Effects of Computer-Based Video Instruction on the Acquisition and Generalization of Grocery Purchasing Skills for Students with Intellectual Disability

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Abstract: The purpose of this study was to evaluate the effects of computer-based video instruction (CBVI) on teaching grocery purchasing skills to students with moderate intellectual disability (ID). Four high school students with mild to moderate ID participated in the study. A multiple-probe design across students was used to examine the effects. Results indicated that using CBVI independently was an effective method for facilitating the acquisition and generalization of grocery purchasing skills by students with ID. The four students in the study acquired and generalized these skills to actual grocery stores. Limitations and suggestions for future research are discussed.

One of the most important skills for students with intellectual disability (ID) is grocery purchasing skills. Morse, Schuster, and Sandknop (1996) stressed the importance of teaching these skills because they are required for the daily lives of the majority of people (Ford et al., 1989) and are directly associated with individuals’ health and nutrition. In addition, these skills provide people with disabilities opportunities to practice other needed life skills (e.g., social skills and money management skills). However, it is unquestionably difficult for special educators to teach these skills to students with ID. There are some reasons for this. First, purchasing groceries requires multiple skills. For instance, individuals need to possess reading skills in order to interpret shopping lists and aisle signage; math skills for calculating purchase totals or change due; and communication skills for greeting others and asking questions. Also, students with ID generally have deficits in cognitive abilities such as memory and short attention span. Limits to such abilities directly impact the acquisition of grocery purchasing skills.

For these reasons, researchers have introduced a variety of systematic interventions and assessed their impact on students with ID grocery purchasing skills. Goo (2013) categorized the interventions in the literature into six types: (1) community-based instruction (Bates, Cuvo, Miner, & Korabek, 2001); (2) classroom simulations (Mores & Schuster, 2000); (3) video technology (Alberto, Cihak, & Gama, 2005); (4) concurrent instruction (Cihak, Alberto, Taber-Doughty, & Gama, 2006); (5) computer technology (Langone, Shade, Clees, & Day, 1999); and (6) computer-based video instruction (Mechling, Gast, & Langone, 2002).

With recent advances in technology, one of the most promising interventions that researchers recommend is computer-based video instruction (CBVI). Computer-based video instruction refers to a method for teaching skills using computers that provide multimedia materials, such as videos, photographs, and auditory components, that simulate real-life environments. Some advantages of using CBVI are that it allows students to experience real-life environments that simulate actual en-
environments and that it offers various examples and instant feedback (Hutcherson, Langone, Ayres, & Clees, 2004). Video segments embedded in CBVI programs also offer opportunities for students to practice skills via mimicking (Mechling, 2005).

The first study investigating the effects of CBVI on teaching grocery purchasing skills to students with ID was conducted by Wissick and colleagues (1992). Three high school students diagnosed as having mild to moderate ID participated in the study. A multiple baseline design across subjects was used to examine the effects of a video-disc simulation program that taught students how to locate and purchase grocery items. The results demonstrated that video-disc simulation was an effective method for instructing the students in these skills. All students’ performance improved following the intervention.

Mechling and colleagues (2002) conducted the next study evaluating the effects of CBVI. In this study, a CBVI program was used to teach four students with moderate ID how to match grocery item words with category words in aisle signs, and then how to locate target grocery items. A multiple probe design across three sets of word pairs associated with grocery shopping and replicated across the students was used. Entering target aisles and locating target grocery items were used as the dependent variables. Results indicated that CBVI was effective in teaching the skills to this population. All students’ performance on entering the target aisles and locating the target grocery items improved in both CBVI and generalization conditions.

Ayres and Langone (2002) evaluated the effects of using only CBVI to teach grocery purchasing skills by employing a multiple probe design across students. A CBVI program called Dollar Plus was used with a constant time delay (CTD) strategy to instruct three elementary school students with ID. The program presented five sets of dollar amounts that allowed the students to practice paying for groceries using video footage. Paying correctly was used as the dependent variable. Study findings indicated that using CBVI programs independently of other interventions improved student performance in the area of grocery purchasing skills; however, using it alone was insufficient for decisively teaching such skills. None of the students in the study reached mastery level, and the acquired skills were not generalized to actual grocery stores.

Mechling and Gast (2003) conducted a study similar to that of Mechling et al. (2002) that investigated the effects of CBVI on teaching students with ID the location of grocery items. The study used a CBVI program and a CTD strategy to teach the relevant skills, and a multiple probe design across grocery and aisle sign word pairs was used across the students. The findings demonstrated that CBVI promoted the acquisition and generalization of the location of target grocery items by students with ID. All students’ performance improved after the CBVI training. Mechling (2004) also conducted a study that examined whether using CBVI increased the shopping fluency of students with ID. Three students with moderate ID participated, and a multiple probe design across students was used. The study employed a CBVI program and a CTD strategy, and total amount of time to complete locating three grocery items was used as the dependent variable. The results indicated that using CBVI alone was an effective medium to improve shopping fluency, as the amount of time each student took to shop for items decreased.

Ayres, Langone, Boon, and Norman (2006) evaluated the effects of CBVI by teaching the Dollar Plus strategy to four secondary school students with ID using Project Shop software, which was designed to teach this strategy. A multiple probe design across students was used. The CBVI program provided the students with training on how to pay the appropriate dollar amount for groceries. Choosing the correct dollar amount in the program and paying the correct dollar amount at a grocery store were used as the dependent variables. Results of the study demonstrated that using CBVI was an effective tool for teaching this strategy to students with ID. Three of the students acquired the strategy, which was then generalized to the grocery store.

The most recent study of the effects of CBVI was conducted by Hansen and Morgan (2008). In this study, which employed a multiple baseline design across students, three secondary school students with ID were taught grocery purchasing skills using CBVI. The Project Shop software package used by Ayres...
et al. (2006) was also used in this study. Five steps required for shopping for grocery items were used as the dependent variables. The findings indicated that using CBVI was an effective medium for teaching these skills to students with ID. The students' performance considerably improved following the intervention, and all students responded 100% correctly in the generalization condition.

As previously mentioned, research has shown that CBVI is effective in the area of teaching grocery purchasing skills to students with ID. However, in many of the previous studies CBVI was incorporated with other instructional strategies (e.g., prompting systems), rather than being evaluated without the use of other strategies. Therefore, this study sought to determine whether using CBVI alone is an effective method for helping students with moderate ID to acquire these skills, as well as whether the skills acquired through CBVI generalize to actual grocery stores.

Method

Participants

The primary researcher first interviewed a resource room teacher working in a large urban district in South Korea to identify participants. The teacher nominated four high school students diagnosed as having moderate ID. All students were served in a resource room to learn functional academic skills, functional life skills, and job skills. Even though all students had previous experience with learning grocery purchasing skills, they were still struggling with implementing these skills. None of the students had any physical problems that affected their movements.

During the identification process, students’ IEP goals were reviewed to ensure that the purpose of the study was relevant and would assist in meeting these goals. The primary researcher then examined four entry skills required to participate in the study. Those skills included: (a) the present performance level of grocery purchasing skills at an actual grocery store, (b) reading sight words related to grocery purchasing, (c) matching sight words and actual items/pictures, and (d) using a computer mouse (e.g., clicking). Based on the examination of the entry skills, all students participated in the study. Table 1 presents the students’ demographic, academic, and social characteristics.

Instructional Arrangement

Two different settings were used in this study. The first was the students’ special education classroom, which measured approximately 35 ft by 25 ft. The primary researcher’s laptop was placed on a desk in the back of the classroom. The second setting was two national chain grocery stores. One was used as a training grocery store; it was located approximately 20 minutes away from the students’ school. This store was chosen because the students often shopped there for grocery items with their families. The training grocery store was videotaped to create videos embedded in a CBVI program for the study and was also used to collect the students’ performance data in the pre- and post-test conditions. The other was a novel grocery store located approximately 30 minutes away from the school that was used to examine whether the skills acquired through CBVI would be generalized to a novel grocery store. This store was used to collect the students’ performance data in the generalization condition. No information about this store was provided during the intervention condition.

Materials

Equipment. An HP Pavilion g series laptop was used to deliver the CBVI intervention and to collect data through a computer-based assessment (CBA) program during the baseline and intervention conditions. A CANON EOS 5D Mark III digital camera was used to create videos and photographs embedded in the CBVI program. SONY Vegas pro 11.0 software and Adobe Photoshop CS5 were used to edit the videos and photographs. Adobe Flash Professional CS5 software was used to create the CBVI and CBA programs.

Photographs. Three target grocery items and one distracting grocery item were photographed. In addition, three target aisle signs and one distracting aisle sign were photographed. These photographs were edited and
embedded in the CBVI and CBA programs as potential answers to questions.

Target grocery items. Based on the curriculum of the resource room, the special education teacher identified three specific grocery items (e.g., "Richam" - a brand of canned meat) for the study. Each item was chosen from different aisles.

Checklist for data collection. A checklist for grocery purchasing skills was used for data collection during the pre- and post-test and generalization conditions. The checklist included participant name, data, location, observer, session, score, start time, end time, duration, the steps of grocery purchasing skills, allotted time, and check boxes.

Video clips. Seventeen short videos teaching each step of grocery purchasing skills were created and embedded in the CBVI program. The primary researcher first wrote scripts for each video and then hired an actor to create the videos. While filming, the actor pretended to be a shopper at the training grocery store and acted out key behaviors and information related to each step. If needed, a close-up technique was used to provide students with details of the key behaviors in the videos. Each video was approximately 10-20 seconds long.

Computer-based video instruction program. The primary researcher developed the CBVI program to teach grocery purchasing skills. The program consisted of a title screen (the first screen), virtual shopping screen (the second screen), and short instructional video and question screens for 17 steps of grocery purchasing skills. Except for the first two screens, screens for each step included one video and one question screen. First, a screen presenting a video for a step would appear; it was followed by a screen presenting a question related to the video. This pattern continued until the last step. In addition, the CBVI pro-

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**TABLE 1**

<table>
<thead>
<tr>
<th>Student</th>
<th>Age</th>
<th>Disability</th>
<th>IQ</th>
<th>Strengths and Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mike</td>
<td>17 yrs 2 m</td>
<td>ID</td>
<td>KISE-KIT®. 44</td>
<td>Academically, he could read sight words associated with grocery purchasing and solve simple addition and subtraction problems. Socially he was very friendly and liked to work with classmates.</td>
</tr>
<tr>
<td>John</td>
<td>18 yrs</td>
<td>ID</td>
<td>KWISC III. 55</td>
<td>Academically, he could read sight words associated with grocery purchasing skills and calculate simple addition and subtraction problems containing regrouping. He displayed mild articulation problems, which might cause communication problems. Socially, he often wanted to be alone and tried not to make eye contact.</td>
</tr>
<tr>
<td>Don</td>
<td>18 yrs</td>
<td>ID</td>
<td>KWISC III. 47</td>
<td>Academically, he could read basic sight words and write simple spelling words and could also calculate two-digit math problems. He was familiar with using a computer. Socially, he was likely to be nervous about unfamiliar situations.</td>
</tr>
<tr>
<td>Jason</td>
<td>18 yrs</td>
<td>ID</td>
<td>KWISC III. 55</td>
<td>Academically, he was able to read simple sentences and solve simple two-digit addition and subtraction problems. He had some behavioral problems such as easily getting upset and repeating phrases. Socially, he had problems with initiating conversations with other people.</td>
</tr>
</tbody>
</table>

Note. KISE-KIT = Korea Institute for Special Education-Korea Intelligence Test for Children; KWISC III = Korea-Wechsler Intelligence Scale for Children III.
gram provided students with visual/auditory feedback and prompts to guide them through the steps.

Computer-based assessment program. The primary researcher also developed a CBA program to collect data during the baseline and intervention conditions. This program was similar to the CBVI program. While it did not present any videos or visual/auditory feedback and prompts, it did present the same questions as the CBVI program.

Experimental Design

A multi-probe design across students (Kazdin, 1982) was employed in this study. First, a pre-test condition took place to measure the students’ present performance level at the training grocery store. Baseline and intervention conditions then took place sequentially. During the baseline condition, the CBA was used to collect data on the students’ present knowledge about performing grocery purchasing skills. During the intervention condition, first the CBVI program was used to teach grocery purchasing skills, and then the CBA program collected data on the students’ progress. Following the intervention condition, a post-test condition took place to measure students’ progress at the training grocery store, and then a generalization condition took place to determine if the skills acquired through the CBVI program were generalized to a novel grocery store.

Dependent Variables

Steps to perform grocery purchasing skills were used as the dependent variables. The steps were adopted and modified from Mechling and colleague’s (2002) study. Seven steps necessary for purchasing one grocery item were used to collect data in the current study. The steps were as follows: (1) getting a shopping cart, (2) entering an aisle, (3) obtaining a target item, (4) placing the target item in the shopping cart, (5) crossing out the target item obtained on the shopping list, (6) returning to the entrance of the aisle, and (7) reaching a checkout stand. Steps 2 through 5 were then repeated in order to locate a total of three grocery items. Therefore, a total of 17 steps were used as the dependent variables across all settings (e.g., grocery store and classroom settings). However, although the same steps were used across settings, the definitions of these steps differed based on the conditions. For example, during the baseline and intervention conditions (classroom settings), the definition of Step 1 was “Obtaining a shopping cart.” On the other hand, during the pre- and post-test and generalization conditions, the definition of Step 1 was, “Completion of getting a shopping cart and starting to push the cart toward the aisles within 20s after the researcher’s direction to start shopping.” See Table 2 for dependent variable steps.

Procedure

Pre- and post-test conditions. The primary researcher took the students to the training grocery store, which was later used as the model store in the CBVI program. The primary researcher brought one of the students to the entrance of the grocery store while an assistant took care of the rest of the students at a rest area outside the store. The primary researcher gave the student a clipboard holding a shopping list and the direction to “begin shopping,” and then followed the student with an inter-observer to collect data. If the student did not complete a step, the primary researcher completed the step and guided the student to the next step by giving the direction, “What is the next step?”

Baseline condition. The baseline condition occurred after the pre-test condition. This procedure was individually conducted with each student. After a student began the procedure, it continued until the student’s data became stable. Three or four sessions were given to each student per week; each session was approximately 5 minutes long. During the baseline condition, the CBA program was used to measure the students’ knowledge of grocery purchasing skills (i.e., the steps necessary to perform grocery purchasing). The primary researcher ran the CBA program and pulled up the first screen (title screen) before the student arrived. After the student entered the classroom, the researcher had the student sit in front of the laptop and then sat by the student and gave the direction, “If you are ready to start this computer program, click on the ‘Start’ button in the middle of the screen.”
In each session, the student was asked 17 multiple-choice questions through the CBA program that were related to each step of purchasing three grocery items. A virtual shopping list with a voice recording (i.e., “This is the shopping list for today.”) was provided in the second screen, and the student clicked on an arrow button on the screen to move forward to the next screen, which presented the first question. While the questions were asked, a virtual shopping list presenting the three grocery items was visible in the top right corner of each screen. This allowed students to view the shopping list throughout the session. The grocery items and the sequence of these items on the virtual shopping list were exactly the same as on the shopping list used during the pre- and post-test and generalization conditions.

Each question corresponded to each step of the grocery purchasing skills and dealt with the correct behavior required to complete

<table>
<thead>
<tr>
<th>Step</th>
<th>Dependent Variable</th>
<th>Definition of Correct Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Obtaining a shopping cart</td>
<td>Completion of getting a shopping cart and starting to push the cart toward the aisles within 20s after the researcher’s direction to start shopping</td>
</tr>
<tr>
<td>2</td>
<td>Entering the first correct aisle</td>
<td>Completion of passing under the correct overhead aisle sign with the shopping cart within 120s after the completion of Step 1</td>
</tr>
<tr>
<td>3</td>
<td>Obtaining the first grocery item on the shopping list</td>
<td>Completion of holding and lifting the target item within 40s after the completion of Step 2</td>
</tr>
<tr>
<td>4</td>
<td>Putting the obtained grocery item in the shopping cart</td>
<td>Completion of putting down the obtained item in the shopping cart within 15s after the completion of Step 3</td>
</tr>
<tr>
<td>5</td>
<td>Crossing out the obtained grocery item on the shopping list</td>
<td>Completion of crossing out the obtained item on the shopping list with a pencil within 15s after the completion of Step 4</td>
</tr>
<tr>
<td>6</td>
<td>Returning to the entrance of the aisle</td>
<td>Completion of placing the cart at the end of the aisle (either side) within 20s after the completion of Step 5</td>
</tr>
<tr>
<td>7</td>
<td>Entering the second correct aisle</td>
<td>Completion of passing under the correct overhead aisle sign with the shopping cart within 40s after the completion of Step 6</td>
</tr>
<tr>
<td>8</td>
<td>Obtaining the second grocery item on the shopping list</td>
<td>Completion of holding and lifting the target item within 40s after the completion of Step 7</td>
</tr>
<tr>
<td>9</td>
<td>Putting the obtained grocery item in the shopping cart</td>
<td>Completion of putting down the obtained item in the shopping cart within 15s after the completion of Step 8</td>
</tr>
<tr>
<td>10</td>
<td>Crossing out the obtained grocery item on the shopping list</td>
<td>Completion of crossing out the obtained item on the shopping list with a pencil within 15s after the completion of Step 9</td>
</tr>
<tr>
<td>11</td>
<td>Returning to the entrance of the aisle</td>
<td>Completion of placing the cart at the end of the aisle (either side) within 20s after the completion of Step 10</td>
</tr>
<tr>
<td>12</td>
<td>Entering the third correct aisle</td>
<td>Completion of passing under the correct overhead aisle sign with the shopping cart within 40s after the completion of Step 11</td>
</tr>
<tr>
<td>13</td>
<td>Obtaining the third grocery item on the shopping list</td>
<td>Completion of holding and lifting the target item within 40s after the completion of Step 12</td>
</tr>
<tr>
<td>14</td>
<td>Putting the obtained grocery item in the shopping cart</td>
<td>Completion of putting down the obtained item in the shopping cart within 15s after the completion of Step 13</td>
</tr>
<tr>
<td>15</td>
<td>Crossing out the obtained grocery item on the shopping list</td>
<td>Completion of crossing out the obtained item on the shopping list with a pencil within 15s after the completion of Step 14</td>
</tr>
<tr>
<td>16</td>
<td>Returning to the entrance of the aisle</td>
<td>Completion of placing the cart at the end of the aisle (either side) within 20s after the completion of Step 15</td>
</tr>
<tr>
<td>17</td>
<td>Reaching a checkout counter</td>
<td>Completion of placing the cart in a line or in front of a cashier within 80s after the completion of Step 16</td>
</tr>
</tbody>
</table>
that step (e.g., “Using the aisle signs, what aisle would you go to in order to get the first item on your shopping list?”). Each question included one correct and three incorrect answers. These answers appeared as either text or photographs based on the steps. For instance, the answers to Step 2 were written (e.g., “b. Get a shopping cart.”), while the answers to Step 3 were photographs of grocery items. As each question was presented on the screen, a voice recording read the question aloud. However, the possible answers to the question were not provided until the voice recording had finished so that the students would have the same amount of time (i.e., 10s) to answer each question regardless of the length of the recording. The CBA program advanced to the next question after 10 seconds irrespective of whether or not a student responded to the question. During the CBA sessions, no prompts were given to students except for neutral praise (e.g., “good job”) after completing the program.

Correct and incorrect responses were scored as one point and zero points, respectively. Thus, the total possible points for each session was 17. The final score of each session was automatically scored and presented as a percentage on the final screen of the CBA program, and the percentage was recorded on the score sheet. After the first student showed stable data points (i.e., three consecutive data points in a row), the student moved on to the intervention condition. The same procedures were then applied to the remaining students. While each student was involved in the intervention, the CBA was intermittently given to the rest of the students in order to collect baseline data. These intermittent measures were conducted 1-2 times per week.

**CBVI condition.** During the CBVI condition, the primary researcher delivered the CBVI intervention to each student. It was approximately 15 minutes long and was given to the students 1-2 times a day based on their classroom schedules. Each CBVI session consisted of two parts: (a) teaching grocery purchasing skills (i.e., CBVI), and (b) measuring students’ progress (i.e., CBA). The primary researcher had students sit in front of the laptop and then gave the same direction used in the baseline condition for the student to begin the CBVI program. The CBVI program presented 17 short instructional videos depicting each step of grocery purchasing skills. After each video, the same question used in the CBA was asked to ensure student’s acquisition of each step. Unlike the CBA, however, the CBVI program presented the questions and possible answers simultaneously.

The CBVI program also provided auditory prompts based on the students’ choices. For instance, if a student chose the correct answer to a question, auditory and visual praise (i.e., “Good job.”) was given through the program. Similarly, if a student chose an incorrect answer, auditory and visual prompts (i.e., “Try again.”) were given. In addition, if a student did not begin to choose an answer within the allotted time (i.e., 10s), the program automatically provided an auditory prompt (i.e., “What is the correct answer?”), and if the student still did not choose an option within the new allotted time (10s), the primary researcher gave a verbal and gestural prompt to choose the correct answer (i.e., “The correct answer is ______,” pointing out the correct response) and then had the student advance to the next screen by clicking the arrow button (i.e., “Can you click the arrow button?”).

The program automatically scored the students’ responses and presented the final scores on the final screen. However, these scores were not considered dependent measures. After the CBVI intervention, the CBA program was used to measure student progress. The same procedures used in the baseline condition were used for these measures. Task completion criterion was 82.4% (i.e., 14 points) or above for three consecutive sessions. Once the first student met the criterion, the CBVI intervention was stopped for that student. The next student then began the baseline condition. The same procedures were implemented for the rest of the students in turn.

**Generalization condition.** Following the post-test condition, the primary researcher took the students to a novel grocery store that was not presented in the CBVI program. The same procedures adopted in the pre- and post-test conditions were used to collect data in the generalization condition.
Inter-Observer Reliability

The special education teacher and a graduate student collected data for inter-observer reliability at the grocery stores. During the baseline and intervention conditions, data were not collected because this function was automatically performed by the programs. Before the data collection started, the primary researcher trained the graduate student and special education teacher. This data collection occurred across all sessions of grocery store settings. A point-by-point agreement method (Kennedy, 2005) was used to calculate inter-observer agreement. Results of inter-observer reliability were as follows: inter-observer agreement of the pre-test condition was 100%, inter-observer agreement of the post-test condition was 97.8%, and inter-observer agreement of the generalization condition was 100%. Overall, the mean of inter-observer agreement across the conditions was 98.9%.

Procedural Fidelity

Data for determining procedural fidelity were collected. Before the CBVI intervention began, the special education teacher and graduate student were trained to observe the implementation of the CBVI intervention. Data were collected in 50% of the sessions of the CBVI intervention condition across the students. The total number of correct steps of the implementation was divided by the total number of steps so as to calculate the procedural fidelity, and then the results were multiplied by 100. The mean of procedural fidelity across all students was 100%.

Results

Figure 1 provides a visual representation of the students’ performances across all conditions. During the pre-test condition, Mike correctly performed 11.8% of the steps of grocery purchasing skills at the training grocery store. During the baseline condition, the mean of his correct responses was 49.0% (range 47.1%–52.9%). After his data points became stable, the CBVI intervention began. His correct response mean was 94.1% (range 88.2%–100%) during this condition. Mike showed immediate improvement in his performance and met the task completion criterion in the third session. During the post-test condition, his mean performance was 79.4% at the training grocery store (range 70.6%–88.2%). As compared to the pre-test condition, his performance improved by 67.6%. During the generalization condition, he performed 52.9% of the steps correctly at the novel grocery store.

John performed 17.6% of the steps correctly at the training grocery store during the pre-test condition. During the baseline condition, his correct response mean was 42.6% (range 35.3%–52.9%). During the intervention condition, his correct response mean was 100.0% (range 100%). His performance improved in the first session and he met the task completion criterion in the third session. During the post-test condition, like Mike, John’s performance also improved at the training grocery store. His mean performance was 94.1% (range 94.1%). As compared to the pre-test condition his performance improved by 76.5%. During the generalization condition, he performed 58.8% of the steps correctly at the novel grocery store.

Don performed 0% of the steps correctly at the training grocery store during the pre-test condition. During the baseline condition, his correct response mean was 25.9% (range 17.6%–29.4%). Following the baseline condition he received the CBVI intervention. His improvement was not as quick as the first two students but it did gradually improved and he met the task completion criterion in six sessions (range 17.6%–100%). The correct response mean was 73.5% (range 17.6%–100.0%). During the post-test condition, Don’s mean performance was 76.5% (range 70.6%–82.4%). As compared to the pre-test condition, his performance improved by 76.5%. During the generalization condition, he performed 70.6% of the steps correctly at the novel grocery store.

Jason performed 0% of the steps correctly at the training grocery store during the pre-test condition. During the baseline condition, his correct response mean was 17.6% (range 17.6%). After the intervention began, his performance rapidly improved and he met the task completion criterion in the fourth session. The mean of his correct responses was 86.8% (range 64.7%–100%). During the post-
test condition, his mean performance was 55.9% (range 52.9%–58.8%). As compared to the pre-test condition, he improved by 55.9%. During the generalization condition, he conducted 64.7% of the steps correctly at the novel grocery store.

Discussion

This study examined whether CBVI is an effective method for helping students with moderate ID to acquire and generalize grocery purchasing skills. These findings are congruent with the current literature that overall CBVI alone is effective in teaching such skills to this population (Mechling et al., 2002). All students acquired the target skills through the CBVI program, and the skills acquired were generalized to the training and novel grocery stores. With respect to the acquisition of grocery purchasing skills, the students’ present knowledge of the skills (e.g., required steps)

Figure 1. Percentage of Correct Responses in Student Performance on the Acquisition of Grocery Purchasing Skills in the Classroom and Generalization of the Skills to Actual Grocery Stores.
was measured during the baseline condition, and the mean performance level was 32.1%. Following the CBVI intervention, student performance levels significantly improved and reached the criterion relatively quickly. In the final session, all students’ performance reached 100% of correct responses. Regarding generalization to actual grocery stores, the students’ initial mean performance at the training grocery store during the pre-test condition was 7.4%, but after the intervention that mean improved to 72.8% during the post-test condition. Furthermore, the mean of the students’ performance was 61.8% at the novel grocery store. Even though this performance was not as high as the level of the post-test condition, with the consideration that the store was not presented during the intervention, this was quite a strong finding.

The findings of this study also support the use of multimedia to help students with ID acquire and generalize grocery purchasing skills (Langone et al., 1999; Mechling, 2004). It is not possible to pinpoint which multimedia component (e.g., video clips, photographs, or audio prompts) led to the improvement in the students’ performance; however, it is evident that the combination of these components resulted in improvement. The CBVI program provided photographs, video, and audio recordings, presenting high-quality representations of real world situations. The combination of these multimedia components may have increased the possibility of acquiring the skills and the generalization to the actual grocery stores (Langone et al., 1999).

Additionally, study results may indicate that providing multiple examples facilitate the acquisition and generalization of grocery purchasing skills for students with ID (Mechling et al., 2002). The CBVI program presented multiple examples and non-examples (e.g., correct grocery items and incorrect grocery items) to the students. It allowed the students to be repeatedly exposed to the examples and non-examples. Providing these multiple examples might have enhanced students’ ability to acquire and maintain their skills.

Finally, the results of this study also add to the present literature by suggesting that using CBVI programs that contain interactive components may facilitate the acquisition and generalization of grocery purchasing skills (Mechling et al., 2002; Wissick et al., 1992). During the intervention, students were required to click answers using a computer mouse. Furthermore, feedback or prompts were provided based on their responses (e.g., “Good job.”; “What is the correct answer?”). Including such interactive components in CBVI programs might result in better learning outcomes.

**Limitations**

There were three limitations of this study. First, the results of the study support the contention that CBVI is an effective medium for teaching grocery purchasing skills; however, the acquired skills were limited to purchasing three grocery items that had been modeled through the CBVI program. How well the program would work if more items were purchased and/or if the item list varied each time students went to the grocery store remains to be answered. Second, the students performed the skills like normal shoppers during the actual grocery conditions. This resulted in some real life distractions affecting the students’ performance. For instance, other shoppers blocked their access to target items while the students were locating groceries. In addition, the location of one target item was changed during the study (i.e., moved to a different aisle), and this led to a student’s incorrect responses. Although a limitation, these types of events occur often during trips to grocery stores and so they likely should be incorporated into grocery store CBVI programs in the future. Third, a limited number of measurements were taken during the actual grocery conditions to examine the generalization of the acquired skills. Two sessions during the post-test condition took place to examine the generalization of the acquired skills to the training grocery store, which was videotaped for the CBVI program, and one session took place to examine the generalization of the acquired skills to the novel grocery store, which was not videotaped for the CBVI program. Future studies should collected more data in post-test and generalization conditions.
Suggestions for Future Research

First, researchers should study what constitutes the most effective combination of multimedia components in CBVI programs (e.g., video and photographs, video and text, or video only) for teaching life skills to students with ID. Simply providing various multimedia components may not always positively affect the acquisition and generalization of these skills, and may in fact prove distracting (e.g., providing too many components). Therefore, the best combinations of components for facilitating learning experiences should be examined closely. Second, researchers should investigate the effects of CBVI including tablet computers and their applications. Researchers and practitioners in special education assume that using tablets may be very effective; however, currently only a few studies examine their impact on teaching life skills to students with ID.

Conclusions

This study demonstrated that overall CBVI alone is an effective instructional method through which to teach grocery purchasing skills to students with moderate ID. The multimedia components (e.g., videos and pictures) of CBVI motivate students to actively engage in learning and results in the acquisition and generalization of grocery purchasing skills. Essential components of effective CBVI programs likely include providing multiple examples (e.g., examples and non-examples) and infusing interactive components (e.g., clicking and immediate feedback on students’ responses).

References


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