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Portable and Accessible Video Modeling: Teaching a Series of Novel Skills within School and Community Settings

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Abstract: This study examined the effectiveness of self-operated video models on the skill acquisition of a series of novel tasks taught in community-based settings. In addition, the percent of independent task transitions and the duration at which four secondary students with a moderate intellectual disability transitioned between tasks was also examined. Using a multiple-baseline design across settings, results indicated that all students showed increases in independent task performance and task transitions as well as decreases in transition durations across community settings when learning novel tasks.

A primary focus of educational programs serving individuals with disabilities is the development of functional skills leading to greater independent performance and community integration. Educators often achieve this goal through the direct instruction of skills in each environment. In order to facilitate the acquisition, maintenance, and generalization of targeted skills, teachers frequently implement a variety of antecedent and response strategies. Use of the system of least/most prompts, time delay, reinforcement schedules, and picture prompts are well documented in the literature (e.g., Alberto, Cihak, & Gama, 2005; Grey & Hastings, 2005; Yilmaz, Konukman, Birkan, & Yanardağ, 2010; Zisimopoulos, Sigafoos, & Koutromanos, 2011). Instructional strategies appear with increasing frequency and include prompting systems that may be self-operated or self-managed including self-operated auditory, picture, and video prompting systems (Alberto, Sharpton, Briggs, & Stright, 1986; Cannella-Malone et al., 2006; Copeland & Hughes, 2000; Graves, Collins, Schuster, & Kleinert, 2005; Hughes, Alberto, & Fredrick, 2006; Lancioni & O'Reilly, 2001; Spriggs, Gast, & Ayres, 2007; Pierce & Schreibman, 1994; Taber-Doughty, 2005; Taber-Doughty, Patton, & Brennan, 2008). Self-operated systems used by students in these studies serve as antecedent cue regulation procedures facilitating a shift in stimulus control from an individual to the system itself allowing the user greater autonomous functioning.

Video modeling is an emerging instructional strategy demonstrating itself to be a promising instructional strategy for use with students who experience moderate and severe intellectual disability (Mechling, Gast, & Langone, 2002) and autism (Shipley-Benamou, Lutzker & Taubman, 2002). This differs from traditional instruction in which a student must rely on a teacher to demonstrate how to complete a task before attempting the task him or herself. Instead, this strategy facilitates a shift in stimulus control from the teacher to a recorded video performance of a task sequence often accompanied by auditory prompts and modeled by a novel or familiar individual. After viewing, an individual then completes the task observed in the video. With video modeling, students are potentially able to work more autonomously and thus, regulate their own behavior in school and community settings.

Studies examining video modeling effectiveness found it was successfully used to teach functional skills (e.g., grocery shopping, putting on a wrist watch, mailing a letter, crossing the street) (Alberto et al., 2005; Branham, Collins, Schuster, & Kleinert, 1999; Mechling, Gast, & Barthold, 2003; Norman, Collins, &

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TABLE 1

Student Characteristics

Student	*Chronological Age*	*Ethnicity*	*IQ*[a]	*Primary Disability*	*Secondary Disabilities*
Eduardo	16	Caucasian	40	Moderate ID	Autism, OHI, OI, Lang/Comm
Andrea	17	Caucasian	46	Moderate ID	OHI, OI, Lang/Comm
Mike	17	Caucasian	56	Moderate ID	Autism
Matilda	18	Caucasian	48	Moderate ID	Lang/Comm

[a] WISC-IV.

cational training. Table 1 provides a summary for each participant.

Eduardo. Eduardo was a 16-year old male identified with autism and a moderate level of intellectual disability. In addition, he received special education services for Other Health Impairments (OHI) and Orthopedic Impairments (OI). Annual goals within his Individualized Education Program (IEP) indicated a focus on functional skills (e.g., using money, following a task list), communication skills (e.g., appropriate greetings, asking for assistance), and increasing on-task behaviors. Eduardo demonstrated high distractibility when engaged in tasks and required supervision and ongoing verbal prompts to complete tasks. He worked well with others on tasks such as cleaning, sorting papers, and cooking and was learning to sign for help when unsure of how to complete a task. In addition, he was able to use the interactive whiteboard with prompting to open and close symbols when engaged in morning calendar activities. He used only a few words and gestures, thus communication with unfamiliar individuals was difficult.

Andrea. Andrea was a 17-year old female identified with a moderate level of intellectual disability, Other Health Impairments (OHI), Orthopedic Impairments (OI), and language/communication disability. She experienced paralysis in her right arm and leg. She wore a brace on her leg and was able to use her arm for tasks such as holding a bowl or an iPad. Andrea appeared to enjoy working with adults, but occasionally refused to do so when frustrated or presented with too many tasks. According to her teacher, Andrea was determined to work independently and generally understood the tasks to be completed. However, her paralysis often made physical implementation difficult. Andrea was frequently absent from school due to illness but was accustomed to catching up and adapting to missed experiences. Andrea laughed easily and enjoyed using sarcasm to joke with adults.

Mike. Mike was a 17-year old male identified as experiencing autism and a moderate level of intellectual disability. Mike was able to read and write; however, his verbal utterances were typically limited to short (1–3 word) phrases. Mike did not seek out interactions with other students, yet was compliant with adults. He showed a fear of large open spaces such as when in the gymnasium and when anxious, would rub his nose and pound his legs. He demonstrated a good memory by recalling sequences after experiencing them a single time and strong reading comprehension skills. When reading the weekly News-2-You, Mike would independently complete all comprehension questions. Mike often spent his free time playing volleyball with peers in classroom; however, Mike would not initiate engaging in volleyball play and would only respond to his peer's requests.

Matilda. Matilda was an 18-year old female with a moderate level of intellectual disability and language/communication disability who demonstrated an eagerness to please. While her speech ability was limited, she generally used short utterances with gestures to effectively communicate her thoughts. She appeared to enjoy interacting with adults and other students and demonstrated strengths in motor skills. She was actively social in the classroom and community settings with both students and adults. However, her interactions and social skills frequently distracted her from the task at hand. While easily distracted, she was also easily redirected back to relevant tasks

and responded positively to reinforcement. Matilda required frequent prompting when reading picture symbols and in completing various tasks in school and community settings.

Settings

School workroom. The school workroom was located within the school library and contained the staff mailboxes, three large tables, chairs, a phone, and other typical office equipment (e.g. paper cutter, hole punch, staplers, die cut). The room was divided into five distinct areas including photocopier, a small conference table, mailboxes, bulletin board materials, and office workspace. During baseline and intervention sessions, the room was busy with teachers collecting mail, making copies, and chatting with colleagues with up to five additional persons present in addition to the student and investigator. Students completed office-related tasks similar to those completed by the teachers frequenting the workroom including delivering mail, hole-punching a document, making a phone call, arranging chairs around a table, collating documents, and cutting paper.

Grocery store. The grocery store was located one block from the high school and was a large chain grocery selling mostly food products. Up to 20 students with intellectual disability arrived on the same day and time (generally before noon) accompanied by two special education teachers and several paraprofessionals to complete their weekly shopping activities. Most students were familiar with the store employees and regularly interacted with the customer service desk employee, deli attendant, and cashiers. On the day and time in which students engaged in their shopping activities, up to 20 customers might also be present. Students typically shopped in small groups of 3–4 using picture-based shopping lists and with a teacher or paraeducator providing direct instruction and verbal prompts.

Bowling Alley. The bowling alley, located approximately three blocks from the school, included 42 bowling lanes, an arcade, a sport bar lounge, shoe rental counter, snack bar, ball racks, a banquet room, and a pro shop. Approximately 20 students, two special education teachers, and eight paraprofessionals participated in community-based bowling activities each Friday during the midafternoon hours. Students were assigned, four to a lane, to various lanes throughout the bowling facility. Upon arrival, each student's routine included retrieving shoes from the shoe counter, locating their assigned bowling lane, changing their shoes, locating a bowling ball, and remaining in their assigned area until instructed to begin their game. During baseline and intervention sessions, from 7 to 10 patrons were present and bowling on nearby lanes.

Materials

Apple iPad®. Two original Apple iPads® were used to deliver video models to students. These devices were 9.56 × 7.47 × .528 inches in size and contained a 9.7 inch multi-touch screen display. Each weighed 1.5 pounds, used a 256 MB DDR RAM memory and contained a 64 GB storage capability. Each device was contained in an adapted Apple iPad® case in which two grommets were inserted into the case's fold and a nylon strap was affixed. This strap allowed students to carry the device over their shoulder and access the iPad® and video models while engaged in activities within community settings.

Video modeling clips. Sixteen (16) total video clips containing audio instructions were developed depicting two different graduate students performing a variety of novel tasks in the school workroom, a local grocery store, and a bowling alley. A Kodak zi8 digital video recorder was used to record video models that were then edited and published with iMovie software on a MacBook Pro laptop and then transferred onto the iPad® and viewed through the Keynote for iPad® software application. Video models ranged in duration from 23 to 84 seconds and contained embedded auditory instructions that signaled students to transition through the steps of each task (see Table 2). For example, for retrieving and stapling papers in the school workroom, the video clip depicted each task step while audio cues directed the student to "One, locate the mailboxes; two, locate your teacher's mailbox; three, remove the paper-clipped stack of papers; four, go to the work table; five, remove

TABLE 2

Duration of Video Models

	Workroom	*Bowling Alley*	*Grocery Store*
Video Model 1	.36	.36	.24
Video Model 2	.55	.41	.44
Video Model 3	.39	.48	.56
Video Model 4	.41	.44	1.24
Video Model 5	1.03	1.02	1.05
Video Model 6	.39	1.18	.56
Total Duration	3.13	4.29	4.09

clip and place it in the cup; six, place papers into stapler; seven, press firmly; and eight, move to your next task". Each auditory instruction occurred as the student viewed each accompanying step in the task sequence.

Keynote for iPad® application. This application cost $9.99 and was used to organize and deliver the video models on the iPad®. A slide show presentation was created for each location. Each slide consisted of a black background and would store and play one video model per page. The video models were centered on each slide. All of the videos were loaded onto a slide in a Keynote presentation titled under the given location (e.g. Bowling Alley). Five plain black slides and one with a large red stop sign were also created. Facilitators would place these slides between the video models being used and the unused video models being stored by keynote during the session, to prevent access by the participants. Participants would view the required video models for that session then come to the stop sign slide, signaling that the session had ended. If the participants accidentally hit *continue* in error, they would come to a black slide. Storing all of the videos within the same keynote presentation made each readily accessible and allowed the selection of videos models to be easily interchanged.

Task analyses with Boardmaker® symbols. For each baseline task sequence was a corresponding visual task analyses printed on six-by-eight inch paper. Each task analysis contained five color Boardmaker® picture symbols, one to represent each of the five tasks, as well as a task label printed next to the symbol. Picture symbols were chosen to represent the task within the corresponding location. Some tasks were represented by symbols of the same label (e.g. get bowling ball was represented by a bowling ball) and others by a symbol portraying the general concept under a different label (e.g. return black beans was represented by a general symbol for put away). Text describing the task was written next to the symbol. (e.g., next to the symbol of a chair, was the text arrange chairs around table). Figure 1 provides a sample task analysis for the school workroom.

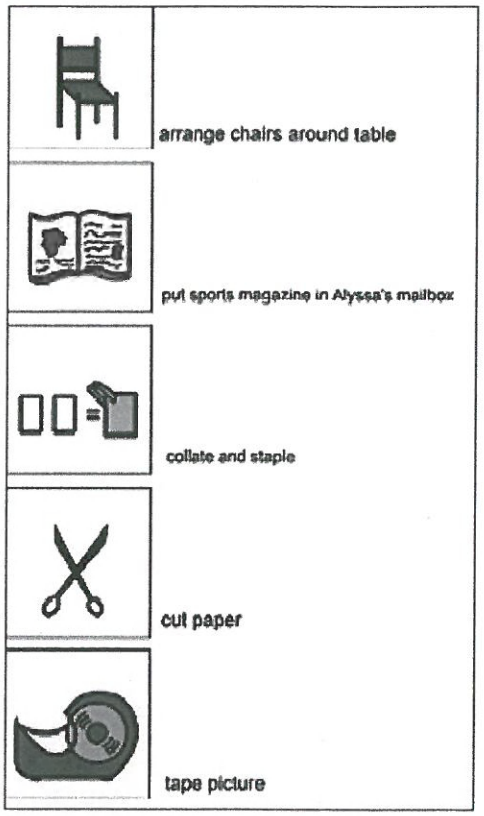

Figure 1. Sample workroom baseline task analysis.

Dependent and Independent Variables

Three dependent variables were targeted for intervention and measured within each setting: the number of task analysis steps students completed independently per task and setting, the number of independent task transitions students completed as he or she moved

between tasks in each setting, and the total duration of task transitions per session in each setting. These variables were selected as they provided evidence as to the impact of the independent variable on skills considered important for increased student autonomy.

Video modeling served as the independent variable as students acquired a series of novel skills across school and community settings. Intervention included the use of self-operated video models delivered via an Apple iPad®. In addition, a modified system of least prompts (verbal and gestural prompts) was available during intervention sessions when students were unable to complete a task step.

Experimental Design

A multiple-baseline across settings design (Kazdin, 1982) was used to illustrate the effectiveness of video models on skill acquisition and the number and duration of independent task transitions for students with moderate intellectual disability in community settings. This design was selected since it allowed investigators to quickly determine the existence of a functional relationship between video modeling and the dependent variables as it was systematically implemented in each setting (Kennedy, 2005). In addition, this design allowed investigators to ensure no significant changes occurred in the dependent variable prior to the introduction of the independent variable. This design is frequently used when learning is involved (Alberto & Troutman, 2006); thus, a multiple-baseline controlled for possible carry-over effects following the introduction of video models.

Data Collection

Two data collection methods were used during this investigation. Event recording was used to document the number of task steps students completed independently for each task in each community setting. In addition, event recording was used to record the number of independent task transitions students made as they moved between task steps in community settings. Duration recording was used to record the cumulative duration students required to transition between task steps. Both event and duration recording procedures were selected as they provided a complete representation of student's actions under both conditions. By considering both duration and independence across tasks and transitions, intervention effectiveness and validity as they pertain to student's typical routines was more clearly demonstrated as students engaged in a series of multi-step tasks.

Experimental Procedures

Pretraining. Prior to intervention, students participated in four pretraining sessions to ensure their ability to independently use an Apple iPad® to complete familiar and novel tasks within their classroom setting. Training sessions included instruction on navigating the touch screen to access the video models, adjusting the volume settings, and using the video models. The training videos consisted of four common classroom activities that included sharpening a pencil, using the whiteboard, using hand sanitizer, and cleaning the top of their desk. Navigation and use of the touch screen required training on how use the index finger to do one tap on the screen, followed by a pause. Participants quickly gained a feel for the amount of pressure required to get the video to begin. The most common error in navigation was multiple taps, which would skip the slide to the next video model. During each training session, the video sequence and the tasks to be completed were selected at random.

Baseline. During 3–5 sessions, students were provided with a task analysis containing printed instructions and Boardmaker® symbols and instructed to complete the sequence of four to five tasks using the system of least prompts. For example, the student was shown the printed task analysis and instructed, "John, today you are going to weigh lemons, purchase tissues, locate this week's ad, and reshelf an item." Observers recorded the level of prompt required for completion of the steps in the task, the level of prompt required for transition to the following task, and the duration between completing the previous task to moving to and beginning the next task. The settings for baseline were the same as in intervention but consisted of varied tasks that were similar in nature to the intervention tasks. Baseline for participants in the school

workroom consisted of three sessions prior to the intervention phase. Intervention in the additional settings began after the previous student demonstrated an increasing number of independent transitions in the previous location. This procedure was used for each student.

Intervention. During intervention, the student was handed the device and instructed to "go to work." Keynote for iPad® was already opened and the presentation with the appropriate video model was set to play mode. The student was then instructed to view the video models one at a time, complete the task performed in the video, and then view the next video until the stop sign appeared, indicating he or she was finished. Between viewing the video models students could either place the iPad® into their basket, hand it the instructor, or wear it using the shoulder strap while completing other tasks. A system of least prompts was available when students were unable to independently complete a step in the task or transition to the next video model.

Inter-observer Agreement and Treatment Fidelity

Inter-observer agreement data were recorded simultaneously but independently from one another by an investigator and trained graduate student during 33% of baseline and 25% of intervention sessions in each setting in which students engaged in activities. Inter-observer agreement was calculated by dividing the number of recorded agreements by the number of agreements plus disagreements and then multiplying by 100. Overall agreement ranged from 86% to 96% with a mean of 91% across all three settings. Within the school workroom, IOA ranged from 91–94% for Eduardo, 67–100% for Mike, 86–100% for Matilda, and 95–98% for Andrea when examining baseline and intervention conditions. At the grocery store, IOA ranged from 81–90% for Eduardo, 90–97% for Mike, 81–95% for Matilda, and 84–92% for Andrea between baseline and intervention conditions. Finally, when engaged in activities at the bowling alley, IOA ranged from 90–98% for Eduardo, 92–96% for Mike, 86–93% for Matilda, and 86–95% for Andrea between baseline and intervention conditions.

Treatment fidelity measures confirmed the correct and consistent use of intervention procedures as investigators facilitated student use of the iPad® for accessing self-operated video models during 20% of intervention sessions in the bowling alley. A trained graduate student used an itemized data sheet with a task analysis of each task and recorded whether each step was followed. Agreement was measured by dividing the number of correctly implemented steps that were observed by the total number of possible steps and then multiplying by 100. Overall mean agreement was 100% for each student. Treatment fidelity agreement measures were not conducted in the workroom or grocery settings.

Results

Figures 2, 3, 4, and 5 illustrate that self-operated video modeling was effective for facilitating increased independent task performance, increased independent task transitions, and decreases in duration for task completion for students across school and community-based settings. See Table 3 for a summary of data across students. Visual analysis confirms most students demonstrated increases in independent task performance between baseline and intervention conditions within each setting. The only exception was Mike, who demonstrated a slight decrease in independent task performance in the school workroom when using the video models to complete targeted tasks.

Eduardo

Eduardo's baseline mean was 32% when using a task analysis to complete a series of workroom activities. He was unable to independently transition through any task ($\mu = 0$) and the average duration for task transitions was 2.32 minutes. Following introduction of the video modeling intervention, he demonstrated a steady increase in independent task performance when completing workroom tasks increasing his task performance to a mean of 43.7%. This represented an 11.7% increase from baseline. His independent task transitions averaged 40% and the average duration for task transitions decreased to 1.13 minutes. At the bowling alley, Eduardo's baseline mean was 49.75%. His independent task transitions averaged 30% and the duration for

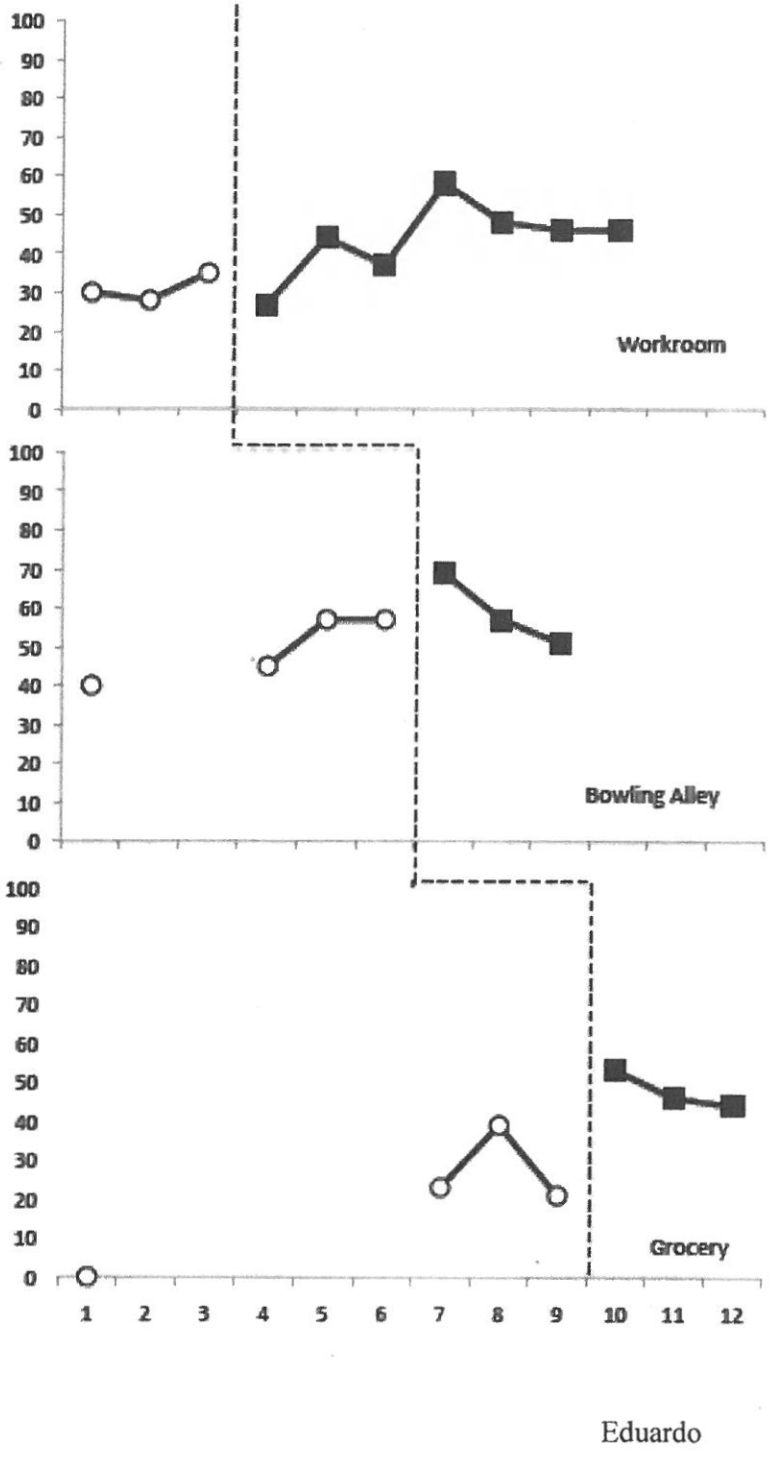

Figure 2. Percent of independent task performance for Eduardo across three settings.

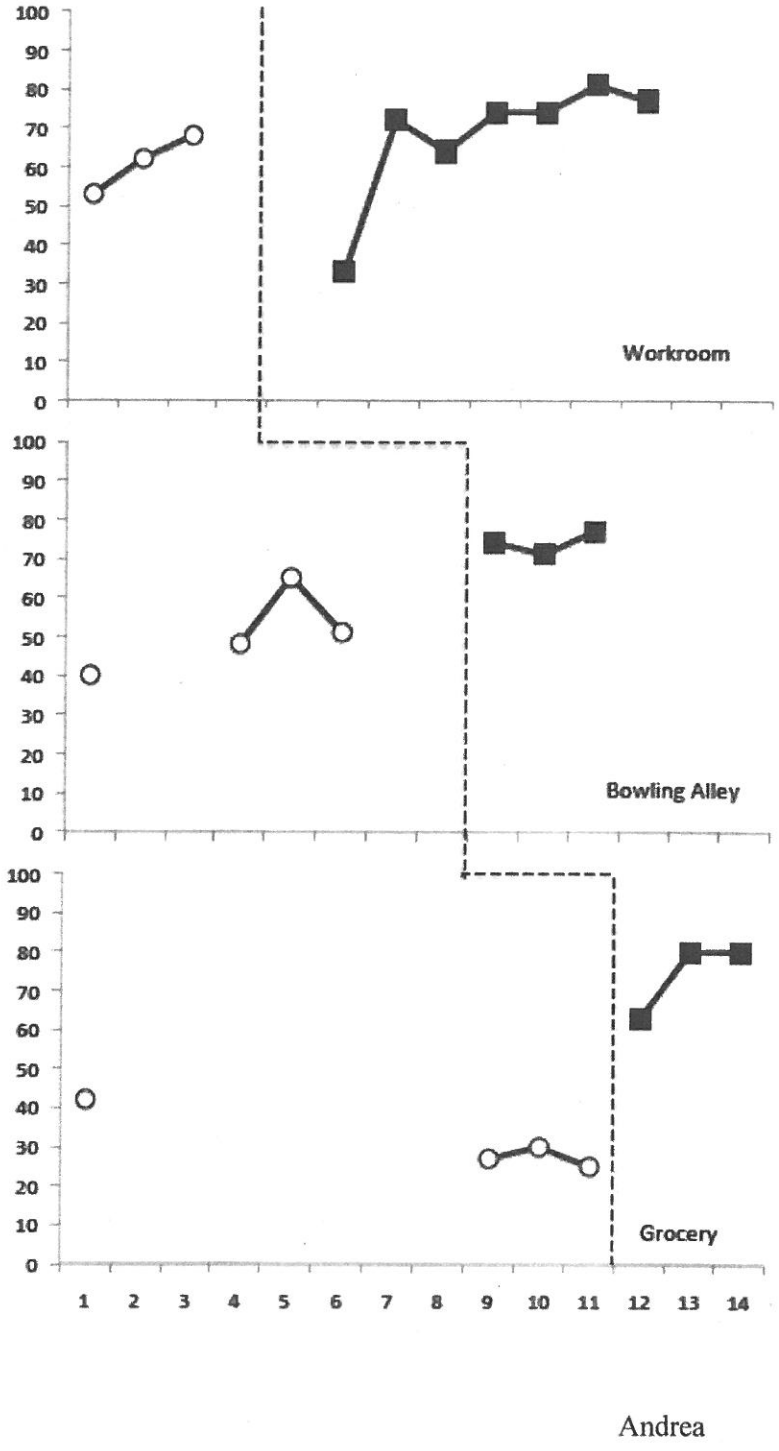

Figure 3. Percent of independent task performance for Andrea across three settings.

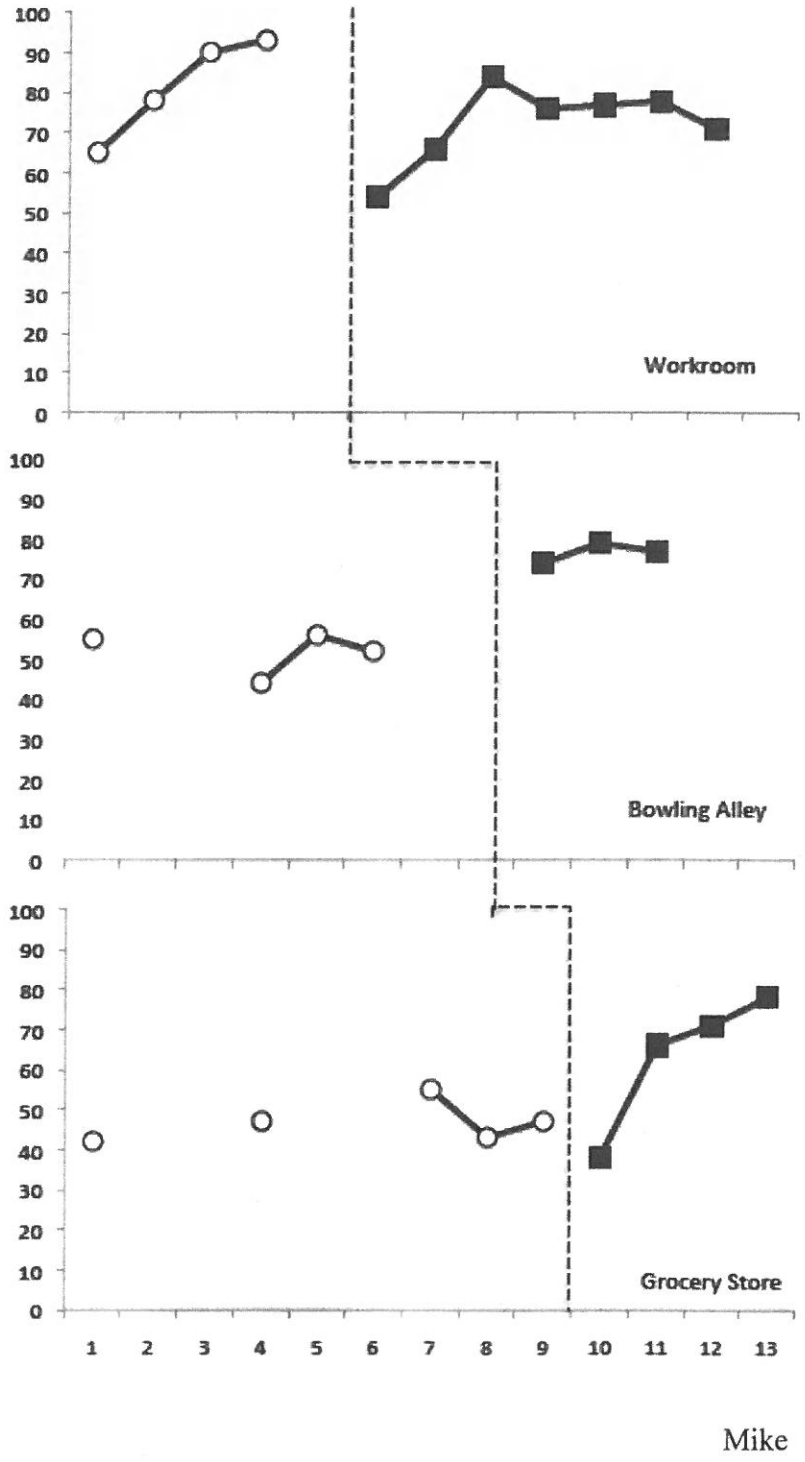

Figure 4. Percent of independent task performance for Mike across three settings.

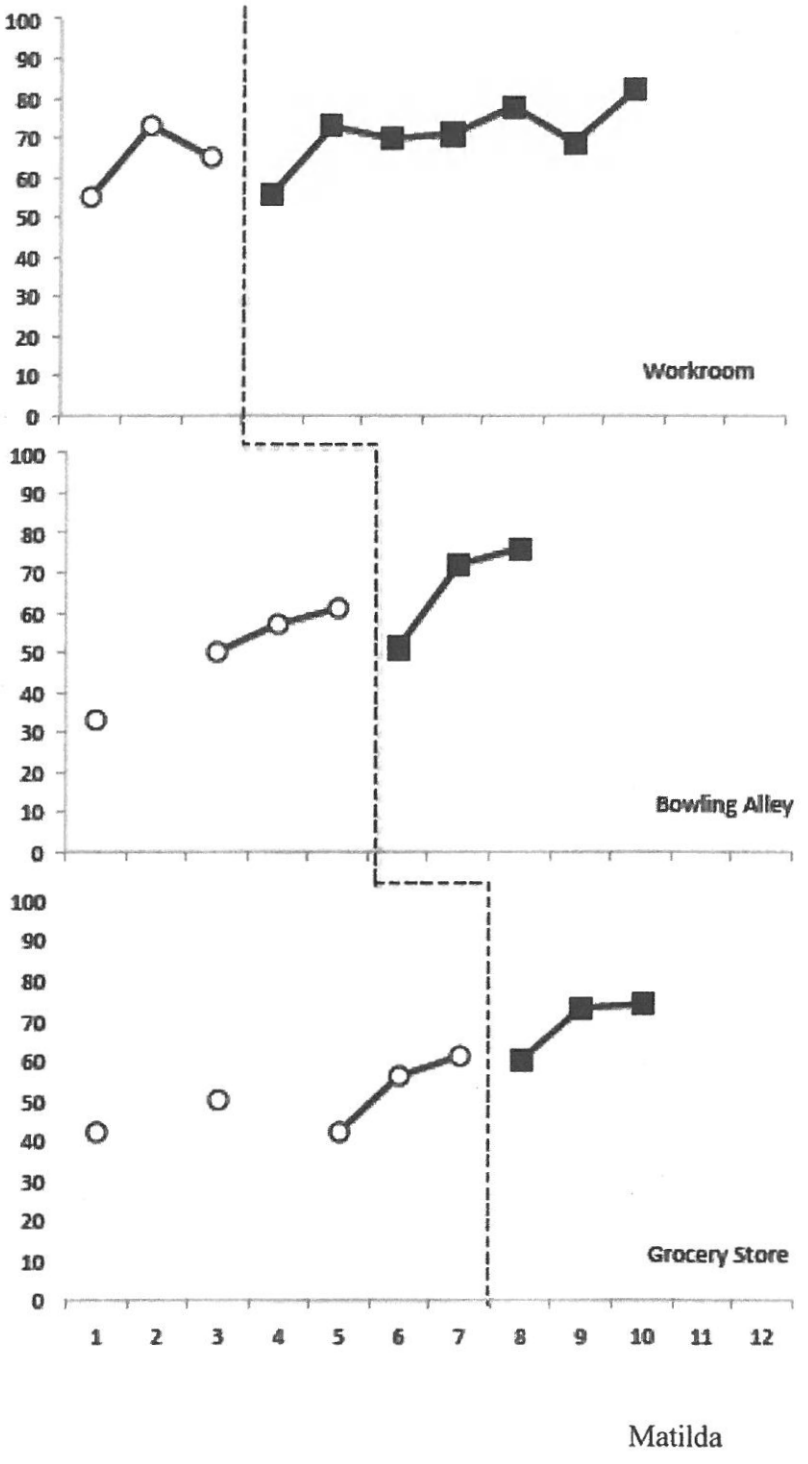

Figure 5. Percent of independent task performance for Matilda across three settings.

TABLE 3

Data Summary

		Workroom			*Bowling Alley*			*Grocery*		
Student	*Condition*	*Mean % Task Independence*	*Mean Transition Duration (Minutes)*	*Mean % Independent Transitions*	*Mean % Task Independence*	*Mean Transition Duration (Minutes)*	*Mean % Independent Transitions*	*Mean % Task Independence*	*Mean Transition Duration (Minutes)*	*Mean % Independent Transitions*
Eduardo	Baseline	32%	2.32	0%	49.75%	4.39	30%	20.7%	2.15	13%
	Intervention	43.7%	1.13	40%	49%	3.55	45%	47%	3.27[b]	7%
Andrea	Baseline	60.7%	1.32	27%	51%	2.72	27%	31.3%	2.91	30%
	Intervention	67.9%	1.09	79%	74%	1.06	87%	74.3%	3.23[b]	60%
Mike	Baseline	81.5%	1.56	50%	51.67%	3.16	40%	46.6%	6.08	7%
	Intervention	72.23%[a]	1.11	74%	76.5%	2.09	100%	63.25%	1.73	40%
Matilda	Baseline	40%	2.05	7%	50.33%	2.27	27%	50.25%	4.55	20%
	Intervention	71.29%	1.28	60%	66.33%	1.19	92%	69%	1.44	73%

[a] Represents a decrease in mean independent task performance
[b] Represents an increase in mean transition duration

task transitions averaged 4.39 minutes. Independent task performance increased to 59% during intervention representing a 9.25% increase from baseline. In addition, his independent task transitions also increased from baseline levels to 45%. However, the duration for task transition decreased to an average of 3.55 minutes. Finally, his baseline mean at the grocery store was 20.7% when using a task analysis to complete a series of shopping activities. Eduardo's independent task transitions averaged 13% and his duration for completing tasks averaged 2.15 minutes. His mean independent task performance increased to 47% during intervention following the introduction of the video models representing a 26.3% increase above baseline. However, his percent of independent task transitions decreased to 7% and his average duration for transition through the series of grocery shopping tasks increased to 3.27 minutes.

Andrea

Andrea's baseline mean was 60.7% when using a task analysis to complete a series of workroom activities. Her independent task transitions averaged 27% and the duration for completing tasks averaged 1.32 minutes. Following introduction of the video modeling intervention, she demonstrated a steady increase in independent task performance when completing workroom tasks. During intervention, her accuracy in task completion improved to a mean of 67.9% representing a 7.2% increase from baseline. Her independent task transitions increased to 79% and her average duration for task transitions in the workroom decreased to 1.09 minutes. At the bowling alley, Andrea's baseline mean for independent task performance was 51%. Her independent task transitions averaged 27% with a mean duration of 2.72 minutes. Independent task performance increased to 74% during intervention representing a 23% increase from baseline. In addition, her independent task transitions increased to 87% with an average duration of 1.06 minutes. Finally, her baseline mean at the grocery store was 31.3% when using a task analysis to complete a series of shopping activities. When examining independent task transitions, she achieved an average of 30% with a mean duration of 2.91 minutes. Her mean independent task performance increased to 74.3% during intervention following the introduction of the video modeling intervention representing a 43% increase above the baseline mean. In addition, her independent task transitions improved to an average of 60% and she transition through the series of tasks in an average of 3.23 minutes.

Mike

Mike's baseline mean was 81.5% when using a task analysis to complete a series of workroom activities. His independent task transitions averaged 50% and the average duration for transitioning through tasks was 1.56 minutes. Following introduction of the video modeling intervention, he demonstrated a steady decrease in independent task performance when completing workroom tasks. During intervention, his accuracy in task completion decreased to a mean of 72.23% representing a 9.27% decrease from baseline. His independent task transitions increased to 74% and his duration for transitioning through the series of workroom tasks decreased to an average of 1.11 minutes. At the bowling alley, Mike's baseline mean for independent task performance was 51.67%. His independent task transitions averaged 40% with a mean duration of 3.16 minutes. His independent task performance increased to 76.5% during intervention representing a 24.83% increase from baseline. In addition, his independent task transitions increased to 100% with an average duration of 2.09 minutes. Finally, his baseline mean at the grocery store was 46.6% when using a task analysis to complete a series of shopping activities. When examining independent task transitions, he achieved an average of 7% with a mean duration of 6.08 minutes. His mean independent task performance increased to 63.25% during intervention following the introduction of the video modeling intervention representing a 16.65% increase above the baseline mean. In addition, his independent task transitions improved to an average of 40% and he averaged task transitions through the task series in 1.73 minutes.

Matilda

Matilda's baseline mean was 40% when using a task analysis to complete a series of workroom activities. Her independent task transitions averaged 7% and the duration for transitioning through tasks averaged 2.05 minutes. Following introduction of the video modeling intervention, she demonstrated a steady increase in independent task performance when completing workroom tasks. During intervention, her accuracy in task completion improved to a mean of 71.29% representing a 31.29% increase from baseline. Her independent task transitions increased to 60% and her duration for transitioning the series of workroom tasks decreased to an average of 1.28 minutes. At the bowling alley, Matilda's baseline mean was 50.33%. Her independent task transitions averaged 27% with a mean duration of 2.27 minutes. Independent task performance increased to 66.33% during intervention representing a 16% increase from baseline. In addition, her independent task transitions increased to 92% with an average duration of 1.19 minutes. Finally, Matilda's baseline mean at the grocery store was 50.25% when using a task analysis to complete a series of shopping activities. When examining independent task transitions, she achieved an average of 20% with a mean duration of 4.55 minutes. Her mean independent task performance increased to 69% during intervention following the introduction of the video modeling intervention representing an 18.75% increase above the baseline mean. In addition, her independent task transitions improved to an average of 73% and averaged task transitions in 1.44 minutes.

Social Validity

Social validity was conducted through a revised Treatment Acceptability Rating Form (TARF-R) (Reimers & Wacker, 1988) provided to the classroom teacher. The TARF-R was a Likert survey consisting of fourteen questions designed to examine the social and applied value of the intervention, as well the as the cost effectiveness and practicality of its use. The teacher responded that the intervention was something that she would like to continue in the future if she had the technology. The intervention a) allowed for increased independence from the teacher, allowing her more time to work with other students, b) increased students motivation to complete tasks, and c) increased student's time on task. Barriers in the use of the intervention expressed by the participating teacher were the time to create the video models, and the resources to obtain the technology used in this study. Students expressed that they enjoyed using the iPads® to access the video models. Peers, paraprofessionals, and other teachers also supported the social validity of the intervention as they requested to use, look at, learn about, and obtain the intervention our participants were using.

Discussion

A clear need exists to replicate and validate the effectiveness of video modeling systems as individuals with an intellectual disability use them to acquire novel skills and engage in complex task sequences within a variety of integrated settings. The present investigation examined the effectiveness of video modeling delivered via iPads® on the independent task performance of four secondary students with an intellectual disability. Additionally, duration measures for completing tasks under baseline and intervention conditions as well as the percent of independent task transitions made by students were also recorded. Together, these data provide evidence supporting the use of video modeling when teaching students to use greater autonomy in community settings.

Present findings confirm previous investigations demonstrating the effectiveness of video modeling for teaching functional skills (e.g., Alberto et al., 2005; Branham et al., 1999; Hammond et al., 2010; Mechling et al., 2003; Norman et al., 2001). This study also verified previous findings (Cihak et al., 2008; Taber et al., 1998) that video models delivered using a portable device may facilitate greater independent performance by shifting stimulus control from an individual to a self-managed device. Students in the present investigation showed increases in independent task performance and task transitions as well as decreases in transition durations across community settings when learning novel tasks. Each also

demonstrated independence using the self-operated device and reported a preference for using the iPad®. Although no student reached 100% independence in any of the instructional settings, the difference in mean performance between baseline and intervention conditions showed considerable increases.

All students improved in task performance in both the bowling alley and grocery store settings. However, in the school workroom only three students increased their independence between baseline and intervention conditions. In this setting, Mike's mean independent task performance decreased slightly (9.27%) after viewing video models. His greater performance during baseline may be attributed to the similarity of tasks to previously learned tasks. For example, during baseline Mike was required to cut, tape, collate/staple, arrange chairs, and put mail in a mailbox. While he performed these tasks in a new context and setting, they were not completely novel and likely generalized from previously learned and similar activities. Thus, future investigations need to assure that tasks are wholly dissimilar from previously learned skills to more accurately gauge the impact of intervention on behavior.

Mike's decreased performance in the workroom during intervention may also be ascribed to his strength in memorizing the static picture prompt task analysis used during baseline and its unavailability during intervention. When presented with the picture prompts during baseline, Mike rarely looked at the prompting sheet more than once per session to confirm the order of tasks to be completed. However, during intervention sessions, he appeared less sure of which task to complete next. This was also apparent in the grocery store setting where he experienced a decrease in his percent of independent task transitions. Thus, future investigations should continue to compare the effects of static picture prompts and video models when teaching community-based skills (see Alberto et al., 2005; Cihak, Alberto, Taber-Doughty, & Gama, 2006). More specifically, investigators should consider student preferences and skills in using picture prompts versus video modeling systems in addition to their effectiveness in fading prompt dependency in community-based settings.

While numerous distractions existed in the bowling alley and grocery store, their impact were observed in only one of the settings. Both settings required students to interact with novel individuals, move across complicated environmental landscapes with various sections and/or departments, and complete activities in noisy and busy surroundings (e.g., other shoppers, bowlers, flashing lights at bowling alley, multiple grocery aisles, music). While all students increased in their independent task performance between baseline and intervention in both settings, in the grocery store both Eduardo and Andrea demonstrated frequent off-task behaviors and experienced an increase in their transition duration between tasks. Prior to intervention, both students were observed to be easily distracted by others individuals within the environment. For example, each would attempt to engage an investigator in social conversations or would stop during a task transition to talk with a peer or adult. When unsure of what task step to complete, neither would ask for help and would aimlessly wander in the store until prompted. Since a corrective prompt was not provided until after 10-seconds, students were often able to wander a considerable distance before being redirected. When at the bowling alley, students were frequently interrupted by their peers who wanted them to take their turn at bowling or to interact socially. However, students did not experience any negative impact in their task performance. Future studies should examine what task requirements when combined with setting characteristics may increase students' duration in transitioning between tasks. In addition, identifying strategies for controlling distracters may enable students to acquire and engage in novel tasks more accurately and efficiently in the future.

This study contains several limitations contributing to its overall results and interpretations. First, this study was conducted with high school students who frequently engaged in community-based instruction. Specifically, each was familiar with the sites at which baseline and intervention activities occurred. Students without previous community experiences may require more intense instruction to acquire targeted skills. Second, all students were familiar with using an iPad® and the video model-

ing software following pretraining. Students who are unfamiliar with using such a device may require training. Third, study activities generally occurred when other teachers and peers were also present in the community-based setting. Their presence may have influenced student performance. Fourth, consideration should be given to the length of the video models. Some video clips were over 1-minute in length requiring students to memorize a greater amount of information as well as focus their attention for a longer period of time. Thus, variation in video duration may have influenced task performance and should be considered in future investigations. Fifth, the individuals depicted in each video model sequence were adults and not students or same-age peers. It is unknown whether students would perform differently if student models were depicted in the video clips. Finally, future research is needed to verify the results of this study.

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