

Effectiveness of Video Modeling to teach *iPod* use to Students with Moderate Intellectual Disabilities

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Abstract: The primary purpose of this study was to examine the effects of video modeling delivered via computer on accurate and independent use of an iPod by three participants with moderate intellectual disabilities. In the context of combined multiple probes across participants and replicated across tasks, three female middle school students learned to watch a movie, listen to music, and look at photos on an iPod. Video clips were created in point of view, as if participants were performing the task and presented via video modeling on an IBM computer. During instruction, participants watched the videos of the entire task they were currently learning. In addition to data on accuracy of responding, data were also collected on efficiency measures (number of sessions and number and percentage of errors to criterion), as well as on types of errors (latency, duration, and topographic). Results indicate that participants acquired the response following video modeling and could independently use the iPod. Students maintained most tasks on follow-up probe trials; however, on skills that deteriorated, students were effectively retrained with video booster sessions.

It is well documented that systematic response prompting procedures have successfully been used to teach participants with a variety of diagnoses functional skills (Collins, Gast, Wolery, Holcombe, & Leatherby, 1991; Hughes, Schuster, & Nelson, 1993; Schoen, Lentz, & Suppa, 1988), including how to use technology (Mechling & Cronin, 2006; Mechling, Gast, & Barthold, 2004). However, there is growing extant literature on the use of video instruction for functional skills, trying to integrate technology and systematic response prompting procedures (Mechling, 2004; Mechling & Cronin; Mechling & Gast, 2003; Norman, Collins, & Schuster, 2001). One of the theoretical foundations of video instruction relates to observational learning (Bandura, 1969, 1977). Bandura discusses students' ability to engage in observational

learning or learning skills by watching others perform those skills. Literature exist that supports participants with intellectual disabilities have the ability to learn functional skills through observational learning (Clark, Kehle, Jenson, & Beck, 1992; Farmer, Gast, Wolery, & Winterling, 1991; Gast, Doyle, Wolery, Ault, & Baklarz, 1991; Griffen, Wolery, & Schuster, 1992). Most often this learning has occurred during small group instruction with live models. It can be argued that video instruction, i.e., the presentation of a model via video, provides another opportunity for participants to learn through observation, in contrast to live demonstration.

Mechling (2005) in her review of personally created instructional video programs outlined the benefits of video technology, stating video offers an opportunity for participants to view the same model as often as necessary (Grice & Blampied, 1994), can be used by a variety of instructors (Charlop-Christy, Le, & Freeman, 2002), can be available outside the classroom and is potentially cost-efficient when compared to in-vivo training (Branham, Collins, Schuster, & Kleinert, 1999). Ayres and Langone (2005)

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also discuss the time and scheduling advantages of video modeling when compared to using live models. Additional benefits of video over live models include editing ability by customizing video footage for participants by emphasizing salient task features and manipulating video length (Coy & Hermansen, 2007). Further, Wis-sick, Gardner, and Langone (1999) argue that video can create an authentic training environment which students can then relate to real experiences. Video footage can also be down-loaded onto portable devices and played on demand which can be advantageous on commu-nity based instruction (CBI) or vocational training sites, places where live models may not be available (Mechling, Gast, & Fields, 2008). Portable devices such as PDA's, iPods, and iPhones also allow students to use, as needed, video prompts to learn new skills and complete learned skills across novel settings with relative ease.

Video modeling and prompting involve cre-ating and presenting video footage of persons engaging in targeted tasks. A range of studies exist; some presenting video models or prompts to participants before or during video instruction. Definitions within the field of special education exist to differentiate video modeling from video prompting. Video modeling is the presentation of the entire target behavior to participants (Haring, Kennedy, Adams, & Pitts-Conway, 1987; Grice & Blampied, 1994), whereas video prompting typically refers to playing a video clip of each step in the target behavior being completed in isolation (Cihak, Alberto, Taber-Doughty, & Gama, 2006). Video modeling and prompting have been successfully used to teach a variety of functional skills such as withdrawing money from an ATM (Alberto, Cihak, & Gama, 2005), purchasing items in a store (Alcantara, 1994; Haring et al.), daily life skills such as brushing teeth (Charlop-Christy et al., 2000), setting the table (Cannella-Malone et al., 2006), cooking (Shipley-Benamou, Lutzker, & Tauman, 2002), and vocational skills (Mech-ling & Ortega-Hurndon, 2007). Participant's ages ranged from 6 years to 41 years and included diagnoses of moderate intellectual disabilities, mild intellectual disabilities and autism. Video instructional sessions were most often conducted in 1:1 arrangements with two

of the studies using group arrangements (Cihak et al., 2006; Norman et al., 2001).

This brief review of the literature on video instruction of functional skills supports incor-porating video into instruction for students with developmental disabilities. In all studies reviewed, participants viewed video as a total task model prior to engaging in the task or as prompts delivered prior to each step in the task. Further, the literature provides support for the combination of video instruction paired with computer delivered response prompt strategies. Considering this literature, video supported instruction is a valuable tool for educators but currently lacks sufficient em-pirical support for using video in the commu-nity. The current study was designed as a first step toward moving toward a model where video is used by learners in situ. Before learn-ers use a device (*iPod*, cell phone, etc.) in natural environments as a self-prompting tool, they have to learn to access the device and independently manipulate the media materi-als they would use to prompt themselves. Therefore, this current study was designed to evaluate video modeling as a means to teach independent use of an *iPod*. This study evalu-ated the use of video modeling on a computer to teach independent use of an *iPod* to access videos, music, and photos. The research ques-tion addressed was: Will video modeling in-crease learners' with moderate intellectual disabilities independent use of an *iPod* to nav-igate to movies, music, and photos?

Method

Participants

Three students, ranging in age from 12 years 8 months to 14 years 11 months, who attended a suburban middle school in Northeast Georgia and received special education services in a self-contained classroom for students with moderate intellectual disabilities, participated in the study. Participants had the following prerequisite skills, the ability to (a) follow multi-step directions, (b) palmer grasp an *iPod*, (c) visually discriminate video on a 17 in. computer screen according to successfully passing a vision test, (d) maintain attention to task for 20 min, (e) complete movements as-sociated with manipulating buttons on an

TABLE 1

Participant Descriptions

	<i>Beth</i>	<i>Sally</i>	<i>Nan</i>
Gender	F	F	F
Special Education Eligibility	MOID	MOID/SI ^a	MOID/SI ^a
IQ	45 ^b	52 ^b	44 ^c
ABAS (GAC) ^d	65	65	49
Age	14 yrs 2 mon	12 yrs 8 mon	14 yrs 11 mon
Grade	8 th	6 th	8 th
Years in Special Education	9	9	4
Ethnicity	African-American	African-American	Hispanic
Free or Reduced Lunch	Yes	No	Yes
Medication	No	No	No

Note: All students were in Grade 8 and were classified as having learning disabilities.

(a) SI: Speech Impairment; (b) Differential Ability Scales (Harcourt Assessment, Inc., 2007); (c) Wechsler Intelligence Scale for Children IV (Wechsler, 2003); (d) Adaptive Behavior Assessment System (Harrison & Oakland, 2000), General Adaptive Composite

iPod, (f) imitate steps of tasks analysis, (g) regularly attend school with one or fewer absences in the 2 weeks prior to the study, and (h) match to sample the words “movies”, “videos”, “photos”, “all photos” “music”, and “songs.” Participants also provided verbal assent or agreement to participate and parental permission for participation was obtained for each participant. Participants who did not possess all entry skills were excluded from the study. Refer to Table 1 for additional participant descriptors.

Participants chosen for the study had a history of using visual activity schedules to structure daily tasks and transition between activities; however, participants required prompting to use their schedules effectively. Participants were unable to transition between activities and engaged in high rates of aberrant behaviors instead of chosen leisure activities. Beth was 14 years 2 months, and had a composite score of 45 on the Differential Ability Scales assessment (DAS; Harcourt Assessment, Inc., 2007). During leisure, Beth enjoyed puzzles, video, playing on the computer, and painting her nails. Beth’s strengths included tasks such as filing by first letter, reading basic sight words, and navigating the school independently. Weaknesses included locating items in the community and counting money. The second participant, Nan, was 14 years 11 months and had a full scale IQ of 44

on the Wechsler Intelligence Scale for Children IV (WISC-IV; Wechsler, 2003), which was administered in Spanish, since English was her second language. During leisure, Nan preferred to watch videos or play games. Nan’s strengths included excellent focus on tasks (i.e. rarely going “off-task”), assembly tasks, sorting by size and color, and sight word recognition. Instructional needs, according to her IEP, included number identification, expressive communication, and interpersonal behavior. Sally was 12 years 8 months and had a composite score of 52 on the DAS. She was identified as having a speech impairment that primarily impacted her expressive communication. During leisure, Sally would prefer to interact with an adult or play on the computer. Strengths for Sally included matching, filing by number and first letter, locating items in the community and receptive communication. None of the participants had previous exposure to video modeling for instructional purposes. In addition, participants had never used *iPods* for instructional or recreational purposes; however, this is an age-appropriate leisure activity.

Settings and Arrangements

Individual probe trials and intervention sessions took place four times per week in a self-contained classroom (32½ ft × 26 ft), dur-

ing participants' independent work time. *iPod* instructional sessions occurred in the back of the classroom at a table adjacent to participants' computer. During video modeling instruction, participants sat at an IBM Lenovo desktop computer in their classroom to watch the DVD of how to use the *iPod*. Participants did not have access to the DVDs or *iPod* during non-instructional time and when not used, the DVDs and *iPod* were stored in a locked file cabinet in the classroom. Prior to intervention the *iPod* was taken out of the file cabinet and placed on the teacher's desk. During Probe trials and Video-Modeling condition sessions participants held the *iPod* and when finished, handed the *iPod* to the teacher.

The classroom was equipped with one front bookcase that housed several leisure activities. Student desks were arranged in two clusters of four. Each cluster was positioned on either side of a group of eight study carrels used for independent work in the center of the classroom. On one side of the room was a rectangular table and microwave which were adjacent to a bathroom and a kidney-shaped table used for small group instruction. Behind student desks and study carrels, at the rear of the room, was a second rectangular table used for additional leisure activities, a small sitting area comprised of a futon and folding chair, and two teacher desks behind two partitions. Adjacent to the sitting area and second rectangular table was a computer station utilized by students and teachers, a round table used for small group instruction, and a rolling cart equipped with age-appropriate books.

Data were collected by participant's special education teacher and reliability data were collected by an independent special education teacher. The special education teacher sat approximately 5 ft behind participants at the student computer and adjacent table, while a paraprofessional was responsible for monitoring nonparticipants whom were involved in various activities outside of the classroom.

Materials and Equipment

Video clips were created using a Sony Handycam DCR-SR42. Three task analyses delineated in Table 2, for navigating an *iPod* to access movies, music, and photos were written

by the principal investigator and recorded in first person point of view onto the video camera's hard drive. The resulting video showed only the hands of the investigator performing the task. As the investigator performed each step in a task analysis, the special education teacher narrated each step beginning with the task direction. Video clips were then downloaded onto a Dell Inspiron 1420 Laptop and each task analysis was burned to separate DVD. The duration of video clips were, 2 min 16 s for movies, 3 min 43 s for music, and 1 min 21 s for photos.

The *iPod* was an 8GB light green third generation *iPod Nano*, which measured approximately 3 in. \times 2 in. and weighed 1 lb 7 oz. The viewing screen measured 1 $\frac{3}{4}$ in. \times 1 $\frac{1}{4}$ in. Ten photos of participants' preferred musical band were downloaded onto the *iPod*. Photo slide show settings were preset for this study; time per photo was set to 2 s, and repeat and shuffle photos were turned "off". For music, a preferred song from The Disney *High School Musical 2 Soundtrack*, was downloaded to the music category. Three movies were downloaded to the movies section of the *iPod*; one 1 min movie clip of a couple dancing, one 1 min movie clip of a boy riding a skate board and one movie clip showing 1 min of the play "The Hobbit". Preferred movies, music, and photos were based on student report of interest. Materials needed for data collection included data sheets, four pens, two clipboards, a three ring binder to store datasheets and two Taylor digital timers, model number 5827-21.

Response Definitions and Recording Procedures

Initial Probe Trials/Video Modeling Sessions/Maintenance Trials. The primary dependent measure was the percentage of steps accurately and independently completed for each target task. Data were collected using trial recording (Ayres & Gast, 2010) following the task analyses presented in Table 2.

A student response was scored as correct if a participant independently initiated the correct topography within 15 s and completed the step in the task analysis within 15 s of the task direction or completion of the previous step. An incorrect response was scored if the student (a) did not initiate within 15 s (no response), (b) did not complete her response

TABLE 2

Tasks Analyses and Response Definitions for Using the iPod

<i>Movie</i>	<i>Music</i>	<i>Photos</i>
1. Press green center button to turn the <i>iPod</i> on.	1. Press green center button to turn the <i>iPod</i> on.	1. Press green center button to turn the <i>iPod</i> on.
2. Wait for menu screen to appear.	2. Wait for menu screen to appear.	2. Wait for menu screen to appear.
3. Put thumb on “menu” button.	3. Make sure “Music” is highlighted in blue.	3. Put thumb on “menu” button.
4. Scroll clockwise until the word “Videos” is highlighted in blue.	4. Press green button to select “Music”.	4. Scroll clockwise until the word “Photos” is highlighted in blue.
5. Press green button with thumb to open “Videos” menu.	5. Scroll clockwise until the word “Songs” is highlighted in blue.	5. Press green button with thumb to open “Photos” menu.
6. Press green button again with thumb to open “Movies” menu.	6. Press green button to open “Songs” menu.	6. Press green button again with thumb to open “All Photos” menu.
7. Put thumb on “menu” button.	7. Put thumb on play button.	7. Put thumb on play button.
8. Scroll clockwise until task movie is highlighted in blue.	8. Press play button to start music.	8. Press play button to start photo slideshow.
9. Press green button with thumb to start movie.	9. When song is finished, press and hold ‘play/pause’ button for 2 s to shut <i>iPod</i> off.	9. Watch slideshow and wait until photo show is finished.
10. Watch movie and wait until movie is finished.	10. Hand <i>iPod</i> to teacher.	10. When photo show is finished, press and hold “play/pause” button for 2 s to shut <i>iPod</i> off.
11. Press and hold “play/pause” button for 2 s to shut <i>iPod</i> off.		11. Hand <i>iPod</i> to teacher.
12. Hand <i>iPod</i> to teacher.		

within 15 s of initiation, or (c) completed the step incorrectly or out of sequence (Mechling & Ortega-Hurdon, 2007). An incorrect response was also scored according to the type of error: (a) latency errors (L), no initiation within 15 s of either task direction or completion of prior step in task analysis; (b) duration errors (D), task analysis step not completed within 15 s; and (c) topography errors (T), as incorrectly completing behavioral response or performing steps in the task analysis out of order from teaching or task sequence. After task completion, percentage of steps completed accurately and independently was calculated by dividing the number of steps accurately and independently completed by the total number of steps in the task analysis and multiplying by 100.

No adult verbal, model, partial or full physical prompt was to occur during initial probe trials, video modeling sessions, or mainte-

nance probe trials to assist in completing target behaviors. Adult prompts were monitored using event recording and incorporated into procedural reliability. Each time an adult provided a verbal prompt (telling a participant what to do), a model (showing a participant what to do), or a partial or full physical prompt (hand over hand assisting a participant through task analysis step), a tally mark was recorded on the data sheet.

General Procedure

Individual sessions were conducted four times weekly with each participant. Each session lasted between 15–20 min, including video modeling during intervention probe trials. Natural reinforcement procedures, access to the selected movie, song, or photos, were held constant across all conditions and no additional preferred items or activities were pro-

vided to participants. A task direction for the target skill (e.g., “Let’s watch a movie”, “Let’s listen to some music”, or “Let’s look at some photos”) was provided to participants, depending on the target task.

Experimental Design

A combination multiple probe design (Gast & Ledford, 2010) across three participants, replicated across three behaviors, was used to evaluate the effects of video modeling to teach participants to use the *iPod*. Three experimental conditions were conducted for each participant: (a) Initial Probe trials, (b) Video Modeling sessions (Pre-Video Modeling probe trial and Post-Video Modeling probe trial), and (c) Maintenance probe trials. Initial Probe and Maintenance trials consisted of one trial and Video Modeling sessions consisted of two trials, a Pre-Video Modeling trial and a Post-Video Modeling trial.

Initial Probe trial data were collected for all target behaviors; navigating the *iPod* to access movies, music, and photos for all three participants, for a minimum of 2 days and 3 sessions and until a stable level and trend were established. Once Initial Probe trial data were stable, video modeling was introduced to Participant 1 on the first target behavior (i.e., selecting movies) until criterion was met. Once criteria were met, probe trial data were collected on all three target behaviors for all participants. After which video-modeling was then introduced to Participant 1 to teach navigating to music and for Participant 2 to teach navigating to movies. Staggering the introduction of instruction on the first target behavior (i.e., selecting movies) based on participant skill acquisition allowed for objective replication of effects across participants (inter-subject direct replication). Replication of intervention effectiveness across two additional skills, selecting music and selecting photos, provides direct intra-subject replication (i.e., repeating the experimental effect with the same participant).

Initial Probe Trials

Single opportunity Initial Probe trials (Cooper, Heron, & Heward, 2007) were conducted for all three tasks with each participant to

determine whether participants could navigate the *iPod*. Materials for the task were pre-arranged and each participant was provided with the task direction to initiate the target behavior (e.g., “Let’s watch a movie”). Data were collected on each participant’s ability to accurately and independently complete each step of the task in sequence. Probe trials were discontinued when a participant either correctly performed the entire task analysis or made an error (e.g., latency, duration, topographic). If a participant responded correctly, she was allowed to continue to use the *iPod* to listen to or view her selection; however, if a participant responded incorrectly, the teacher stated, “Ok, we are done”, and took the *iPod* from the participant. If the participant attempted to exit the area of the classroom during a probe trial, she was verbally redirected (“Let’s finish”) back to the *iPod* and given 15 s to initiate the next step in the task analysis. Video modeling instruction was implemented after three stable data points across a minimum of two days.

Video Modeling Sessions

Video Modeling sessions consisted of Pre-Video Modeling probe trials, video modeling instruction, and Post-Video Modeling probe trials. Pre-Video Modeling probe trials and Post-Video Modeling probe trials were conducted identical to Initial Probe trials. Pre-Video Modeling probe trials were “cold” trials; in other words, the student had not yet received instruction that day for using the *iPod*. The purpose of the Pre-Video Modeling probe trials was to assess participant responding prior to daily instruction. If participants did not reach criteria, 100% accurate responding on the Pre-Video Modeling probe trial, video modeling instruction was implemented. Only Pre-Video Modeling probe trial data were graphed and mastery criterion was established at 100% accurate and independent responding during Pre-Video Modeling probe trials for two sessions for all three participants. Establishing acquisition criterion on the Pre-Video Modeling trials was more stringent, requiring participants to maintain target behaviors over a minimum of two days.

Following Pre-Video Modeling probe trials, if the participant failed to respond with 100%

accuracy, video modeling sessions were conducted. Instructional sessions were conducted individually and involved the teacher showing participants the entire video clip depicting navigation of the *iPod* to access movies, music, or photos, depending on target task. The researcher directed a participant to the computer and told the participant to sit down (“Have a seat at the computer”). Once the participant was seated and the DVD was inserted into the computer, the teacher directed, “Watch this”, and the video clip displaying the target skill was shown on the computer beginning with the task direction. Participants were required to sit at the computer and watch the video clip of the entire task analysis. Immediately following completion of the video clip, a Post-Video Modeling probe trial was conducted identical to Pre-Video Modeling probe trial. Post-Video Modeling trials were conducted to assess immediate recall of target behavior and to provide participants practice with the task analysis immediately after viewing the video clip.

Maintenance Probe Trials

Once a participant met criteria, maintenance data were periodically collected following probe trial procedures. A minimum of one maintenance probe trial was conducted per task for each participant. Maintenance probe trials were conducted during sessions 15, 21, 26, 31, 46, 56, 60 and 70 for Beth; sessions 31, 46, 56, 60 and 70 for Sally; and sessions 47, 60, and 70 for Nan.

Reliability

Procedural fidelity (PF) and interobserver agreement (IOA) data were collected simultaneously by an independent observer, who was a second special education teacher. The reliability observer was provided with a copy of task analyses, a digital timer, a data sheet on which to record data, a clipboard, and a pen. IOA and PF data were collected on a minimum of 20% across sessions and behaviors for all participants.

IOA was calculated for each step in the task analysis using point-by-point method of comparison by dividing the number of agreements by number of agreements plus disagreements

multiplied by 100 (Ayres & Gast, 2010). During Initial Probe trials, Pre-Video Modeling probe trials and Post-Video Modeling probe trials, occurrence/nonoccurrence PF data were collected on (a) adult prompting, (b) delivery of correct task direction, (c) participant positioning, (d) participant being given 15 s to initiate a response, (e) participant given 15 s to complete step, and (f) no delivery of an additional preferred item or activity. Similarly, during video modeling occurrence/nonoccurrence data were collected on above behaviors plus, whether the (a) correct DVD was handed to participant, (b) correct DVD was played, and (c) task direction “watch this” provided. PF was converted to percentage by dividing the number of emitted researcher behaviors by the number of planned researcher behaviors and multiplying by 100 (Billingsley, White, & Munson, 1980). At least 90% agreement was required for both IOA and PF in each condition or reliability raters were retrained.

IOA and PF data were collected 25.48% across all conditions for all participants. Mean IOA was 100% across all conditions for Beth, Sally, and Nan respectively. During Initial Probe trials and Maintenance probe trials, mean PF was 100%. Mean PF during Pre-Video Modeling probe trials and Post-Video Modeling probe trials was 98.55% (range = 92.59%–100%) for movies, 98.88% (range = 96.66%–100%) for music, and 100% for photos. Procedural reliability errors included providing a gestural prompt to Beth during one Pre-Video Modeling probe trial during movies, providing Beth with an additional verbal praise when she completed navigating to movies and not providing Sally with 15 s to complete a step in the task analysis during navigating to music.

Social Validity

At the conclusion of the study, social validity data were collected on the perceived outcomes of video modeling as an instructional tool for teaching participants with moderate intellectual disabilities to use an *iPod*. A survey using a Likert rating scale, ranging from 1, representing strongly disagree, to 5, representing strongly agree was completed for each participant. Surveys were completed by para-

TABLE 3

Social Validity Questionnaire: Mean Score and Range for each Question

Questions:	Beth		Sally		Nan		Mean Response
	Mean	Range	Mean	Range	Mean	Range	
1. The identified behavior was important to increase for the participant.	4.2	3–5	4.4	4–5	4.8	4–5	4.7
2. Questions regarding the research were answered in a prompt manner and to my satisfaction.	4.8	4–5	4.8	4–5	4.8	4–5	4.8
3. The outcomes, increase participants' ability to navigate/use iPod was significant to the participant.	4.8	4–5	4.2	4–5	4.8	4–5	4.6
4. The participant became more independent as a result of instruction.	4.6	4–5	3.8	3–4	4.8	4–5	4.4
5. I now believe the participant is able to learn from video modeling.	4.6	4–5	4.0	3–5	4.6	4–5	4.4
6. I believe video modeling was solely responsible for the participants learning.	4.2	3–5	3.8	3–5	4.4	4–5	4.1
7. My opinions about using video modeling for instruction purposes have changed.	3.4	3–5	3.4	2–5	3.4	2–5	3.4
Total Respondents	5		5		5		

professionals, special education teachers, therapists, and significant others. Specifically, social validity data were collected on: (a) the identified behavior was important to increase for the participant; (b) questions regarding the research were answered in a prompt manner and to my satisfaction; (c) the outcomes, increase participants' ability to navigate/use iPod, were significant to the participant; (d) the participant became more independent as a result of instruction; (e) I now believe the participant is able to learn from video modeling; (f) I believe video modeling was solely responsible for the participants learning; and (g) my opinions about using video modeling for instruction purposes have changed. Data were summed and averaged and the range/mean scores were reported for each question for each participant. Table 3 presents the mean score for each question, for each participant. A total of 5 respondents per participant provided social validity feedback. Mean ratings related to effectiveness of intervention (4.1) and practical application of video mod-

eling (3.4) were lower with most respondents reporting an "agree" or "no opinion".

Results

Effectiveness of Video Modeling

Movies. Figure 1 presents data on the percentage of steps completed accurately and independently for Beth, Sally, and Nan. Navigating to movies is represented by an open square (□), navigating to music is represented by an open triangle (△) and navigating to photos is represented by an open circle (○). Initial Probe trial data were collected on all tasks during the first three sessions of the study for all participants. Introduction of video modeling was staggered across participants, which allowed additional Initial Probe trial data to be collected for Sally during session 15 and for Nan during sessions 15 and 31. All participants demonstrated 0% independent responding during Initial Probe trials for all target behaviors. Video modeling instruc-

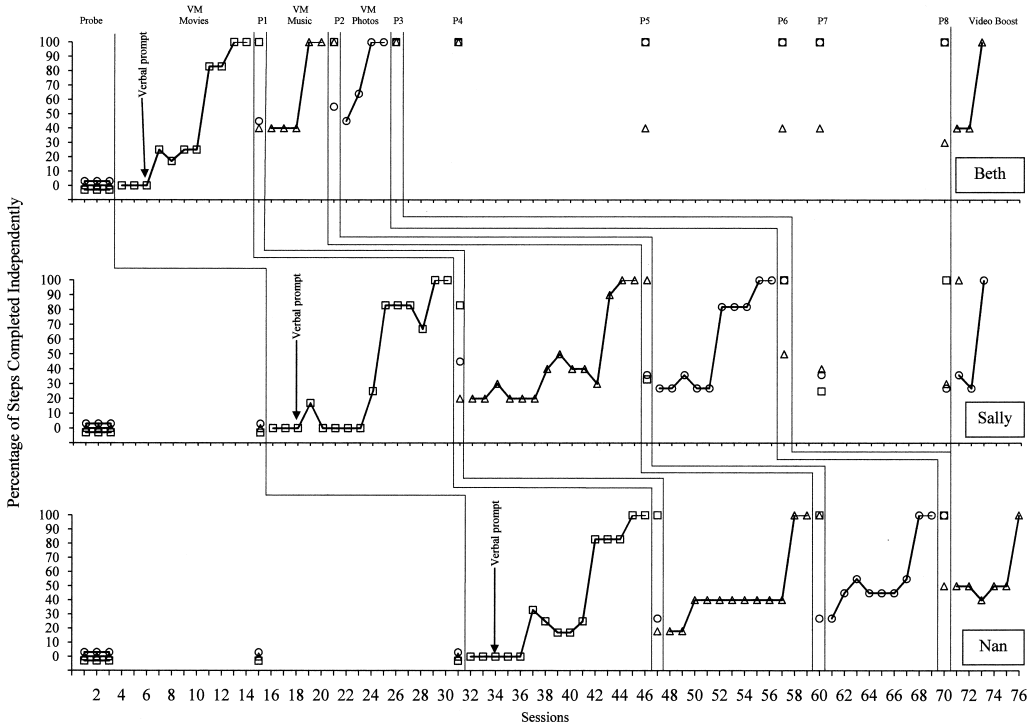


Figure 1. Percentage of Steps Completed Independently for Beth, Sally, and Nan. □ = Daily Probe for iPod Movies, △ = Daily Probe for iPod Music, ○ = Daily Probe for iPod Photos.

tion was implemented with Beth during session 4, session 16 for Sally, and session 32 for Nan. Upon introduction of video modeling to the first behavior, selecting movies, participants required 3, 3, and 5 Pre-Video Modeling Probe trials before an increase in correct performance was observed. During Post-Video Modeling Probe trials, the addition of a verbal prompt (“You can go ahead”) only on the first target behavior (selecting movies) was necessary after participants responding remained at 0% for three consecutive days. During Post-Video Modeling trials for navigating to music and photos, participants were provided only with the task direction and initiated the task without needing the verbal prompt.

Criterion was mastered in 11 sessions for Beth and 15 sessions for Sally and Nan. Mean number of sessions to acquisition was 13.6. Beth maintained 100% responding (session 15) for navigating to movies and increased responding for both navigating to music (40%) and photos (45%). Sally had difficulty navigating to movies (session 31), with a de-

crease in responding to 83%. Similar to Beth, Sally increased independent responding for navigating to music (20%) and photos (45%), indicating similar steps between the three task analyses generalized. Nan maintained 100% responding for navigating to movies and increased responding for navigating to music (20%) and photos (27%) during her Maintenance Probe trial (session 47). An increase in navigating to music and photo responding prior to video modeling instruction can be attributed to the overlap in steps across the three task analyses. Four steps across tasks were identical.

Music. Data on the percentage of steps completed independently for navigating to music are also presented on Figure 1, denoted by an open triangle. All participants’ demonstrated 0% accurate responding for navigating to music during Initial Probe trials. Upon introduction of video modeling, 5, 14, and 12 sessions (Mean = 10.3 sessions) were required for Beth, Sally, and Nan, respectively to acquire the target behavior. Beth maintained

100% responding for navigating to movies and music and concurrently increased responding for navigating to photos (55%). Sally maintained her ability to navigate to music; however, she continued to have difficulty navigating to movies showing a decrease in responding to 33%. She maintained some independent responding for navigating to photos (36%). Nan remained at 100% responding for navigating to movies and music and navigating to photos remained stable at 27%.

Photos. Figure 1 presents data on the percentage of steps completed independently for photos, represented by an open circle. All participants demonstrated 0% accurate and independent responding for navigating to photos during Initial Probe trials. Upon introduction of video modeling, sessions 22, 47, and 61 for Beth, Sally, and Nan, respectively Beth met criteria in 4 sessions while both Sally and Nan required 9 sessions (Mean = 7.3 sessions). Independent performance was maintained by Beth and Nan through session 70. Sally maintained 100% performance during her initial Maintenance Probe trial, but her performance decreased on subsequent probe trials (Range = 27%–36%). Navigating to photos required the least number of sessions to criterion. Compared to navigating to movies and music, three and six fewer sessions were required to teach participants to navigate to photos.

Video Booster. Following session 70, a “video booster” was introduced to tasks which did not maintain at criterion levels. Video booster sessions were review sessions involving a re-introduction of the Video Modeling Condition: a Pre-Video Modeling Probe trial, exposure to the video clip, followed by a Post-Video Modeling Probe trial. Video booster sessions continued until all behaviors returned to 100% accurate and independent performance. All participants required “video booster” sessions for music and Sally required retraining for photos. Sally reached criteria for navigating to music on the first video booster session; while, Beth required 3 sessions and Nan required 6 sessions to reach criteria. Sally also required 3 video booster sessions to reach previous levels of independent performance on navigating to photos. A final follow-up probe was scheduled, but data

could not be collected due to the end of the school year.

Results show a functional relation between the use of video modeling and an increase in the percentage of steps completed accurately and independently for all *iPod* tasks. Direct intra-subject replication was achieved by replication of effects within each participant across three tasks and direct inter-subject replication was obtained by replication of effects across three participants.

Error Analysis. During Post-Video Modeling Probe trials, once the participant continued to make the same error, demonstrated by 10 consecutive sessions, a gestural prompt, a point indicating the next step in the task analysis was provided. Participants were then given 15 s to initiate and complete step after gestural prompt. If the step was completed correctly, the participant could continue; however, if the participant made an error, the trial was discontinued and the *iPod* was removed. The gestural prompt was delivered by the participants’ teacher. Gestural prompts were implemented for the following: Beth: session 13 of movies, step 11; Sally: session 25 of movies, step 5 and sessions 41 and 42 of music, step 6; and Nan: session 41 of movies, step 5 and session 57 of music, step 5. None of the participants required the use of an additional gestural prompt during the photo sessions.

Table 4 presents data on the number and percentage of errors during the probe trials for each experimental condition for all participants and target behaviors. Since probes were single opportunity, meaning as soon as an error was emitted, the trial concluded, information regarding total number of errors made during each condition is equal to the number of sessions minus sessions with criteria performance. An analysis of the types of errors made, latency (L), duration (D), and topographic (T), though limited was conducted. Though duration errors did not occur, the types of error (latency and topographic) emitted by participants changed, most noticeably between Initial Probe trials and video modeling instruction. During the first three sessions of Initial Probe trial data, participants emitted more latency errors when compared to topographic errors. When probing subsequent tasks, Beth and Sally began to emit topographic errors, after instruction on

TABLE 4
Percentage of Errors for Each Condition

	<i>Initial Probe</i>			<i>Video Modeling</i>			<i>Maintenance</i>			<i>Video Boost Sessions</i>			<i>Total Errors</i>
	<i>L</i>	<i>D</i>	<i>T</i>	<i>L</i>	<i>D</i>	<i>T</i>	<i>L</i>	<i>D</i>	<i>T</i>	<i>L</i>	<i>D</i>	<i>T</i>	
<i>Beth</i>													
Movie	3	0	0	5	0	4	0	0	0	–	–	–	12
Music	3	0	1	0	0	3	0	0	3	0	0	3	13
Photos	3	0	2	0	0	2	0	0	0	–	–	–	7
Total Errors	9	0	3	5	0	9	0	0	3	0	0	3	32
<i>Sally</i>													
Movie	4	0	0	5	0	8	0	0	3	–	–	–	20
Music	4	0	1	1	0	11	0	0	2	0	0	0	19
Photos	4	0	2	0	0	8	0	0	1	0	0	3	18
Total Errors	12	0	3	6	0	27	0	0	6	0	0	3	57
<i>Nan</i>													
Movie	5	0	0	6	0	7	0	0	0	–	–	–	18
Music	5	0	1	2	0	8	0	0	1	0	0	5	22
Photos	7	0	0	1	0	6	0	0	0	–	–	–	14
Total Errors	17	0	1	9	0	21	0	0	1	0	0	5	54
Total Errors*	38	0	7	20	0	57	0	0	10	0	0	11	143
Mean Percentage**													
Movie	32%	0%	0%	80%	0%	33%	0%	0%	30%	0%	0%	0%	35%
Music	32%	0%	43%	15%	0%	39%	0%	0%	60%	0%	0%	73%	38%
Photos	36%	0%	57%	5%	0%	28%	0%	0%	10%	0%	0%	27%	27%

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 mean percentage of error type across all participants for each condition for each target behavior; – = Data not collected because condition was not implemented for participant.

navigating to movies. Perhaps participants had become familiar with the nature of the task and were attempting the target behavior. Initial Probe trials for Nan showed no consistent pattern of errors. During instruction, though participants continued to emit latency errors, a majority of errors were topographic. After instruction for each task, all subsequent errors were topographical.

Discussion

This study evaluated the effectiveness of video modeling on participant's percentage of accurate and independent responding to navigate to movies, music, and photos on the *iPod*. While video modeling has been demonstrated to be effective in teaching community skills and other functional skills, limited literature

exists supporting the effectiveness of video modeling to teach use of portable technology. Results indicate participants learned how to navigate the *iPod*, though some tasks did not maintain. All participants had difficulty maintaining how to navigate to music. Unless the *iPod* settings are altered, a variety of ways exist for participants to access music on an *iPod*. After video modeling instruction, both Beth and Nan maintained their ability to navigate to music; however, it was not according to the task analysis. Both participants made errors on step 5 of the task analysis and selected "playlist" instead of "songs." The *iPod* settings can be altered to narrow the menu options available to participants, a recommendation for future research.

Probe data for Sally on session 60 resulted in low levels of maintenance for all tasks (mov-

ies = 25%; music = 40%; photos = 36%). The researcher learned that at the time probe data were collected, Sally was in an argument with a fellow classmate, which could have adversely affected her performance during that probe trial, particularly on navigating to movies, since independent performance during the next daily probe trial was 100%. Sally still had difficulty navigating to music and photos, but quickly returned to criterion with video booster sessions.

All participants required a verbal prompt ("You can go ahead") on the first target behavior. It was expected that since the task direction was provided on the video clip prior to task initiation that the task direction would cue participants to initiate the target response. This did not occur, therefore, participants were provided the task direction and a teacher verbal prompt to begin the task. The addition of the verbal prompt was required only on the first task and not during navigating to music or photo instruction. Future researchers may want to evaluate the effectiveness of audio recording the verbal prompt on the video during video modeling instruction to determine if the teacher's presence during instruction is necessary or if the video can provide all necessary task directions and prompts. Audio recordings in this study were completed by the participants' teacher to provide them with a familiar voice delivering instruction. Future researchers may evaluate audio recording non-familiar adults/peers providing task directions to students to determine if it is necessary that video modeling instruction incorporate participants' teachers' voice or if a novel person can provide audio for the video clips.

A trend in the types of errors participants emitted emerged. Data indicate participants did not initiate responses during the first three sessions of the probe condition, most likely because participants did not know how to respond to the task direction and were willing to wait for teacher directed instruction. Data also show that after instruction on the initial task, participants became familiar with task expectations and initiated navigating to music and photos. An analysis of error data shows that video modeling instruction lead to a high rate of errors, particularly topographic errors. The number of errors may have been

higher if a multiple opportunity probe strategy were used.

The use of the *iPod* was reinforcing and age-appropriate for middle school students with moderate intellectual disabilities. Each participant often would ask to use the *iPod* during independent leisure time. At the completion of the study all participants expressed a desire to obtain *iPods* of their own, expressing pride in their learning and excitement at the prospect of having and using a piece of technology their same-age peers in regular education often used.

Limitation

Though results support effectiveness, a limitation of this study was conducting single opportunity probe trials. Due to the single opportunity probe, it was difficult to discern the information participants were learning from the video when the *iPod* was taken away after the first error. It is possible single opportunity probe trials underestimated participants actual performance levels because trials were terminated as soon as participants made an error. Future research should incorporate a multiple opportunity probe strategy, providing participants maximum opportunity to respond and complete all of the steps in the task analysis. Data should be collected to determine if using a multiple opportunity probe strategy would eliminate the need to incorporate a gesture prompt.

Future Research

Throughout the course of the study, there was an upgrade in technology and the fourth generation *iPod Nano* was introduced to the market. Due to lack of availability and time constraints, the current study was unable to conduct a generalization probe across novel technology. However, since technology changes rapidly, future research may want to assess participants' ability to generalize trained behaviors to novel technology upgrades. Important questions to answer could include: (a) Will participants generalize previously trained skills across novel technology upgrades?, and (b) If generalization does not occur, how effective and efficient would

“video booster” sessions be in re-training target behaviors?

Future research should also focus on replication of procedures across age groups and disability categories. Recommendations for procedure changes include (a) modifying the *iPod* menu settings to limit the selection options to participants, (b) including the verbal prompt on the video, (c) using a multiple opportunity probe strategy, (d) using a novel person to record the audio onto the videos, and (e) comparing video modeling and video prompting on efficiency measures including topographical errors.

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