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Technology to Teach Self-Help Skills to Elementary Students with Mental Disabilities

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This study investigated the effectiveness of a treatment package that included video technology (e.g., video modeling and video prompting) to teach three self-help skills (e.g., cleaning sunglasses, putting on a wrist watch, and zipping a jacket) to three elementary school students with mental disabilities in a small group setting. Using a constant time delay (CTD) procedure, observers measured the percentage of steps of the task analyses performed correctly before and after a video model prompt. A multiple probe design across behaviors, replicated across participants, demonstrated experimental control. The results indicate that an instructional package that includes video technology can be an effective method for teaching self-help skills to students with mental disabilities.

Keywords: Self-help Skills, Mental Disability, Elementary Students

One role of special education is to increase the functional independence of the students receiving services. Practitioners have used systematic instruction to teach academic, social, self-help, recreation/leisure, and vocational skills. Assistive technology also can increase functional independence across domains. As research with technology and systematic instruction continues to grow, there is a need to search for ways to combine the use of technology and systematic instruction to increase skill acquisition across domains.

Performing basic self-help skills across settings increases independent functioning. Students with moderate to severe disabilities may need systematic instruction to acquire self-care skills, such as dressing, grooming, toileting, and self-feeding. For example, Hughes, Schuster, and Nelson (1993) used a constant time delay (CTD) procedure to teach dressing skills to elementary students with multiple disabilities; Schoen, Lentz, and Suppa (1988) used a most to least prompting procedure and a graduated guidance procedure to teach face washing and drinking from a water fountain to preschoolers with Down Syndrome; and Collins, Gast, Wolery, Holcombe, and Leatherby (1991) used a CTD procedure to teach self-feeding skills to preschoolers who had multiple severe disabilities.

Television and the media have become prominent relevant stimuli in the lives of many people. Industry is learning that consumers often want to stay in their homes and still have goods and services offered to them. At any time of day, one can turn on the television and find some type of self-help program. These programs include physical fitness workouts, cooking programs, art and craft shows, gardening shows, decorating shows, and do-it-yourself home repair shows, to name just a few. In addition, universities are using video instruction to facilitate foreign language instruction (Herron, 1994), and large corporations are using videotape to train employees (Sickler, 1993). In spite of the growing use of technology in the world around us, there is limited research in the

area of video instruction with students with moderate cognitive disabilities. Only a few studies have investigated the use of video instruction to teach chained tasks, and there is no research using video instruction in a small group setting.

In addition to facilitating acquisition, videotape often is used to increase the likelihood of the generalization of skills. The research base in this area is limited but promising. Charlop and Milstein (1989) used videotaped conversation as a model to increase the fluency and generalization of conversational speech (via role play) for students with autism. Haring, Kennedy, Adams, and Pitts-Conway (1987) used videotapes of peers shopping across stores to facilitate the generalization of shopping skills for students with autism. Cuvo and Klatt (1992) found that secondary students with developmental delays generalized community-referenced sight words to community settings when they were taught in the classroom with videotapes. Poche, Yoder, and Miltenberger (1988) used videotapes showing multiple exemplars of potential abductors and role modeling of children saying "no" and running away to train self-protection skills in young children. Finally, LeGrice and Blampied (1994) and Branham, Collins, Schuster, and Kleinert (1999) used video modeling and prompting to teach chained tasks to adolescents with moderate cognitive disabilities that generalized across settings.

Because teacher time for conducting direct instruction is limited, video instruction is promising as an alternate means to present students with effective systematic instruction. The research using video technology with response prompts to teach students with disabilities is limited to instruction with adolescents (Branham et al., 1999; Lasater & Brady, 1995) with only one study including a self-help skill (Lasater & Brady, 1995). During this investigation, an instructional package combining video modeling and video prompting with a CTD procedure was implemented with elementary students with mental disabilities to teach the following chained self-help skills: (a) cleaning sunglasses, (b) putting on a wrist watch, and (c) zipping a jacket. These skills were selected because (a) the parents and educators involved believed that these skills would lead to more independent functioning, (b) peers without disabilities of the same chronological age could already perform these skills without assistance, and (c) each of the participants had at least one of the skills as an objective on their individualized education programs (IEPs). Given the effectiveness of video modeling and prompting and of the CTD procedure coupled with the limited number of research investigations combining these procedures with students with mental disabilities, this study attempted to answer two questions:

1. Is an instructional package including video technology (e.g., CTD with video modeling and prompting) effective in teaching self-help skills in a small group setting?

2. If the instructional package is an effective technology for teaching these skills, will the skills generalize to novel trainers, settings, and materials?

Method

Participants:

Students. Based on the goals of their Individualized Educational Programs (IEP) and the desire of parents to have their children learn the target skills, the trainer selected 3 participants from self-contained classrooms for students with moderate to severe disabilities. All students had the following prerequisite skills for participation: (a) motor imitation, (b) visual and auditory acuity within normal functioning limits, (c) identified reinforces, and (d) a wait response of 5 seconds.

Riya was an 8-year, 1-month old female diagnosed as having Down Syndrome, moderate cognitive delays, a severe speech sound production disorder, and a moderate language disorder. She had received services from an early age and had a history with systematic instruction (e.g., instruction with response prompting procedures). Testing with the Psychological Procedures on Mental Retardation Adaptive Behavior Scale - indicated that Riya was below average or poor in her functioning levels when compared to students without disabilities. She communicated with verbal demands, functional sign language, and gestures. Her strengths included (a) counting to 30 and identifying numerals 1-100, (b) alphabet letters (both upper and lower case), (c) sight words for the days of the week, (d) colors, and (e) body parts. Her weaknesses included (a) inappropriately displaying frustration (e.g., tantrums), (b) being noncompliant when asked to do something she did not want to do, and (c) not telling time. Riya received speech therapy and adaptive physical education.

Ankit was a 9-year, 8-month old male diagnosed as having Down Syndrome, mild cognitive delays, mild speech sound production disorder, and a severe language disorder. He had received services from an early age and had a history with systematic instruction. Ankit scored a 60 on the Test of Learning Aptitude (Hiskey, 1966) and had a partial test composite score of 59 on the Stanford-Binet Intelligence Scale - Fourth Edition (Terman & Merrill, 1973). His strengths included (a) using gross and fine motor skills, (b) identifying all letters of the alphabet, (c) telling time to the hour, (d) identifying numbers 1 - 50, (e) stating the names of coins and their values, and (f) reading basic sight words, personal information, survival words, and recipe words. His weaknesses included (a) distractibility (e.g., inability to attend to task for an extended time) and (b) lack of expressive language intelligibility. Ankit received both speech therapy and adaptive physical education.

Pankaj was a 12-year, 3-month old male diagnosed as having autism, attention deficit hyperactivity disorder (ADHD), and moderate cognitive disabilities. He was non-verbal and had received systematic instruction for 3 years prior to this study. Pankaj's score on the abstract/visual reasoning portion of the Stanford-Binet Intelligence Scale - Fourth Edition (Terman & Merrill, 1973) was 42. His strengths included communicating needs with communication boards and identifying numerals 1 - 20, survival and environmental signs, all letters of the alphabet, and personal information. Pankaj's weaknesses included (a) exhibiting prompt dependency, (b) being distractible and inattentive (e.g., failing to attend to task for an extended time), and (c) exhibiting poor use of fine motor skills. Pankaj took medication for ADHD and seizure control. His medication changed three times while he received instruction on the first task in this study.

Trainer: The trainer in this study was a graduate student in special education. She had 2 years of experience working with the students as an instructional assistant in their classroom.

Reliability data collectors. The classroom teacher, who had a Master's degree in special education and was experienced in systematic instruction and data collection, collected the majority of the reliability data in this study. In addition, two special educators periodically collected reliability data. Prior to the baseline condition, the trainer conducted specific training (e.g., verbal instruction, practice with forms) for collecting dependent and independent variable reliability data specific to the study.

Setting

All experimental sessions occurred at a round-shaped table at the back of the

classroom. During each session, the trainer placed a television on the table in front of the students. The 3 students sat across from the television and took turns performing the target skills. The instructor sat beside each student while he or she performed the skill in order to observe student responses and provide error correction, if needed. Three to five additional students and four other instructional staff (1 teacher, 3 instructional assistants) also were present in the classroom and were involved in other instructional activities during all sessions.

Materials and Equipment

Materials and equipment included a 13-inch color television with a built-in video-cassette recorder (VCR) and a videotape for each of the target skills (e.g., cleaning sunglasses, putting on a wrist watch, zipping a jacket). The videotapes used a subjective viewpoint (tape showing what the subject saw while completing the task) so the students saw the same thing on the television and at their work station. This allowed the students to replicate the skill exactly as they viewed it. The trainer made the original videotape, and an instructional technology expert at a Central Institute of Educational Technology in editing.

The videotape started with the task direction presented both orally and in graphic print (e.g., "Clean your sunglasses" appeared on the television screen as the announcer said, "Clean your sunglasses."). The videotape sometimes used a female voice and sometimes used a male voice to deliver the verbal task direction and the subsequent verbal description of the task. The videotape then presented a preview of the task (e.g., modeled the total task for the students from start to finish). Next, the videotape again presented the verbal and written model of the task direction (e.g., "Clean your sunglasses"). After the designated delay interval (e.g., zero seconds for initial sessions or 5 seconds for subsequent sessions), the videotape delivered a verbal prompt paired with a model prompt of the first step in the task analysis, with a still frame at the end of the step. After this prompt, the videotape paused for 15 seconds (i.e., the maximum amount of time that was needed to complete any one step of the task) for the student to complete the step. This procedure continued for each step across all three skills.

Additional materials included data sheets and materials needed to perform each selected task (e.g., cleaning solution and cloth for sunglasses, clothing items, watches, etc.). The task materials included multiple exemplars (e.g., jackets varying in color, heaviness, and sleeve type; watches varying in type and color; sunglasses varying in frame and color).

Skill Selection

Based on parent and teacher input, the following self-help skills were selected to be taught through video modeling in this investigation: (a) cleaning sunglasses, (b) putting on a wrist watch, and (c) and zipping a jacket. The trainer developed the task analyses (with response definitions) by performing each of the skills multiple times, writing down each step of the task, and having another person perform the skills by following the task analysis. In addition, task analyses were developed using the right hand as the dominant hand because 2 of the 3 students were right-handed and the third student did not demonstrate a preference for either hand. The task analyses contained 11 steps for cleaning sunglasses, 11 steps for putting on a wrist watch, and 8 steps for zipping a jacket (See Table 1).

Table 1 Task Analyses for Targeted Skills

Cleaning Sunglasses	Response Definition
1. Open eyeglass arms	Pick up sunglasses and unfold arms of sunglasses one at a time. Using index finger and thumb hold right arm in right hand and left arm in left hand.
2. Lower sunglasses to water	Lower arms at elbow and hold sunglasses just above container of cleaning solution (warm soapy water).
3. Wet sunglasses	Drop wrists so that sunglasses enter water and scoop sunglasses upward.
4. Remove excess water	Move sunglasses in a downward motion to shake off excess water.
5. Hold sunglasses in left hand	Hold sunglasses by either the bridge or the rim.
6. Place cloth on right lens	Pick up cloth in right hand and fold towel so that sunglasses go in the cloth covering the right lens with fingers on one side of the lens/cloth and thumb on the other side.
7. Wipe right lens	Wipe lens with cloth in a circular motion (to dry the lens).
8. Wipe left lens	Move cloth to left lens as state above, and wipe in circular motion.
9. Check to see if clean	Hold sunglasses up by arms 3 to 8 in. from face, look for spots.
10. If clean, fold arms	Fold left arm of sunglasses down, and then the right arm of sunglasses down.
11. Put away sunglasses	Hold sunglasses by bridge, put sunglasses into an eyeglass case.
Putting on Wrist Watch	**Response Definition**
1. Pick up watch	Pick up watch in right hand. Watch should be face up in fingers, palm side of right hand.
2. Place watch on left wrist	Watch should be centered face up with the prong and eye farthest from the body.
3. Hold to wrist with fingers	Place thumb of right hand on the strap below the watch face on the inside of wrist, place index finger of the right hand on the strap above the watch face on the outside of the wrist.
4. Turn left arm over	Turn arm over away from body so that the outside of the wrist is against the stomach, release grasp with fingers.
5. Grab strap	Take strap with holes in it between the index finger and thumb of right hand.
6. Thread strap through eye	Move the end of the strap through the eye at the end of the other strap.
7. Pull strap	Use middle and index finger to pull the strap to a comfortable tension.
8. Put prong through hole	Using the thumb, push the prong of the watch to the closest hole in the strap.
9. Grab strap	Using index finger and thumb.
10. Feed strap through loops	Strap should go under loop to hold down strap.
11. Check watch	Check to make sure it is on the correct way and is comfortable.
Zipping a Jacket	**Response Definition**
1. Hold zipper	Using the right hand, hold zipper supporting base with finger, and pinching the zipper pulley with thumb (on top) and index finger (on bottom).

2. Hold teeth of zipper	Using the left hand, hold teeth at base, moving material flap away from teeth and grasping with thumb (on top) and index finger (below).
3. Align zipper	Align both parts so the teeth are just above the hole on the right side of the zipper.
4. Engage zipper	Move teeth downward into zipper until it cannot go in any further.
5. Hold zipper at bottom	Using left hand hold the zipper at the bottom where both pieces are connected.
6. Pull zipper pull upward	Using pincher grasp of right hand (described above) move pulley upward toward head.
7. Stop at desired level	Release zipper when zipped to a comfortable level, minimum of half way up the jacket.
8. Adjust waistline	Grasp bottom of jacket with thumbs on outside of jacket and fingers on inside of jacket, move hands, around bottom of jacket so it comfortable and placed properly.

Data Collection:

The trainer collected continuous data on each step of the task analysis during all sessions. During baseline, maintenance, and generalization probe sessions, student responses were recorded as either correct (+) or incorrect (-). A correct response was defined as completing the step independently within 15 seconds of the initial task direction or previously completed step. An incorrect response was defined as (a) not performing the step correctly (topographical error), (b) not performing the step in the correct order (sequential error), (c) not completing the step within 15 seconds of the task direction or previous step (duration error), or (d) not initiating the response within 5 seconds. If the student made an error on any step, the trainer completed that step for the student.

During intervention, the trainer used a CTD procedure and recorded responses in the following manner: (a) correct anticipation (step completed independently within 15 seconds of the task direction or previously completed step), a "+" was recorded in the "before the prompt" column; (b) incorrect anticipation (topographical error, sequential error, or duration error within 15 seconds of the task direction or previously complete step), a "-T," "-S," or "-D," recorded in the "before the prompt" column; (c) correct wait (step completed independently within 15 seconds after prompt), a "+" recorded in the "after the prompt" column; (d) incorrect wait (topographical error, sequential error, or duration error), a "-T," "-S," or "-D" recorded in the "after the prompt" column; and (e) no response (student not initiating response within 5 seconds of prompt), an "NR" recorded in the "after the prompt" column.

Procedures:

General Procedures: The trainer taught the self-help skills in a small group setting using an instructional package consisting of the CTD procedure with video modeling and prompting. Experimental sessions occurred Monday through Friday and lasted no more than 30 minutes each. Each session began with the trainer delivering an attentional cue, "Is everybody ready to work?," and students responding (e.g., nod head, say "yes") that they were ready to work. The trainer used an intra-sequential small group instructional format (Collins, Gast, Ault, & Wolery, 1991) with one total task training trial presented individually to each student per session (total of 3 trials per session). Criterion was met when all

participants performed 100% correct anticipations (i.e., correct before the prompt) for three consecutive sessions.

Baseline/Probe Procedures: Baseline conditions occurred prior to the intervention on each task. For each task, the trainer collected baseline data in a 1:1 format for a minimum of three sessions or until data were stable. Baseline, maintenance, and generalization probe sessions consisted of a multiple opportunity format. The trial sequence began with the delivery of the task direction by the trainer (e.g., "Clean your sunglasses"). The trainer then waited 5 seconds for the student to initiate and 15 seconds for the student to complete the first step of the task analysis. If the student responded correctly, the trainer delivered verbal praise specific to the step and gave the student 5 seconds to initiate and 15 seconds to complete the next step in the task analysis. If the student responded incorrectly or made no response, the trainer stopped the student and asked the student to look away from the task. The trainer then completed that step of the task for the student and told the student to continue (e.g., "Clean your sunglasses"), again giving the student 5 seconds to initiate or 15 seconds to complete the next step of the task analysis. This procedure continued for each step in the task analysis.

Students completed probe sessions on tasks that were not in the intervention phase of the investigation a minimum of once every other week. The trainer praised student attention on a variable ratio of every third step (i.e., VR3 schedule). Contingent on appropriate behavior at the end of each session, students also received a token for good work that could be used to earn free time at the end of the school day. In addition, students who earned a token could choose an edible from a reinforcement box or a reinforcing activity (e.g., computer, music, picture books, action figures, etc.) following each session.

Independent Variable: Small group instruction began after all students demonstrated stable baseline performance for the first task to be taught. All students sat with a view within 36 inches of the television screen. Each session began with the trainer delivering the attentional cue, "Watch," as the task direction (e.g., "Clean you sunglasses") was both printed across the television screen and heard by the students. Following the delivery of the task direction, the videotape presented a preview of the task (e.g., model of the total task from beginning to end). At the completion of the task model, the task direction was redelivered (auditorily and visually on the screen) for each student. The trainer counterbalanced which student received the first instructional trial each day. Since all of the students were motorically imitative, the controlling prompt was a video model paired with a verbal direction.

Intervention on each task began with a zero seconds delay interval. Each participant remained at a zero seconds delay until he or she had 100% correct wait responses (i.e., correct responses following the prompt) for two consecutive days. During zero seconds delay sessions, the trainer secured attention and then played the videotape. The students watched the preview of the total task, then waited for the task direction to be delivered on the monitor (orally and printed across the television screen). Immediately following the task direction, the videotape presented a model of the first step of the task analysis with a verbal description (e.g., videotape showed hands reaching down and picking up sunglasses with verbal prompt of "Pick up your sunglasses"). The videotape froze at the end of the step, allowing the student to compare his or her progress on the task to that on the video screen. The videotape then allowed 5 seconds for the student to initiate and 15 seconds for the student to complete that step. The trainer praised students for

correct responses on a continuous reinforcement (CRF) schedule. Incorrect responses resulted in an error correction procedure in which the trainer interrupted the error, stopped the videotape, and physically prompted the student through the step. This procedure continued throughout the task.

The remaining training sessions used a 5 second delay interval. The videotape delivered the task direction and showed a model preview of the total task as stated above. The videotape then repeated the task with a delay interval of 5 seconds prior to the model prompt of each step. When one student in the group reached 100% correct responses before the prompt for one day, the trainer deleted the videotape model preview of the total task. During training, if a student initiated a step before the prompt within 5 seconds and completed the step correctly within 15 seconds (i.e., correct anticipation), he or she received specific verbal praise (e.g., "I like the way you picked up your sunglasses"); if the student made an incorrect response before the prompt (i.e., incorrect anticipation), the trainer told the student to wait for the prompt (e.g., "No, wait if you are not sure.)." After the 5-second delay interval, the videotape showed a model of the correct step of the chain, freezing on the final frame. The student then had 5 seconds to initiate and 15 seconds to complete the step following the video prompt. If the student responded correctly after the prompt (i.e., correct wait), the student received general verbal praise (e.g., "Good"). If the student made an incorrect response or did not respond after the prompt (i.e., incorrect wait), the trainer used an error correction procedure (i.e., interrupted the error, paused the videotape, and physically prompted the student through the step). If the student responded correctly by performing more than one step of the task, the trainer fast-forwarded the video to keep up with the student's progress within the task. If the student made an error that took longer than 15 seconds to correct, the trainer paused the videotape until the step was completed. This procedure continued until the participant completed the total task.

The trainer praised correct responses on a continuous reinforcement (CRF) schedule until the student performed 100% correct anticipations (e.g., unprompted responses) for one session. Praise was thinned, then, for correct responses to a variable ratio of every four steps (VR4 schedule) until the participant performed 100% correct anticipations for a second session and then reinforcement was further thinned to the end of the chain until the participant performed 100% correct anticipations for a third day. As in baseline sessions, the trainer praised students for attending on a VR3 schedule (variable ratio of every three steps), delivered a token for good work at the end of the session, and allowed students to choose an edible or a reinforcing activity at the end of each session.

In summary, the trainer was available during instructional sessions to supplement the videotape in the following ways: (a) starting the videotape, (b) praising correct responses, (d) providing physical guidance to correct errors, (e) fast forwarding the videotape (when indicated by student responses), and (f) stopping the videotape. The students were not required to operate the technology.

Maintenance: As each skill met criterion, the trainer conducted a minimum of three maintenance probe sessions per skill. Due to inclement weather and school calendar time constraints, the time intervals between maintenance sessions varied from student to student and ranged from 1 to 13 weeks following intervention. During maintenance sessions, the trainer did not use any videotape or verbal prompts; however, she praised attending on a VR3 schedule and praised correct responses at the completion of the chained tasks. When a student made

an error, the trainer completed the step for the student.

Generalization: Once the students met criterion of 100% correct wait responses during zero second delay sessions, the trainer introduced multiple exemplars of materials to facilitate generalization. When students met criterion of 100% correct anticipations during intervention, the trainer attempted to assess generalization. To assess generalization across persons, a novel person delivered the verbal task direction (e.g., "Clean your sunglasses") and used the same materials from intervention. To assess generalization across materials, the trainer delivered the verbal SD but used a novel set of materials. Following intervention on Task 1, Riya and Ankit participated in probe sessions to assess generalization across persons. Ankit participated in a probe session to assess generalization across materials following intervention on Tasks 1 and 2. Due to the end of the school year, the trainer was unable to conduct further probe sessions for generalization.

Experimental design This investigation used a multiple probe (Tawney & Gast, 1984) across behaviors design replicated across participants. The trainer collected baseline data across tasks for a minimum of three days or until data were stable. When data were stable, training began on the first task. Training on successive tasks occurred only when criteria had been met on previous tasks. For this reason, training on Task 2 did not include Pankaj as he was not ready to move on to Task 2 when the other students were ready. Once Pankaj met criteria on the first task and Riya and Ankit met criteria on the second task, training for all 3 students began on the third task.

Results

The effectiveness of the video prompting procedures for Riya, Pankaj, and Ankit can be seen in Figure 1, Figure 2, and Figure 3, respectively. Because the duration of the investigation was confined to a single academic school year, the trainer was unable to conduct a limited number of maintenance and generalization sessions. During baseline probe conditions, Riya's data were stable. She met criteria for cleaning sunglasses after 30 instructional sessions, and the amount of time it took Riya to complete the task decreased from 5 min 25 seconds at the beginning of intervention to 53 seconds by the completion of intervention. Total training time for Riya on Task 1 was approximately 1 hour and 2 minutes. She maintained this skill with 100% accuracy for 13 weeks and generalized the skill across a novel trainer with 100% accuracy. Riya made 53 (16%) errors during intervention on Task 1. Riya met criterion for putting on a wrist watch after 28 instructional sessions, and the amount of time it took her to complete the task decreased from 5 minutes 3zero seconds at the beginning of intervention to 1 minute 18 seconds by the completion of intervention. Total training time for Riya on Task 2 was approximately 1 hour 39 minutes. She maintained this skill with 91% accuracy for 7 weeks. Riya made 55 (1%) errors during intervention on Task 2. Riya met criterion for engaging a zipper after 24 instructional sessions, and the amount of time it took her to complete the task decreased from 3 minutes 49 sseconds at the beginning of intervention to 56 seconds by the completion of intervention. Total training time for Riya on Task 3 was approximately 1 hour 9 minutes. She maintained this skill with 100% accuracy for 1 week. Riya made 52 (27%) errors during intervention on Task 3. Across skills, 60% of Riya's errors were topographical.

During baseline probe conditions, Ankit' data were stable. Ankit met criteria for cleaning sunglasses after 19 instructional sessions, and the amount of time it took him to complete the task decreased from 4 minutes 32 seconds at the beginning of

intervention to 46 seconds by the completion of intervention. Total training time for Ankit on Task 1 was approximately 24 minutes. Ankit maintained this skill for 13 weeks with 100% accuracy. Ankit made 20 (10%) errors during intervention on Task 1. Ankit met criterion for putting on a wrist watch after 21 instructional sessions, and the amount of time it took him to complete the task decreased from 4 minutes 42 seconds at the beginning of intervention to 43 seconds by the completion of intervention. Total training time for Ankit on Task 2 was approximately 1 hour 7 minutes.

Figure 1: Percent of Correct Responses for Riya.

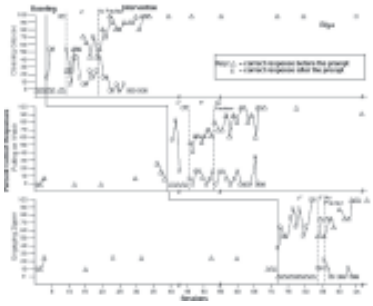
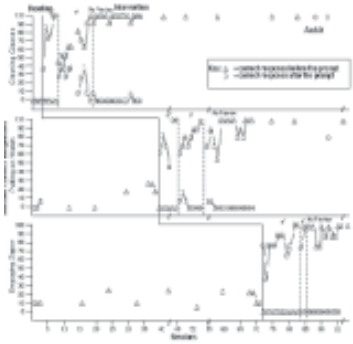
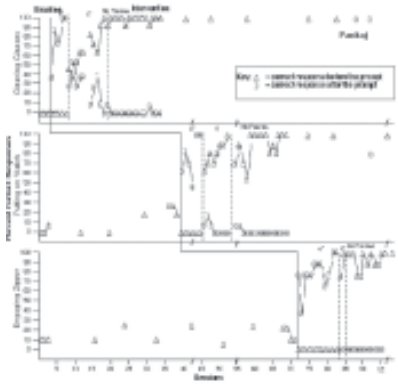


Figure 2: Percent of Correct Responses for Ankit.



He maintained this skill for 7 weeks with 100% accuracy. Ankit made 42 (18%) errors during intervention on task. Finally, Ankit met criterion for engaging a zipper after 16 instructional sessions, and the amount of time it took him to complete the task decreased from 3 minutes 23 seconds at the beginning of intervention to 23 seconds by the completion of intervention. Total training time

Figure 3. Percent of Correct Responses for Pankaj



for Ankit on Task 3 was approximately 44 minutes. He maintained this skill at 100% accuracy for 1 week. Ankit made 25 (17%) errors during intervention on Task 3. He generalized cleaning sunglasses across a novel trainer and across novel materials with 100% accuracy, and he generalized putting on a wrist watch across novel materials with 82% accuracy. Across tasks, over 60% of Ankit' errors were topographical.

During baseline probe conditions, Pankaj's data were stable. Pankaj met criteria for cleaning sunglasses after 57 instructional sessions, and the amount of time it took him to complete the task decreased from 8 minutes 1 second at the beginning of intervention to 1 minute 9 seconds by the completion of intervention. Total training time for Pankaj on Task 1 was approximately 2 hours 51 minutes. Pankaj maintained this skill for 6 weeks with a mean of 88%. Pankaj made 189 (30%) errors during Task 1. Because Pankaj required more sessions to acquire Task 1, Riya and Ankit moved on to Task 2 without Pankaj. In addition, the trainer made adaptations to the intervention for Pankaj after 20 sessions due to his failure to make progress on Task 1. First, differential reinforcement was added so that only verbal reinforcement was given to Pankaj for correct responses before the prompt and ignored correct responses after the prompt. Following this adaptation, Pankaj increased the number

of steps he independently completed with the correct topographical response; however, he still had difficulty performing some steps in the correct sequence. After 11 additional sessions, the trainer adapted the intervention by providing Pankaj with five massed trials of performing the problematic steps (5 through 9) prior to delivery of the SD for the entire task. After implementing the massed trials procedure, Pankaj continued to make progress until he met criterion on Task 1. He then returned to group instruction with Riya and Ankit for Task 3.

Pankaj did not receive instruction on Task 2. Pankaj met criterion for engaging a zipper after 31 instructional sessions with no adaptations, and the amount of time it took him to complete the task decreased from 4 minutes 36 seconds.

It is also possible that the procedural fidelity of teachers may decrease over time. That is to say, once students reach criterion on a task taught through video prompting, praise and error correction from the teacher are no longer needed. Thus, it is possible videotapes could be used as review tools during maintenance sessions without input (e.g., praise or error correction) from the teacher.

This study adds to the research literature because it is the first investigation to use an instructional package combining video prompting and modeling with the CTD procedure to teach self-help skills to elementary students with mental disabilities. The combination of video modeling and prompting used in this investigation exposed students in advance to what was expected and provided a visual prompt for each step, as needed. This may have increased task fluency. In addition, the instructional package resulted in maintenance of self-help skills and some evidence of generalization across materials and instructors.

While this was not a comparison study, instructional data collected across students and skills yielded some interesting results. First, the video prompting procedure appears to have been more time efficient for Riya and Ankit than it was for Pankaj, although this may not be the case. Due to the time limitations of the investigation, Pankaj received supplemental 1:1 instruction on the first skill while the remaining participants received group instruction on the second skill. It cannot be determined if Pankaj eventually would have met criterion on the first skill if the trainer had not made this change. However, the instructional package implemented in a group setting resulted in his acquisition of the third skill. During previous systematic instruction, it took Pankaj 3 years to acquire the skill of buttoning. Based on this past learning history, the instructional package appears to have been a more efficient way for Pankaj to learn than were previous strategies. In addition, there are other variables that may have affected Pankaj's acquisition of the first task. These include (a) three medication changes that occurred during instruction on the task and (b) the beginning of his transition process to the middle school. During this transition, Pankaj was only present at the elementary school to participate in sessions for this investigation and a few other selected activities. At the same time, Pankaj began to frequently cry and scream, and Pankaj's middle school teacher hypothesized that the change in his behavior appeared to be related to the confusion involved in changing his routine and attending two schools at the same time. On the other hand, Riya's progress shows that she met criterion in fewer sessions on each subsequent task. In addition, the longer she remained on a task (while waiting for other students to meet criteria), the more rapidly she performed the skill. Even though Ankit did not follow this pattern, he was able to perform each of the skills in less than 1 minute by the end of instruction.

The data also can be analyzed in regard to errors. Wolery, Ault, and Doyle (1992) state

that CTD is an errorless procedure and should result in less than 20% student errors with chained tasks. In a review of the CTD literature, Schuster et al. (1998) found reported errors to range from 0% to 16.8%. During this investigation, the percentage of errors was higher. Riya had 27% errors during intervention on Task 3, and Pankaj had above 30% errors during intervention on both tasks he was taught. Most investigations report the majority of errors in chained tasks as sequential errors; however, this investigation found that the students made more topographical errors than any other type of error. One possible explanation for the higher rate of errors is that the tasks taught consisted of specifically defined and potentially difficult fine motor skills as opposed to the skills most often taught in the professional CTD literature (e.g., engaging a zipper or fastening a wrist watch vs. stirring recipe ingredients or crossing a street). Consequently, steps not performed exactly as written in the task analyses (e.g., right hand vs. left hand grasping an item) resulted in topographical errors.

In spite of the positive results, the instructional package had other variables that may have affected the data or made implementation difficult. First, the CTD procedure requires students to complete trials with a zero seconds delay interval before progressing to a larger delay interval. In this investigation, students had to continue at a zero seconds delay until they had 2 consecutive days with 100% accuracy. Thus, students had no opportunity to respond independently prior to prompting during initial trials. Baseline data show that, on several tasks, students sometimes made correct independent response on selected steps. Yet, initial instructional sessions suppressed the opportunity for students to perform those steps independently. Because intermittent probe data collected during baseline conditions show a slow therapeutic trend (if any) and because consecutive sessions immediately prior to intervention show stability of data or a contra-therapeutic trend, the case is built that, while students eventually may have learned the tasks through trial and error, the instructional package resulted in more rapid acquisition of tasks than the absence of treatment. In addition, the trainer found 0 s delay sessions difficult to implement in that there was no way to fast forward the tape precisely to the next step in the chain. In particular, zero delay sessions were difficult for the task of zipping a jacket since, once the student started to pull the zipper, there was little time to fast forward the tape and show the next step of the chain before the student completed the subsequent step (i.e., stop pulling zipper at desired level). It is noted that other technologies (e.g., CD-ROM) could eliminate the need for the instructor to fast forward the videotape; however, at the time this study was conducted, the technology to burn CDs was not readily available to the trainer. Even today, many rural school districts may have limited access to various technologies; yet, most instructors have the minimal skills and the necessary equipment readily available to make and play videotapes.

Another issue in interpretation of the data involves the limited evidence regarding generalization (one of the original research questions). Due to the lack of baseline generalization data and the limited number of post-intervention generalization sessions, it only can be suggested that the instructional package results in generalization across either persons or materials. Future trainers should research this issue.

An additional issue to be considered in analyzing this study involves the interplay of the instructional components. Because the instructional package combined the CTD procedure with video modeling and video prompting, it is impossible to draw conclusions as to the effectiveness of individual components. Future investigations are needed to determine if video instruction alone results in acquisition or generalization

of self-help skills, especially by young children with mental disabilities. In addition, teaching students to operate the video player and imitate the videotape could be more time efficient for the instructor.

Yet another consideration is the decision to conduct instruction in an intra-sequential small group format rather than through a 1:1 format. Because of the group criterion, students could not move at their own pace. However, this component of the instructional package may have been beneficial in providing opportunities for over learning, as well as opportunities for observational learning as students watched each other perform the tasks. Since the research literature (e.g., Griffen, Wolery, & Schuster, 1992) has shown that students may learn chained tasks through watching each other, the issue is raised that the students in this study may have learned the tasks without the video components. However, it should be noted that the video component was filmed with a subjective viewpoint to allow students to view the task from their own perspective rather than from the perspective of watching another. While video- and computer-based instruction often occurs in a 1:1 format, this investigation was conducted in a group setting to facilitate observational learning by allowing students to see each other perform the target tasks and to facilitate over learning by allowing them to see repeated models from the videotape. In the future, others may wish to investigate the effectiveness of video instruction in teaching self-help skills in a 1:1 format or compare 1:1 video instruction to small group video instruction.

Since the results of this investigation are promising, future research should include replicating this study in teaching a variety of skills across domains (e.g., domestic skills, vocational skills, leisure activities). Replication involving training across settings (i.e., using video prompting procedures to train vocational skills in the classroom in combination with in vivo instruction on the job site or the reverse) also would be beneficial. Replicating this study to include a pre-test and post-test on acquisition of non-targeted information (e.g., the words printed across the television screen) also would add to the numerous studies that have shown that students can acquire non-targeted information when presented in other formats (e.g., Schuster et al., 1998). Comparison studies could demonstrate which instructional procedures (e.g., CTD, system of least prompts, simultaneous prompting) are most efficient when used in combination with video modeling and prompting. Also, separate elements of the instructional package could be isolated and compared (e.g., videotape instruction without CTD). In addition, instruction using videotape in a small group format could be compared to instruction using videotape in a 1:1 format. Finally, videotape could be replaced by other technologies, such as prompting from a CD-ROM or computer program.

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Teachers can create systems for helping students organize their notebooks while also making space for them to take a body break if they feel overwhelmed. Donâ€™t reinvent the wheel. â€œRead through the IEP or any accommodations/modifications ahead of time,â€ suggests Rocheleau.Â Teachers can avoid many of the behavioral problems potentially faced when teaching a student with disabilities by using structure, positive reinforcement, and clear expectations. How do these concepts work and how can they be implemented successfully? Structure can refer to a regular schedule of activities or a lack of staff turnover. How can we teach life skills to students with mental retardation? A primary purpose of special education is to help students with disabilities lead successful and personally fulfilling lives now and in the future. Curriculum for students with mental retardation should be designed to prepare students to function as independently as possible in an integrated society.Â (From A Functional Curriculum for Teaching Students with Disabilities. Bender, Valletutti, and Baglin, PRO-ED Publisher.) Following are links to related Internet resources and Internet discussion groups, as well as selected citations from the ERIC database and the search terms we used to find the citations. Teaching Students with Disabilities. There is a newer version of this teaching guide. Visit Creating Accessible Learning Environments for the most recent guide on the topic.Â Similarly students with physical disabilities face damaging and incorrect stereotypes, such as that those who use a wheelchair must also have a mental disability. (Scorgie, K., Kildal, L., & Wilgosh, L., 2010) Additionally, those students with â€œhidden disabilitiesâ€ like epilepsy or chronic pain frequently describe awkward situations in which others minimize their disability with phrases like â€œWell, you look fine.â€