Effects of a Video Model to Teach Students with Moderate Intellectual Disability to Use Key Features of an iPhone

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Abstract This study evaluated the effects of video modeling on teaching three high school students with moderate intellectual disability to perform three activities on an iPhone 3GS. This study is a replication and extension of the Hammond, Whatley, Ayres, and Gast (2010) study in which researchers taught this same set of skills using a slightly different format of instruction and a less complex hand-held device. In the current study, a multiple probe design across three behaviors, replicated across three participants, was used to evaluate the effects of video modeling on participants’ capacities to (a) take a photograph of a person, (b) look at photographs by starting a slideshow, and (c) access and view a video. Generalization to a more complex home screen arrangement featuring multiple unused buttons not present during intervention was also measured following intervention. Results of the present study indicate that video modeling was effective in teaching target behaviors in a near-errorless fashion. Additionally, during generalization, students were able to navigate to each of the three tasks despite the addition of 14 other distracter buttons, not previously present without additional training.

The Individuals with Disabilities Improvement Act defines assistive technology (AT) devices as those tools that help students with disabilities function in their environment (Wright, 2004). The range in what qualifies as a “device” is broad and can include things from specialized eating utensils to computer software that converts speech to text. Some of these are everyday items that simply require a low tech modification (e.g., fattening a pencil with a rubber grip) while others are more complex and specialized (e.g., Dynavox augmentative communication systems). In many cases the technology is specialized in some way, either by design or modification, to promote independence.

Depending on how dynamic an individual’s needs are, the life-span of an AT device may be limited. Many years ago, Phillips and Zhao (1993) noted shifting user needs as one of the primary reasons individuals stopped using an AT device. Further, Brookes (1998) suggested that some families may decide not to utilize AT for their children because of the increased focus on the child and disability. Much of the research cited by Parette and Scherer (2004) focused on the stigma associated with AT and the influence on the user. The fear that AT may magnify the visual perception of an individual’s disability weighs heavily in the decision to use or forgo AT. However, solutions exist in more typical formats. Applications currently exist for the iPod and iPhone that put communication options (e.g., speech-to-text) in a “normal” device that does not look atypical across multiple environments. Within today’s technology-dependent population, the ubiquity of people using an iPhone or listening to an iPod in public is striking.

Shifting AT emphasis toward device options used more frequently by the general public may reduce the stigma typically associated with AT and increase user adoption. Abner and Lahm (2002) noted teacher reluctance to...
implement AT with which they themselves have little familiarity. Therefore, adapting a device like an iPod or iPhone that has widespread usage within the general population is a logical step. Thus, beginning to train individuals to use a handheld device (e.g., an iPod or iPhone) to take advantage of the flexible range of software supports becomes the next challenge.

Video modeling on computers, handheld devices, and other tools has been used across disciplines and across settings to teach a variety of skills. In 2002, Davies, Stock, and Wehmeyer examined the use of a handheld, self-directed visual and auditory prompting system to improve the independent performance of community-based vocational tasks. In addition, the researchers tried to determine if the use of the handheld systems would also reduce the amount of support needed from teachers or job coaches. They reported that the handheld prompting systems resulted in increases for each student’s independent functioning in community-based tasks, but more importantly, the study demonstrated the handheld systems reduced the amount of support time required by the teacher or job coach for each student.

In two studies, one with middle school aged students with moderate intellectual disability (Hammond et al., 2010) and the second with elementary-aged students with autism (Hammond, Muething, Ayres, & Gast, in review), researchers examined the use of video modeling to teach students to access activities on iPods. The intention was, in part, to evaluate the use of video modeling with fine motor tasks that may be more difficult for users to discriminate. In both cases, all students learned the target tasks, but important limitations were identified in the initial study (Hammond et al., 2010). These researchers used single opportunity probes (Cooper, Heron, & Heward, 2007) to evaluate student performance of the steps of their task analyses (e.g., accessing music, accessing videos, and accessing photographs). This may have artificially suppressed baseline responding because if a student failed at the first step, they would not have had a chance to demonstrate whether they could perform subsequent steps. While the students’ mastered the skills, their performance deteriorated over time. During main-tenance probes, the researchers noted the lower levels of responding and implemented “booster” sessions of video modeling to help the students regain criterion level performance.

In a subsequent study, Hammond et al. (in review) used the same instructional methodology and incorporated multiple opportunity probes rather than single opportunity probes. This allowed participants to make an error on a step and have a chance to respond to the later steps in the task analysis (TA). The effects of intervention were evaluated with a multiple baseline design across behaviors replicated across participants. After learning one of the target skills, two of the participants generalized those steps to the other tasks that shared many of the same procedural steps. As a result of the design’s structure, this generalization did not weaken Hammond et al.’s (2010) experimental control. However, it did suggest that the trio of behaviors being taught may have shared too many critical features to serve as target behaviors in this research context where ideally you would want skills that are functionally independent to safeguard against carry-over threats (Wolery, Gast, & Hammond, 2010).

The current study is a replication and extension of Hammond et al. (in review). Capitalizing on the foundation laid with the structure of the research design, this study used the same multiple baseline design across behaviors replicated across participants to evaluate the effects of video modeling on student acquisition of three skills on an iPhone 3GS. The purpose of the replication is to apply a similar procedure to a more complex device and evaluate generalization to untrained interfaces. The research questions addressed here include: (1) What effect does video modeling have on the acquisition of taking a photograph of a person, viewing photographs in a slideshow, and viewing a video in iTunes?; and (2) If students acquire the skills via video modeling in an environment of reduced distracters (e.g., only the minimum number of buttons on the screen) will the student generalize this without training to an environment filled with distracters (e.g., screen filled with icons)?
Method

Participants

Four high school students, all identified as having moderate intellectual disability (MOID), initially agreed to participate in the study. However, due to health concerns and multiple absences, the fourth participant had to leave the study. All participants were selected because they had IEP goals related to recreation and leisure that fit with the target objectives of the project (e.g., visual discrimination and following instructions). Participants additionally possessed the following prerequisite skills: (a) visual acuity and manual dexterity sufficient to place the tip of a finger on a 1 cm by 1 cm target on the face of an iPhone; and (b) ability to sit for at least 15 minutes.

The first participant, Holly, was a loquacious 21 year and 5 month old female at the onset of the study with a diagnosis of Down’s Syndrome and MOID. Holly displayed deficits in reading for informational purposes and counting mixed dollar bills. However, Holly possessed strengths in learning to expressively state sight words, sound out unfamiliar words, and her ability to manage personal items (e.g., purse, insulin materials, and cell phone). Prior to the study, Holly had experience using a family member’s iPhone 3GS to send and receive text messages. However, Holly’s performance was dependent upon assistance with reading and typing messages on the iPhone. The Vineland Adaptive Behavior Scales (VABS; Sparrow, Balla, Cicchetti, & Doll, 1984) indicated that she showed standard scores of 63 for daily living, 86 for socialization, and 62 for communication with a composite of 68. The Differential Ability Scales (DAS; Elliott, 2005) indicated that Holly scored a 47 in the verbal cluster, a 57 in the nonverbal reasoning cluster, 50 in the spatial cluster, a 47 in the general cognitive ability, and a 51 in the special nonverbal composite.

Jake, the second participant, was 17 years and 9 months old at the introduction of the study with a diagnosis of Fragile X and MOID. Jake displayed anxiety and attention-seeking behaviors (e.g., hand-biting, using inappropriate language). This behavior was avoided throughout the study via verbal reassurances and redirection along with sustained involvement. Jake displayed deficits in attention and impulse control, oftentimes negatively impacting his ability to acquire new information and skills. Jake possessed strengths in computer and calculator proficiency. The DAS (Elliott, 2005) indicated that Jake scored a 76 in the verbal cluster, a 53 in the nonverbal reasoning cluster, and a 61 for the overall general cognitive ability score.

The final participant, Norman, was 18 years old at the beginning of the study. He displayed deficits in adaptive behavior that impacted his educational progress as he tended to be easily distracted. Norman’s strengths included his ability to recall key parts of stories that were read to him and his ability to learn and recall sight words. Norman also enjoyed cooking with his class. On the VABS (Elliott, 2005) he scored standard scores of 62 for daily living, 66 for socialization, and 47 for communication with a composite of 56. Results from the Wechsler Intelligence Scale for Children – Third Edition (Wechsler, 1991) indicated a verbal intelligence quotient (IQ) of 54, performance IQ of 46, and a full scale IQ of 46.

Materials and Settings

Students viewed video models on a 15” MacBook Pro laptop. The videos were viewed in QuickTime (QuickTime, 2011) and were cued for the student prior to the session’s commencement. Videos depicted the hands of an actor using an 8 GB iPhone 3GS running iOS 4. The duration of the three video models varied: 28 s for watching a video, 18 s for taking a photograph of a person, and 26 s for looking at photographs. During baseline and initial instruction, the iPhone screen only displayed four soft buttons at the bottom of the screen that included one of the target buttons, the orange iPod button. Soft buttons are those that could not be changed and were located on the bottommost horizontal toolbar. The rest of the screen contained only two icons: one to initiate the iPhone’s camera and one to view the photograph album. Five high interest photographs were included in the photograph album and, similarly, for watching a video, five high interest videos were imported into iTunes. Due to one participant, Jake’s, changing preference throughout the study, a
sixth and seventh video were added to match his changing taste and therefore motivation to seek the videos.

This study was conducted in a rural public high school in the South. All sessions took place in an empty classroom located next to the school’s gymnasium approximately 20 ft by 20 ft in dimension. Only the participating student and data collectors were in the room during each session. The researcher providing instruction always stood to the side of the student so as to be readily available to interrupt and correct errors during the multiple opportunity probe trials and to collect data. The researcher collecting interobserver agreement (IOA) and procedural fidelity data always stood to the other side of the participant in order to see their physical movements and the screen of the iPhone. During all instructional sessions, students sat at a desk and the researcher handed them the phone with a black screen prior to the beginning of the session.

Response Definitions and Data Collection

The primary dependent measure was independent performance of each step of the target skills (See Table 1 for task analyses). A step was considered independent if the student initiated the step within 5 s of the task direction or completion of the previous step and completed that step in a topographically correct manner within 5 s. Failure to initiate a step within 5 s resulted in that step being scored as a latency error. If a student initiated the step but failed to complete it within 5 s the response was scored as a duration error. If the student initiated an incorrect topography within the latency time frame, that step was scored as a topographical error. Keeping with protocol for multiple opportunity probes, in the case of all errors across all conditions, the student was interrupted, their line of vision was redirected away from the device, and the device was advanced to the conclusion of that step prior to having their attention redirected back to the iPhone. This ensured that for each step, the student was presented with correct discriminative stimulus and had the opportunity to respond. Interobserver agreement (IOA) and procedural fidelity were collected by a second data collector during at least 20% of all sessions, for each participant, in each condition. IOA was calculated using the point-by-point method (number of agreements divided by the number of agreements plus disagreements, multiplied by 100) and a minimum acceptability for reliability levels was 85%. Procedural fidelity data were calculated based on the number of behaviors correctly performed by the investigator, divided by the number of planned investigator behaviors, multiplied by 100 (Billingsley, White, & Munson, 1980). Investigator behaviors which were assessed during baseline, Pre-Video Modeling, and Post-Video Modeling sessions included the following: delivery of the general attentional cue, delivery of the task direction, correct issuance of the iPhone with a black screen, and the investigator’s attendance to latency, allotted response duration, error interruption, error restart, and issuance of corrective feedback.

During a minimum of 20% of both baseline and intervention sessions for all students, a second observer collected interobserver agreement (IOA) and procedural fidelity. Procedural fidelity was based on a checklist of expected researcher behaviors for each session. The number of correctly performed researcher behaviors was divided by the number of expected behaviors and multiplied by 100.

Procedure

General procedure. This study is composed of two conditions (baseline and video modeling intervention). All sessions in both conditions contained an initial probe trial to measure performance on the target skill (sometimes referred to as a “cold” probe). During Video Modeling, students had the cold probe followed by Video Modeling Instruction and a Post-Video Modeling Practice trial. In all cases students participated individually in sessions lasting 5 to 10 minutes 3 to 4 times per week. Once the materials for a task had been arranged, participants were given the task direction for one of three target skills (e.g., “Take a photograph of a person,” “Look at photographs,” or “Watch a video”) while simultaneously being handed the iPhone with a black screen indicating the need to initiate the target task. The phone was in a stand-by position similar to how it would be in if some-
one had just pulled it from his or her pocket. Once students began intervention and received Video Modeling instruction, they were asked to engage in a single opportunity practice trial (Post Video Modeling Practice) to allow the student to rehearse the task and measure their ability to respond soon after viewing a model. Any error which occurred during single opportunity probes immediately terminated the session. Data from the practice trials were recorded, but did not count toward skill mastery.

**Baseline and Pre-Video Modeling Probe sessions.** Pre-Video Modeling Probes were conducted in a multiple opportunity format (Cooper, Heron, & Heward, 2007). Thus, if an error occurred, the observer monitoring student performance would fix the error and prepare the iPhone for the next step without the student seeing. The observer would then tell the student to “keep working.” Students were initially presented with the iPhone with a blank screen and given the task direction (e.g., “Let’s take a photograph.”) to indicate which target task to initiate. Data were collected after the delivery of the task direction on each student to measure independent and accurate performance of each step of the target task. If a duration error occurred, the student’s attention was directed away from the phone as the instructor simultaneously completed the current step in the TA, preparing the phone for the student to complete the next step in the TA. The student’s attention was then verbally redirected back to the task. If a sequential or topographical error occurred, the instructor would undo the error in addition to preparing the phone for the student to complete the next step in the TA. Corrective feedback was not provided during probe trials; however, descriptive verbal praise was given for correct responses (during Baseline Pre-Video Modeling as well as during Pre-Video Modeling conducted during intervention. Praise was delivered on a variable ratio schedule after the average of every third correct response (VR-3). Once students reached criterion on a task, the reinforcement schedule was thinned to every fifth step for all target tasks (FR-5). Under the FR-5 schedule of reinforcement, a student received descriptive verbal praise once they completed the entire target task. After three stable data points had been collected across three consecutive sessions across a minimum of two days for the first task for each participant, Video Modeling Instruction began. For the second and third tasks, instruction began only after the student demonstrated 100% independence on the previous task for at least one session. During intervention, once a student completed the Pre-Video Modeling Probe, he or she moved into Video Modeling for that skill.

**Video Modeling.** Video Modeling sessions consisted of three parts (Pre-Video Modeling probe trials, Video-Modeling, and Post-Video Modeling Practice), implemented within one

### TABLE 1

**Task Analyses for all Tasks**

**Watch a Video**

<table>
<thead>
<tr>
<th>Screen Appearance</th>
<th>Task Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screen Black</td>
<td>1. Push HOME button</td>
</tr>
<tr>
<td>Lock Screen</td>
<td>2. Slide LOCK to the right</td>
</tr>
<tr>
<td>Orange iPod Bottom Right</td>
<td>3. Hit iPod button</td>
</tr>
<tr>
<td>Varies</td>
<td>4. Hit VIDEO button</td>
</tr>
<tr>
<td>Video List</td>
<td>5. Select target video</td>
</tr>
<tr>
<td>Target Video Begins</td>
<td></td>
</tr>
</tbody>
</table>

**Take a Photograph of a Person**

| Screen Black      | 1. Push HOME button |
| Lock screen       | 2. Slide LOCK to the right |
| Home Screen       | 3. Hit FLOWER button |
| Display of Camera | 4. Point camera at a person |
| Person in “View”  | 5. Click CAMERA button |

session. These Pre-Video Modeling trials were conducted identical to those conducted during the baseline condition and described previously. However, Post-Video Modeling Practice trials were conducted differently. Video Modeling Instruction began if a student did not complete the target task with 100% accuracy during Pre-Video Modeling Probes. After the probe trial, if students were to receive video instruction, the computer was placed in front of them. Once their attention was secured, they were then instructed to “Watch this,” by the instructor, as the video was started. Each of the 3 videos depicted navigation of the iPhone, in first person perspective, to take a photograph of a person, look at photographs, or watch a video. Post-Video Modeling trials Practice took place immediately following Video-Modeling instructional trials and consisted of a single opportunity practice trial.

**Experimental Design**

A multiple probe across behaviors, replicated across participants was used to evaluate a functional relation between the dependent variable and the video-based intervention (Gast & Ledford, 2010). Experimental control was demonstrated through the replication of effects of the video modeling procedure as the introduction of the independent variable was staggered based on a predetermined criterion across three tasks for each of the three participants in the study.

**Results**

**Reliability**

IOA and procedural fidelity data were collected during 22% of baseline sessions and 29% of Video Modeling sessions. During all sessions in which IOA were collected, the mean percent agreement was 100%. The mean procedural fidelity was 98.92% (range: 88.9–100%) for all investigator behaviors across all experimental conditions. Instances in which procedural fidelity data were below 100% included the instructor’s lack of adherence to the pre-determined latency established between the issuance of the task direction or naturally occurring discriminative stimulus within the task itself and the instructor’s error correction statement.

**Effectiveness of a Video Model**

Figures 1, 2, and 3 present data on the percentage of steps completed accurately and independently for Holly, Jake, and Norman, respectively, across all three skills. Norman and Jake demonstrated 0% independent responding during baseline probes for all target behaviors whereas Holly demonstrated some skill with the iPhone based on prior experience. All students ultimately mastered the skills and demonstrated an ability to generalize to the more complex discriminations required when more icons were added to the iPhone screen. Table 2 shows the types of errors students made across trials. Intervention Probes were single opportunity, thus, as soon as an error was emitted, the trial was finished. An analysis of the types of errors made, latency, duration, and topographic, was conducted. Types of error emitted by participants were variable across conditions and participants. Latency and topographical errors were the most frequently made type of mistakes across all participants and conditions.

**Holly.** Holly’s baseline performance on taking a photograph accelerated across the condition. The decision was made to begin intervention after the sixth session because it did not appear likely that she was going to complete step 3 (hitting the camera button) or 5 (clicking the camera button) without instruction. Her performance on the other skills also accelerated but leveled out at 60% until intervention was provided for those skills. Upon introduction of video modeling for taking a photograph accelerated across the condition. The decision was made to begin intervention after the sixth session because it did not appear likely that she was going to complete step 3 (hitting the camera button) or 5 (clicking the camera button) without instruction. Her performance on the other skills also accelerated but leveled out at 60% until intervention was provided for those skills. Upon introduction of video modeling for taking a photograph accelerated across the condition. The decision was made to begin intervention after the sixth session because it did not appear likely that she was going to complete step 3 (hitting the camera button) or 5 (clicking the camera button) without instruction. Her performance on the other skills also accelerated but leveled out at 60% until intervention was provided for those skills. Upon introduction of video modeling for taking a photograph accelerated across the condition. The decision was made to begin intervention after the sixth session because it did not appear likely that she was going to complete step 3 (hitting the camera button) or 5 (clicking the camera button) without instruction. Her performance on the other skills also accelerated but leveled out at 60% until intervention was provided for those skills.
Figure 1. Holly multiple baseline graph. Dotted line throughout graphs indicates a change in condition, from baseline to video modeling intervention. The circle around the data point on session X indicates the inclusion of the aforementioned verbal prompt (e.g., “Don’t hold so long.”), added after Holly made the error during step 1.
Figure 2. Jake multiple baseline graph. Dotted line throughout graphs indicates a change in condition, from baseline to video modeling intervention.
Figure 3. Norman multiple baseline graph. Dotted line throughout graphs indicates a change in condition, from baseline to video modeling intervention.
This same verbal prompt was used for the same error made in step 3. Following the fifth trial, step 3 was then mass trialed in the same manner. Holly correctly completed all steps in the sixth intervention session but then her performance deteriorated before rebounding to mastery level performance. Once she achieved mastery with taking a photograph and her baseline data were stable for the other two behaviors, intervention began on accessing and looking at photographs. Immediately following intervention, Holly met criterion-level performance. Additional baseline data were collected on watching videos to confirm stable performance and intervention was then begun. Similar to her performance on looking at photographs, Holly immediately demonstrated mastery performance after intervention began.

During generalization to evaluate performance with an iPhone screen filled with distracters, Holly demonstrated 100% correct performance for taking a photograph, 80% for looking at photographs, and 80% for watching a video. Her error in the latter two skills occurred on steps unrelated to the addition of the distracter buttons, but instead were topographical errors that occurred as a result of holding the button down for too long on the home screen, resulting in the iPhone going into edit mode.

Jake. Following a stable baseline condition across all skills, Jake began video modeling for watching a video. Upon introduction of video modeling to the behavior of watching a video, Jake required two intervention sessions before he began to show improvement. After four training sessions he achieved mastery and during generalization to the iPhone screen with multiple distracters, he continued to show 100% independent performance.

After mastery on watching a video and a continued stable baseline was reached with the other skills, intervention began for look-

### Table 2

<table>
<thead>
<tr>
<th></th>
<th>Baseline Probe</th>
<th>Pre-Video Modeling Probe</th>
<th>Post-Video Modeling Probe</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L D T</td>
<td>L D T</td>
<td>L D T</td>
<td>Errors</td>
</tr>
<tr>
<td>Holly</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Look</td>
<td>0 12 18</td>
<td>0 0 2</td>
<td>0 0 0</td>
<td>32</td>
</tr>
<tr>
<td>Take</td>
<td>1 4 8</td>
<td>0 4 8</td>
<td>0 3 4</td>
<td>32</td>
</tr>
<tr>
<td>Watch</td>
<td>0 7 23</td>
<td>1 1 5</td>
<td>0 0 2</td>
<td>39</td>
</tr>
<tr>
<td>Total Errors</td>
<td>1 23 49</td>
<td>1 5 15</td>
<td>0 3 6</td>
<td>103</td>
</tr>
<tr>
<td>Jake</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Look</td>
<td>11 0 9</td>
<td>0 0 2</td>
<td>0 0 0</td>
<td>22</td>
</tr>
<tr>
<td>Take</td>
<td>28 2 2</td>
<td>4 0 1</td>
<td>0 0 1</td>
<td>38</td>
</tr>
<tr>
<td>Watch</td>
<td>18 0 2</td>
<td>15 0 3</td>
<td>3 0 1</td>
<td>42</td>
</tr>
<tr>
<td>Total Errors</td>
<td>57 2 13</td>
<td>19 0 6</td>
<td>3 0 2</td>
<td>102</td>
</tr>
<tr>
<td>Norman</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Look</td>
<td>12 1 2</td>
<td>24 2 3</td>
<td>5 0 0</td>
<td>49</td>
</tr>
<tr>
<td>Take</td>
<td>14 3 7</td>
<td>0 0 4</td>
<td>0 0 0</td>
<td>28</td>
</tr>
<tr>
<td>Watch</td>
<td>14 1 3</td>
<td>11 2 8</td>
<td>1 0 8</td>
<td>48</td>
</tr>
<tr>
<td>Total Errors</td>
<td>40 5 12</td>
<td>35 4 15</td>
<td>6 0 8</td>
<td>125</td>
</tr>
<tr>
<td>Total Errors*</td>
<td>98 30 74</td>
<td>55 9 36</td>
<td>9 3 16</td>
<td>330</td>
</tr>
<tr>
<td>Mean Percentage**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Look</td>
<td>23.5% 43.3% 39.2%</td>
<td>43.6% 22.2% 19.4%</td>
<td>55.6% 0% 0%</td>
<td>31.2%</td>
</tr>
<tr>
<td>Take</td>
<td>43.8% 30% 23%</td>
<td>7.3% 44.4% 36.1%</td>
<td>0% 100% 31.3%</td>
<td>29.7%</td>
</tr>
<tr>
<td>Watch</td>
<td>32.7% 26.7% 37.8%</td>
<td>49.1% 33.4% 44.5%</td>
<td>44.4% 0% 68.7%</td>
<td>39.1%</td>
</tr>
</tbody>
</table>

Key: (L) = Latency Errors; (D) = Duration Errors; (T) = Topographical Errors; * = Represents total number of errors across all participants for each error type and condition; ** = Represents percentage of error type across all participants for each condition for each target behavior.
ing at photographs. Jake only required a single training session before showing criterion level performance. During generalization for looking at photographs, Jake completed 100% of the task independently. With mastery met on watching a video and a stable baseline for taking a photograph, video modeling was introduced on this last skill. He quickly demonstrated 100% performance for taking a photograph but his responding deteriorated markedly and required an additional seven training sessions to meet and hold criterion level performance. Jake’s decrease in performance occurred simultaneously with an increase in agitation and anxious behaviors (e.g., hand-biting), seen across sessions and classroom contexts with his special education teacher. He correctly responded with 100% accuracy during measurement of his generalization to the screen with multiple distracters.

Norman. Norman displayed zero to low levels of accurate responding across skills in baseline. Intervention was introduced first to looking at photographs. However, in observing Norman, it became apparent that he had minimal experience with any piece of hand-held technology (e.g., iPod, iPhone, camera, etc.). As a result, all errors initially made during baseline and intervention trials may have resulted from his hesitation to touch the phone (e.g., when and if he held it, he held it very gingerly out of fear of breaking the device).

Upon introduction of intervention for the first task, it was apparent that Norman attended to the screen when the video models were playing, yet his performance both prior to and after the video model remained at 0%. In response, a different phone was taken out when in the presence of Norman after the third session at 0% and it was conversationally described to him that he would not break the unknown piece of technology. He was never instructed specifically what to do, only that he should not be afraid to touch the screen and the buttons. Criterion was mastered in 19 sessions for Norman. During the generalization session for looking at photographs, Norman completed 100% of the task independently.

Subsequently, during the sixth video modeling session for looking at photographs, the addition of a verbal prompt ("Go on") was used to encourage Norman to touch and interact with the phone. This persisted with his second skill, watching a video, but was not required for the final skill of taking a photograph. Once criterion was met for looking at videos, he began intervention on watching videos. The same hesitance was encountered and he required the verbal prompt to engage with the phone. Following this prompt he required three more sessions to reach mastery. With a stable baseline still evident for taking photographs, intervention was introduced. He immediately increased his independent performance and reached 100% independence after two intervention sessions. Norman demonstrated 100% independent performance during the generalization probe across all tasks.

Discussion

All participants mastered all target skills. Video modeling appeared to be a contributing factor to their learning and replicated the findings of Hammond et al. (2010) with a more complicated device. In addition, the practice and training procedures may have been responsible for the students learning to make discriminations of target buttons in more complex arrays. However, these findings still need to be considered in light of certain limitations.

Limitations. While all students acquired the tasks and generalized the skills to more complex displays these results need to be interpreted with caution given the long latency to change in participant behavior. Prior to the commencement of this study, only one participant, Holly, had previous experience with an iPhone or a personal cell phone of any kind.
Holly’s previous experience with the device, though limited, left her at an advantage for accurately guessing which step could be next during the baseline condition. For example, on the final step of the first task (taking a photograph of a person), only one button was left on the screen which would correctly complete the task. As a result of limited choices, Holly would oftentimes look at the phone for a couple of seconds prior to tilting her head and saying a phrase such as, “maybe this one,” before hitting the correct button. In essence, Holly’s guesses and successes resulted in her learning steps of the skill during the baseline condition. These likely occurred as a result of her prior experience and familiarity with the iPhone’s mechanisms which the other two participants lacked. The second observed limitation with Holly involved the appearance of slow effects of the video model for the first task, taking a photograph of a person. Despite the onset of intervention, Holly took six sessions to hit criterion level and 14 to reach criterion as a result of the iPhone’s sensitivity to a user’s finger pressure for an extended duration. Holly consistently made topographical errors related to holding a button for too long across three steps which resulted in an error along with variable rates of data. Oftentimes, Holly was hitting the correct button to complete the target task correctly; however, her extended pressure on the button resulted in a topographical error upon the iPhone going into edit or voice command mode.

Neither Norman nor Jake had ever used a cell phone or similar device (e.g., iPod). Therefore, Norman and Jake demonstrated a period of adaptation that should have been addressed prior to baseline. Their reluctance to do anything except hold the device may have artificially suppressed baseline responding. However, once students began intervention on their first target behaviors, behaviors in baseline remained relatively low (even after they had been de-sensitized to the device) thus possibly moderating an adaptation effect suppressing baseline responding. Norman’s performance climbed slightly as he was now doing the first step of the task analysis. Similarly, Jake’s remained at low levels until he was given intervention on those skills. Despite having to verbally prompt Norman during intervention that it was “okay to use the phone,” the sustained low level responding during baseline indicates that any suppression was likely minimal and should not completely discount the contributions of intervention to changes in the dependent variable. This is especially apparent with the last skill for Norman where he immediately achieve criterion level performance once provided intervention and did not require any verbal prompting. Further, the low baseline and immediate increases for Jake’s second two skills point to the impact of video modeling.

While video modeling has been used to teach a wide range of skills to students with developmental disabilities (Mechling, 2005), there are certain aspects of behavior that are difficult to convey to a learner via video. In the case of Holly, she could observe the general topography of the target response (pressing a button), she could not see how hard the model pressed the button. She may have been able to count how long the button was held (one of the factors that causes the iPhone to move to voice control) but this would still not have helped her identify how hard the button was pressed. Therefore the decision was made to incorporate other instruction to help her learn the correct pressure. Following this instruction at sessions 13 and 14, no further assistance was required. The small increases in responding for all untrained tasks prior to video modeling instruction were attributed to the overlap in steps across the three task analyses. Aside from these threats to internal validity, all of history and maturation threats were controlled for via the time-lagged introduction of intervention and maintenance of stable, low baselines prior to intervention. Procedural fidelity and IOA were high.

Implications for Practice. The current investigation adds to the extant literature on video modeling as an instructional tool and further provides evidence related to video modeling for fine motor tasks with multi-step discriminations. These practices can be reasonably adapted to other fine motor recreational leisure type skills as well as vocational (e.g., operating office equipment) to independent living tasks (e.g., operating microwaves, computers, etc.). The findings also suggest that some limitations exist for the types of skills that educators may use video modeling to teach. In the case of the current examina-
tion, some aspects of the target behavior could not adequately be captured in a video to allow a student to imitate (e.g., pressure on a button). In these instances, educators will need to recognize the limitations and incorporate other sound instructional methods.

References


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