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COMPARISON OF PROMPTING PROCEDURES TO TEACH INTERNET SKILLS TO OLDER ADULTS

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The Internet and information and communications technologies (ICTs) have been found to produce meaningful social interactions and greater social support among older adults (White et al., 2002). Despite these benefits, the Internet and ICTs are not widely used among the older-adult population (Cresci, Yarandi, & Morrell, 2010). The purpose of the current study was to compare the effectiveness and efficiency of video prompting and text-based instructions on the acquisition of three tablet-based tasks: emailing, video calling (FaceTime® application), and searching for a YouTube™ video. Both video prompting and text-based instructions were effective for all three participants, with text-based instructions being slightly more efficient for one participant and video prompting being more efficient for two participants, suggesting that both prompting procedures can be used to teach older adults Internet and ICT skills.

Key words: information and communication technologies, older adults, video prompting, text-based instructions

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The Internet and information and communications technologies (ICTs) have significantly advanced over time and are pervasive in most areas of life (Struve & Wandke, 2009; Wagner, Hassanein, & Head, 2010). ICTs include any computer-based device or application used for communication and information purposes, such as Internet-connected computers or tablets (e.g., iPads®), mobile communication devices (e.g., smartphones), and social media applications (e.g., email, video calling or conferencing, Facebook™; Berkowsky, Cotton, Yost, & Winstead, 2013; Woodward et al., 2011).

These technological advances may not benefit all people and, in fact, a "grey" digital divide currently exists between older and younger adults (Cresci et al., 2010; Millward, 2003; Morrell, Mayhorn, & Bennett, 2000; Morris, Goodman, & Brading, 2007). Older adults (i.e., individuals 65 years and older) are less likely to use the Internet and ICTs than younger individuals. Several factors may influence older adults' use (or lack thereof) of the Internet and ICTs, including: misconceptions about the Internet and ICTs being too difficult (Berkowsky et al., 2013; Morris et al., 2007), safety and privacy concerns (Cresci et al., 2010), health declines (Carpenter & Buday, 2007; Wagner et al., 2010), income and education constraints (Carpenter & Buday, 2007; Cresci et al. 2010; Morris et al., 2007; Woodward et al., 2011), and continuous technological advancements that may make it difficult for older adults to keep pace with these technologies (Heaggans, 2012).

Despite these potential barriers, older adults who regularly use the Internet have reported experiencing enhanced and more meaningful social interactions and greater social support from others (White et al., 1999; Woodward et al., 2011). This appears to be one of the most important benefits of the Internet and ICTs for older adults—especially for those residing in nursing homes (Gato & Tak, 2008;

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Praderas & MacDonald, 1986). Therefore, it seems prudent to evaluate the effectiveness of various instructional methods to teach older adults how to use these applications to maximize their benefits.

One such instructional method is video prompting. Video prompting is a video-based procedure in which the learner watches a video segment depicting one step of a behavior chain before performing that step. This pattern continues until all steps of the behavior chain have been completed (Burke et al., 2013). As such, video prompting may be a viable instructional method for older adult learners because they often experience cognitive declines in the form of memory loss and attention difficulties (Charness & Holley, 2004; Wagner et al., 2010).

Although video prompting has not been evaluated as an instructional method to teach older adult learners to use the Internet and ICTs, it has been successfully used to teach (a) Internet and ICT skills to individuals with developmental disabilities (e.g., Le Grice & Blampied, 1994; Zisimopoulos, Sigafoos, & Koutromanos, 2011) and (b) various daily living skills to older adult learners (Perilli et al., 2013). Perilli et al. (2013) compared the effectiveness of video prompting, verbal instructions, and pictorial cues to teach daily living skills to older adults with mild and moderate Alzheimer's disease. First, the researchers compared the effectiveness of video prompting and verbal instructions to teach four participants to perform table-setting and coffee preparation, and found that both instructional methods were similarly effective. Next, the researchers compared the effectiveness of video prompting and pictorial cues to teach four participants to prepare vegetables and to dress vegetables. The researchers found that both video prompting and pictorial cues were effective strategies. The results of both experiments showed that video prompting, verbal instructions, and pictorial cues were equally effective in teaching the target skills to all participants. In light of these findings, it may be important to consider other factors that may influence the selection and use of these prompting strategies, such as participant preference, efficiency, cost, and the amount of time and effort required by instructors to design and create the prompt itself.

Relative to video prompting, written instructions offer fewer technological demands, lower associated costs (Graff & Karsten, 2012; Sigafoos et al., 2005), and less effort on the part of the instructor (Perilli et al., 2013). Written instructions have been combined with other instructional components to teach a variety of skills to diverse populations. For example, written instructions have been combined with feedback to teach self-care skills to individuals with brain injuries (O'Reilly & Cuvo, 1989) and cleaning skills to individuals with developmental disabilities (Cuvo, Davis, O'Reilly, Mooney, & Crowley, 1992). Written instructions using limited technical jargon have been combined with diagrams and a data sheet to teach staff to conduct stimulus preference assessments (Graff & Karsten, 2012). More recently, Tyner and Fienup (2015) combined written instructions with pictures. The authors compared the effects of written instructions with pictures, video modeling, and no instructions on undergraduate students' graphing performance using a computer program. Results showed that video modeling produced more accurate performance, faster performance, and fewer errors on the graphing task relative to text-based instructions and no instructions. These findings suggest that video-based procedures may be more effective and efficient than text-based instructions when teaching computer-related skills to adult learners; however, more research comparing these instructional methods is needed before definitive conclusions can be made.

The Internet and ICTs have the potential to enhance the quality of life of older adults and improve their social interaction and communication with others. Therefore, the identification of an instructional method that is both effective and efficient seems important given the continuous developments and advancements in technology. The purpose of this study was to compare the effectiveness and efficiency of video prompting and text-based instructions on the acquisition of Internet and ICT-related skills for older-adult learners.

METHOD

Participants, Setting, and Materials

Three older adults with no known cognitive impairments and who resided in a local retirement residence, participated in this study. All participants had limited or no experience using an iPad®. Janice was a 75-year-old woman and was the only participant who owned an iPad® prior to the start of the study, which she used to play games (e.g., Scrabble) and to take pictures. The remaining two participants had never used an iPad® prior to the start of the study but did own a computer. Doris was a 91-year-old woman who owned a desktop computer, which she used to check emails on a weekly basis. Henry was a 93-year-old-man who owned a laptop computer, which he did not use, but turned on monthly to make sure it was still operating. All participants demonstrated the following prerequisite skills: (a) visually discriminate images on a 24.6-cm screen, (b) read size 18 Times New Roman font on standard letter-size paper (21.6 cm by 27.9 cm), (c) complete various movements associated with manipulating buttons on an iPad® (i.e., type letters on the onscreen keyboard, drag finger up, down, left, and right on the screen to scroll, tap the screen to open applications and to select options), and (d) hear a video played on an iPad® with an external speaker. An external speaker was used during all sessions and the volume was set by each participant prior to the start of each session. All sessions were conducted in a small room within the participants' retirement residence. The session room contained a table, at least two chairs, a video camera for interobserver agreement (IOA) and procedural integrity purposes, two identical iPad Air 2 devices, data sheets, writing utensils, speakers, and text-based instructions, when necessary.

Tablet-Based Tasks

Three tablet-based tasks were selected for this study, all of which focused on increasing communication or providing entertainment. These tasks included making an online video call (FaceTime®), sending an email, and searching for a YouTube™ video. Table 1 provides a list of task analysis (TA) steps for each tablet-based task. For the FaceTime® and email tasks, participants were required to video call and email the researcher, whose contact information was preprogrammed into the iPad's address book. For the YouTube™ task, the researcher helped participants to select a video of their choice prior to the start of the session. Prior to the start of the study, researchers consulted with experienced tablet users (i.e., individuals who used the three tablet-based tasks on an iPad® daily for at least 3 years) to develop and approve the TA for each tablet-based task. To ensure that task difficulty was equated across all tasks, a logical analysis of each TA was conducted to assess the (a) number of steps required to complete each TA, (b) mean time required to complete each TA, and (c) nature of the movements required to complete each TA. Between six and seven TA steps were required to complete each of the tablet-based tasks. The mean completion times were 27 s, 23 s, and 27 s for FaceTime®, email, and YouTubeTM tasks, respectively, suggesting that all tasks took nearly the same amount of time to complete. Further, each tablet-based task required the same type of movement for completion (i.e., the "finger tap"). Taken together, these results suggest that all three tablet-based tasks were relatively equal in difficulty.

Table 1
Task Analyses and Response Definitions for Tablet-Based Tasks

Making a video call (FaceTime®)	Sending an email	Searching for a YouTube™ video
1. Tap on the "FaceTime®" application	1. Tap on the "Mail" application	1. Tap on the "YouTube™" application
2. Tap the box at the top of the screen that says "Enter name, email, or number"	2. Tap the "compose mail" icon located in the top right corner of the screen	2. Tap the "search" icon located in the top right corner of the screen
3. Type in the name of the person you wish to video call. Type **"Jackie."**	3. In the "To:" box, type the name of the person you wish to email. Type **"Jackie."**	3. Type some words that describe the video that you want to watch into the search field (e.g., if you want to watch a video on how to change a tire, you can type, "how to change a tire")
4. Once **"Jackie"** appears, tap the video camera icon located to the right of the name, **"Jackie."**	4. Tap on the name **"Jackie"** once it appears	4. Tap on the blue "search" button located on the keyboard
5. Wait for the person to answer the call	5. Tap on the "Subject:" box (below the "To:" box) and type the word, **"Hi."**	5. Use your index finger to scroll up and down on the screen. Tap firmly on the video that you want to watch.
6. To hang up, tap anywhere on the screen and then press the red phone icon located at the bottom of the screen	6. Tap on the message box (below the subject box) and type, **"How are you?"**	6. Increase the size of the video by taping on the video and then tap on the small square icon located in the bottom right corner of the video screen
	7. Tap on the "Send" icon located on the top right corner of the screen	7. When you are finished watching, return to your search by tapping on the video screen and then tap on the small square icon located in the bottom right corner of the video screen.

The text-based instructions for each tablet-based task included written TAs with enlarged font (i.e., size 18 Times New Roman font) and corresponding pictures for each step of the TA. Picture prompts were included because they have been cited as a critical feature of instructional manuals or books that contain written instructions (Tyner & Fienup, 2015). An application called *VideoTote* (Burke et al., 2013) was used for the video-prompting condition. VideoTote was downloaded on an iPad Air 2®, a computer tablet device that weighed 0.44 kg and was equipped with a 24.6-cm picture display. The iPad® was also equipped with a protective case that also served as a horizontal stand for the iPad®. VideoTote recordings displayed an adult model demonstrating how to complete each TA step for each of the three tablet-based tasks. Each TA step served as a chapter such that a video of a seven-step TA, for example, consisted of seven chapters. All video recordings were filmed from the participant's point of view and only showed the iPad® and the hands of the model performing the task on the iPad®. Voice over instructions were also provided for each step and were identical to the text-based instructions.

Experimental Design

An adapted alternating treatments design (Sindelar, Rosenberg, & Wilson, 1985) within a multiple baseline across participants design was used to compare the effects of text-based instructions and video prompting on the acquisition of tablet-based tasks with three older adults. Two tablet-based tasks were taught simultaneously. One tablet-based task was assigned to each prompting procedure and a third task was assigned to the control condition. Tablet-based tasks were quasirandomly assigned to conditions such that no more than two tablet-based tasks were assigned to the same condition across participants. In addition, the order in which conditions were conducted was counterbalanced across participants. The experiment consisted of two phases: baseline and prompt comparison. A one-week follow-up assessment was also conducted.

Response Measurement, Interobserver Agreement, and Procedural Integrity

The primary dependent measure was the percentage of independent responses. An *independent response* was defined as the participant completing the correct TA step without assistance and within 10 s of (a) completing the previous TA step or (b) receiving a task direction from the researcher. Task directions were only provided during assessment sessions and did not specify *how* to complete the TA, but rather prompted participants to *initiate* or *continue* the chain. Task directions consisted of instructions from the researcher regarding a TA step that either (a) initiated the chain (e.g., "Send a FaceTime® video call to Jackie"), (b) was not required to complete the chain in sequence (e.g., "What would you do if you wanted to increase the size of the video?"), or (c) followed a contrived aspect of the chain (e.g., after the participant and the researcher had a brief conversation using the FaceTime® application, the researcher said, "Okay, now let's say that the conversation is over. What would you do next?"). An *error* was defined as the participant performing a TA step incorrectly or out of sequence, or failing to respond within 10 s of (a) completing the previous TA step or (b) receiving a task direction from the researcher.

Session duration data were collected as a measure of efficiency. Session duration was defined as the amount of time that elapsed between the researcher's task direction to initiate the chain and the completion of the final step of the chain. The amount of time spent engaging in the terminal internet activity (i.e., watching a YouTube™ video, composing an email, or conversing with the researcher during the video call) was excluded from the total session duration.

Interobserver agreement was assessed on an average of 45% of sessions during each condition in each phase for all participants (range, 33% to 100%). A second independent observer collected data on all dependent variables. These data were compared on a step-by-step basis. An agreement was defined as both observers recording the same response for each step of the task analysis. Trial-by-trial IOA was calculated by dividing the number of agreements by the total number of agreements plus disagreements and converting the ratio to a percentage. IOA was also calculated on the duration of sessions by dividing the shorter session duration by the longer session duration and converting the ratio to a percentage. Mean IOA across all participants was 98.2% (range, 63% to 100%).

Procedural integrity was assessed on an average of 45% of sessions during each condition in each phase for all participants (range, 33% to 100%). A second independent observer collected data on correct feedback for independent and prompted responses, errors, and requests for assistance. Correct feedback for independent and prompted responses consisted of the researcher providing a brief statement regarding the accurate performance of a step (e.g., "That's correct"). Correct feedback for errors and requests for assistance consisted of the researcher providing a brief statement such as, "I will help you with that one" and completing the target TA step outside of the participant's line of vision. We calculated procedural integrity by dividing the instances of correct researcher feedback by the total number of correct plus incorrect instances of researcher feedback and converting the ratio to a percentage. Mean procedural integrity across all measures for all participants was 99% (range, 86% to 100%).

Procedure

We conducted one to five sessions per experimental visit, with two to three visits per week. One tablet-based task was conducted per session and no more than two sessions with the same tablet-based task were conducted in an experimental visit. Participants received a 1- to 2-min break between sessions. Prior to each session, the researcher ensured that the iPad® was turned on, connected to the internet, and opened to the home screen for the participants.

Assessment sessions evaluated participants' level of performance on each tablet-based task. We conducted two to three assessment sessions per visit. During all assessment sessions, regardless of phase, participants were presented with the iPad® and asked to complete a tablet-based task independently. Independent completion of each step of the TA resulted in a brief statement regarding the accurate performance of that step (e.g., "That's correct"). Errors or requests for assistance resulted in the researcher saying, "I will help you with that one," while completing that step out of the participant's line of vision. After the researcher completed that step for the participant, the researcher handed the tablet back to the participant and asked the participant to complete the TA. We used the data collected from the assessment sessions to assess the effectiveness of the two prompting procedures because these data reflect independent (i.e., unprompted) performance on the tablet-based tasks.

We conducted teaching sessions only if a participant did not perform 100% of a tablet-based task independently during an assessment session. During teaching sessions, participants were provided with text-based instructions or video prompts to complete the assigned tablet-based task. Total task chaining was used during each prompting condition. That is, participants were taught to complete each step of the TA during each teaching session. We used data collected from the teaching sessions to assess the efficiency of the two prompting procedures. Specifically, we collected data on total session duration, mean session duration, and the number of teaching sessions required to meet acquisition criterion.

Baseline. We conducted assessment sessions with each tablet-based task during baseline.

Prompt comparison. We quasirandomly alternated the text-based instructions condition, the video-prompting condition, and the control condition. To ensure that the first data point in each condition during this phase depicted responding following exposure to the prompting conditions, the researcher conducted one teaching session for each prompting condition during the first experimental visit of the prompt-comparison phase (assessment sessions were not conducted). During all subsequent experimental visits, the researcher first conducted one assessment session for each prompting condition. If the participant performed less than 100% of the tablet-based task independently during an assessment session, the researcher conducted the associated teaching session during the same experimental visit. The prompt-comparison phase continued until the participant reached the acquisition criterion (100% independent responding across three consecutive assessment sessions) in both prompting conditions. If a participant met the acquisition criterion in one prompting condition before the other, we discontinued sessions for the mastered tablet-based task and continued to conduct sessions for the other tablet-based task until the participant met the acquisition criterion in that prompting condition.

Text-based instructions. The researcher provided participants with the sheet of paper that contained the text-based instructions for the tablet-based task assigned to this condition. Participants were then asked to complete the tablet-based task on the iPad® by following the text-based instructions one step at a time.

Video prompting. Prior to each video-prompting session, the researcher provided participants with verbal instructions and a brief demonstration on how to use the VideoTote app. Following the demonstration, the researcher handed the participant an iPad® set to the home screen and placed a second iPad® with the VideoTote app open on a stand in front of the participant. The researcher then asked the participant to complete the assigned tablet-based task using their iPad® and pressed play on the VideoTote app on the second iPad®. Each VideoTote chapter depicted one TA step and automatically stopped after each step, at which point the participant completed that step on his or her iPad®. Participants were instructed to watch each VideoTote chapter from start to finish before attempting to complete each step on their iPad®. Once the participant indicated that he or she was ready to proceed to the next step, the researcher advanced to the next VideoTote chapter on the second iPad®.

Control. We conducted assessment sessions intermittently with the tablet-based task assigned to the control condition. Participants did not receive any formal instruction (text- or video-based) for the tablet-based task assigned to the control condition.

Follow-up assessment. We conducted one assessment session one week after the participant met the acquisition criterion for each tablet-based task assigned to a prompting condition to assess maintenance of treatment effects.

Social Validity

A social validity questionnaire was administered to participants within 2 weeks of their completion of the study. The social validity questionnaires addressed three broad categories. The first category consisted of three multiple-choice questions to determine (a) which prompting procedure was preferred, (b) if the participants would use the preferred prompting procedure again in the future, and (c) which prompting procedure was easier to use. The second category consisted of six questions scored on a 5-point rating scale from strongly disagree (1) to strongly agree (5). Questions in this category addressed participants' ratings for each of the prompting procedures in terms of (a) ease of use, (b) helpfulness, and (c) the likelihood that participants would recommend each of the prompting procedures to a friend. The third category consisted of two questions on a 5-point rating scale from strongly disagree (1) to strongly agree (5). Questions in this category addressed participants' opinions regarding the appropriateness and relevance of the tablet-based tasks taught in this study, as well as their comfort level with the iPad® following completion of the study. A separate social validity questionnaire was administered to Janice because she was the only participant who owned an iPad® prior to

Table 2
Summary of Efficiency Data for Doris, Janice, and Henry

		Assessment sessions	Teaching sessions		
Participant	Condition	No. sessions to acquisition	No. sessions	Total duration (min)	Avg. duration and range (min)
Doris	VP	15	11	48	4 (range, 3-9)
	T-BI	14	10	29	3 (range, 2-5)
Janice	VP	10	8	22	2 (range, 2-4)
	T-BI	12	9	24	3 (range, 2-4)
Henry	VP	10	8	50	6 (range, 5-7)
	T-BI	22	20	81	4 (range, 3-6)

Note. VP = video prompting; T-BI = text-based instructions the start of the study. This questionnaire was identical to the original social validity questionnaire except for three additional questions, also rated on a 5-point rating scale from strongly disagree (1) to strongly agree (5). The additional questions addressed Janice's iPad® use following completion of the study.

RESULTS

Figure 1 displays the outcomes of the treatment comparison for Doris, Janice, and Henry. The data for Doris are depicted in the top panel. During baseline, we observed low levels of independent responding on each tablet-based task. Both prompting procedures were effective in promoting independent performance on both tablet-based tasks, with the acquisition criterion met in 15 assessment sessions in the video-prompting condition and in 14 assessment sessions in the text-based instructions condition. In addition, independent responding maintained at 100% at follow up in both prompting conditions. Throughout the prompt-comparison phase, we observed differentiated responding between the control and both prompting conditions. However, independent responding during the control condition occurred at higher levels (*M* = 33%; range, 29%-43%) than those observed during baseline (*M* = 4.77%; range, 0%-14.3%). Efficiency data for all participants are depicted in Table 2. For Doris, there was a total of 15 video-prompting assessment sessions and 14 text-based instructions assessment sessions. There were 11 video-prompting teaching sessions and 10 text-based instructions teaching sessions. The total duration of teaching sessions in the video-prompting condition was 48 min 25 s, with an average duration of 4 min 24 s (range, 2 min 35 s to 8 min 40 s). The total duration of teaching sessions in the text-based instructions condition was 28 min 30 s, with an average duration of 2 min 51 s (range, 1 min 30 s to 4 min 35 s). Despite the finding that Doris achieved the acquisition criterion in both prompting procedures within one session of each other, which may suggest that both prompting procedures were nearly equally efficient, the duration data collected in the teaching sessions seem to indicate that the text-based instructions were more efficient for Doris.

Janice's data are depicted in the middle panel of Figure 1. During baseline, we observed moderate levels of independent responding on each tablet-based task. Janice reached the acquisition criterion in 10 assessment sessions in the video-prompting condition and in 12 assessment sessions in the text-based instructions condition, indicating that both prompting procedures were effective in promoting independent performance on the assigned tablet-based tasks. In addition, independent responding maintained at 100% at follow up in both conditions. Throughout the prompt-comparison phase, we observed differentiated responding between the control and both prompting conditions and independent responding during the control condition remained stable (43% during each session), which was similar to the level of independent responding observed during baseline. For Janice, there were 10 video-prompting assessment sessions and 12 text-based instructions assessment sessions (see Table 2). There-were eight video-prompting teaching sessions and nine text-based instructions teaching sessions. The total duration of teaching sessions in the video-prompting condition was 21 min 38 s, with an average duration of 2 min 24 s (range, 1 min 35 s to 3 min 30 s). The total duration of teaching sessions in the text-based instructions condition was 23 min 46 s, with an average duration of 3 min 16 s (range, 1 min 40 s to 4 min 25 s). Results from these efficiency data suggest that video prompting was slightly more efficient than text-based instructions for Janice.

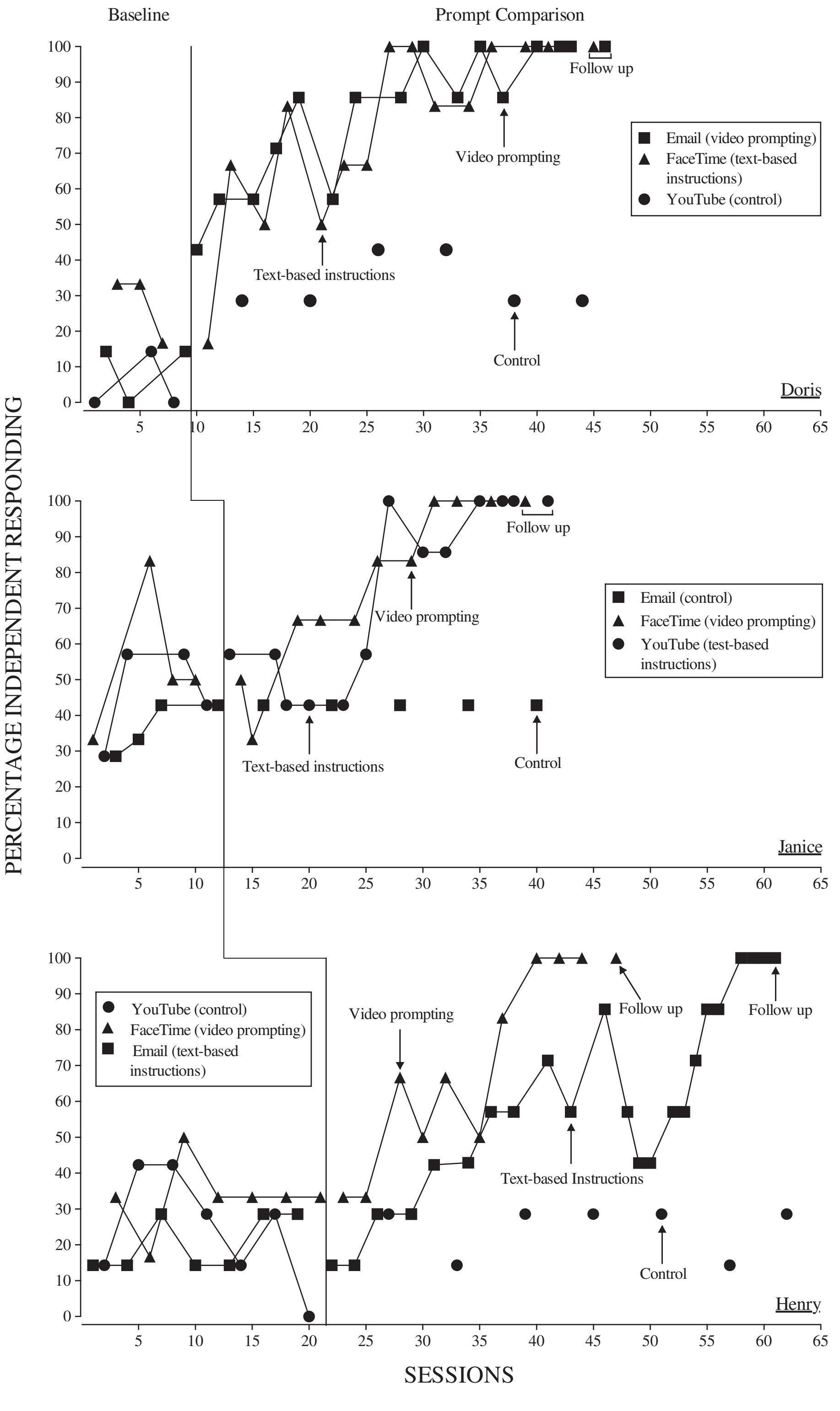

Figure 1. Percentage of steps completed independently by Doris (top panel), Janice (middle panel), and Henry (bottom panel).

Table 3
Summary of Social Validity Questionnaires for Doris, Janice, and Henry

Category	Questions	Participants		
		Doris	Janice	Henry
Category 1	Which prompting procedure did you like best?	Text-based instructions	Video prompting	Video prompting
	Would you use this preferred procedure again?	Yes	Yes	Yes
	Which prompting procedure did you find easier to use?	Text-based instructions	Video prompting	Video prompting
Category 2[a]	Ease of use			
	Video prompting	3	5	5
	Text-based instructions	4	3	4
	Helpfulness			
	Video prompting	4	5	5
	Text-based instructions	4	4	3
	Recommend to a friend			
	Video prompting	4	5	5
	Text-based instructions	5	3	4
Category 3[a]	Relevance / usefulness of tablet-based tasks	4	5	5
	Comfort level with iPad®	5	5	5
Category 4 [a] (Janice only)	I use my iPad® more for the activities taught in this study compared to before participating in this study		4	
	I use my iPad® more for other activities not taught in this study compared to before participating in this study		5	
	FaceTime® has helped me to connect more with friends and family after participating in this study		N/A	

[a] Questions scored on a 5-point rating scale from strongly disagree (1) to strongly agree (5).

Henry's data are depicted in the bottom panel of the figure. During baseline, we observed low to moderate levels of independent responding on each tablet-based task. Henry reached the acquisition criterion in 10 assessment sessions in the video-prompting condition and in 22 assessment sessions in the text-based instructions condition. These data indicate that both prompting procedures were effective in promoting independent performance on both tablet-based tasks. Independent responding maintained at 100% at follow up in both prompting conditions. Throughout the prompt-comparison phase, we observed differentiated responding between the control and both prompting conditions, and independent responding during the control condition remained stable (M = 24%; range, 14% and 29%) and at similar levels as in baseline. For Henry, there were 10 video-prompting assessment sessions and 22 text-based instructions assessment sessions (see Table 2). There were eight video-prompting teaching sessions and 20 text-based instructions teaching sessions. The total duration of teaching sessions in the video-prompting condition was 50 min 9 s, with an average duration of 6 min 16 s (range, 4 min 40 s to 7 min 27 s). The total duration of teaching sessions in the text-based instructions condition was 80 min 29 s, with an average duration of 4 min 1 s (range, 2 min 57 s to 6 min 17 s). Results from these efficiency data lend further support indicating that video prompting was more efficient than text-based instructions for Henry.

Social Validity Questionnaire

Results from the social validity questionnaires are depicted in Table 3. For the first category, Doris indicated that she (a) preferred text-based instructions over video prompting, (b) would use text-based instructions again in the future, and (c) found text-based instructions easier to use than video prompting. Both Janice and Henry reported that they (a) preferred video prompting over text-based instructions, (b) would use video prompting again in the future, and (c) found video-prompting easier to use than text-based instructions. For the second category, on average, participants rated the ease of use for video prompting higher (M = 4.3) than text-based instructions (M = 3.7), rated the helpfulness of video prompting higher (M = 4.7) than text-based instructions (M = 3.7), rated the likelihood of recommending video prompting to a friend higher (M = 4.7) than text-based instructions (M = 4). For the third category, participants agreed that the tablet-based tasks chosen and taught in this study were relevant and useful to learn (M = 4.7), and all participants strongly agreed that they were more comfortable using an iPad® after completing the study (M = 5). In fact, Doris and Henry purchased an iPad® of their own following completion of the study. Because Janice owned an iPad® prior to the start of the study, she was asked three additional questions to determine whether her participation in the study further influenced her iPad® activity. After participating in the study, Janice reported to use her iPad® more to search for and watch videos on YouTube™ (score = 4) as well as for other activities not taught in this study (e.g., reading, playing games; score = 5). In terms of staying connected with friends and family via FaceTime®, Janice reported that she had not set up a FaceTime® account on her iPad® (score = N/A).

DISCUSSION

Both video prompting and text-based instructions were found to be effective for all three participants. In terms of the relative efficiency of the prompting procedures, text-based instructions were slightly more efficient for Doris, video prompting was slightly more efficient for Janice, and video prompting was more efficient for Henry. These findings suggest that either prompting procedure can be used to teach older adults Internet and ICT skills; however, the relative efficiency of these prompting procedures is less clear and may be idiosyncratic across participants.

The duration data for Doris during teaching sessions appear to suggest, at least initially, that text-based instructions were a far more efficient prompting procedure. However, observations revealed that teaching session durations during both prompting conditions were similar toward the end of the study. Perhaps one explanation for this discrepancy in the efficiency data from the beginning to the end of the study may have been Doris' unfamiliarity or lack of experience with the video-prompting format as a method of instruction at the beginning of the study. One way to capture this information, albeit indirectly, was to compare the difference in session duration between video prompting and text-based instructions during the first half and second half of the teaching sessions in the prompt-comparison phase. Results of this evaluation revealed that there was about a 2.5 min difference in the average duration between video-prompting and text-based instruction teaching sessions in the first half of sessions and only a 30 s difference between these two prompting procedures during the second half of sessions. This difference in average duration may be indicative of a practice effect. That is, following repeated exposure to the video-prompts, Doris may have become more efficient in consuming the video prompts. These data, in addition to the finding that Doris reached the acquisition criterion in both prompting conditions within one session of each other, *may* suggest that following some exposure to the video prompts, both prompting procedures were nearly equal in terms of efficiency, with text-based instructions being slightly more efficient. These findings also suggest that some pretraining may be necessary for novel or unfamiliar prompting procedures (e.g., video prompting).

Video prompting was found to be more efficient than text-based instructions for Janice and Henry, albeit only slightly so for Janice. Henry was the only participant for whom a marked difference in efficiency was observed between the two prompting procedures. Although video prompting was found to be more efficient for Henry in terms of the (a) number of assessment sessions, (b) number of teaching sessions, and (c) the total duration of teaching sessions, Henry spent more time consuming video prompts than text-based instructions, on average. That is, the average duration of video-prompting teaching sessions was 2 min 15 s longer than the average duration of text-based instructions teaching sessions. Henry was observed to frequently re-watch the VideoTote chapters several times before completing each step of the TA. It is possible that we did not capture all relevant measures of efficiency. Therefore, future researchers may consider taking additional or different efficiency measures (e.g., duration of prompt consumption, frequency of prompt consumption). Future researchers may also consider evaluating the efficiency of these two prompting procedures from the perspective of the instructor. For example, it may useful to consider the amount of time and effort required for instructors to develop and create the instructional materials as well as the associated costs related to each prompting procedure.

We collected data intermittently on the tablet-based tasks assigned to the control condition to determine if participant responding was influenced by carry-over effects, history effects, or maturation effects. An evaluation of the responding on the tablet-based tasks assigned to the control condition for all three participants revealed that the level of independent responding during the control condition remained stable from baseline to the prompt-comparison phase for Janice and Henry and increased slightly for Doris. During baseline, Doris never performed the first step of the control task (i.e., tap the YouTube™ icon to open the YouTube™ application) correctly. However, after receiving explicit instruction on how to tap on the FaceTime® and email icons during teaching sessions, Doris began to perform the first step of the control task correctly during the prompt-comparison phase. This increase may be due to stimulus generalization, given that the stimuli involved in the first step of the email and the FaceTime® tasks are similar to the stimulus involved in the first step of the YouTube™ (control) task. That is, all three icons (a) are the same size, (b) are square with rounded edges, (c) contain a symbol or picture in the center, and (d) list the name of the application below the icon. Despite the slight increase in responding during the control condition from baseline to the prompt-comparison phase, Doris' responding during the control condition *within* the prompt-comparison phase remained stable, demonstrating that responding during both prompting conditions was a function of the prompting procedures themselves, and not a function of carry-over effects, history effects, or maturation effects.

It should be noted that all three participants reached the acquisition criterion for the FaceTime® task first. This could indicate that the FaceTime® task was inherently easier than the other two tablet-based tasks; however, two of three participants (Doris and Janice) reached the acquisition criterion on the FaceTime® task within only one to two sessions of the other task assigned to a prompting condition. If the FaceTime® task was inherently easier than the email and YouTube™ tasks, one might expect a larger difference in the number of assessment sessions to reach the acquisition criterion with the FaceTime® task relative to the other two tasks across all participants. In fact, a logical analysis was conducted prior to the start of the study to equate task difficulty across all three tasks. The only logical analysis measure on which FaceTime® was found to be slightly different from the other two tablet-based tasks was the number of TA steps. The FaceTime® task consisted of six TA steps, whereas the email and YouTube™ tasks consisted of seven TA steps. Although the FaceTime® task consisted of one less step than the other two tasks, it was either equal to or required more time to complete than the other two tablet-based tasks, and required the same nature of movements as the other two tasks (i.e., the finger tap). Although there is precedent in the literature for including TAs that are not perfectly equated (e.g., Mechling & Collins, 2012; Smith, Ayres, Mechling, & Smith, 2013), future researchers using an adapted alternating treatments design may consider ensuring that all tasks are well matched on all logical-analysis measures.

One potential limitation of the current investigation is that not all tablet-based tasks were assigned to each condition. For example, the FaceTime® task was never assigned to the control condition for any participant. Therefore, it is possible that responding to the FaceTime® task would gradually increase over time in the absence of any intervention. However, because (a) all tasks were roughly equal in terms of number of steps, mean completion time, and nature of movements, and (b) participants' responding to the email and YouTube™ tasks remained stable when these tasks were assigned to the control condition, it is unlikely that this would occur. In addition, the YouTube™ task was never assigned to the video-prompting condition. Initially, we had assigned all tablet-based tasks to all conditions for four participants; however, a fourth participant (Sarah; data not reported) passed away prior to completing this study. When conducting research with older adults, future researchers may consider recruiting additional participants to account for the possibility of attrition.

An additional limitation of this study is the use of video prompting on an iPad® to teach skills on an iPad®. This limitation may call into question the practicality of the video-prompting procedure because participants initially did not know how to operate an iPad®. However, the purpose of the current study was not to evaluate the participants' ability to *independently* use these prompting procedures, but rather to evaluate the effectiveness and efficiency of these prompting procedures themselves. In light of the finding that video prompting was an effective prompting procedure for all participants, the next logical steps would be to evaluate (a) methods to teach older adults to independently use VideoTote and (b) participants' ability to independently access and use each prompting procedure to learn new skills, and whether this changes performance outcomes.

The outcomes from this study suggest several areas for further investigation. First, an interesting relationship between prompt preference and prompt efficiency was observed for all three participants. That is, video prompting was found to be more efficient for Henry and slightly more efficient for Janice, and was also reported to be preferred over text-based instructions for both participants. For Doris, text-based instructions were found to be slightly more efficient and were also reported to be preferred over video prompting. Therefore, future researchers may consider evaluating whether participant preference for a prompting procedure influences the efficiency with which a participant acquires a task, or if efficiency influences preference for a prompting procedure. It is possible that two of three participants reported a preference for video prompting because video-based instruction offers a dynamic approach to teaching in which instructional methods are interactive, engaging, and more salient for the learner (Mechling & Gustafson, 2009; Tyner & Fienup, 2015). It is also possible that video prompting was reportedly more preferred by Janice and Henry because video prompting may help to reduce stimulus overselectivity by highlighting the relevant stimulus features on the iPad® screen (Charlop-Christy, Le, & Freeman, 2000; Mechling & Gustafson, 2009). In this study, the video prompt showed a model slowly positioning her finger over the target icon, which may have reduced the likelihood that the participant responded to an irrelevant stimulus feature on the iPad® screen. This is particularly relevant given that both Janice and Henry reported that the video-prompting procedure was easier to follow than text-based instructions on the social validity questionnaire. Therefore, future researchers may consider evaluating the extent to which the video-prompting condition reduces overselectivity, and the relationship this may have with the efficiency of the prompting procedure.

Second, the video-prompting condition consisted of a video demonstration of the target task and voice-over instructions, and the text-based instructions condition consisted of picture prompts and written instructions. As such, the necessary and sufficient conditions required to produce acquisition of the target tasks are presently unclear. Therefore, future researchers may consider evaluating separately the components of the prompting procedures evaluated in this study. For example, future researchers may consider examining the effects of video prompting with and without voice-over instruction, and text-based instructions with and without picture prompts with older adult learners (Mechling & Gustafson, 2009). Finally, future researchers may consider evaluating the effectiveness of video prompting and text-based instructions to teach older adults to operate technologies that support their health, independence, and safety (e.g., telemedicine, sensor technology, and medication management systems).

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