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COMPARING SELF-DELIVERED TO INSTRUCTOR-DELIVERED REINFORCEMENT DURING VOCATIONAL INSTRUCTION FOR STUDENTS WITH INTELLECTUAL DISABILITY USING VIDEO ACTIVITY SCHEDULES

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THESIS

A thesis submitted in partial fulfillment of the
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at the University of Kentucky

By

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ABSTRACT OF THESIS

COMPARING SELF_DELIVERED TO INSTRUCTOR_DELIVERED REINFORCEMENT DURING VOCATIONAL INSTRUCTION FOR STUDENTS WITH INTELLECTUAL DISABILITY USING VIDEO ACTIVITY SCHEDULES

In this study, an adapted alternating treatments design was used to compare the effectiveness of teaching vocational task when using self-delivered reinforcement versus instructor-delivered reinforcement while using video prompting. Participants consisted of four high school students who had been diagnosed with intellectual disabilities. Results indicated that instructor delivered reinforcement was slightly more effective at teaching a vocational task for 2 of the 4 participants. The results of the other 2 participants indicated that both forms of reinforcement delivery were similarly effective.

KEYWORDS: Self-reinforcement, Self-delivered Reinforcement, Instructor-delivered Reinforcement, Video Prompting, Vocational Skills

Katherine Elise White

04/26/2022

Date

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INTRODUCTION

The ability to manage your own behavior is necessary to live independently (Pierce & Schreibman, 1994). However, attaining these skills can be difficult for individuals who rely more regularly on the help of others (Hume et al., 2009). A large portion of students with moderate to severe disabilities rely on an instructor to engage in tasks and become dependent on prompting to complete them (MacDuff et al., 2001). Evidence-based practices can be used to assist students in performing their desired behaviors independently. The main strategies of focus for the current study include video prompting, visual schedules, and self-reinforcement. These practices allow the student to initiate the task, engage in the task, and provide reinforcement with minimal presence from an instructor (Shepley et al., 2019). These strategies can be especially beneficial for students with moderate to severe disabilities in high school classrooms who are preparing for transitioning to post-secondary or workplace environments, and out of a classroom setting. Utilizing strategies such as visual schedules and self-reinforcement can aid the transitioning process by providing the individuals with experience delivering their own necessary prompts and praise so they can continue to rely on them when the support from the classroom is no longer available (Smith et al., 2015).

Incorporating the use of activity schedules is a strategy that can help students engage in a task without needing prompting from an instructor. Activity schedules list a sequence of events using text, pictures, or objects (Spriggs et al., 2016). Research indicates that the incorporation of activity schedules into instruction can assist in the independent initiation and completion of a task by individuals with moderate to severe

disabilities, as well as decreasing counterproductive behaviors, such as being off-task (Lequia et al., 2012). Activity schedules can be utilized to break down the steps of various types of tasks, including vocational tasks. Vocational skills provide students with experience in areas that they may be able to apply in work settings (Kellems & Morningstar, 2012). The importance of students' ability to engage in vocational tasks independently increases with age so that when they graduate, students have a set of skills that they can use to apply for and maintain jobs. One strategy commonly used to teach vocational skills is video modeling, a visual representation of an individual engaging in the task from beginning to end (Allen et al., 2010). According to the findings from Allen et al. (2010), video modeling is an effective strategy that can be used to teach adolescents with disabilities to engage in vocational tasks. Video models can be broken down into smaller segments known as video prompts. A video prompt provides the viewer a short video of each step of the task analysis allowing time between each video for the steps to be completed (Banda et al., 2011). According to the findings in Cannella-Malone et al. (2006), video prompting can be more effective in a quicker acquisition of functional skills compared to video modeling.

Video can also be incorporated into activity schedules to display the completion of the task to the individual watching it**.** Video activity schedules are defined as embedding video models or video prompts into visual activity schedules (Shepley et al., 2018). The findings from Shepley et al. (2018) indicate that video activity schedules can be used to teach vocational tasks to students with disabilities. Video activity schedules can increase the amount of independence that a student engages in while completing a vocational task. According to the findings in Shepley et al. (2019), video activity

schedules of the task can be used to facilitate self-instruction for individuals with intellectual disability. Self-instruction "occurs when individuals are able to access resources to learn a new skill independent of another person's direction, which can lead to independence in approaching novel tasks once students leave the school setting" (Shepley et al., 2018).

Self-instruction is a component of self-management, a treatment package made up of three components that has been found to be an effective intervention to assist in the independent completion of tasks, as well as promote the generalization of tasks for individuals with disabilities. The other two components of self-management are self-monitoring and self-reinforcement. An individual engages in self-monitoring when they observe their own behavior (Newman et al., 1997). Self-reinforcement occurs when the individual who is completing a task delivers a reinforcer to themselves dependent on their response (Newman et al., 1997). Therefore, the utilization of self-management strategies to provide instruction on vocational tasks can provide students with the resources to learn the task, monitor progress, and reinforce their own behavior without an instructor's presence.

In contrast to self-reinforcement, another strategy that is used to deliver reinforcement during elementary and secondary education is instructor-delivered reinforcement**.** Instructor-delivered reinforcement can produce more reliable and accurate results than self-reinforcement because the instructor can ensure that the participant is reliably engaging in the correct behavior before reinforcement is accessed. With self-delivered reinforcement, the participant may not score their responses as reliably to gain access to the reinforcer more frequently. According to the findings in Argan et al. (2001),

instructor-delivered reinforcement can produce more consistent results than when reinforcement is delivered by the participant. The authors indicated that the contrast in the student's performance in the self-reinforcement condition compared to the instructor-delivered reinforcement condition may have been caused by a lack of experience in delivering self-reinforcement or that the reinforcer was not as reinforcing when delivered by themselves. In contrast, in a study conducted by Beaver et al. (2017), it was found that both instructor-delivered reinforcement and self-reinforcement were effective in increasing the accuracy in the independent completion of vocational tasks using activity schedules with text. The students were taught vocational, functional, and leisure tasks using a picture schedule. Every time students engaged two consecutive correct responses, the individual providing reinforcement, either the instructor or student, would click a golf counter. After earning the required number of clicks, the student was given time to interact with an application on a device.

Due to the conflicting evidence from Argan et al. (2001) and Beaver et al. (2017), it remains unclear if learners with intellectual disability can accurately and efficiently acquire a new skill when delivering their own reinforcers. As students prepare to transition out of the classroom and potentially into the workforce, the components of self-management, including self-reinforcement, are important skills for them to achieve to be successful in the environments they will encounter after high school. These skills can also be beneficial for individuals who are preparing or want to live without the presence of a caregiver. Self-reinforcement can be a useful skill to teach students to adjust their reliance on others to provide a consequence that will encourage their engagement in necessary tasks.

The purpose of the current study was to compare the effectiveness of instructor-delivered reinforcement to self-reinforcement on the accuracy of a novel vocational task using a video activity schedule. This study expanded on Beaver et al. (2017) by utilizing an activity schedule loaded with video prompts, focusing instruction on vocational tasks, and using a checklist as opposed to a golf-counter as a token system. The following research questions were addressed:

Research question 1: What are the differential effects between self- and instructor-delivered reinforcement on the acquisition of a novel vocational task using a video activity schedule?

Research question 2: What is the difference in participants' on-task behavior while completing a vocational task when reinforcement is delivered by the instructor as opposed to self-reinforcement?

METHOD

Participants

To participate in the study, prior to implementation, participants must have attended at least 80% of the previous school days in the school year. Inclusion criteria were as follows: all participants demonstrated that they were able to attend to an activity and video for at least 5 min, their vision and hearing were within normal limits, they could attend to a verbal stimulus in a video, they could follow verbal directions, they could imitate a multi-step video model, they could write various symbols or shapes, they could manipulate and use an iPhone, and they could manipulate an activity schedule programmed into the application used to display the video prompts during the study.

Participants were excluded from the study if they didn't meet the requirements previously mentioned and if they did not tolerate a physical prompt. Inclusion and exclusion criteria were assessed during a screening of participants prior to the implementation of procedures. The screening process consisted of the main implementor sitting with each of the potential participants individually to assess their knowledge of the skills.

Four high school students, ages ranging from 15- to 18-years old were participants in this study. All participants attended a public high school and engaged in coursework predominately in a special education classroom. All participants had previously been identified as needing special education services and had an individualized education plan (IEP). Individual participant information can be found in Table 1.

Table 1 *Participant Information*

Participant	Age	Sex	Race	Dx	IO Score	AB Score	ASD Rating Score	Communication Anecdotes
Destiny	15	F	African American	ASD	45[a]	73[b]	128[c]	Low initiation; two-to-three-word responses to questions
Ethan	16	M	Caucasian	ASD	43[d]	49[e]	80[f]	Low initiation; used SGD when requested
Thomas	16	M	Caucasian	ID	52[a]	*Not found*	NA	Social; spoke in full sentences
Amelia	18	F	Caucasian	ID	57[a]	54[e]	NA	Social; spoke in full sentences

Note. AB=Adaptive Behavior; Dx=Diagnosis; SGD = Speed Generating Device; [a]Wechsler Intelligence Scale for Children-Fifth Edition (WISC-V; Wechsler, 2014), [b]Developmental Assessment of Young Children-Second Edition (DAYC-2; Judith & Maddox, 2013), [c]Gilliam Autism Rating Scale-Third Edition (GARS-3; Gilliam, 2014), [d]Kaufman Brief Intelligence Test-Second Edition (KBIT-2; Bain & Jaspers,

2010), [e]Adaptive Behavior Assessment System-Third Edition (ABAS-3; Harrison & Oakland, 2015), [f]Autism Spectrum Rating Scale (ASRS; Goldstien & Naglieri, 2009).

Experimenter and Assistants

The main implementer of the study was the first author who held a bachelor's degree in special education and was enrolled in a master's degree program in applied behavior analysis. Individuals who assisted in the implementation of procedures, including interobserver agreement (IOA) and procedural fidelity data included university faculty and graduate students in applied behavior analysis or special education programs.

Setting

The study was conducted at the participants' high school in a commercial kitchen where students worked on vocational tasks one at a time to prevent any observational learning that could impact the experiment results. The room contained larger kitchen appliances such as refrigerators, food warmers, and a three-basin sink. The appliances were placed around the perimeter of the room to access the electrical outlets leaving the middle of the room open. The materials needed for the study were set up on a cart in the corner of the room away from the larger kitchen appliances or any other materials that were frequently used during the school day. The small appliances that were needed for the study were plugged into an outlet on the wall behind the cart. The materials were arranged in the same way they were displayed in the videos used for the study. Any extra materials needed for the tasks were placed on shelves under the cart.

Materials

The materials used during sessions included the token board, the participant's assigned mobile device with any needed applications loaded onto the device, as well as specific task materials.

Token Board

After completing a step in the task analysis, the participant received a token in the form of a check mark on a token board. The token boards consisted of 15 steps written on a small dry erase board. As the participant completed the task, a checkmark was provided beside the corresponding step. The delivery of tokens using checkmarks on a dry erase board would allow reinforcement to be more inconspicuous. This was a more appropriate form of reinforcement delivery for the participants' age when compared to the delivery of tokens in the Beaver et al. (2017)study which used the golf counter. See Appendix A for an example of the token board used in the study.

iPhone with Applications

The mobile device used to access the video activity schedules and the reinforcers for this study was an iPhone XS. The iPhone was loaded with Apple applications (e.g., Settings, Clock, Calculator), as well as the applications needed for the study: (1) Choiceworks and (2) applications used as reinforcers based on individual preference assessments (Choiceworks, 2022). See Appendix B for a visual representation of the applications on the device.

Choiceworks was the application that was used in the study as a video activity schedule. This application was designed to assist with the completion of activities or routines, portray feelings, and increase an individual's tolerance to waiting. The application was downloaded onto the iPhone that was designated for all participants to

use during the study. Prior to the study, participants used the Choiceworks application on the designated mobile device during screening and self-reinforcement coaching procedures to allow them to become more familiar with using the app. For the purposes of this study, activity schedules were created for each of the three vocational tasks with videos embedded into each step of the task analysis. As the participants selected a step in the task analysis, a video was played demonstrating the completion of that step. After observing the video prompt, the participant engaged in the step that was demonstrated before moving to the next video prompt. See Appendix C for a visual representation of one of video activity schedules used in the study.

After the completion of a task and the delivery of all tokens, the participants were given the option of two apps identified as reinforcers through a preference assessment. Reinforcer apps consisted of video streaming services and games.

Video Activity Schedules

Prior to the implementation of treatment, videos were recorded, edited, and programmed onto the device into Choiceworks, an application they had previous experience with. Videos were filmed and acted by the research team; the steps were narrated as they were being completed. During baseline and during control sessions, the tasks were added to the Choiceworks app using a static picture representing the device used for the task (e.g., the coffee machine). During the implementation of the comparison and best alone conditions, video prompts for the instructor- and self-delivered reinforcement tasks were loaded into Choiceworks to allow the participants to view each step of the task analysis as they completed the task. As the participants clicked on each step of the schedule, they were shown the video prompt of an individual completing one

step using the same materials as they were given and with the same set-up as how the materials were arranged in the environment. Video prompts ranged from 3 to 18 s, with an average duration of 7.3 s.

Vocational Tasks and Materials

The tasks were selected according to the desire of the participant's teacher for students to be able to engage in functional and vocational skills. The acquisition of these skills was necessary for the students to work for the school's "coffee cart". The skills selected included making a pot of coffee using a standard coffee machine, making a cup of coffee using a Keurig machine, and making a cup of tea using an electric kettle. While making a pot of coffee with a coffee maker, the materials included a coffee machine, a carafe, a pitcher filled with water, ground coffee, a measuring cup, and coffee filters. For the task of making a cup of coffee with the Keurig, the materials included a Keurig machine, reusable K-cups, a pitcher filled with water, ground coffee, a measuring spoon, and disposable coffee cups. For the task of making a cup of tea with a kettle, the materials included an electric kettle, a tea infuser, a measuring spoon, loose-leaf tea, a pitcher filled with water, and Styrofoam drinking cups.

Task Analyses

The difficulty of each task was assessed and modified prior to the study using guidelines outlined by Bellamy et al. (1979). According to these guidelines, tasks should be similar in length, therefore the necessary components of the task were created with this guideline in mind to ensure that the task was fully completed in a similar number of steps as the other two tasks. These guidelines also indicate that each of the steps should only have need of one response to complete and that the same amount of reinforcement

be delivered upon engagement in each task. These guidelines were taken into consideration during the creation of the task analysis for each task and the participant's responses.

Although the three target tasks may have been similar, the research team carefully ensured that each task was of equal difficulty, but functionally independent. Each of the tasks produces a similar product and uses similar materials, but few of the materials or machinery were repeated across tasks. Each task analysis was also broken down into the same number of steps. Refer to Table 2 to view each task analysis.

Table 2 *Task Analyses of Vocational Tasks*

Step	Making a Pot of Coffee with a Coffee Maker	Making a Cup of Coffee with a Keurig	Making a Cup of Tea with a Kettle
1.	Lift the coffee machine lid	Lift the water portion of the Keurig	Take the kettle off the warmer
2.	Place filter in coffee machine	Place coffee cup on table	Open the kettle
3.	Open the tub of coffee	Get the pitcher and fill the cup with water	Pour water to the first line on the kettle and close the kettle
4.	Get the large scoop	Pour water into and close the water portion of Keurig	Place kettle back on warmer
5.	Pour one scoop of coffee into the filter	Place cup under the spout	Turn on the kettle
6.	Put the scoop back	Open the coffee portion of the Keurig	Get Styrofoam cup
7.	Close the coffee tub	Open the bag of coffee	Open tea infuser
8.	Place coffee pot on the table	Get the reusable k-cup	Open tea tin
9.	Open the lid of the coffee pot	Get the small scoop	Get the small scoop
10.	Pick up the pitcher and fill the coffee pot to at least 4 cups	Put the scoop back	Put 3 scoops of tea into the tea infuser and close the infuser
11.	Close lid of coffee pot	Close the bag of coffee	Put the scoop back
12.	Pour water into the machine	Place cup under spout of Keurig	Close the tea tin

13.	Place coffee pot in machine	Place k-cup in and close the coffee portion of the Keurig	Place infuser in Styrofoam cup
14.	Close lid on coffee machine	Press the “on” button	Turn off kettle
15.	Press the “on” button	Press the “brew” button	Pour hot water into Styrofoam cup

Preference Assessment

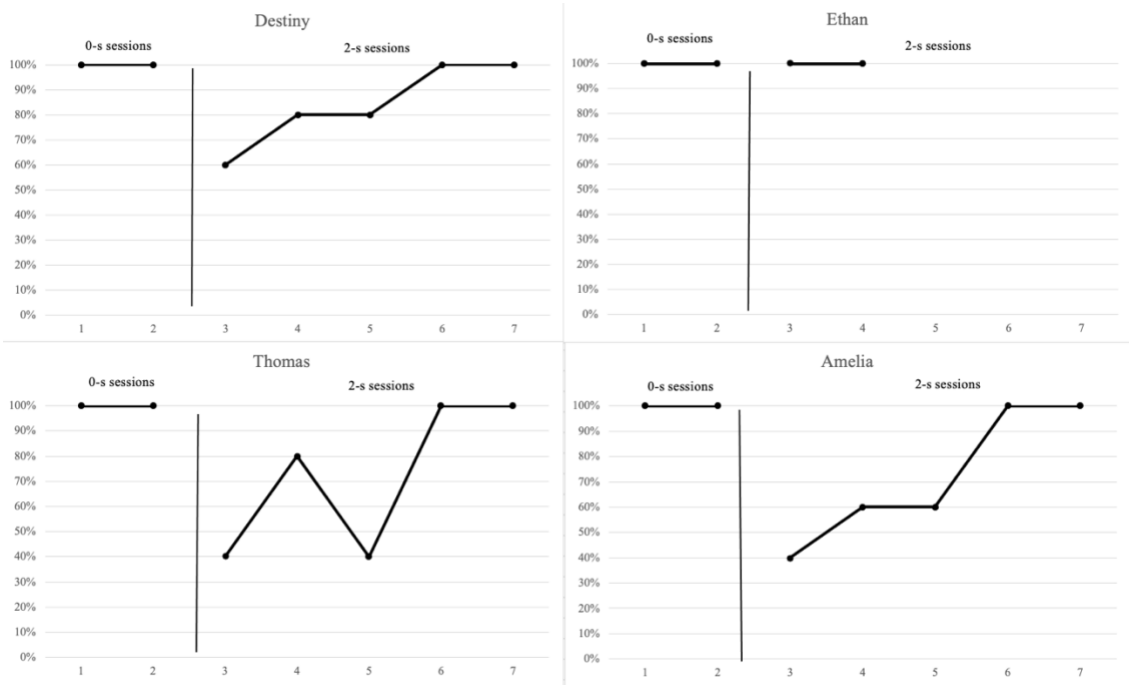
Before conducting the experiment, reinforcers were identified using a paired stimulus preference assessment (Leaf et al., 2018). Prior to the preference assessment, data were collected on the participant’s interests. Data were collected through direct observation, as well as indirect observations reported by the participants’ instructors. After five potential reinforcers were identified for each participant, the implementor conducted a paired stimulus preference assessment with the participants. During these assessments, the implementor provided them with the option to select and engage with two different mobile applications. The participants selected their preferred application and were given a few minutes to engage with that app before two more applications were presented again. After the paired stimulus preference assessment was conducted three times for each participant, a hierarchy of the participants’ selections was created. The top three were rotated as options for the participants to select upon the completion of their tasks.

Self-Reinforcement Coaching

Before experimental sessions began, the participants were trained on the implementation of delivering self-reinforcement using constant time delay. The participants were given a chained task presented on the Choiceworks application with

video prompts of each step of the task. The tasks selected were unrelated to the tasks selected for the study and were tasks that the participants had previously demonstrated that they could complete independently (e.g., write your name, grab a piece of paper). During 0 s time delay sessions, the participants were prompted by the implementor to select the correct video and provide a check on the token board after the completion of each step. The mastery criterion for these sessions was 100% correct with or without prompting. After mastery was achieved for the 0 s time delay sessions, the time delay was increased to 2 s. Participants were given 2 s to provide a checkmark on the token board upon the completion of each step. The mastery criteria for these sessions were 2 consecutive sessions at 100% correct responding before the prompt could be delivered. Refer to Figure 1 to see the results of these sessions.

Figure 1. *Results of Self-Reinforcement Coaching Sessions*



Dependent Measures

Independent task completion

Data were collected on the independent completion of each task based on the task analysis (Table 2). Across all conditions, correct responses were recorded depending on the participant's performance of each step as described in the task analysis of each task. If participants began engaging in the step within 5 s and independently completed the step as described by the task analysis, their response was recorded as a correct response.

During baseline and treatment procedures, a step was recorded as an incorrect response if the participant began engaging in a step incorrectly as defined by the task analysis for each task or if they did not engage in the step during their completion of the task. During treatment, if the participant engaged in an incorrect response, the implementer completed the step for the participant. The percentage of correct responses were graphed to display a visual of each participant's progress. During both conditions, the percentage of correct responses was obtained by dividing the number of correct responses of each participant by the total amount of steps in the task analysis and multiplying that number by 100. The mastery criterion set for each task was 100% unprompted correct for 3 sessions with 2 being consecutive.

On-task behavior

Data were also collected on the percentage of intervals the participant engaged in on-task behavior during their participation in the study. Data were collected using a 30-s momentary time sampling procedure. On-task behavior was defined as any instance when the participant engaged in either (a) visually attending to their schedule, (b) physically engaging with their visual schedule, (c) visually attending to the materials for their task, (d) physically engaging with the materials for the task, (e) transitioning within the task

(e.g., walking to the sink to fill the pitcher), or (f) making comments about the task or materials used for that task. Off-task behavior was defined as any instance when the participants (a) engaged with materials outside of the task at hand, (b) engaged in a behavior that hindered their ability to engage in the steps of the task analysis, (c) utilized materials inappropriately, (d) visually attended away from the materials or their visual schedule for at least 3 s, or (e) making comments unrelated to the task.

Experimental Design

An adapted alternating-treatments design (Ledford & Gast, Ch. 11) was used to compare independent variables used in this study. Adapted alternating treatment designs alternate the implementation of conditions between each session. This design allows for the analysis of the nonreversible independent variables to determine which treatment is superior to the intervention of the dependent variable. Nonreversible behaviors are skills that the learner will be able to continue to engage in regardless of the withdrawal of intervention. To demonstrate that a change in the learner's behavior was made by the implementation of the intervention, a third condition is often implemented as a control condition. If the control condition continues to perform similarly to how it performed during baseline, this indicates that any changes made in either intervention conditions are a result of the interventions being implemented. To test all conditions accurately, three tasks need to be selected that are functionally independent but similar. This will ensure that the tasks are comparable, but the results of each skill will not be affected by the acquisition of the other skills. See Table 3 for more detail on threats to internal validity with this research design and how the research attempted to detect and control for these threats.

Table 3 *Interval Validity Threats in Adapted Alternating Treatment Designs*

Threats to IV	Define	Detect	Control
Procedural Infidelity	Implementation differs from written procedures	Procedural fidelity data collected throughout study	Train data collectors, discuss disagreements
Adaptation	Participant's behavior is altered due to the unnatural conditions of the study	Change occurs during baseline	Baseline continues until data stabilizes
Hawthorne Effect	Participant's behavior changes due to their knowledge of being observed	Participant's behavior is inconsistent with what was expected at onset of the study	Using behaviors that are unknown to the participant, continue to collect baseline data
Mulitreatment Interference	Behavior is influenced by the implementation of multiple treatments	Compare treatment data to control and best alone condition	Use control and best alone condition
Unequal Behavior Difficulty	Behaviors being observed are not equal in difficulty	Analyze the data from each task across participants	Highly likely when using multiple behaviors

The independent variables used during this study were instructor-delivered reinforcement and self-reinforcement. Task assignments were counterbalanced across independent variables and participants. See Table 4 for task assignment by participant and condition.

Table 4 *Counterbalanced Task Assignments*

Condition	Participants			
	Destiny	Ethan	Thomas	Amelia

Instructor-delivered reinforcement	Making tea with a kettle	Making a pot of coffee with a coffee machine	Making a cup of coffee with a Keurig	Making a cup of coffee with a Keurig
Self-delivered reinforcement	Making a pot of coffee with a coffee machine	Making a cup of coffee with a Keurig	Making a cup of tea with a kettle	Making a pot of coffee with a coffee machine
Control	Making a cup of coffee with a Keurig	Making a cup of tea with a kettle	Making a pot of coffee with a coffee machine	Making a cup of tea with a kettle

General Procedures

Prior to each session, the implementor independently reviewed the steps of the task, set up the environment, loaded the correct schedule on the iPhone, and embedded a choice of reinforcers if appropriate. The implementor would state an attentional cue (e.g., "Are you ready to work?") and wait for the participant to deliver a verbal attentional response (e.g., "yes") before starting the session. The implementor would begin a session by handing the participant their schedule loaded on the iPhone and stating the task direction to the participant (e.g., "Make a cup of coffee with the Keurig"). Participants then selected the first visual on their activity schedule, beginning the session duration. Sessions occurred for an average of 35 s during baseline or control conditions and 5 min length during intervention conditions.

Baseline Condition

During baseline sessions, the application was loaded with a single static picture representing the task. Once selected, the application would audibly state the task direction (e.g., "Make a cup of tea") without providing any video prompts. During baseline

sessions, the implementor did not provide any prompts. If the participants asked for assistance, they were redirected and/or asked to continue engaging in the task. The session concluded when participant completed the task, the participant did not respond or made consecutive errors for 30 s, if the participant indicated that they were finished, or after the participant indicated that they did not know what else to do. The implementor provided general praise. Baseline sessions were conducted for a minimum of 3 sessions.

Comparison Condition

During instructional sessions for both the instructor-delivered reinforcement and the self-reinforcement conditions, the video activity schedule included an icon for each step of the task analysis. Prior to the start of the session, the instructor set up the environment as described in the general procedures. The implementer also set out the token board and a dry erase marker. The attentional cue was given as described in the general procedures. When delivering the task direction, the implementer would state which individual, either the implementer or the participant, was in charge of providing reinforcement during that session and how many checkmarks they needed to earn to access reinforcement (e.g., “For this session, you are going to give yourself a check after you have completed each step. If you get 8 of the 15 checks, you can have some free time on the device”). Once the participant selected the first step of the task, starting the session duration, a video prompt played demonstrating and narrating the correct response for that step. After the video was finished, the participant had 5 s to initiate the step. If the participant did not initiate the step within that time frame or began to engage in an incorrect response, the instructor would provide a physical prompt in the form of hand-over-hand guidance to assist the participant in the completion of the step. At the

completion of each step, the participant moved the task step image to the right on the Choiceworks screen, and the application would audibly say “All done.” Comparison sessions were conducted for a minimum of 5 sessions for each condition.

Instructor-Delivered Reinforcement. During these sessions, the instructor delivered tokens contingent on the participants’ responding. Reinforcement was delivered on a continuous reinforcement schedule, in which token reinforcement was provided upon the participant’s completion of each step of the task analysis regardless of whether physical prompting was necessary or not. If the participant engaged in an incorrect response, the instructor would block the incorrect response if necessary and physically prompt the correct response. The instructor did not deliver a token if the participant engaged in an incorrect response. After completing the task and earning at least 8 tokens, the participant was provided the option of two applications identified from their preference assessment to engage with for 5 min. During baseline, the most correct responses made by a participant was 7 out of 15 steps. Therefore, 8 of 15 correct responses was chosen as the criteria for reinforcement to make reinforcement attainable with, but still require all participants to improve when engaging in tasks in the comparison condition to access the reinforcer.

Self-Reinforcement. During these sessions, the participants delivered their own tokens by placing a check mark on the token board. The delivery of reinforcement after the task was similar to the delivery of reinforcement described in the instructor-delivered reinforcement condition.

Control. During the control condition, procedures were identical to those described in baseline.

Probe

Probe sessions were conducted if a superior treatment could not be determined by the data collected during treatment sessions. The procedures for probe sessions were identical to baseline procedures. All three tasks were probed to determine if the participant could complete the tasks without the video prompting or token reinforcement. This was done as an additional effectiveness measure and to see if there was a difference without the video prompting or token reinforcement. Results of this condition demonstrated how the participants maintained the steps of each skill independent of prompting or reinforcement.

Best Alone

After a superior treatment was determined, the participant completed their control task using the identified superior method of reinforcement. Best alone sessions were identical to the treatment conditions. The method of reinforcement delivery and procedures utilized was determined by the data collected during the comparison condition and the probe.

Inter-observer Agreement and Procedural Fidelity

Inter-observer agreement (IOA) data were collected using the point-by-point method (Cooper, 2019). IOA data were collected for at least 20% of sessions in each condition for all participants. The minimal acceptance percentage of agreements is 80%. An agreement was scored if the observers recorded the same participant responses within each step of the task analysis. IOA was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying the result by 100 to obtain a percentage of agreement. If the percentage of agreement during any session fell

below 80%, the observer and the implementer met to discuss the disagreements before implementing any more sessions. Table 5 provides all IOA data collected on each participant for each condition.

Procedural fidelity (PF) data were collected to ensure accurate implementation of procedures. Procedural fidelity data were collected at the same time as IOA data. As the implementer conducted a session, a secondary observer collected data on the implementer's implementation of the procedures. PF data were collected on environmental set-up procedures (i.e., iPhone loaded accurately, needed materials available and arranged according to the video, token board and marker available) and session implementation procedures (i.e., attention cue delivered, introduced condition description, provided task direction, started/stopped duration timer, delivered tokens on CRF schedule, provided physical prompt as needed, and gave general praise for working at task completion). A correct response was recorded if the implementer engaged in a behavior that was defined in the procedures. An incorrect response was recorded if the implementer did not engage in a step in the procedures or they implemented the step incorrectly. Procedural fidelity data were calculated by dividing the number of correct responses by the number of opportunities to respond. The result of this was divided by 100 to create a percentage of procedures implemented with fidelity. Refer to Appendix D for a visual representation of data sheets used during the study. PF data are represented in Table 5 for each participant in every condition.

Table 5 *IOA and PF data by Condition and Participant*

	Baseline	*Comparison*

Participant	*%age of sessions*	*Mean IOA*		*Mean PF*	*%age of sessions*	*Mean IOA*		*Mean PF*
		%age correct	*%age on task*			*%age correct*	*%age on task*	
Destiny	33%	100%	100%	99%	20%	100%	100%	100%
Ethan	33%	100%	100%	100%	20%	96%	97%	100%
Thomas	33%	96%	100%	100%	20%	100%	100%	99%
Amelia	25%	100%	100%	99%	20%	100%	100%	100%

Participant	*Probe*				*Best Alone*			
	%age of sessions	*Mean IOA*		*Mean PF*	*%age of sessions*	*Mean IOA*		*Mean PF*
		%age correct	*%age on task*			*%age correct*	*%age on task*	
Destiny	100%	98%	100%	100%	33%	100%	100%	98%
Ethan	N/A	N/A	N/A	N/A				
Thomas	100%	93%	100%	100%	33%	100%	100%	100%
Amelia	100%	100%	100%	100%	33%	100%	100%	100%

RESULTS

Percentage Correct Responding

A demonstration of effect for both interventions was observed across all four participants between baseline and comparison conditions. This indicates that both instructor-delivered and self-delivered reinforcement paired with video activity schedules were effective in teaching the vocational tasks to all four participants. To identify the most effective treatment, first, trials to criterion were considered. If the number of trials to criterion were the same, a probe was conducted to identify which skills the participants retained without needing the video activity schedule. If the data collected from both conditions during the probe were the same, the participants were asked which form of reinforcement delivery they preferred. The results indicate that there is a minimal difference in efficiency and effectiveness between the types of reinforcement delivery.

Figure 2 depicts the percentage of Destiny's correct responses in each condition. During baseline, Destiny performed each task at low levels ranging from 0% to 20%

correct responding. This translates to zero to three correct steps completed out of 15. The data for the control (i.e., the open squares) and the instructor-delivered reinforcement (i.e., the closed triangles) tasks were zero-celerating. Destiny's data for the self-delivered reinforcement task (i.e., closed circles) were decelerating in a countertherapeutic trend. During the comparison condition, Destiny's control task data were consistent to baseline performance, indicating that the implementation of multiple treatment interference did not take place. Data for both self-delivered and instructor-delivered reinforcement tasks immediately increased to high levels in a therapeutic trend. Destiny's performance during both intervention tasks was nearly identical. She reached criterion for both tasks within 5 sessions which indicates that they were equally effective and efficient to acquire vocational tasks. During the probe, the control task stayed at low levels similar to baseline and comparison conditions. Destiny was able to perform both the self-delivered and the instructor-delivered reinforcement tasks with 100% accuracy without the video activity schedules or any additional reinforcement. This indicated that she fully acquired both tasks and was able to maintain performance independent of supports. Because there was no difference in the data between the types of reinforcement delivery, the researcher asked Destiny which method of reinforcement delivery she preferred, and she selected instructor-delivered reinforcement; therefore, instructor-delivered reinforcement was applied to the control task during her best alone condition. During the best alone condition, an immediate increase was demonstrated with the control task. Destiny completed the task with 100% accuracy for 3 consecutive sessions obtaining mastery. This demonstrates that a replication of the effect of implementing instructor-delivered reinforcement on the control task was achieved.

Figure 2. *Percentage of independent correct responses for Destiny*.

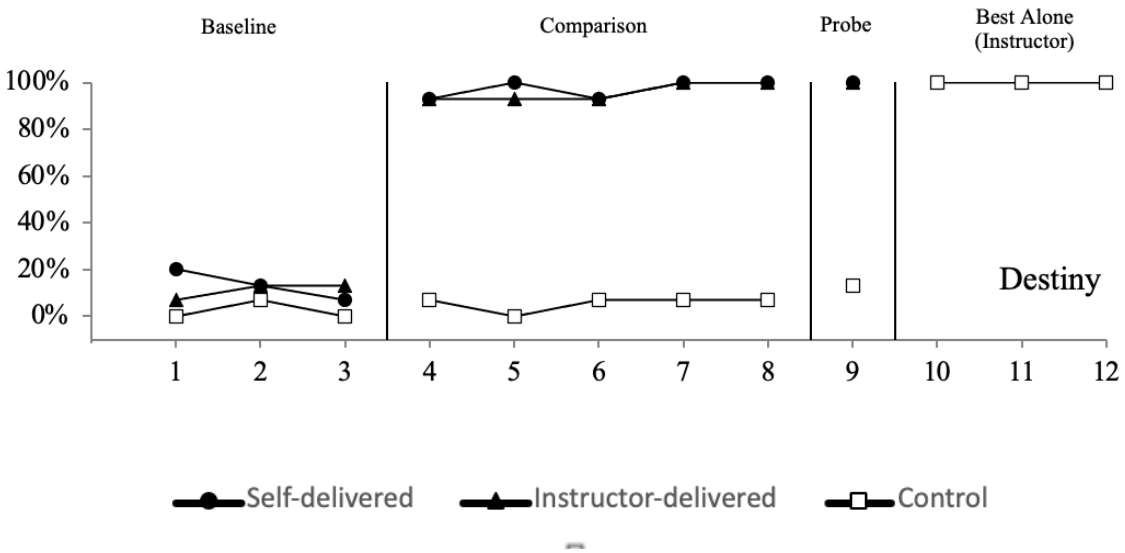


Figure 3 depicts the percentage of correct responses of Ethan in each condition. Data during baseline for Ethan was consistently low at 0% for all three tasks each session. During the comparison condition, there was an immediate increase in the level for both self-delivered and instructor-delivered reinforcement tasks. Data continued to accelerate trend. During this condition, control stayed at low levels consistent to baseline performance indicating that mutitreatment interference did not occur. The instructor-delivered reinforcement task reached mastery within five sessions. Ethan never performed to mastery criterion with the self-delivered reinforcement task during this condition. This indicated that instructor-delivered reinforcement was the superior intervention for Ethan. Because this distinction was able to be made during the comparison condition, a probe was not necessary for this participant. During the best alone condition, data were XXX until reaching mastery criterion in X sessions.

Figure 3. *Percentage of independent correct responses for Ethan.*

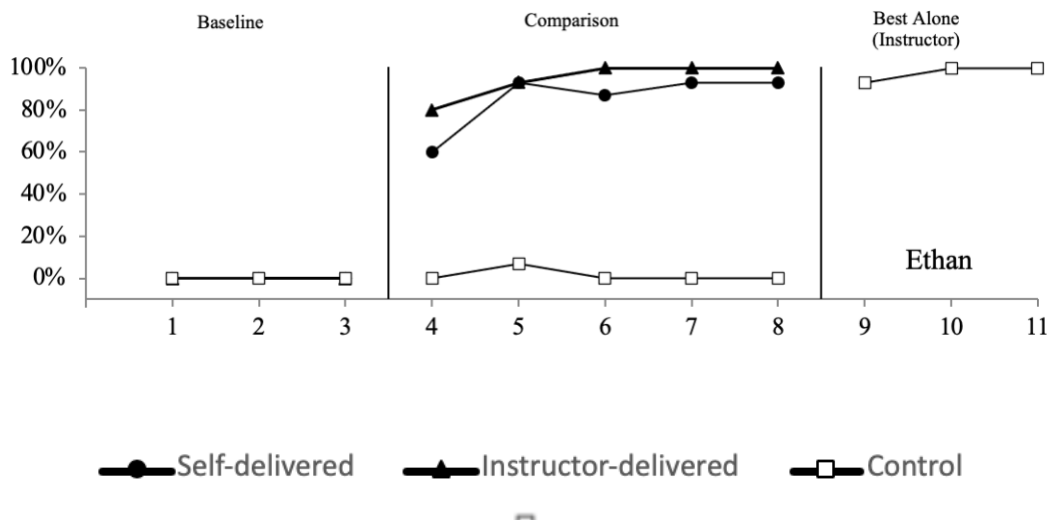


Figure 4 depicts the percentage of correct responses of Thomas in each condition. During Thomas' baseline condition, data for all three tasks were stable with a zero-celerating trend. This indicates that he was not making any progress in acquiring the tasks independently and that an intervention was necessary to acquire these skills. During the comparison condition, data for the control task continued at a low level and with a zero-celerating trend. An immediate increase in level was demonstrated during the comparison condition in the instructor-delivered and self-delivered reinforcement tasks. Data were almost identical for these two tasks during this condition, with both tasks reaching criterion within five sessions. Therefore, a probe was necessary to determine the superior treatment. During the probe, Thomas maintained the instructor-delivered reinforcement task with 100% accuracy, whereas he completed the self-delivered reinforcement task with 93% accuracy. According to the results of the probe, instructor-delivered reinforcement was a more effective intervention compared to self-delivered reinforcement. During the best alone condition, there was an immediate and abrupt change in level of Thomas' performance on the control task. During the best alone

condition, data were accelerating in a therapeutic trend until reaching mastery criterion in X sessions.

Figure 4. *Percentage of independent correct responses for Thomas*.

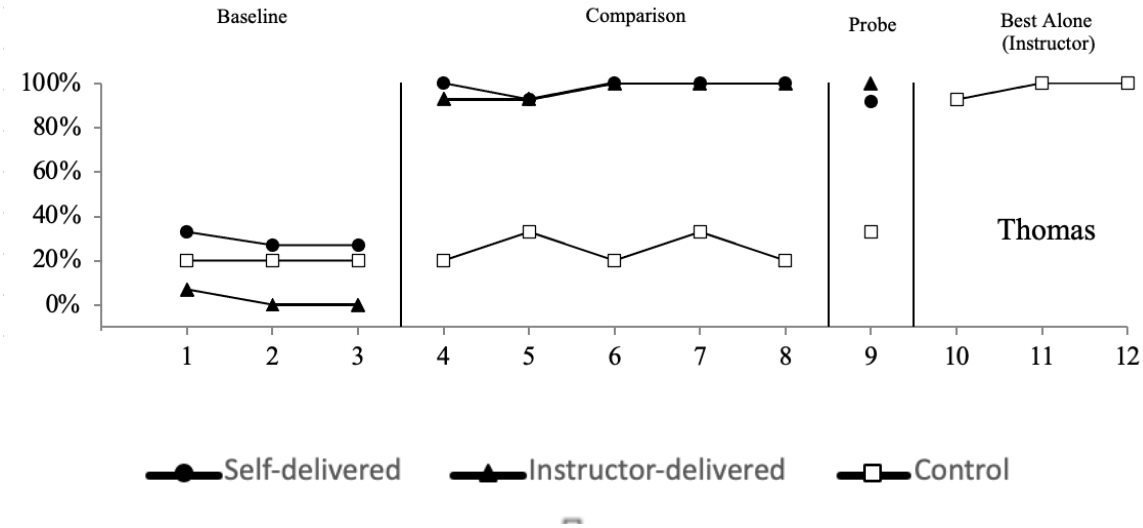
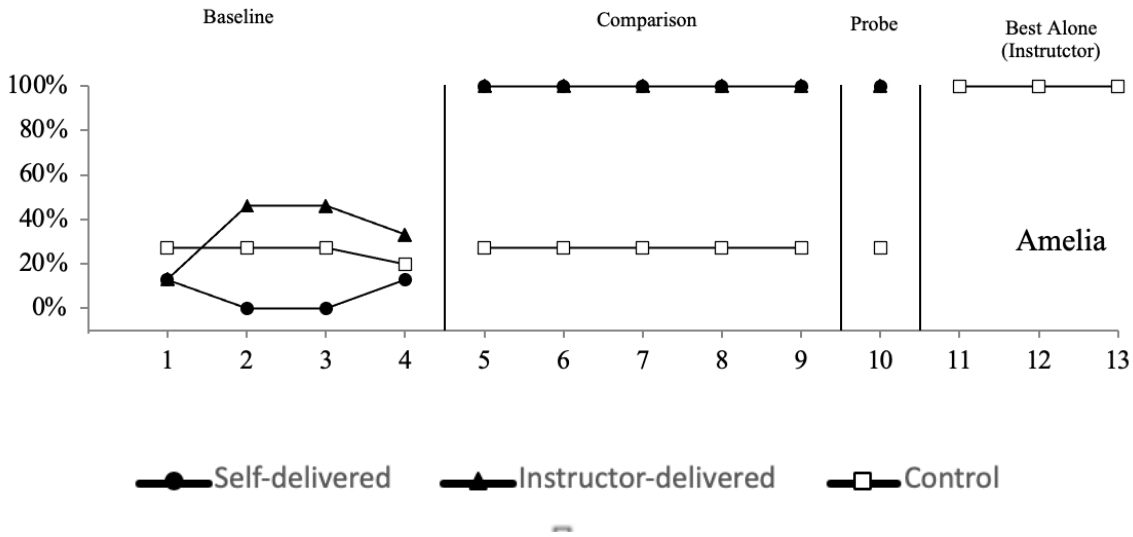


Figure 5 depicts Amelia's percentage of correct responses in each condition. Amelia's data during baseline for the self-delivered reinforcement and control task were stable during the first three sessions. However, data for the instructor-delivered reinforcement task increased in a therapeutic trend in the second session. Therefore, a fourth session of baseline was conducted to ensure that she was not making progress on that skill independently. During the comparison condition, there was an immediate increase in independent performance in both the self-delivered and the instructor-delivered reinforcement tasks. Amelia performed both tasks at 100% accuracy for all 5 sessions. Independent performance data during the control task remained consistent at 27% during all 5 sessions. Because data were identical between the self-delivered and the instructor-delivered reinforcement task, a probe was conducted to determine the superior treatment. During the probe, data were identical to the comparison condition. Therefore,

to determine a superior treatment, Amelia was asked to choose her preferred method of reinforcement delivery. Amelia indicated that she preferred instructor-delivered reinforcement to self-delivered reinforcement.

Figure 5. *Percentage of independent correct responses for Amelia.*

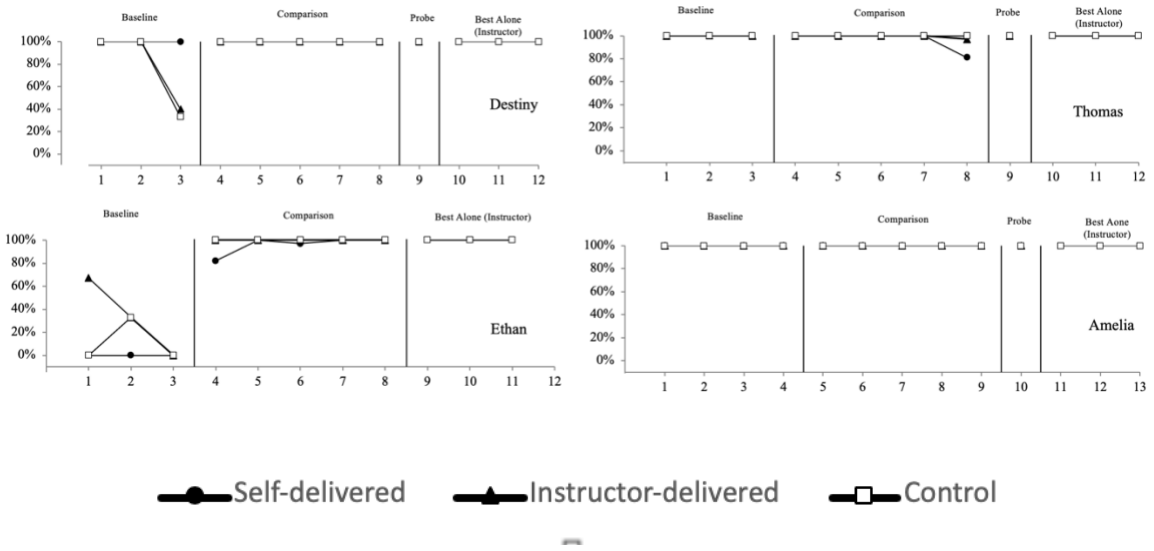


Percentage of Intervals On-Task

Figure 6 shows the percentage of intervals participants engaged in on-task behavior. The percentage of on-task behavior for Destiny, Thomas, and Amelia was at 100% during the majority of every condition. This indicates that the implementation of intervention did not have an effect on the participant's on-task behavior. Ethan did engage in low levels of on-task behavior during baseline. His data for the self-delivered reinforcement and control tasks were stable and zero-celerating. The instructor-delivered reinforcement task was decelerating in a countertherapeutic trend. During the comparison condition, there was an immediate increase in on-task behavior for all three tasks. Data were stable and at high levels ranging from 80% to 100% on task. This indicates that the

implementation of intervention affected the participant's on-task behavior across all three tasks. Because there was also an immediate effect in the control task, it is not clear which intervention, if either, or both, affected the participant's on-task behavior. Instructor-delivered reinforcement task was decelerating in a countertherapeutic trend. During the comparison condition, there was an immediate increase in on-task behavior for all three tasks. Data were stable and at high levels ranging from 80% to 100% on task. This indicates that the implementation of intervention affected the participant's on-task behavior across all three tasks. Because there was also an immediate effect in the control task, it is not clear which intervention, if either, or both, affected the participant's on-task behavior.

Figure 6. *Percentage of intervals on-task for all participants.*



DISCUSSION

The current study compared the effectiveness between self-delivered and instructor-delivered reinforcement when using video activity schedules to teach high

school students' vocational tasks. The benefits of self-reinforcement with the video prompting were that the learner would be able learn a skill with minimal presence from an instructor. This study does support that a learner could acquire a skill using self-reinforcement. However, all four participants either personally preferred or their data indicated that instructor-delivered reinforcement was a more effective or efficient form of instruction. The results of this study are similar to the results of the replicated study, Beaver et al. (2017), which found that the forms of reinforcement were similar in efficiency.

Another measure that was collected was the duration of time across all sessions. Duration data were not included because the length of completing the tasks was never compared to how quickly it would normally be completed by others in a predetermined peer group. It was collected to measure the intervals of on-task behavior. However, in analyzing the duration of each session, the duration data indicated that instructor-delivered reinforcement sessions were almost always shorter in length in comparison to the self-delivered reinforcement tasks. This could be a reason that the participants who got the chance to select a preferred method chose instructor-delivered reinforcement instruction. During self-delivered reinforcement sessions, they had to stop the flow of completing the task to deliver their checkmark. However, during instructor-delivered reinforcement sessions, they were free to continue to the next step while the instructor delivered the token. Time was also a factor in preparing the participants for the study. It took several days for participants to reach mastery on self-delivering tokens during the coaching sessions. This adds even more instructional time to the already lengthier self-delivered reinforcement learning sessions.

The results of this study question the social validity of self-reinforcement. The results for two of the participants indicated that self-reinforcement was less efficacious. The other two participants were given the choice and both preferred instructor-delivered reinforcement. The participants of this study were students in a classroom where the instructor is the main deliverer of reinforcement, which makes that delivery of reinforcement more common and thus might have impacted their preference. But even in larger general education classrooms, students access social reinforcers from others, such as school-wide rewards, instructor-delivered praise, and social recognition from peers. Outside of education contexts, adults perform tasks to access reinforcement delivered from others. For example, doing laundry to escape negative attention, going to work to earn a paycheck, or posting a picture on social media to be acknowledged by others. Even within the current study, Thomas always brought one of his finished products (e.g., a hot cup of tea) back to his classroom to give to someone else. Even though he oversaw the delivery of his checkmarks to earn a break with his selected reinforcer, his completion of the task may have still been reinforced by the attention he received once he delivered the finished product to a peer or staff member. Self-management is important for students to develop transitioning into adulthood; however, self-reinforcement may not be socially valid or worthwhile to teach students if, once they graduate, they will access reinforcement from others anyway.

Limitations

There were a few limitations to this study that should be noted. One limitation was identifying participants for the study. Participants were selected if they demonstrated that they did not have any knowledge of the tasks selected and met the participant

inclusion criteria. They were not selected based on their history of off-task behavior. Two of the participants selected, Destiny and Ethan, had previously been observed engaging in off-task behavior. However, because Destiny rarely engaged in off-task behavior during the sessions, this may have been an abnormal occurrence for her. Her off-task behavior may have also been affected by the environment of the study. Because she was working with new individuals and in a new setting, she may have been more engaged in instruction. According to the baseline data collected, Destiny, Thomas, and Amelia's did not engage in concerning levels of off-task behavior, therefore there was no need to intervene on that behavior.

Another limitation to this study was the participant's performance was never assessed either without video prompts used or without either form of reinforcement. During the comparison condition in both instructor- and self-delivered reinforcement sessions, both strategies were implemented at the same time. Therefore, the results of this study reflect the implications of implementing both strategies at once. However, there is a possibility that the results of the study could have been a result of the implementation of either of the strategies independently and the other strategy had no effect on the participants' behavior.

Implications

The findings of this study indicate that video activity schedules are an effective strategy to teach vocational skills with minimal presence from an instructor during self and instructor-delivered reinforcement. Video prompting loaded within schedules may be more time consuming to set up initially, but it needs less attention from the instructor in the long run. Future research should evaluate the duration of the time it takes to create the

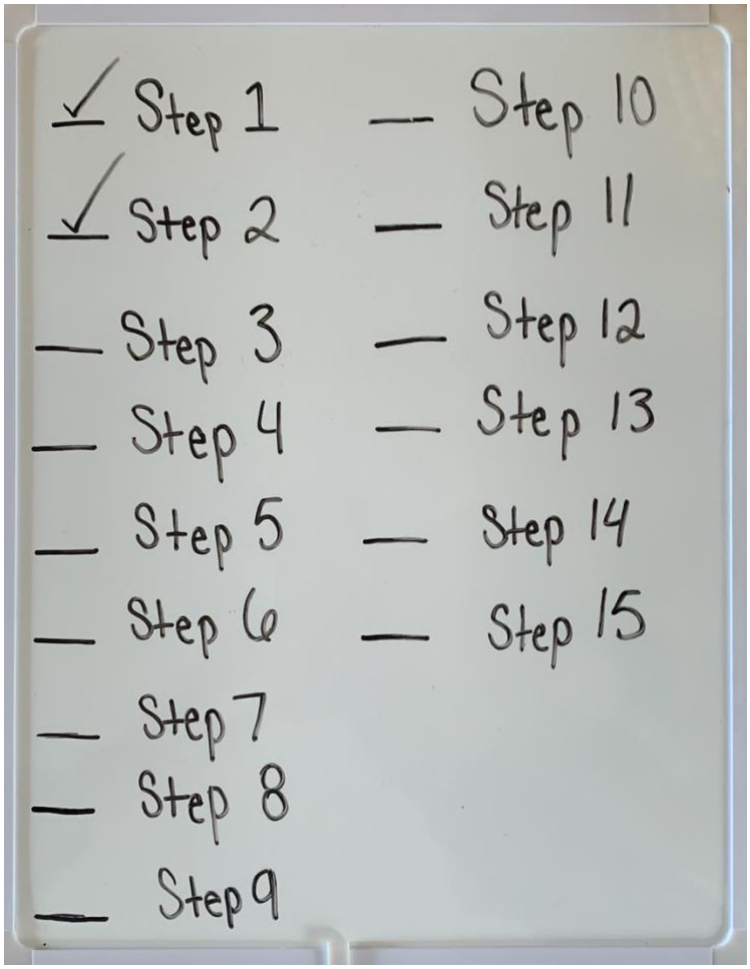
video models, as well as the implementation of instruction when using video prompting versus implementing instruction in vivo.

The findings for this study were inconclusive for off-task behavior. Therefore, future research could replicate this study with participants who have a more reliable history of engaging in off-task behavior.

The findings of this study also suggest that self-reinforcement may not be a critical component of self-management procedures. Future research could evaluate the efficiency of self-management as a package versus self-management without the self-reinforcement component.

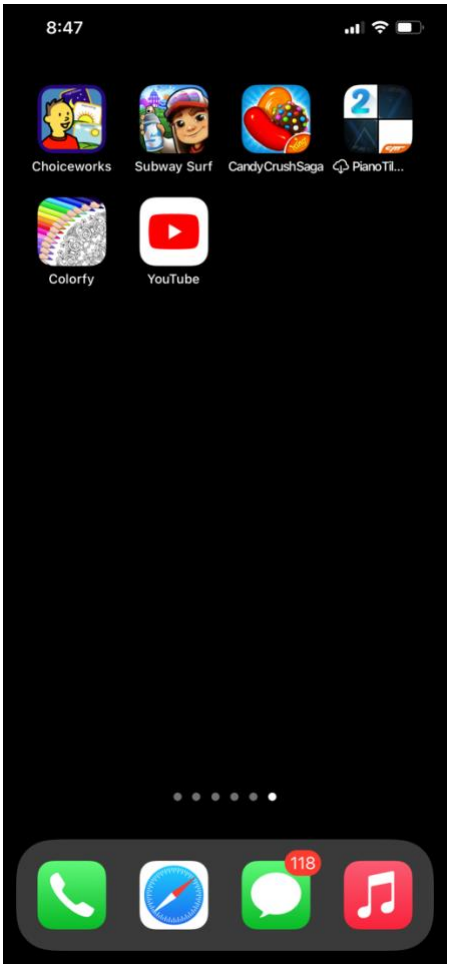
APPENDIX A.

Photo of Token Board



APPENDIX B.

Screenshot of Applications Used



APPENDIX C.

Screenshot of Video Activity Schedule

APPENDIX D.

Data Sheets

Circle one: **PRIMARY** **RELIABILITY**
Condition (circle one): student-delivered
Participant Initials: _____ Session #: _____ Date: _____ Time: _____ Data Collector: _____

Environmental Set-up:	**+ or -**
iPod set up correctly: *Ensure coffee cart schedule 1B*	
Watch video activity schedule for making coffee with coffee maker	
Materials needed for task: coffee machine (plugged in, empty, and clean), filters, coffee tub (on top shelf of cart), large scoop (in container), pitcher of water (at least 4 cups full, on filling cabinet)	
*Token board and marker ready for **student** to use*	
Fill out top of data sheet	

Pre-session fidelity:	**+ or -**
Delivered attentional cue and waited for attentional response **(e.g., "It's time to do your coffee cart work." & nod, eye contact, "ok")**	
Introduced condition **(i.e., "During this session, you are going to give yourself a checkmark after you complete every step. If you get 8 out of the 15 checkmarks, you will get some free time.)**	
Correct task direction provided **(i.e., For this task, you are going to make a pot of coffee with the coffee machine")**	
Once participant selects the vocational icon, **start timer**	

***On-task behavior: Visually attending or physically engaging with activity schedule or materials and comments on task*

	Making a Pot of Coffee with the Coffee Machine							**Fidelity Only**
Task Steps:	BEFORE prompt	AFTER prompt					Token delivered (check if yes)	CTD* (+ or -)
1. Lift coffee machine lid	+ -	+ - NR	0:1	0:2	0:3			
2. Place a filter in coffee machine	+ -	+ - NR	0:4	0:5	1:0			
3. Open coffee tub	+ -	+ - NR	1:1	1:2	1:3			
4. Get large scoop	+ -	+ - NR	1:4	1:5	2:0			
5. Get one scoop of coffee and pour coffee into filter	+ -	+ - NR	2:1	2:2	2:3			
			2:4	2:5	3:0			
6. Put scoop back	+ -	+ - NR	3:1	3:2	3:3			
7. Close coffee tub	+ -	+ - NR	3:4	3:5	4:0			
8. Place coffee pot on table	+ -	+ - NR	4:1	4:2	4:3			
9. Open lid of coffee pot	+ -	+ - NR	4:4	4:5	5:0			
10. Pick up the pitcher and fill coffee pot to 4 cups	+ -	+ - NR	5:1	5:2	5:3			
			5:4	5:5	6:0			
11. Close lid of coffee machine	+ -	+ - NR	6:1	6:2	6:3			
12. Pour water into the machine	+ -	+ - NR	6:4	6:5	7:0			
13. Place coffee pot in machine	+ -	+ - NR	7:1	7:2	7:3			
14. Close lid on coffee machine	+ -	+ - NR	7:4	7:5	8:0			
15. Press the "on" button	+ -	+ - NR	8:1	8:2	8:3			
Once last step complete, **stop timer**	**Duration (mm:ss):**						**+ or - :**	
Task Performance Inp. Correct:	# B+							

**Implementer correctly delivered the controlling prompt with 5 s latency after the presentation of the stimulus or the completion of a previous step (unless participant error initiated); Fidelity Errors could include: shorter/longer latency*

Post-session fidelity:	**+ or -**
Following completion, general praise for working (e.g., "thanks for working") and sent back to class	

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