls and it's school and they all really want jobs and you say, 'This is gonna help you get a job,' it motivates them.*

The infrequent use was coupled with some students exhibiting high concentrations of use in a given day. "They were so proud of their interviews. Some students like A1 redid his. He wanted to try again. He wanted to do better (A0)." Student A1 registered over 400 app uses in one day while most of the month there were days of

non-use. “I don’t exactly know what happened but I was able to keep practicing and practicing by learning all of these questions (A1).”

One possible explanation for finding high concentrations of use in short periods could be the tendency for some people with ASD to engage in repetitive behaviors (Lam & Aman, 2006; South et al., 2005). “He might watch it more than once. With him it’s a little more prompting. Okay, let’s move on to the next one. Let’s go to the next one now. But on his own he might just be doing it just to do it (B0).” Teacher B0 shared with me the tendency of student B1 to become engrossed in repetitive behavior, where he would watch a video in VidCoach over and over. She did say that despite the repetitive behavior, she saw that he comprehended what he was watching. Her main focus in this response is to highlight the need to prompt or move the student along.

Another reason for non-use has to do with a student’s preference for a particular job interview, such as viewing only the general and healthcare interviews. I asked student A2 why he did not practice interviews other than those he had mentioned. A2 replied, “We didn’t have experience with it and I didn’t want to use it if I don’t really have joy from that kind of job. I stuck with the ones that I know (A2).”

Finally, readiness, or the lack thereof, on the part of the student can be cited as a factor for infrequent and non-use. Specifically, a student may feel more comfortable only viewing videos and not recording themselves. When asked if he wanted to get

recorded in VidCoach, he responded by saying, "I think I am not ready (B1)." I spoke to his teacher later, who said about his lack of readiness,

*B0: I know that maybe the higher functioning kids are able to use it more on their own without me sorta being there so much so I know for a couple of them they do use it on their own and they'll tell me about it…but if I have a couple of lower functioning kids to them it's more like a learning experience because they might not be ready for that interview. Depending on what level they are, some kids are more ready for interviews and getting a job. I have a couple that might not be there quite yet.*

Teacher B0 described self recording as too complicated of a process for a certain students to perform on their own. Creating a self recording with a mobile device has several components. The student needs to properly position the device, find the camera on the device, mentally prepare their on-camera performance, and finally press the record button. Despite the advanced camera technologies built into mobile devices, self recording may be no less easier now than it was with VHS camcorders and tripods.

### 5.4 Limitations & Discussion

The major limitation of the use study was in the incorrect assumptions that I made in how VidCoach would be used *in situ*. I thought that participants would only be using VidCoach on their own devices and not on shared devices provided by their teachers. In addition, the data collection process, interviewing and use log collection,

had to be adapted to the changing situations found in the field. As a result I was not able to get individual use patterns as I had hoped.

Upon my arrival to school A to begin research interviews, the specialist recommended that we work on the interview questions (see Appendix E7) together as a group with the six students present. I allowed the specialist to lead the discussion. She had all of us sit around the table and each student would take turns reading the questions as we worked on them. The specialist would at times have to give further explanation for the question. For example, the question that asked the student what kept them from using the app needed to be elaborated. She had to ask if there were any problems with being able to use the app and what those problems might have been. The teacher at school B treated the questionnaire in a similar fashion. She asked the questions and would also rephrase my follow up questions for the students.

The original intention of the printed out interviews were for myself as the researcher. I was planning to take notes of each interview on the print outs. Instead, they took on the function of a worksheet, and the students used the blank lines for their own handwritten answers.

Both the specialist and students understood some questions differently. When asked if they shared the badges, progress tracker, or emoji with anyone, I had listed prompts underneath to remind me to ask about friends, parents, teachers, etc. They

took this formatting to mean that it was a multiple choice question where they would choose one. I allowed the discussion to proceed the way it did with the plan that I would still speak with each student in person afterwards.

I had prepared the data that I collected during the deployment so that I could select a specific user ID and show the student what their chart looked like over the last month. I obtained the current student's device ID in the moment by asking them to show me how they use VidCoach. I would make sure that their device was connected to a wireless network and I had the database open on my laptop. As the student proceeded to show me how they used VidCoach, new data would populate in the database, and I was able to record the device ID.

The first few charts surprised me since they showed little use. On average, there were a few data points at the beginning of the deployment and nothing else. I soon discovered the reason behind the issue. I asked another student to show me their use of VidCoach and she said that she didn't have her device with her. The specialist intervened and provided her device. When I pulled up the chart for that device, it registered an extremely high level of use. It turns out that students often do not have their own device and so the specialist had to provide one and this same device was used by any student that did not have their own device at the moment.

An assumption that I made in the design of the app was that there would only be one user per device. I did not anticipate a situation where students would need to use

their specialist's device because they either did not have their own or ran out of battery.

I should also note that as I reviewed the data with the students, I received answers that were different from what they had written down when we went over the questions together as a group. For example one student's written response to the question about how often VidCoach was used was, "I use it everyday because it helps me a whole lot anywhere." However, when I showed him his use chart and asked him why he didn't use the app that much over the last month he replied, "I think it's because I've been so busy with other plans. Like if I have to help family by cooking something up or if I'm in the middle of doing some kind of a home project. A lot of hard stuff." Instead of throwing out the data because of contradictions I decided to accept both. The written answers may be biased by the students' desire to get the right answer as if it were a test. The students may also be attempting to please the researchers by giving the answer that is assumed that the researcher would want to hear. What is interesting is that the answers project what they thought should have happened. Instead of getting what appears to be an inconsistent story, I believe that I found more complex narratives about their use of VidCoach.

I also made incorrect assumptions about the process of practicing for job interviews. I had thought that job interviews would be a central activity in the work transition experience. It turns out that the specialists organize their programs to more

holistically address life skills. One teacher said that she used VidCoach in her classroom as part of the vocational training she was giving to her students. She saw VidCoach as a general tool to broadly help with communication and social skills. Other specialists used VidCoach specifically to prepare their students for job interviews. However, job interviews were not a regular occurrence for these students. In fact, some simply get placed in a particular workplace. These placements are treated as volunteer opportunities or internships where the focus was to give the student work experience. Since job interviews were not a regular part of many students' schedule, the use of VidCoach was just as sparse. From these new findings, I shifted my focus away from seeing usability as a function of frequency, but, rather, as one of impact in the micro-interactions with a particular application. It is possible that a person may find an application usable and useful even if the time of engagement of that application is relatively short in comparison to other applications. To take it even further, good usability can be seen to promote short, seamless integration into the overall technological experience. A user would find value in an app that serves its purpose for the short moments that it is needed.

Since the use log data was deemed as uninformative at this point, I relied on the qualitative feedback from the interviews with the participants and the teachers/specialists. The various setups found at each of the four locations reflect the challenge of overseeing classrooms with students on different areas of the spectrum.

# Chapter 6. Conclusion and Future Work

Employment interviews serve a key gating function for transition students. Without successful interview skills, they are unlikely to obtain full, paid employment and may even struggle to become involved in volunteer or internship positions. For students who find new places and new people anxiety provoking, interview skills can be particularly challenging to develop. A variety of intervention strategies—including scripting, role-play, and community-based instruction—have been shown to improve outcomes for transition students. Likewise, video modeling and video prompting have been used to teach a variety of vocational skills. However, this research is the first to focus on how video techniques might be used to improve the key vocational skill of employment interviewing.

Mobile devices, such as iPods, tablets, and smartphones, have become essential tools for many students and workers. They offer real time and *in situ* support for time and task management as well as access to a variety of information sources and applications. Additionally, their video capture and playback capabilities provide opportunities to use video modeling in a variety of vocational settings and for a variety of vocational tasks.

In this work, I sought to understand how the innovative technologies available today might be better leveraged to address some of the currently unaddressed needs of students developing vocational interview skills. My results indicate that even a minimal intervention, directly before an interview, has the potential to produce a

positive impact. Specifically, use of video modeling showed promise in increasing participants' abilities to present their ideas logically and succinctly, improving interview hygiene, and decreasing fidgeting. Qualitative results suggest that use of such tools is enjoyable and considered useful by students in transition programs. This helped us understand an approach to persuasive design that focused on use for moments when an application is needed as opposed to pushing for regular or daily use.

In the second iteration of VidCoach I implemented features based on a persuasive design framework. Results of the second study showed that my implementation of some of the persuasive design requirements showed potential to motivate participants. Although these results were inconclusive in terms of effects, they provided insight into how design might be further improved. For example, the achievement structure should be restructured, the interface visualizations should be redesigned, and the system should validate the user input.

The reward mechanism was designed with the expectation of daily use. A different system for earning rewards may better suit the use patterns of the students. Shorter engagements should be the focus of the rewards system. A possible redesign includes using a map metaphor where "unexplored" regions are exposed as the user interacted with more interviews and questions. Rewards are then earned by exploring the breadth of the system as opposed to encouraging depth through repeated, daily use. Gaps between use would not impact achievement retention.

Also, a visible prompt similar to the dashed circles needs to be present to encourage the attainment of higher level badges. Again, the map methaphor is another kind of visualization of "completeness" and "incompleteness." Unexplored regions of the map are darkened so as to prompt the user to expose them by using the system. Another metaphor that leverages the concept of completeness is the activity of building a structure. With each engagement, the user would earn a building block towards completion of a structure. Video games such as Minecraft utilize this type of approach.

Validation of user input and increasing the complexity of tasks would create a better match between awards given and the effort required to earn them. Mobile operating systems and hardware are continuously expanding their capabilities to sense and detect the world around them. Input validation can come in the form of facial recognition for interview practice. A recording would not be accepted as valid unless a face was detected by the camera. Additionally, expressions can be recognized so that the system would provide feedback for smiling or frowning.

Also, interface elements should be persistently visible. Future interface designs for VidCoach should make the badge list more visible or prompt the user to visit the list once a badge is earned. The on-screen dialog can present a button for the user to admire their collection of badges immediately after one is collected. To take into account the gaps in engagement, an on-screen message can welcome back the user

after opening the app and invite them to look over their badges. In fact, the badges may well replace the interview and interview question interface. In other words, user focus can be directed to think about the badge that is sought after followed by the activity to achieve it. Integrating the badge list into the user flow would also increase its visible persistence.

User support and instruction should be an element in future designs that is given persistent visibility. As we have seen with VidCoach, how to use the system was not immediately understood, particularly the reward system. It is common practice in mobile applications to provide access to a tutorial for the user (Neil & Malley, 2014). This can come in the form of a help button that is on every screen that brings up a diagram that points out the different features and invites the user to explore them. Another tutorial approach is to include the tutorial as one of the "interview" modules that could likewise be watched and practiced. This module would be listed with the other interviews as persistent visual cue. It would be impractical to force a user to interact with a tutorial during every use session. Additionally, the system can be designed to detect when the application is idle and prompt the user to proceed to the next step or video with on-screen visual assistance. Idleness in a user session, however, can also mean that the user may need assistance with the current question or may have trouble understanding the interviewer. In this case, the system can ask if the user required clarification or a replay of the question. Providing this kind of user support could help students maximize their experience with VidCoach.

Both studies revealed social practices around VidCoach and the way the app was integrated into the workflow of the transition programs I observed. Students encouraged each other and shared their achievements with their parents and teachers. While students were less apt to view themselves or share their recordings with others, the reward system became a more comfortable artifact for them to share with each other. Teachers also cited the potential for friendly competition in the earning of badges. Also, designing for synchronous or asynchronous use between two or more users could enhance the social interaction between students in VidCoach. Synchronous use occurs when users use the system at the same time. This could be in the same place or done remotely. Asynchronous use can be described much like the turn-taking approaches used in some games such as Words with Friends. One user would perform an action with the system and another user may reply with an action of their own later that day or later that week. These approaches would extend beyond the in-person interactions between students in transition programs and allow them to work together on the app even outside the classroom. For example, a job interview question interaction can require that one user hold the mobile device's camera while the other user is recorded. Having VidCoach require that another user rate or comment on a recorded video would be an asynchronous approach promoting more social interaction.

For students who may require more prompting than others, the option to activate reminders for use could be implemented. A teacher or parent may want to specify

the frequency of the reminders depending on how they know the student will respond to them. Additionally, custom alerts and reminders can be set to encourage badge achievement by increasing the number of views and practices. Persuasive design recommendations include just-in-time prompting and a varied schedule for the delivery of prompts (Arroyo et al., 2005). Particular contexts can help trigger impactful prompts such as the system recognizing that a job interview is in the calendar for that week. Varying the pattern for the schedule of prompting helps to maintain the effectiveness of those prompts. Too frequent of a prompt schedule may be perceived as annoying and may just be ignored.

My research indicates that mobile video modeling and prompting coupled with persuasive design is a viable way to learn professional interview skills. In the efficacy study, Quantitative data indicates moderate change in behavior in job interview performance. Qualitative data reveals an increase in comfort and confidence in the students in their preparation and performance in job interviews. The use study results suggest that persuasive design can generate motivation and enjoyment. More precise quantitative measures can firmly establish the potential impact of this system. Further study is warranted to provide stronger evidence with statistical significance.

The question of regular use, however, still remains. Study surrounding use in its various forms can be done. Future research should examine natural patterns of use and see if a system like VidCoach can change those patterns and what impact that

change would have. Also, infrequent use is an area in usability that may warrant more study. Some factors that may contribute to non-use are an unusable system and environments that make a system unusable. In the case of VidCoach, there may be elements of both. Additional study into the relationship between them can help us gain more understanding about usability and infrequent use. Do applications like VidCoach have value to users even if they are rarely used? More research can be done with VidCoach to explore the relationship between motivation and use. Do the suggested design improvements increase motivation and does that result in greater use? More indepth research in use and usability in the context of job interview preparation for transition age students can lead us to design guidelines for similar systems and situations.

It is also important to keep in mind that ASD as a spectrum has a wide range of diverse user types. Even students seeking employment with the aid of a transition program vary widely in their skills and abilities. Future versions of VidCoach should take into account the variability of use. There will be students that will engage with part of the app, such as only watching videos. Others may interact with every aspect of VidCoach. Subsequent studies can focus on how VidCoach is used by the different subsets of users along the spectrum. Further examination should be done to quantify the impact of VidCoach on the various types of users it can serve. From this, we may also find additional ways to also learn more about ASD through interventions with technology.

In addition, the extended vision for VidCoach is the modeling of other social behaviors, such as talking to classmates, teachers, or employers. As the scope of the system is broadened, other questions may arise. What other social contexts can be modeled in the same way that VidCoach uses video modeling and video prompting? Are some more amenable to VidCoach's systematic approach than others? Incorporating additional social contexts will also prompt inquiry into use, motivation, and user adoption for each social context.

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# Appendix A. Storyboards

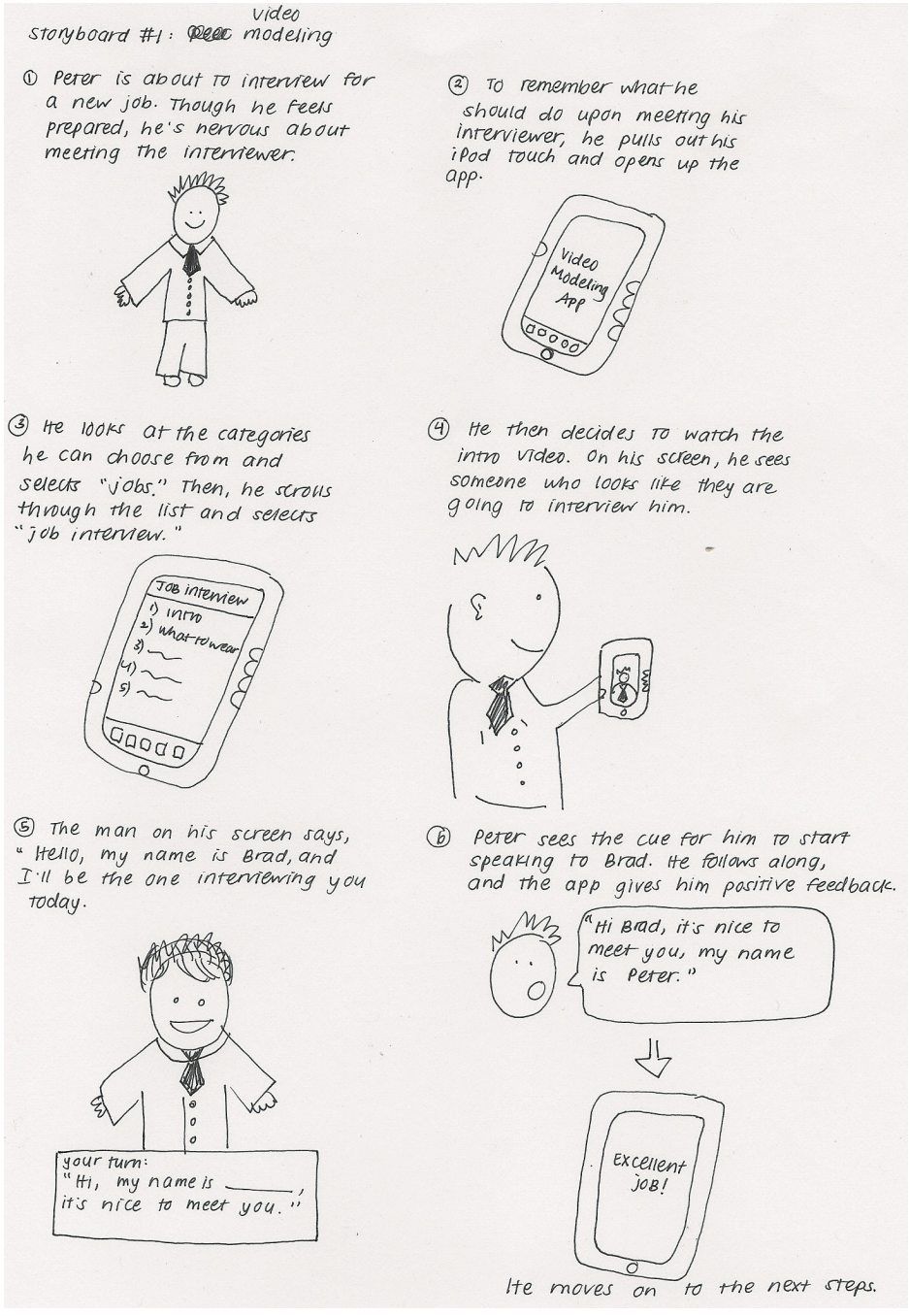



**Figure A1. Storyboard modeling practicing for a job interview.**

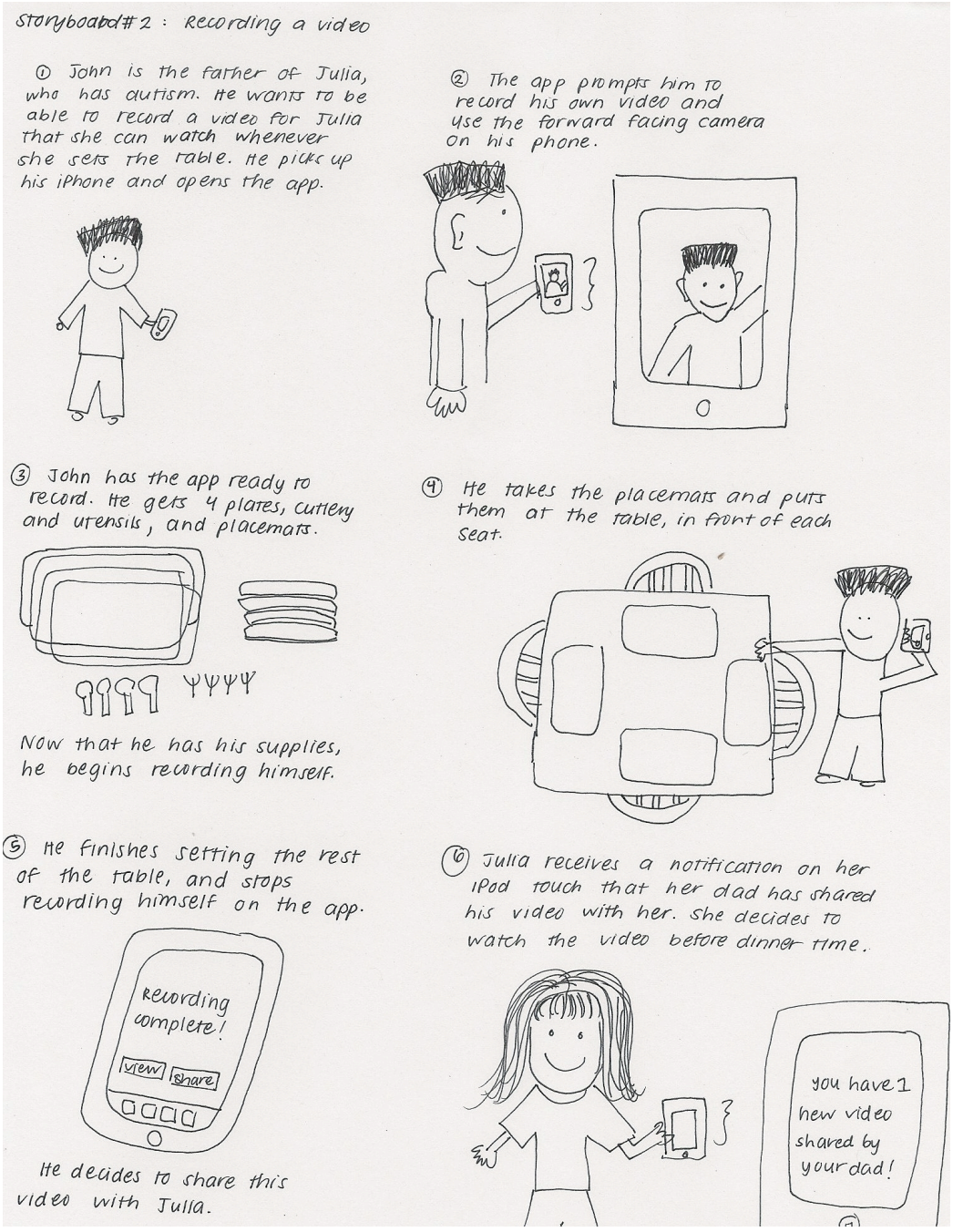



**Figure A2. Storyboard modeling setting the table.**




**Figure A3. Storyboard modeling making the bed.**

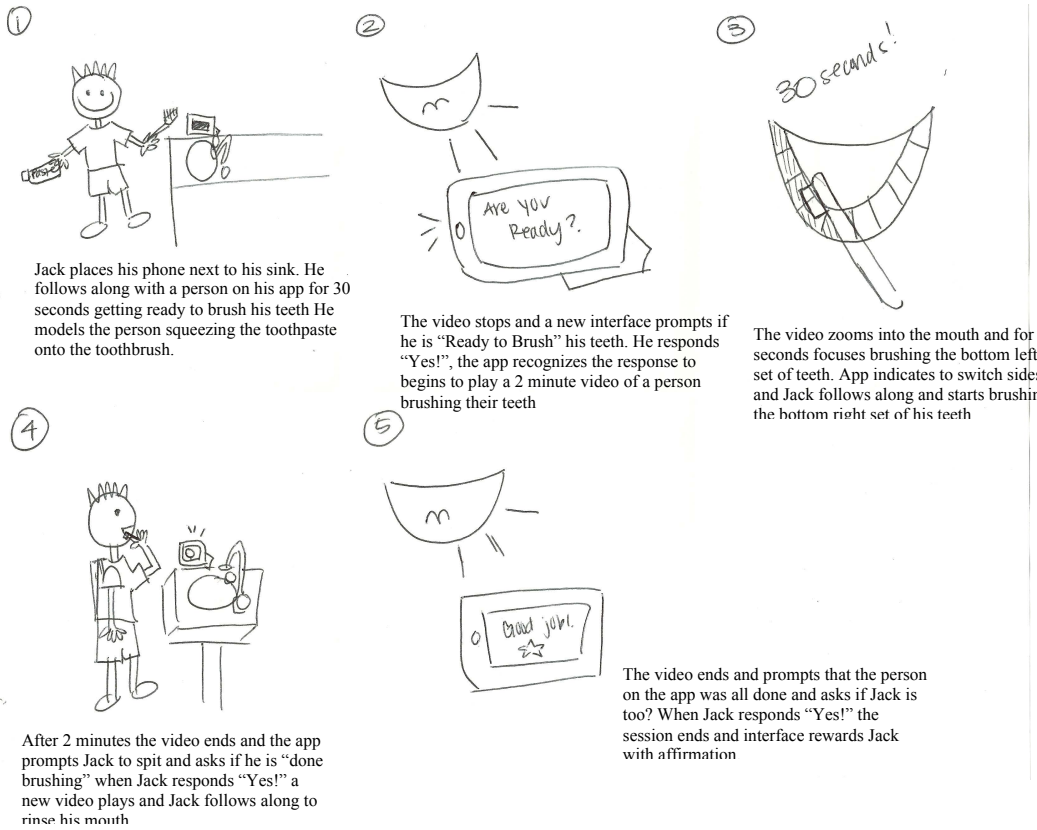



**Figure A4. Storyboard modeling good teeth brushing technique.**

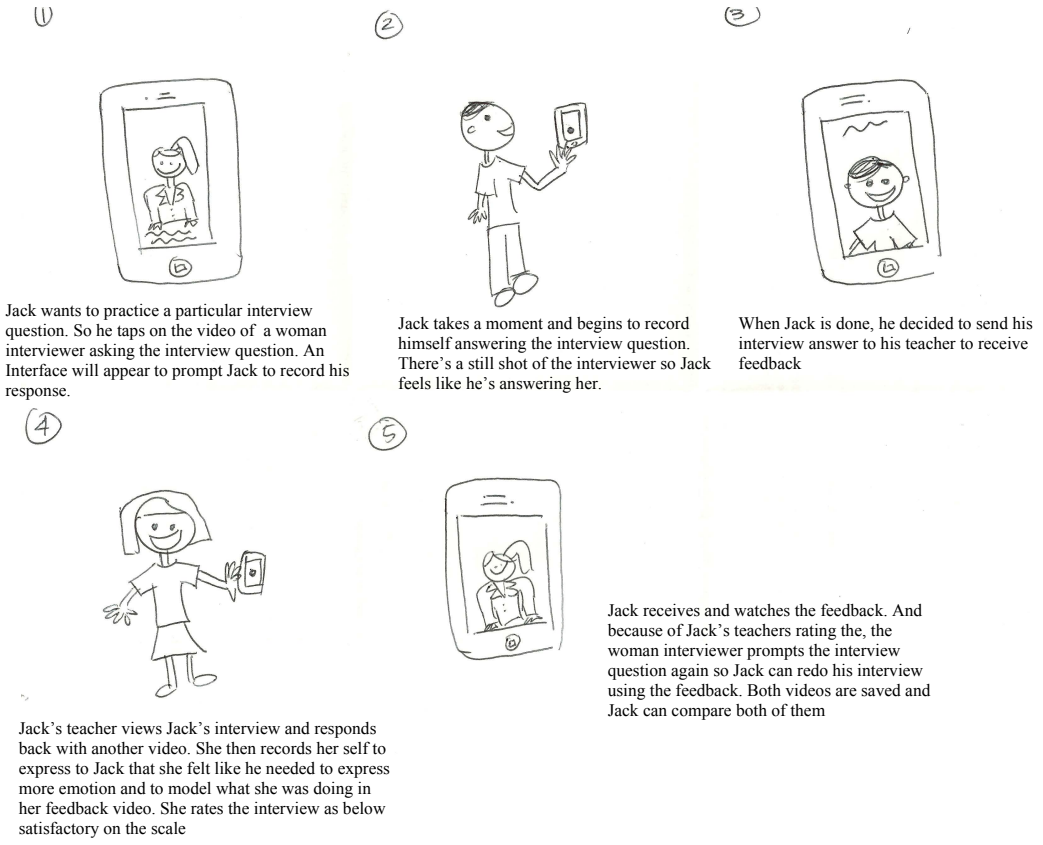



**Figure A5. Storyboard modeling practicing for a job interview.**

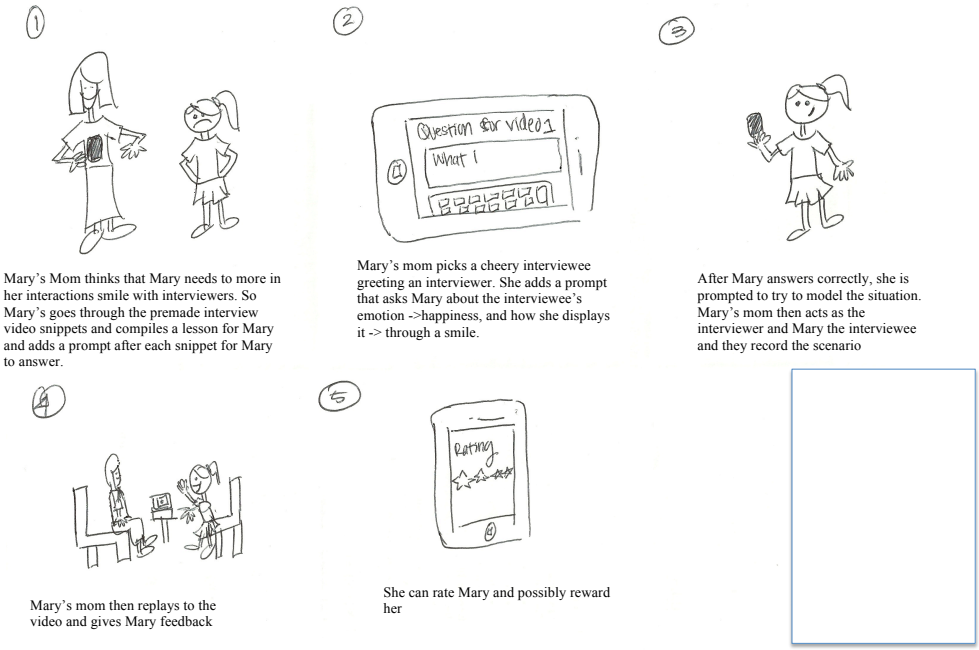



**Figure A6 Storyboard showing a parent creating a custom prompt.**

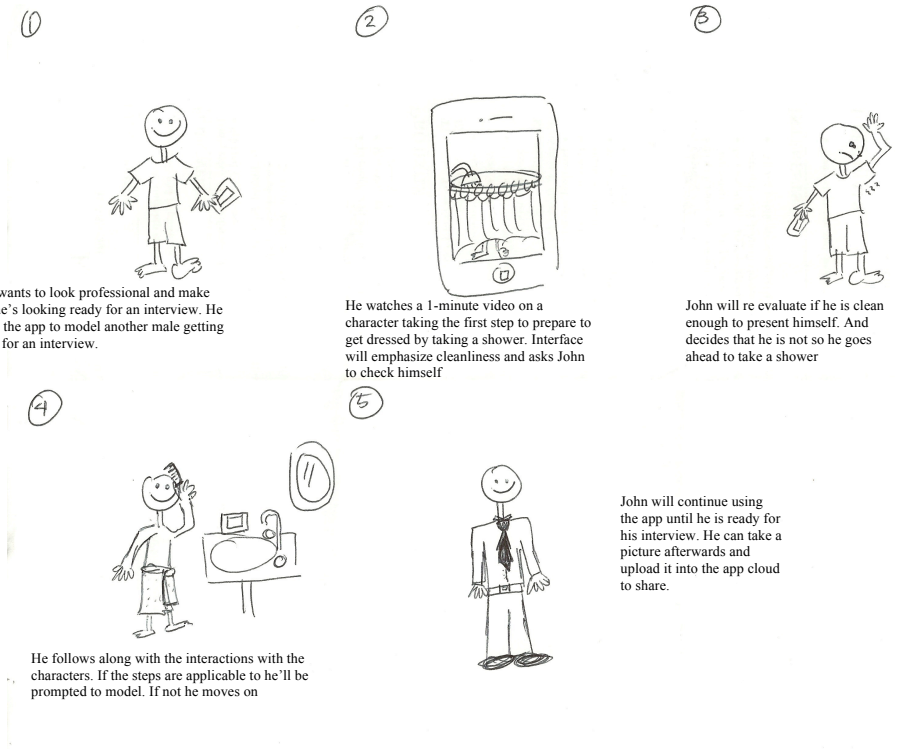



**Figure A7. Storyboard modeling proper hygiene.**

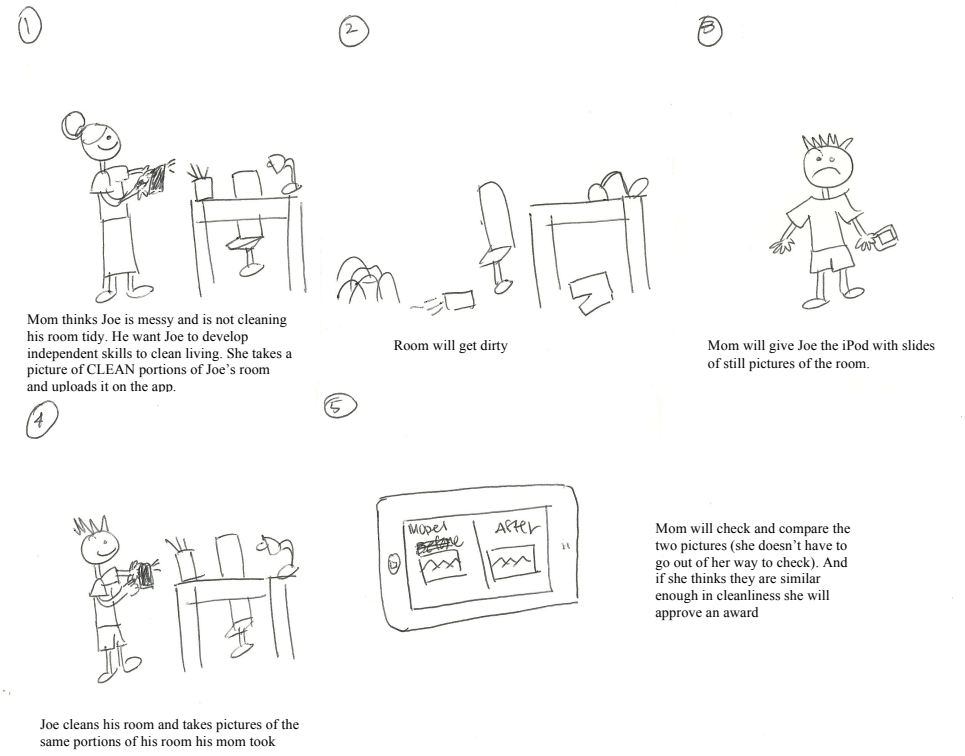



**Figure A8. Storyboard modeling cleaning a bedroom.**

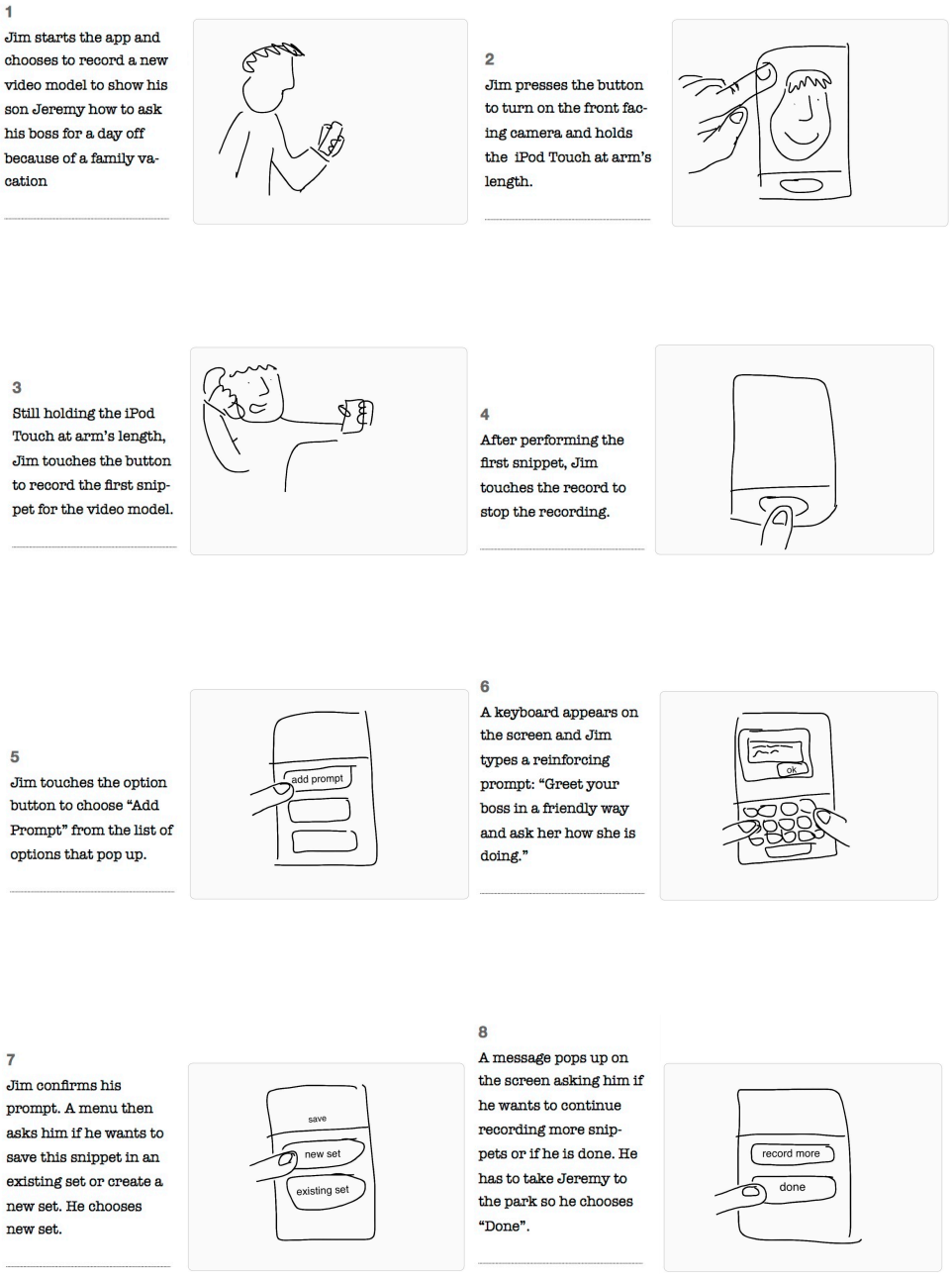
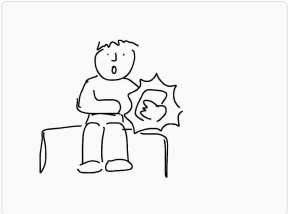



**Figure A9. Storyboard of parent creating custom model.**

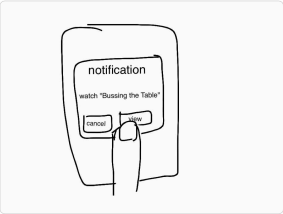
1

Jeremy is at the bus stop on the way to the grocery store listening to his iPod Touch. A notification message pops up on the screen reminding him to watch the video module for bussing tables at his new job.



2

Jeremy taps "View" from the message and the first snippet displays on the screen waiting for him to tap the play button. He taps "play".



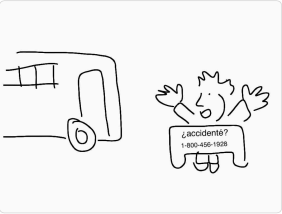

3

Jeremy watches the snippet. At the end of the snippet a prompt pops up on the screen asking: "Is it ok to clear the table while customers are still sitting there?" Jeremy correctly answers "No". A message pops up saying: "Correct!"



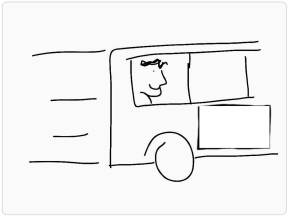

4

A menu pops up asking if he wants to continue or if he is done. The bus suddenly shows up so Jeremy chooses "Done".




5

Minutes later Jeremy is seated in the bus in transit. He decides to continue his video model. He opens the app since the iPod Touch had since fallen asleep. A message immediately pops up asking: "Would you like to continue the video "Bussing the Table"? Jeremy chooses "Yes".



6

After watching the rest of the snippets, a message pops up saying: "Great Job!"

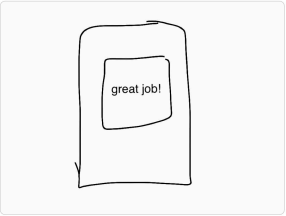



**Figure A10. Storyboard of app alerts.**

# Appendix B. Wireframes & Mockups




**Figure B1. Mockup for watching an interview.**




**Figure B2. Mockup of interaction for self recording with custom prompt.**

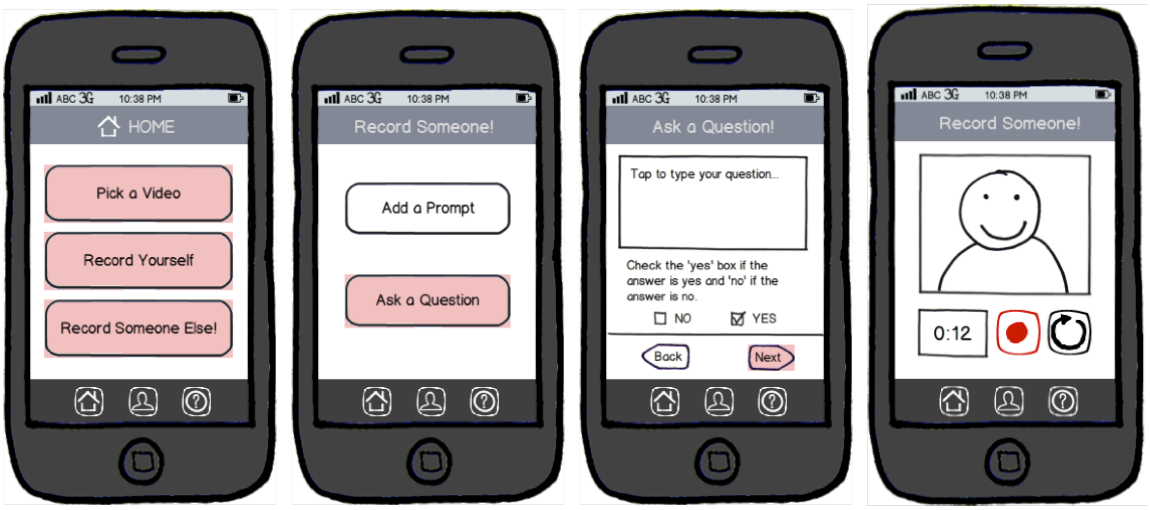



**Figure B3. Mockup of interaction for peer recording with custom question.**

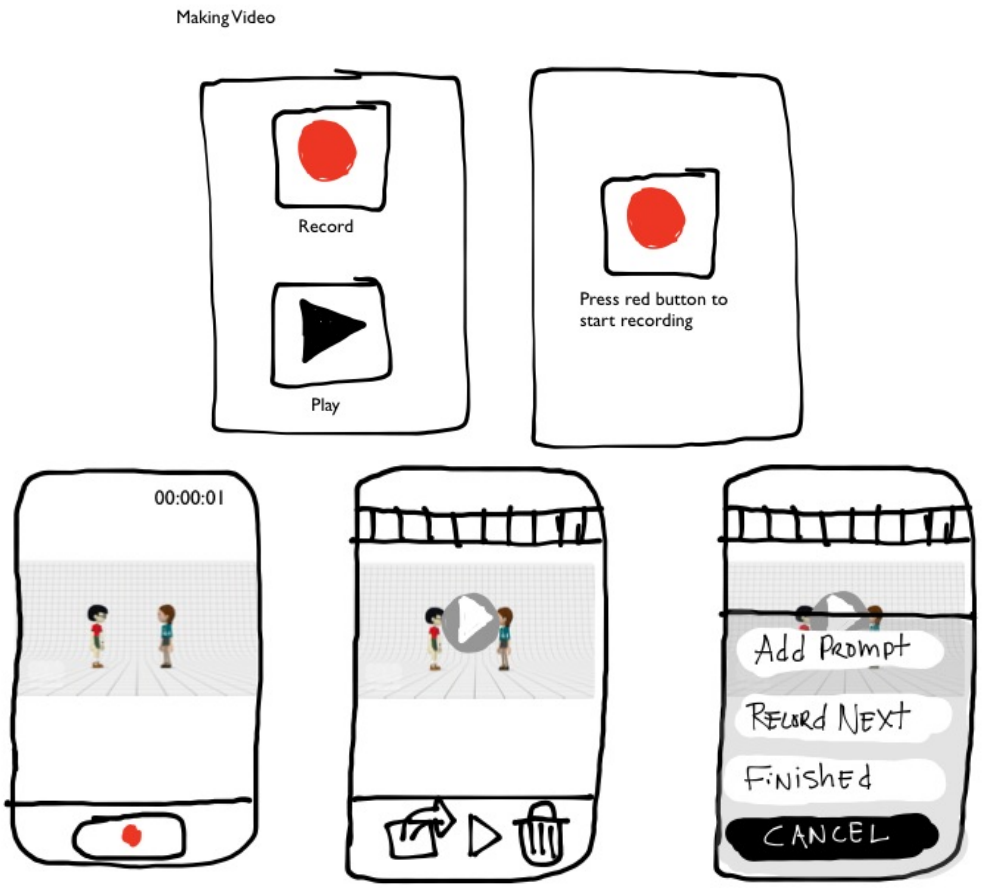



**Figure B4. Wireframe showing interaction of creating custom video.**

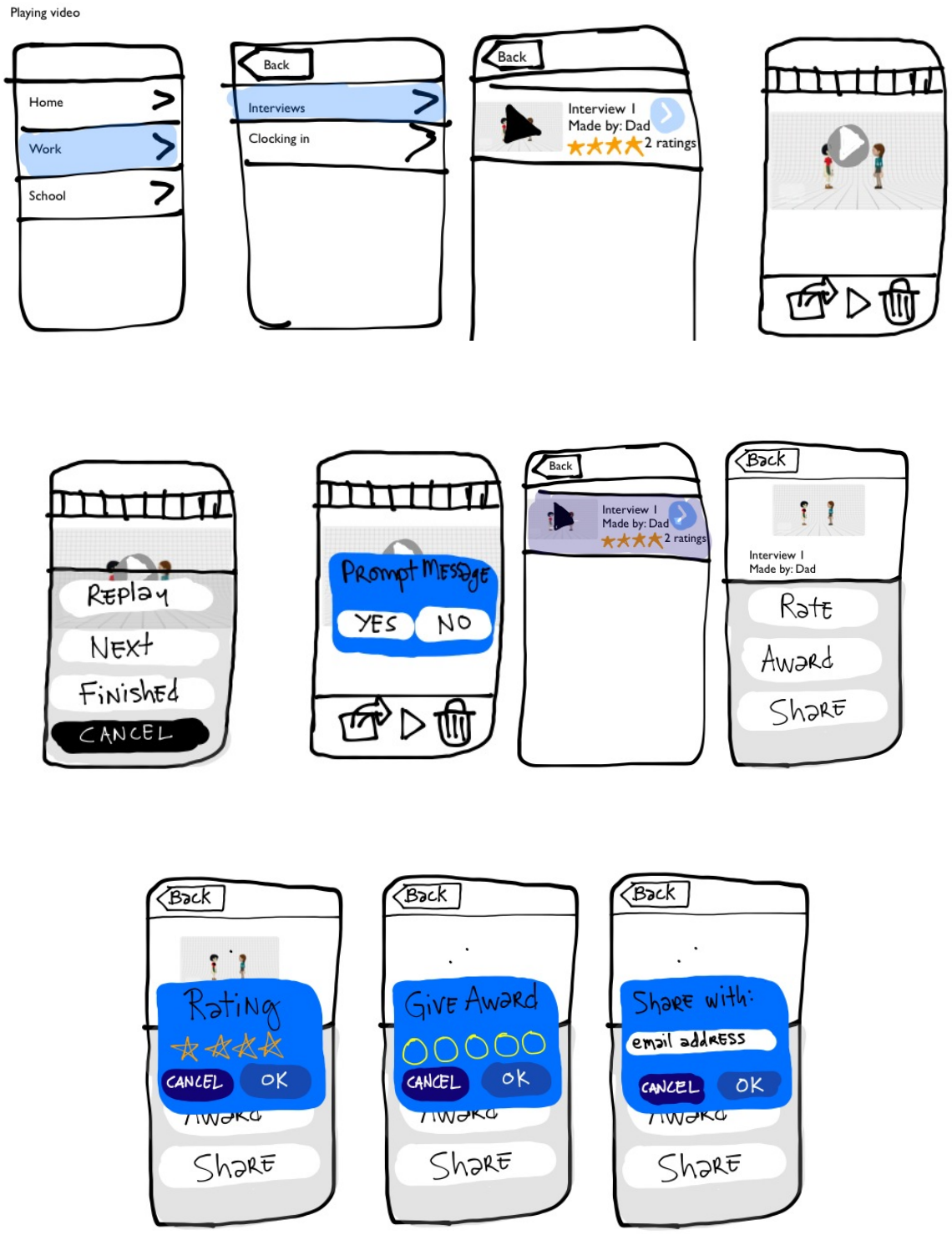



**Figure B5. Wireframe showing interaction for playing, rating, awarding, and sharing a video.**




**Figure B6. Mockup showing interaction for creating custom video.**




**Figure B7. Mockup showing interaction for rating a video.**

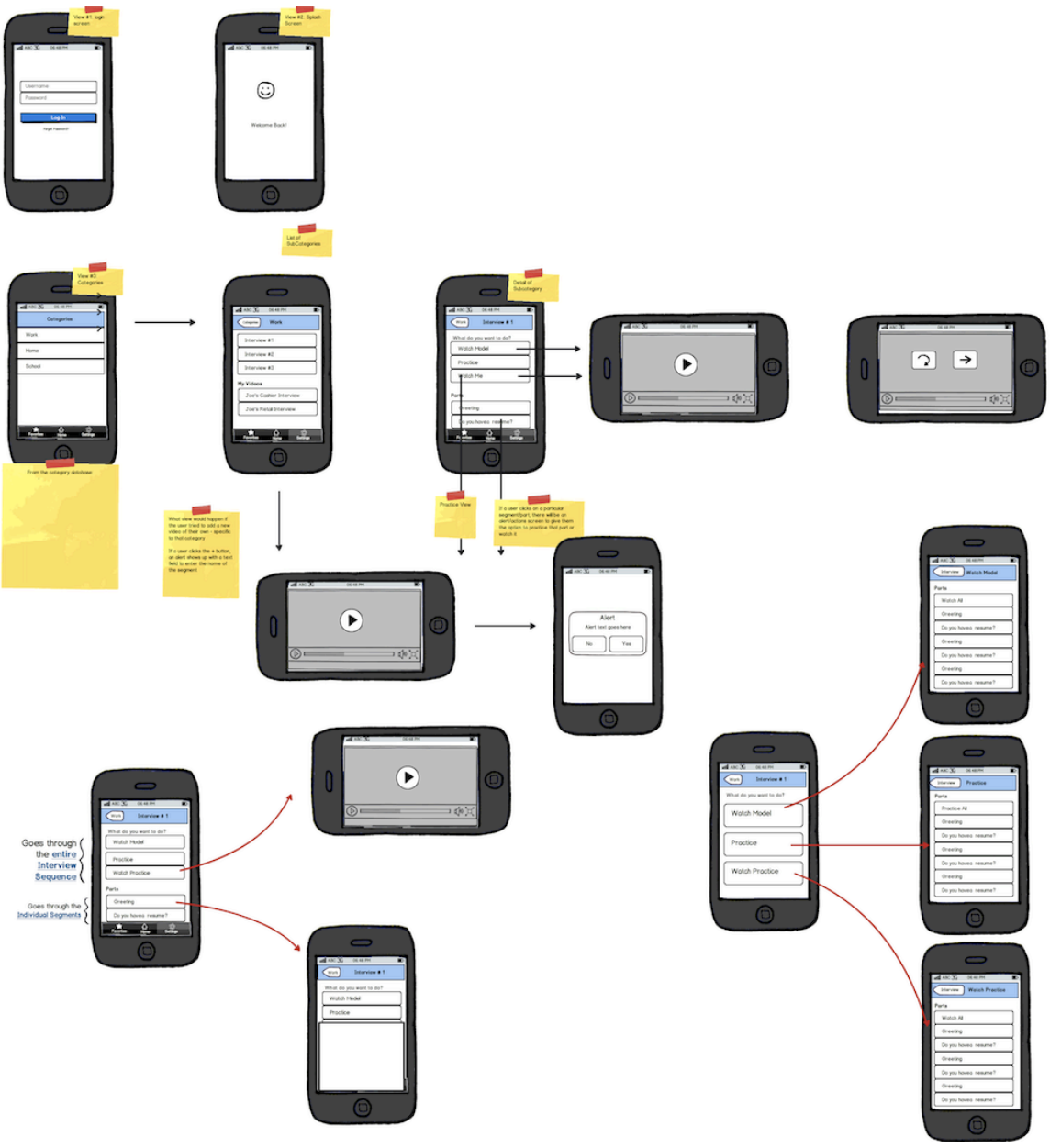



**Figure B8. Final Mockup.**

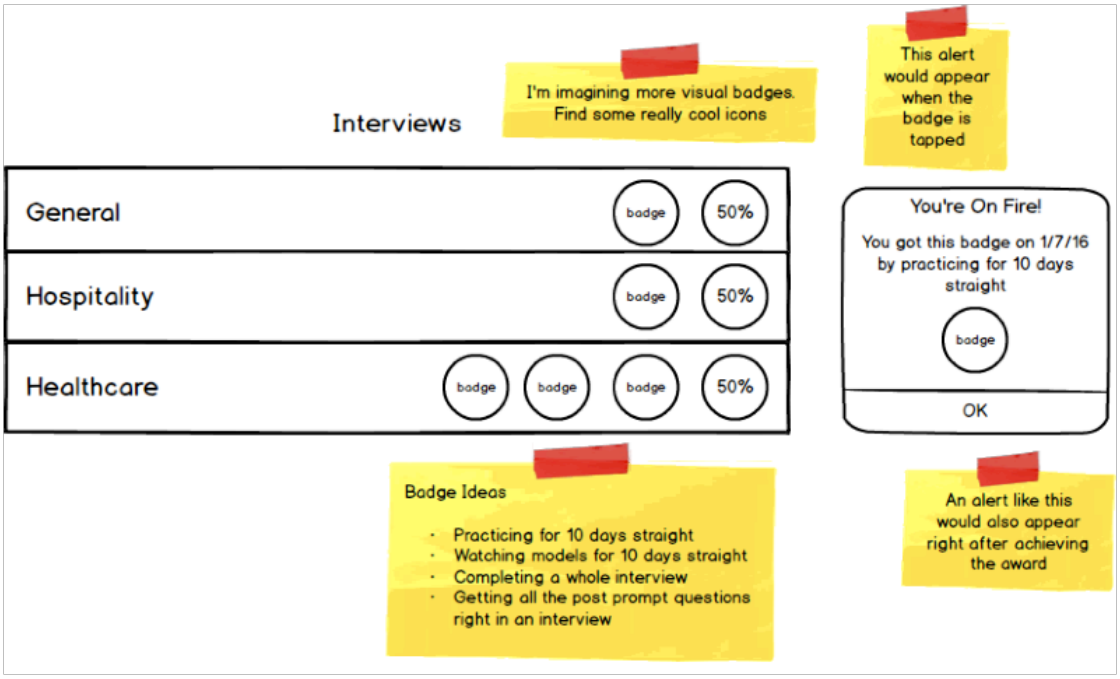



**Figure B9. Wireframe of badge and progress tracker features for VidCoach 2.**

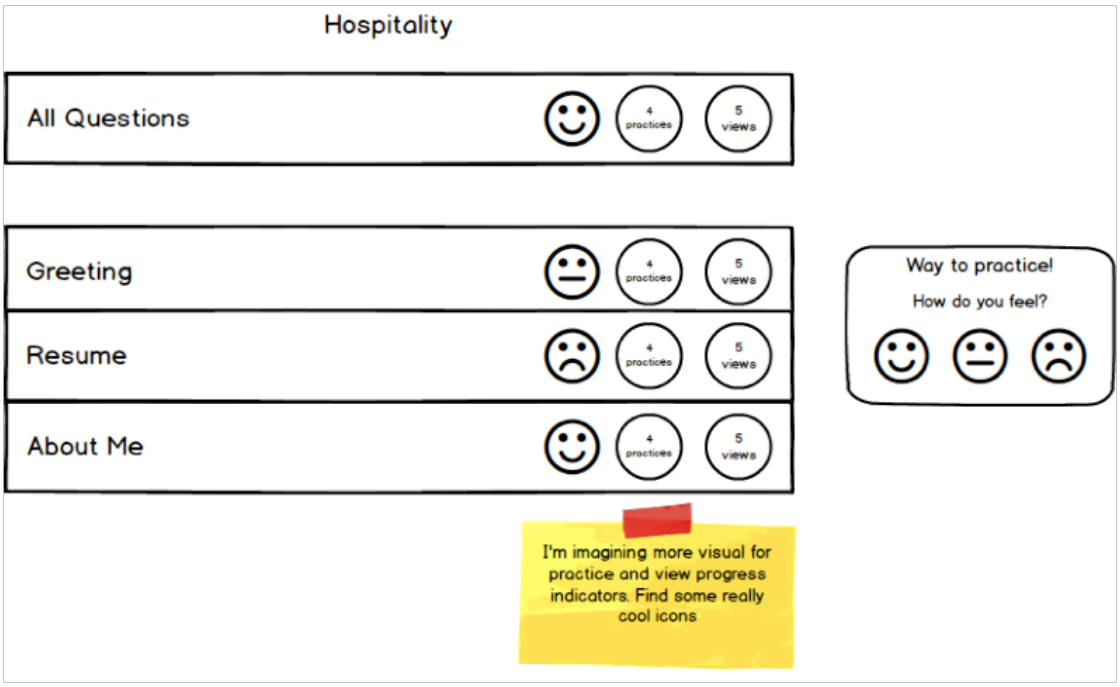



**Figure B10. Wireframe of emoji feature for VidCoach 2.**

# Appendix C. System Architecture.

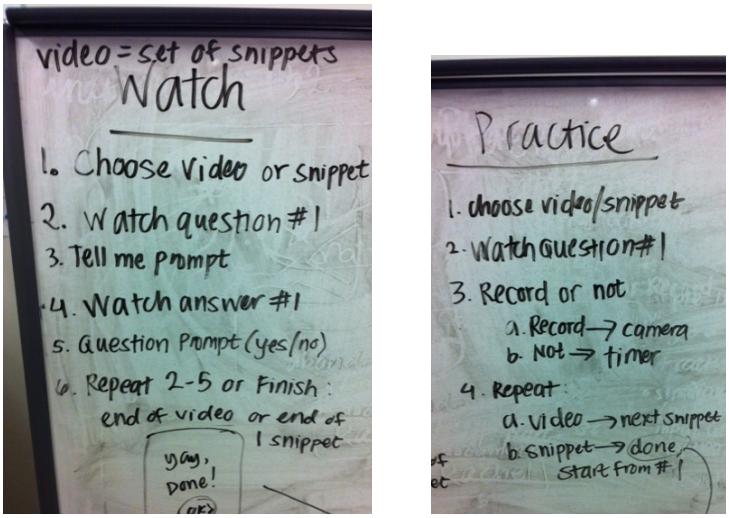



**Figure C1. System functionality derived from wireframes and mockups.**

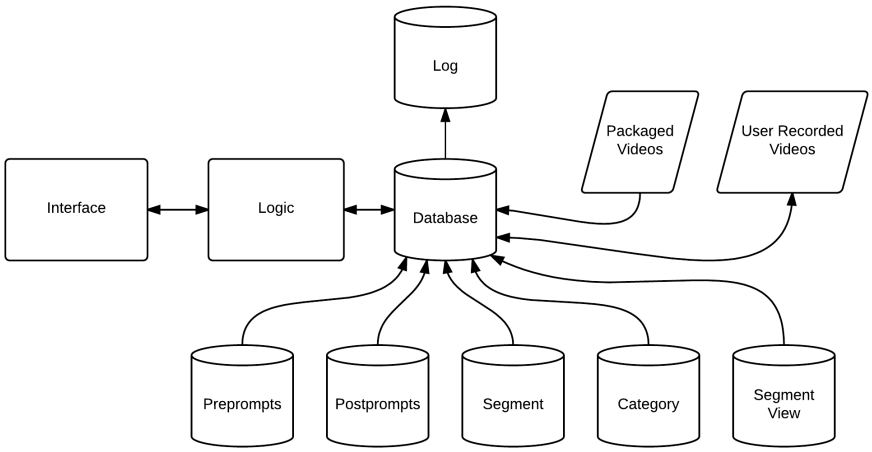



**Figure C2. VidCoach System as implemented in version 1.**

| Segment | Prompt | Category | PromptAnswer | SegmentView | Functions | Function Desc. |
|---|---|---|---|---|---|---|
| Id | Id | type (main or sub) | ID | ID | showSubCategories() | Load SubCat View |
| Name | Type | CategoryId | UserId | UserId | getSubCategories() | Grab SubCats from DB |
| UserId | Title | Name | PromptId | SegmentID | showSegments() | Load Segments View |
| Filepath | Message | Created | Created | created | getSegments() | Grab Segments from DB |
| CategoryId | Cancel | (recursive) | Correct(bool) | location | | |
| SubCategoryId | OtherButtonTitles | | | | | |
| Order | Answer | | | | showVideoPlayer() | Load VideoPlayer View |
| PrePromptId | No. of right answers | | | | playSegment() | Grab Video from DB and play |
| PostPromptId | No. of wrong answers | | | | showRecordView() | Load Record View |
| No. of views | created | | | | recordSegment() | Record segment |
| | updated | | | | saveSegmentData() | video metadata and the video |
| created | deleted | | | | calculate%() | calculates right and wrong |
| updated | | | | | saveUserInfo() | data. |
| deleted | | | | | createSubcategory() | |
| CALL_ID whatever has the same category, same subcategory id and if it is instruction, gets the same callID. | | | | | | |

**MORE NOTES**

recording will be linear. If they skip a step or do one incorrectly it will force them to go back and redo the steps

keep track of how many times they record/rerecord (ex: recording themselves handing a resume to someone)

*Create a stub w/ fake data so interface can keep moving forward



**Figure C3. VidCoach Version 1 Database Design.**

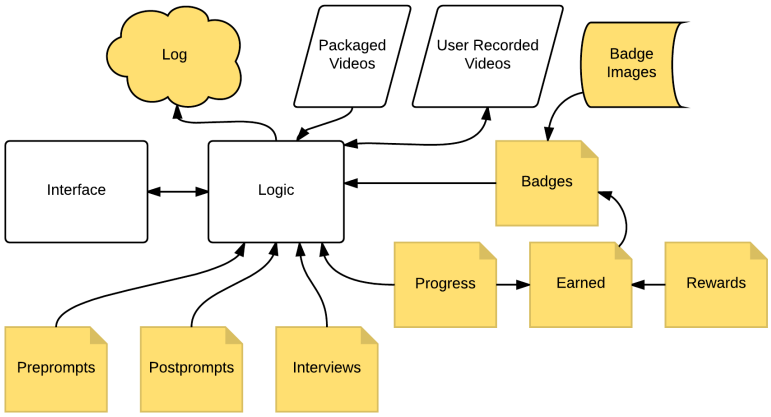



**Figure C4. VidCoach system as implemented in version 2.**

# Appendix D. Participant Codes

| Participant ID | Role |
|---|---|
| DG1 | Program Director |
| DG2 | Program Manager |
| DG3 | Special Education Teacher 1 |
| DG4 | Special Education Teacher 2 |
| DG5 | Director of Support Services |
| DG6 | Case Manager |
| DG7 | Job Developer |

**Figure D1. Requirements Elicitation Participants**

| Participant ID | Group | Sex |
|---|---|---|
| P1 | Control | Male |
| P2 | Control | Female |
| P3 | Intervention | Male |
| P4 | Intervention | Male |
| P5 | Control | Male |
| P6 | Intervention | Male |
| P7 | Intervention | Male |
| P9 | Intervention | Male |
| P10 | Control | Male |
| P11 | Intervention | Male |
| P12 | Intervention | Female |
| P13 | Control | Male |
| P14 | Control | Male |
| P15 | Control | Male |

**Figure D2. Efficacy Study Participants.**

| Participant ID | Type | Sex | School |
|---|---|---|---|
| A0 | Teacher | Female | A |
| A1 | Student | Male | A |
| A2 | Student | Male | A |
| A3 | Student | Male | A |
| A4 | Student | Female | A |
| A5 | Student | Female | A |
| A6 | Student | Female | A |
| B0 | Teacher | Female | B |
| B1 | Student | Male | B |
| C0 | Teacher | Female | C |
| C00 | Teacher | Female | C |
| C1 | Student | Male | C |
| D0 | Teacher | Female | D |
| D1 | Student | Male | D |
| D2 | Student | Male | D |

**Figure D3. Use Study Participants.**

# Appendix E. Study Files

| Video Title | TimeStamp |
|---|---|
| GeneralInterview0 | 15:27:58--04-24-2013 |
| GeneralInterview0 | 15:30:35--04-24-2013 |
| GeneralInterview0 | 16:08:30--04-24-2013 |
| GeneralInterview1 | 16:09:16--04-24-2013 |
| GeneralInterview2 | 16:09:40--04-24-2013 |
| GeneralInterview6 | 16:10:29--04-24-2013 |
| FoodService6 | 16:11:26--04-24-2013 |
| RetailwExp0 | 17:01:23--04-24-2013 |
| RetailwExp11 | 17:02:12--04-24-2013 |
| RetailwExp8 | 17:03:02--04-24-2013 |
| RetailwExp4 | 17:04:18--04-24-2013 |
| RetailwExp0 | 17:04:55--04-24-2013 |
| RetailwExp1 | 17:05:10--04-24-2013 |
| RetailwExp2 | 17:05:27--04-24-2013 |
| RetailwExp3 | 17:05:59--04-24-2013 |
| Hospitality4 | 17:30:03--04-24-2013 |
| Hospitality0 | 17:30:55--04-24-2013 |
| Hospitality1 | 17:31:16--04-24-2013 |
| Hospitality2 | 17:31:39--04-24-2013 |
| GeneralInterview0 | 18:44:30--04-24-2013 |
| GeneralInterview0 | 18:46:23--04-24-2013 |
| GeneralInterview2 | 18:55:48--04-24-2013 |
| GeneralInterview4 | 18:56:34--04-24-2013 |
| GeneralInterview0 | 18:57:18--04-24-2013 |
| GeneralInterview2 | 18:57:45--04-24-2013 |
| FoodService0 | 16:55:23--04-25-2013 |
| FoodService1 | 16:55:42--04-25-2013 |
| FoodService2 | 16:55:58--04-25-2013 |
| FoodService3 | 16:56:34--04-25-2013 |
| FoodService4 | 16:57:12--04-25-2013 |
| FoodService5 | 16:57:55--04-25-2013 |
| FoodService6 | 16:58:29--04-25-2013 |
| FoodService7 | 16:58:59--04-25-2013 |
| FoodService8 | 16:59:28--04-25-2013 |

**Figure E1. Efficacy Study Sample Log Data of Views.**
Each row represents a viewed video. The first column lists the interview questions viewed. The number following the interview title represents the question in sequence. (e.g. GeneralInterview0 represents the first question in the General Interview). The second column lists the time and day the viewing occurred.

| Video Title |
|---|
| FoodService0-16/54/22--04-30-2013.mp4 |
| FoodService0-17/57/53--05-08-2013.mp4 |
| FoodService1-16/54/42--04-30-2013.mp4 |
| FoodService1-17/58/06--05-08-2013.mp4 |
| FoodService2-16/55/47--04-30-2013.mp4 |
| FoodService2-17/58/28--05-08-2013.mp4 |
| FoodService3-16/56/34--04-30-2013.mp4 |
| FoodService3-17/58/57--05-08-2013.mp4 |
| FoodService4-16/57/08--04-30-2013.mp4 |
| FoodService4-17/59/18--05-08-2013.mp4 |
| GeneralInterview0-08/08/51--05-02-2013.mp4 |
| GeneralInterview0-08/46/14--04-26-2013.mp4 |
| GeneralInterview0-10/56/03--05-18-2013.mp4 |
| GeneralInterview0-15/30/14--04-24-2013.mp4 |
| GeneralInterview0-16/19/10--04-26-2013.mp4 |
| GeneralInterview0-16/50/53--04-30-2013.mp4 |
| GeneralInterview0-16/58/00--04-30-2013.mp4 |
| GeneralInterview0-17/02/08--04-27-2013.mp4 |

**Figure E2. Efficacy Study Sample Log Data of Recordings.**
This log lists the recordings made by the user. Each item represents the actual filename of the recording as indicated by the .mp4 suffix. Each file was named to also represent what question and interview the recording was in response to. The number following the interview title represents the question in sequence. The time and date are also included in the filename.
For example, FoodService0-16/54/22--04-30-2013.mp4 represents the first question of the Food Service interview recorded at 4:54:22pm on 4/30/2013.

## General Interview Scoring Sheet

| | |
|---|---|
| **Interview #:** | |
| **Interviewer ID:** | |
| **Participant ID:** | |

**Score: 1.....2.....3.....4**
**Poor Excellent**

| Score | Description | Comments |
|---|---|---|
| | **Presentation:** Professional and appropriate dress and appearance, makes eye contact, has good handshake, uses appropriate body language and presents an image conducive to our office's image. | |
| | **Preparation for the Interview:** Knowledgeable of the office/department, understands job expectations, demonstrates preparedness for the job, able to ask pertinent questions and has related work and academic experience. | |
| | **Verbal Communication/Content of Answers:** Persuasive/passionate in presenting ideas, quickly grasps concepts/questions, responds directly to questions, uses correct grammar and vocabulary, articulate and presents ideas logically and succinctly. | |
| | **Interpersonal Skills:** Enthusiastic, energetic, motivated, mature and has initiative; comfortable and confident around multiple personality types: open, engaging and candid demeanor; demonstrates listening skills and empathy. | |
| | **Desire/Interest:** Determined, eager, sincere, passionate, wants position and will work hard after hired. | |
| | **Skill Level:** Possesses required skills. | |
| **TOTAL** | | |

**Figure E3. Efficacy Study Mock Interview Scoring Sheet**

**Operational Definitions of Behavior to be Scored for Mock Interviews**

**One-time scoring:**

*Professional and appropriate dress and appearance:* Wearing a suit or business casual, including golf shirts, button-up blouse/shirt, slacks or skirt (of near to or below knee length), dress shoes (not sneakers, flip flops, or sandals unless dress sandals on a female). No stains. Wrinkles minimal or nonexistent.

*Hygiene and hair care:* Appears to be showered with hair brushed. If long hair, tied back or otherwise managed. If short hair, limited flyaways or hair is combed. No noticeable sweating, such as through underarm sweat marks and dripping on brow.

*Handshake:* When approached by interviewer, responds with appropriate handshake of no less than 2 seconds and no more than 5 seconds. If interviewer does not approach for handshake at either beginning or end of interview, interviewee initiates handshake.

*Asking appropriate questions:* When asked for their own questions, has at least one relevant and appropriate question to ask interviewer.

**Continuous Scoring:**
*Reading from notes:* Looks at notes for more 2 seconds when responding to a question or when interviewer is speaking.

*Inappropriate use of food or beverage:* drinking or eating when meant to be answering a question; food or drink spilled on clothing or stuck in teeth.

*Fidgeting:* any continuous engagement with hands, table, or items for more than 3 seconds, including repeated rocking of the body. Any engagement with hands (including cracking knuckles), table, or items for any duration that appears to interfere with response to interviewer question or draws the attention of the interviewer.

*Rolling in chair:* moving the chair in what appears to be an intentional manner (repeated rolling movement).

*Posture:* head perpendicular to floor; leaning no more than 20 degrees to either side or to the back. No slouching (defined as substantial curving in the spine). Legs can be crossed or uncrossed, but at least one foot should touch the ground. Seated approximately in the center of the chair.

**Monotonous Speaking:* No change in tone of answer during time period coded.

*Not understanding questions asked:* Requests additional information about interviewer question; States unable to answer question (Says “I don’t know” or doesn’t answer the question at all - for 3 to 4 seconds); or Answers a question that was not asked or is different from question asked.

**Uses correct grammar and vocabulary:* Grammatically correct speech (for spoken English appropriate for an adult). Uses words appropriately according to their dictionary definitions.

*Speaks clearly:* Can be understood by both interviewer and video scorer. No mumbling (unintelligible noises) or drifting off at the end of sentences. Includes stuttering if it impairs ability to understand the interviewee.

*Presents ideas logically and succinctly:* Thoughts follow a unified thread and do not change topics. Stops speaking when question answered. Answers to questions are of appropriate length. This includes long pauses (10 seconds or more) in cogent answers.

*Smiling:* mouth curved upward for at least one second. Anytime the corners of the mouth are turned up and the front teeth are exposed.

*Frowning: mouth curved downward or brow furrowed for at least one second.*

*Interruption:* Any overlapping of voices while interviewer is in mid-sentence or speaks over interviewer interrupting or distracting the interviewer while they are asking the question, not while the interviewer is on the last syllable of their last word. (This does not include the interviewer interrupting the participant.)

**Tone of Conversation (scores would be Professional vs. Casual):* Professional conversation uses formal language, whereas casual uses more relaxed language:

| Professional | Casual |
|---|---|
| Yes | Yeah, Yup, uh-huh, mm-hm |
| No | Nope, nah, nuh-uh |
| Sir, Ma'am, Mr/Mrs, and other formal titles | |
| For example | You know, like |
| I don't know; I can find out; I can check into that. | Dunno, um, uh, particularly with no follow up. |
| Only verbal responses or verbal responses with accompanying body language | Only non-verbal responses (e.g., Nodding, shaking head no) |

*Licking Lips, sticking out tongue:* Anytime you can see the tongue outside of the mouth.

*Note—when a behavior is both observed and not during the same one-minute period, score for whichever is happening more during that period.

**Figure E4. Efficacy Study Operational Definitions.**

| Entry ID | Device ID | Interview | Mode | Question | Timestamp | Type |
|---|---|---|---|---|---|---|
| -K8FpDG_akGZYMb-7ckG | F4D25683-DB6B-43F9-8881-2437B1C918CA | General | watchModel | Greeting | 01.17.2016 10:24:35 PST | Question |
| -K8FssfWFHYq-05kieqs | F4D25683-DB6B-43F9-8881-2437B1C918CA | General | practice | Greeting | 01.17.2016 10:40:35 PST | Answer |
| -K8Ft6HdH3nJxCOjt4L- | F4D25683-DB6B-43F9-8881-2437B1C918CA | General | practice | Why Should We Hire You | 01.17.2016 10:41:35 PST | Question |
| -K8Fv-82GLcyjg4ruGcL | F4D25683-DB6B-43F9-8881-2437B1C918CA | General | practice | Greeting | 01.17.2016 10:49:50 PST | MadeRecording |
| -K8Fv7duFHvug4urGmU- | F4D25683-DB6B-43F9-8881-2437B1C918CA | General | practice | About Me | 01.17.2016 10:50:25 PST | MadeRecording |
| -K8G-eW8ZC42B-m-6wmp | CB208630-A5F5-43E1-A0EF-19453DFB4011 | General | practice | Questions | 01.17.2016 11:14:34 PST | Question |
| -K8G2L-10DuFwgRLXBcC | CB208630-A5F5-43E1-A0EF-19453DFB4011 | General | practice | Strengths | 01.17.2016 11:26:17 PST | MadeRecording |
| -K8GdcTUwRJnXkJJrKt- | 1A8D881D-3638-4A29-A0C1-E0B6A2BB50F6 | General | watchModel | Resume | 01.17.2016 14:13:34 PST | Question |
| -K8GqElDg3OcR5PktxL- | FE6E78F6-9B4E-45BA-A4F2-EBE5E6B6565F | General | practice | Resume | 01.17.2016 15:08:41 PST | Answer |

**Figure E5. Use Study Sample Log Data.**
*Entry ID*: Unique identifier for the log entry.

*Device ID*: Unique identifier of the device running VidCoach.

*Interview*: The interview that was viewed or practiced.

*Mode*: watchModel – user viewed a video, practice – user practiced a video.

*Question*: The interview question that was viewed or practiced.

*Timestamp*: The date and time of the log entry.

*Type*: Question – user viewed the question segment, Answer – user viewed the answer segment, MadeRecording – user recorded an answer.

```
1  setwd("~/Google Drive/VidCoach2")
2  library(dplyr)
3  library(ggvis)
4  library(shiny)
5  library(tidyr)
6  newstudyData <- read.csv("~/Google Drive/VidCoach2/VidCoach2raw.csv")
7  colnames(newstudyData)[6] <- "timestamp"
8  colnames(newstudyData)[2] <- "device"
9  newstudyData$timestamp <- as.POSIXct(newstudyData$timestamp,format="%m.%d.%Y %H:%M:%S",tz="")
10 devices <- as.vector(unique(newstudyData$device))
11 newStudyData <- separate(newstudyData,timestamp,into = c("date","time"),sep=" ")
12 newStudyData <- filter(newStudyData,date >= "2016-02-01",date < "2016-03-01")
13 newStudyData$date <- as.character(newStudyData$date)
14 newStudyData$date <- gsub("2016-02-","",newStudyData$date)
15 colnames(newStudyData)[6] <- "day"
16 newStudyData$day <- as.numeric(newStudyData$day)
17
18 newStudyData %>%
19   ggvis(~day,~device) %>%
20   filter(device == eval(input_select(
21     label="Select Device:",
22     choices=devices))) %>%
23   layer_histograms(width=1) %>%
24   scale_numeric("x",domain=c(1,29)) %>%
25   add_axis("x",values=c(1,7,14,21,28),subdivide=5, title = "Day in Study") %>%
26   add_axis("y", title = "Number of Views & Practices")
```

**Figure E6. R Script to process Use Study log data.**
Lines 1-16 Loads and formats the log data.
Lines 18-26 Generates the chart and dropdown selector.

**Participant Questions**

1. What made you use the app?

_____
_____
_____
_____

2. What kept you from using the app?

_____
_____
_____
_____

3. When would you pick up the app? Why?

_____
_____
_____
_____

4. Tell me some things that you liked about VidCoach.

_____
_____
_____
_____

5. How did you feel about the badges?

_____
_____
_____
_____

6. Did you share *badges* with anyone?

i. With your friends?
ii. With your parents?
iii. With your teachers?
iv. With your job coach?
v. Why or why not?

_____
_____
_____
_____

7. How hard or easy was it to get a badge?

_____
_____
_____
_____

8. How did you feel about the views and practices progress tracker?

_____
_____
_____
_____

9. Did you share *the progress tracker* with anyone?
i. With your friends?
ii. With your parents?
iii. With your teachers?
iv. With your job coach?
v. Why or why not?
vi. Tell me a time…

_____
_____
_____
_____

10. How did you feel about the emoji after practicing?

_____
_____
_____
_____

11. Did you share *the emoji* with anyone?
i. With your friends?
ii. With your parents?
iii. With your teachers?
iv. With your job coach?
v. Why or why not?
vi. Tell me a time…

_____
_____
_____
_____

12. Did you share *videos* with anyone?
i. With your friends?
ii. With your parents?
iii. With your teachers?
iv. With your job coach?
v. Why or why not?
vi. Tell me a time…

_____
_____
_____
_____

13. Did you tell your friends or classmates about VidCoach?
a. (If yes) What did you tell them?
b. What did they say?
c. (If no) Why not?

_____
_____
_____
_____

14. During a typical session, how long did you stay on the app?

_____
_____

15. Did you ever exit out of a video before it finished? (if yes) Why?

16. I have some charts about your usage of VidCoach. Let's look at them together.
a. I see that you used it a lot here.
b. I see that you didn't use VidCoach on these days.
c. I see that you watched/practiced a lot.
d. I see that you didn't watch/practice much.
e. I see that you did/didn't complete a full job interview.
f. What happened here? (for each of these, prompt them to say more if necessary)

17. How important is getting a job for you?
a. Not important, Slightly Important, Moderately Important, Very Important, Extremely Important
b. Why?

18. What is your motivation for getting a job?

19. Did you have any interviews during the time you were using the app? If so, when? How did you use the app to prepare?

**Figure E7. Use Study Interview Questions.**

# Appendix F. Interview Files

***Student with Work Experience- Retail***

**Employer**: "Hello, nice to meet you. Please, have a seat."

Student shakes hands with employer.

**Student**: "Nice to meet you too."

Student sits down.

**Employer**: "So, I see here that you have some work experience. Tell me about some of your main responsibilities at your most recent position."

The student should limit their answer to one or two examples. The student should be as specific as possible, and relate their previous experience to the responsibilities of the job they are interviewing for.

**Student**: "At my previous job, I was in charge of making certain the cafeteria was clean. Plus, I was responsible for keeping the inventory closet stocked.

**Employer**: "Excellent. What did you enjoy the most about your previous position?"

The student should pick a specific example that is positive. Avoid saying negative things like "we got a lot of break time."

**Student**: "I really enjoyed working with the other employees. And I also felt a lot of pride when my manager would compliment me on doing a great job in keeping the cafeteria looking good."

**Employer**: "What did you not enjoy about your previous position?"

The student should try to keep this answer as positive as possible. If possible, do not say outright negative things about your previous job. If a student can't think of anything negative to say, it is acceptable to say that the previous job was a pleasure and that you can't think of anything negative.

**Student**: "Supplies from the supply closet would often go missing and I would have to find them."

**Employer**: "What was your reason for leaving your previous position?"

The student should simply communicate their reason for leaving.

Student: "I really enjoyed my job, but it was too far from my house and school. I was spending almost two hours on the bus, just to work 3 hours at the hospital."

**Employer**: "What would your previous co workers say about you?"

When an employer asks about your relationship with your coworkers, they are probing to determine if you work well within a team. The student should pick only positive descriptions that coworkers would use. For example, hardworking, punctual, friendly, flexible, and a good team member.

**Figure F1. Excerpt from early version of retail job interview script.**

**General Interview**

**1. Hi Welcome to our interview, let's get started -start hand shake**
Name

**2. If you have a resume with you I would like to see it.**
- hand resume

**3. So, tell me about yourself**
Senior in Highschool
going to community college
In a lot of clubs
i do community service and am in math club and science club

**4. So, What are your strengths?**
I work well in teams - I am a leader I was president of the math club

Take initiative on - for an example I started the math club at my school

Fast learner - I enjoy learning new things
**5. Why should we hire you?**

Im a really hard worker
I pick up new skills quickly
Asset to the company

**6. Do you have any questions for me?**

do you have any questions or concerns regarding my my ability to do this job
What can I expect the job to be like day to day?
What do you like about working at this company?
How many hours would I be expected to work each week?

**7. We're at the end of the interview, we will get back to you in about a week**
- thank you
i look forward to hearing from you

**Figure F2. General Interview final script used to for recording models.**

# General Interview

**Introduction**

*Pre Prompt*

If the interviewer extends his/her hand to you, you should shake their hand for about two seconds.

*Post Prompt*

How long should you shake hands for?

**a. 2 seconds**

b. 30 seconds

c. 1 minute

**Question 1: Resume**

*Pre Prompt*

Hand your resume to the interviewer.

*Post Prompt*

You should remember to bring your resume

**- True. If you have a resume, you should bring it to the interview**

- False. If you have a resume, you should bring it to the interview

**Question 2: About Yourself**

*Pre Prompt*

Tell the interviewer about yourself! You should talk about school, your goals, interests, and hobbies.

*Post Prompt*

Which of the following is an appropriate answer?

a. I once got in trouble for being late to school.

**b. I like to help people and I am involved in community service.**

c. I don't want to work here.

**Question 3: Strengths**

*Pre Prompt*

Tell the interviewer about your strengths! You can talk about leadership skills, how you work with others, and awards that you've received.

*Post Prompt*

Which of the following is an appropriate answer?

a. I am bad at working with others

**b. I get good grades in school and work well with others, and I learn fast.**

c. I ate spaghetti for dinner last night.

**Figure F2. Excerpt of Pre-Prompt and Post-Prompt Script.**