

The Effects of Video-Based Instruction on Employment-Related Social Behaviors for College Students with Intellectual and Developmental Disabilities


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Abstract

Having poor social skills is a leading factor why individuals with intellectual and developmental disabilities (IDD) lose their jobs. Fortunately, the use of technology has made learning and teaching social skills more seamless and integrated in employment contexts. We conducted a multiple-probe-across-participants single-case experimental design study to evaluate the effects of video-based instruction on the employment-related social behaviors of three college students with IDD enrolled in a comprehensive transition program at a large public university. Results indicated small to moderate effect sizes for all three students. Participants found the intervention to be helpful in improving their employment readiness skills. We discuss implications for research and practical ways technology can be used to support college students with IDD to strengthen their employment-related social behaviors.

Keywords: video-based instruction, employment skills, intellectual and developmental disabilities, visual analysis, Tau-U

Plain Language Summary

- Individuals with intellectual disability and autism may experience difficulty in getting access to or maintaining a job.
- Enrolling in inclusive postsecondary education programs may provide these students with real-world-work experiences.
- **What we did in this study:** We presented video-based instruction to three participants via an iPad with additional features in the videos such as text

bubbles to indicate when a vocal initiation or response was happening and labels to indicate who each person in the video was representing.

- The intervention was designed entirely using free apps (i.e., YouTube, Vita) that are widely available on all computers and smartphones.
- **Findings:** All participants learned new social skills and found the video-based instruction to be helpful.
- **Conclusion:** This study affirms the importance of employment-related social behaviors and offers a free, accessible, and sustainable way to teach these skills to students with IDD using YouTube and handheld technology.
- Practitioners can apply this type of instructional approach in classroom and community settings to equip students for competitive, integrated employment.

College represents a time when many students often explore different job opportunities to help identify their career paths. Engaging in a part-time job or internship can be a way for students to find jobs that align with their skills and interests. A career or job can help any person feel included within their community, and propel them toward independence (Hagler et al., 2015). Alongside the proliferation of inclusive postsecondary education (IPSE) programs, many students with intellectual and developmental disabilities (IDD) can attend college classes, live on campus, and participate in vocational experiences to equip them for lifelong careers.

Grigal et al. (2017) cite promising findings regarding employment and students with IDD enrolled in ISPE programs. Specific outcome data is available annually for model demonstration programs appropriated by the Higher Education Opportunity Act (2008) to fund Transition and Postsecondary Programs for Students with Intellectual Disability (TPSID) within the U.S. Department of Education. Grigal et al. (2017) reported that 76% of students who exited TPSID programs at year five had a paid job, participated in unpaid career development activities or they were doing both. Additionally, 68% of students reported completion of the program and an earned credential as their main reason for the exit from the TPSID programs followed by 15% completion of degree or certificate program as the next reason for the exit. Grigal et al. (2021) stated that 59% of those who exited IPSE programs had paid jobs within a year; within two years it increased to 66%. This positive trend in employment outcomes for college graduates with IDD suggests that the targeted employment preparation provided by IPSE programs is effective in shaping career trajectories.

Employment preparation and job coaching in IPSE programs often emphasize independence in job-specific tasks as well as employment-related social behaviors (Moore & Schelling, 2015). These experiences provide students in IPSE programs with opportunities to work alongside others without disabilities and learn social skills in competitive and integrated employment (Gilson & Carter, 2016; Izzo & Shuman, 2013).

Employment-Related Social Behaviors

According to Carter and Wehby (2003), employers expect employees to be equipped with interpersonal skills that meet the social expectations of any job setting. Agran et al. (2016) confirmed the importance of social skills (e.g., seeking clarification for unclear instructions, interacting well with customers) from a national sample of professionals who provide transition services. In addition, poor social skills could have a devastating impact on an individual's employability status, especially those with a disability (Storey & Miner, 2011). Ju et al. (2012; 2017) asserted the importance of social skills as highly valued by employers for both persons with and without disabilities. The most important skills were basic skills (e.g., reading, writing, communication), basic work skills (e.g., seek help, be a team player), social skills (e.g., socially acceptable language, respect for others), personal traits (e.g., personal interest in work, adapt to change), and critical thinking skills (e.g., self advocate, goal setting).

The addition of a social component to employment instruction in IPSEs could help young adults with IDD adapt to the unpredictable nature of working in an inclusive setting (Gilson et al., 2017). The National Technical Assistance Center on Transition (NTACT, 2021) describes work readiness skills as skills and behaviors needed for any job. These can include social-related (e.g., interactions with coworkers and supervisors) and task-related (completing work tasks on time and correctly) and work production tasks (e.g., performance). Therefore, a student must have a diverse repertoire of social-related and task-related skills to be successful at a job. In this study, we use the term "employment-related social behaviors" (ERSB) to describe two types of social behaviors often exhibited in the workplace. Based on the definition conceptualized by Carter and Wehby (2003), ERSB comprises task-related social behaviors and nontask-related social behaviors, both of which are essential for social fluency in the workplace. Carter and Wehby defined task-related social behaviors as interactions which are required for the performance of the job, such as asking coworkers for help or asking for clarification. Nontask-related social behaviors are not directly related to the performance of the job, but are intended to socialize and build relationships with others. Examples include making "small talk," responding to a joke, or offering compliments.

Video-Based Instruction to Teach ERSB

Gilson et al. (2017) reviewed the literature on instructional methods to teach employment skills to secondary students with IDD and found eight categories of intervention approaches used to promote these skills. Instructional approaches included self-management, video-based, audio-based, picture and tactile-based, direct instruction, augmentative and alternative communication, simulation, and peer-delivered. In the review, all eight interventions had at least 75% of studies with strong positive or positive outcomes. Gilson et al. further demonstrated the increasing popularity of technology-based interventions alongside the exponential growth of technology across all aspects of daily life. In particular, technology-based interventions that can be delivered by a portable electronic assistive technology (PEAT), such as a smartphone or tablet, are useful because they are more discreet and less stigmatizing when receiving instruction in a community-based setting, such as a workplace (Collins & Collet-Klingenberg, 2018).

One such effective intervention practice is video-based instruction (VBI), which is an umbrella term combining elements of video modeling and/or video prompting (Gilson & Carter, 2018). According to Alberto et al. (2005), video prompting is an instructional approach in which a skill is broken down into short sequential video clips, the student is asked to imitate the actions observed after each clip, and the instructional coach provides feedback. Video modeling consists of one short video which shows a skill being performed from start to finish, and the student is then asked to imitate the same skill (Alberto et al., 2005). Park et al. (2019) conducted a systematic literature review exploring the use of video modeling and video prompting to teach various skills to individuals with intellectual disability. Their review summarized the positive effects of VBI to promote a wide array of skills (e.g., social, functional, socio-communicative, and daily living skills) for individuals with IDD (Gardner & Wolfe, 2013; Park et al., 2019).

VBI can be used to program common stimuli and can serve as a contrived mediating stimulus used to promote generalized behavior change. According to Cooper et al. (2020), a smartphone or a tablet can serve as a mediating stimulus if the device or stimulus prompts the student to perform the target behavior and is easy to transport from the instructional to generalized setting. Cooper et al. mentioned how it can be challenging to conduct training sessions in the actual place of employment, so VBI allows a way for students to receive instruction in a simulated environment.

In addition to the established success of VBI across settings, it is especially important to consider how VBI can supplement or replace the need for in-person job coaches in proximity to the student for the duration of their employment task. A job coach may bring more unwanted attention to students with disabilities, which may have an impact on social opportunities (Gilson & Carter, 2016; 2018). Given this finding, employers, practitioners, and young adults with IDD should rely on technology to access instructional videos at their discretion via a more normalized medium (i.e., smartphone).

Although VBI has shown promise in other settings, it is still an emerging intervention in research on students with IDD in IPSE programs. In a scoping review of recent research related to IPSE programs, only 23 of the 68 included studies were interventions, with only three focusing on social and vocational skills in integrated employment settings (Whirley et al., 2020). Two focused on interventions related to VBI. First, Schoenherr (2018) used video modeling to teach young adults in a postsecondary program vocational skills. Results indicated that video modeling was effective in teaching job related skills (e.g., using a lawnmower, picking up litter, sweeping). Second, Cullen et al. (2017) studied the effects of self-directed video prompting on three young adults with IDD attending a postsecondary education program. All participants were able to learn their vocational skills in their employment settings and also generalized these skills. Cullen et al. recommended more research on social skills in the same context.

The purpose of this study was to assess the effects of VBI on ERSB in college students with IDD completing internships at competitive, integrated employment sites on a large, public university campus. Specifically, we sought to answer the following research questions:

1. Does VBI improve the independent ERSB for college students with IDD?
2. To what extent do ERSB generalize to different job sites?

Method

Setting

The study took place within a four-year, inclusive, residential, certificate-based IPSE program at a large public university in the south central United States. The program is a comprehensive transition program and one of the grantees in the third cohort of TPSID funding (2020-2025). In addition to TPSID funding, the program receives financial support from philanthropic efforts and donations. As a comprehensive transition program, all students can apply for federal financial aid and scholarships.

All students adhere to the same schedule and student conduct expectations as their degree-seeking counterparts at the university. For the first two years, all students are fully immersed in the campus community, including inclusive academic coursework, living on campus in inclusive residence halls, joining student organizations, and attending seminars to learn about study skills and time management. University-based coursework includes an expansive catalog of interdisciplinary courses that can be selected by the student with approval from the faculty. During the last two years of the program, students still take inclusive classes, but they typically live off campus with friends or peers and typically work off campus. Throughout the four years, students can join student organizations, participate in academic advising, access health and fitness centers, utilize the campus transit system, and access all campus resources and facilities (e.g., recreation center, library). Program staff work closely with many departments on campus through a Faculty Advisory Committee (i.e., faculty representatives from many colleges and departments across campus) and a University Steering Committee (i.e., staff representatives from departments focused on student affairs and student services). Key collaborators include Disability Resources, Residence Life, and Student Life.

In addition to university-based services, the program employs several full-time staff members and graduate assistants to coordinate program-specific services such as training job coaches, teaching seminars, and working with families. At the time of the study, the staff included a faculty director, program manager, job developer, internal program evaluator, and three graduate assistants, each focused on key domains of employment, academics, and independent living.

The academic advising structure of the program is individualized for each student through person-centered planning, a collaborative process led by the student with support from the program staff, their family, and peers. At least once per semester, students showcase their person-centered planning goals and accomplishments to faculty, staff, friends, and family members. Beginning in their first year, students in the program participated in an internship, typically rotating each semester to different sites on campus and in the community. The job developer selected internships for each student based on their interests, work experience, and career goals, and in consultation with the student and their family. The internships could be paid or unpaid and often included support from

a job coach, an undergraduate or graduate student who accompanied students to their work shifts and provided on-the-job support and performance feedback. Job coaches were trained to fade support gradually as they deemed appropriate, given each student's level of independence and integration in the workplace. Students worked between four and ten hours per week at their internships, which typically took place on campus for the first two years. As they advanced in the program, their internship placements became more specialized and aligned with their career goals.

Participants

The study took place in the 2021-2022 academic year. After receiving approval from the Institutional Review Board, the first author held an informal presentation on the study with all students potentially interested in participating. In the meeting, students learned more about the study and asked any questions they had. An individual follow-up session was held to explain the study further and obtain consent from the three students who expressed interest. To participate in the study, students had to meet the following inclusion criteria: (a) be enrolled in the IPSE program, (b) have a documented diagnosis of an intellectual disability or developmental disability based on school reports or psychological evaluation, (c) be able to vocally imitate, (d) observe a model presented, (e) use verbal language to communicate, and (f) have basic knowledge on operating "smart" devices (e.g., smartphone, tablet). All students who gave consent were identified by program staff to need targeted support in communication and social skills. Their ability to imitate a model was assessed across different settings by IPSE staff and members of the research team. Each student spent about an hour with the lead researcher learning to navigate YouTube.

Michael

Michael was a 23-year-old sophomore, White man with intellectual disability, attention deficit hyperactivity disorder (ADHD), and speech impairment. He was previously employed at a movie theater for three years as a greeter and for five years as a volunteer at an athletic center. His prior internship included working at the university student center's front desk along with a couple of his coworkers. According to his pre-baseline observational assessment, Michael's employment skills were rated mostly poor as he would not take the initiative to greet customers and would struggle to help customers. Michael stated that his long term goal was to work full-time in a gym or as a fitness instructor and live independently or with roommates.

Freddy

Freddy was a 21-year-old sophomore, Hispanic man with a diagnosis of autism and intellectual disability. He worked at a local grocery store for a year before coming to college. He was in community college for a year before coming to the IPSE program. His prior internship included working as a research assistant where he met the instructor virtually once a week. According to his pre-baseline observational assessment, Freddy was observed engaging mostly in nonverbal language such as head nods, smiling, nonvocal communication such as "Mm-mm" while nodding to indicate "no," and one-word

or two-word responses (e.g., ok, thank you). The research team rated Freddy's employment skills mostly poor on his pre-baseline assessment, due to failing to respond to comments such as "nice to meet you" from different coworkers and failure to respond to conversations such as, "How did you like the tour?" Freddy's long term goal was to work in an inclusive setting either at a store or as a pharmacy technician.

Jason

Jason was a 20-year-old sophomore, White man with a traumatic brain injury and an intellectual disability. He worked at a grocery store before attending college for approximately 15 hours each week. His prior internship included working as a social media intern for the IPSE program. According to the pre-baseline assessment, Jason's employment skills were rated mostly poor as he would respond to some questions but would not reciprocate, his greetings would come off as inappropriate, he would fail to greet customers consistently, and he would not acknowledge coworkers. He also required help talking on the phone. Jason's long term goal was to work full-time in an inclusive environment, so that he can live independently.

Research Team and Support Staff

The research team included three graduate students, a faculty member in special education, a postdoctoral research associate in educational technology, and one undergraduate student. The first author was an advanced doctoral student in special education and a Board Certified Behavior Analyst who identifies as a Hispanic man. He supervised the research team and led the data collection process, as advised by the second author. The second author was an assistant professor of special education who identifies as a White woman. She had previous experience working in IPSE programs and conducting video-based interventions for students with IDD. The third author was a postdoctoral research associate working with the IPSE program with research expertise in educational technology who identifies as an Asian man. The fourth author is a doctoral student in special education who worked as a graduate assistant for the IPSE program and identifies as a Hispanic man. The third and fourth authors collected data to attain interobserver agreement (IOA). The fifth author is a doctoral student in research, measurement and statistics and identifies as an Asian woman.

All students worked with the same job coach at least once per week throughout the study. The job coach was a White female junior undergraduate majoring in Allied Health with plans to become an occupational therapist. She had worked with the IPSE program as a job coach for one semester prior to assisting with the research study. Due to scheduling constraints, the first author also served as a job coach once per week for Michael.

Internship Settings

All observations for baseline and intervention phases were conducted in the internship sites for each student during Fall 2021. Michael worked at the university's gymnasium, where he worked 1.75 hours per shift twice a week. His tasks included setting

up before customers arrived for their workout classes, greeting customers, asking for their names, and checking them in for their workout classes. Michael always worked with a coworker. When he was not checking in customers, he could converse with his coworkers as they waited for more customers.

Freddy worked in an office setting on campus, where he was responsible for sorting, stuffing envelopes, and matching the contents with customized address labels for each envelope. If he finished the tasks before his shift was over, he would go find a supervisor and ask for additional tasks. At the end of his shift, he would then take all sealed envelopes to the mailroom. Freddy worked twice a week for a total of four hours. Most of Freddy's social interactions came from supervisors and other coworkers who would pass by his workstation.

Jason also worked in an office setting twice a week for two hours, where he sat at the front desk. His tasks included greeting and assisting customers. He was also responsible for using the telephone and dialing extension numbers and relaying customers' messages to his supervisors. When he had free time, he could converse with one or two of his coworkers.

During the generalization phase, all observations were conducted in their employment site the following semester in Spring 2022. During the generalization phase, Michael stayed at the same location where he worked three days out of the week for a total of six hours per week. Freddy's generalization phase occurred during his internship as a research assistant, in which he worked independently on job tasks assigned by the professor. Freddy was a research assistant for a professor in entomology and helped with a literature review. He met the professor once a week to update him on weekly tasks. Data for Freddy was only taken as he interacted with the professor via Zoom. Jason's generalization phase took place at the university hotel where he worked once a week for three hours as a bellhop. Initially, he worked twice a week, but he requested to work once a week since it interfered with his classes. All three students worked on campus in both semesters and had job coaches to assist them in their work duties.

Experimental Design

This study is a conceptual replication of Gilson and Carter (2018). We used a multiple-probe-across-participants design (Ledford & Gast, 2018) to evaluate the effectiveness of VBI on ERSB. A concurrent multiple-probe-across-participants design allows for multiple replications across three participants at three different points in time. This design allows a comparison between the baseline (i.e., control) and intervention phase in each tier. This design also included a follow-up phase to collect generalization data. All participants had similar characteristics, which does not eliminate but minimizes the likelihood of inconsistent effects (Cooper et al., 2020; Ledford & Gast, 2018). Additional data collection was conducted to rule out the likelihood of testing before the intervention was introduced. Furthermore, we ensured that all students were not receiving any social skills instruction from any other faculty or staff member to ensure that behavior change was due to the intervention and not any other variables. The following was how the order of treatment was decided. The baseline level for all three participants were low

while trend had a decreasing trend or zero trend for all participants. Additionally, data variability were minimal to none in all baseline tiers. Data in all baseline tiers were stable before the intervention was first introduced to Michael. The intervention was then introduced to Freddy and then Jason after the data were stable for all participants.

Procedures

Selection of Target Skills. We used an adapted version of a questionnaire from Carter and Wehby (2003) to conduct a pre-baseline assessment and to determine the skills that would be targeted in the intervention. It was adapted by including more specific behaviors under “nontask related social behaviors” such as “student responds and reciprocates to coworker.” This specific ERSB was not listed under the category, so it was added for each student, since this specific ERSB was also observed in each setting. This form has also been used in prior research studies as an observational tool (Gilson & Carter, 2018). Since our study focused on ERSB, only social-related workplace behaviors were assessed. These skills were rated on the following Likert-type scale: *4 = very well, 3 = somewhat well, 2 = somewhat poorly, 1 = very poorly*. Data collectors could also select unsure if they did not have an opportunity to observe this behavior. The first and third author completed these forms by observing students at their internships prior to collecting baseline data. Some of the items under task-related social behaviors included: seeking clarification from coworkers or supervisors, offering or asking coworkers for assistance, following through with directions, and referring questions to others when unsure. Some of the tasks for *non-task-related social behaviors* included: making friends with co-workers, starting and/or responding to conversations with coworkers about work or nonwork topics, using polite language, and interacting well with customers. Areas of greatest need across all students focused on communication skills, specifically initiating and responding to others on the job site (e.g., coworkers, customers). Thus, we chose to focus VBI broadly on initiating and responding but with individual customization and common stimuli for each student and their internship setting. All students expressed a desire to learn these skills during the informal presentation.

Baseline. During the baseline phase, the job coach was instructed to engage in “business as usual” job coaching utilizing any procedure she had previously used to help the students. Data collectors recorded whether the target behavior occurred or not and if any assistance was provided, whether the student was engaged, and with whom the student interacted (e.g., coworker, customers, supervisors, or others). If the student did not engage in target behavior because there was no opportunity (i.e., no customers or coworkers around), data collectors documented what the student was doing at the time (e.g., job duties). Some of the students received instruction during baseline from supervisors on what to do and say, unrelated to the specific goals of the study. For example, Jason’s supervisor went through a list of things he must say to customers who come in. Even with this guidance, Jason’s performance in baseline had a decreasing trend.

Video-Based Instruction. The students watched video models in which members of the research team performed a realistic skit imitating a typical shift at each of their internship settings. We programmed common stimuli by including salient and physical

features from the work setting into our instructional format (Cooper et al., 2020; Stokes & Baer, 1977). All videos were recorded at their place of employment during a time when the students were not scheduled to work. Other stimuli included in the videos were commonly asked questions from customers, commonly used phrases used to help customers, and typical small talk that was observed at their job sites, such as game-day, finals, or graduation-talk between coworkers. Videos were separated into two categories: vocal initiations and vocal responses. Each student watched only their own set of videos. All videos were uploaded to the lead researcher's YouTube account where the videos were set as "unlisted," meaning they were not searchable and only people with the unique link could access them. Scripts for all three participants were created beforehand while observing and taking data on them during their working hours using the questionnaire from Carter and Wehby (2003). All participants had an average number of five videos for initiations and two for responses and an average duration across both categories of 24 seconds with a range of four seconds to 52 seconds. Additionally, each video took no more than five minutes to edit. A common theme for all students during their responses videos was answering the question and asking the same question by reciprocating, "What about you?"

Each student met the job coach at their jobsite 10 to 20 minutes before their shift started, and she instructed them to watch the videos once. The job coach would then put the iPad away and instruct the student to go to work. After their shifts, students would meet with the job coach to evaluate their performance using a self-reflection form. For example, the job coach asked each student how they did at work with their initiations and responses, and the job coach also rated their performances. Students and job coach indicated one of the following: *I did it*, *I did it but could have done better*, and *no I did not do it*. Next, the job coach asked them what steps they need to take to meet their goal and helped them come up with a plan. Gilson and Carter (2018) also used this form. See Appendix A for a copy of the self-reflection tool.

Dependent Measures

Social Interactions

Social interaction was the target behavior, and it was defined as any occurrence of vocal initiations or vocal responses (within the conversational volume) directed toward coworkers, supervisors, or customers. These can include a one-syllable response "yes" or multiple words, "Yes, I understand." These do not include head nodding, gestures (e.g., thumbs up), or other non-vocal responses with head nods such as "Mhmm," which may follow the following question "Do you understand what to do?" An example was if a student says, "Hi. How are you today?" Another example would be the supervisor saying, "good morning!" and the student replies with "good morning." A third example would be a coworker asking, "what type of music do you like?" and the student responds, "I like rock. What about you?" Nonexamples would be the supervisor saying, "good morning" and the student only smiles or waves. A second nonexample would be a coworker asking, "Do you have any questions?" and the student responds using nonvocal communication such as shaking their head to indicate no.

Engagement

Task engagement was defined as following through with instructions from coworkers and/or supervisors and/or engaging in job duties. *Unengaged* was defined as not doing what was assigned by coworker or supervisor and/or job duties (e.g., on the phone, resting outside of break hours, socializing with friends, and not doing job duties). *No task* was defined as the student is not expected to perform any job duties (e.g., on a break, finished all tasks). Momentary time sampling was used to document whether students were engaged in job duties, and task engagement was collected in the same session as social interactions using the same data collection form.

Observers and Observational Procedures

Observer Training

The first author and third author served as the primary observers, along with the fourth author who assisted with IOA. Two observers collected data simultaneously twice a week for each student to assess IOA. All data collectors went through a one-hour training session in which we reviewed the data collection manual, operational definitions, and videos created by the second author. In order to conduct live observations, all data collectors had to (a) score a 90% or better on a quiz on the coding manual and (b) score a 90% or better in IOA on a practice data sheet while watching instructional videos. Data was compared to the master data collection forms created by the first author.

Observational Procedures

Paper and paperless methods via an iPad were used to collect data on the dependent variable, IOA, and treatment fidelity. Each observational period lasted 15 minutes. Data collectors were required to collect data at least once each shift. Given the nature of how social opportunities fluctuate, we initially chose times when ERSB were maximized across all phases and remained consistent across phases or conditions. For example, an effort was made to collect data at the same time per shift for Michael to capture ERSB in the presence of opportunities (e.g., an influx of customers for 4:00 p.m., 4:15 p.m., and 4:45 p.m. workout classes). Further, his times and the rest of the students' times remained consistent. Furthermore, this same data collection process was consistent for data collection in the baseline phases, too. Throughout each phase of the study, Michael had an average of three observational periods per shift, Freddy had an average of two observational periods, and Jason had an average of three observational periods. The measures graphed represent the average percentage of intervals with the target behavior across the data collection periods.

Interobserver Agreement (IOA)

We collected IOA data at least 33% in each phase of baseline, intervention, and generalization. Interval-by-interval IOA was used to collect IOA. This is also known as point by point and total interval method. To calculate this, the agreements were divided by the total number of intervals and multiplied by 100. See Table 1 for summary of IOA.

Fidelity Measures

Treatment fidelity was assessed to ensure that the job coach was systematically applying intervention only in the intervention phase. It was assessed by observing what strategies were used by the job coach after the student's work shift and during the self-reflection process, and it was also used to assess which strategies were used by the job coach during the student's work shift. Treatment fidelity for during the student's work shift included: (1) job coach lets the student watch the video one time before starting the shift, (2) the job coach prompts student that she will put iPad away, (3) the job coach prompts student to "go work" after watching the video, (4) the job coach provides additional assistance if needed (e.g., least to most prompting if not responding after 10 seconds), (5) job coach prompts student to complete the self-reflection form. Treatment fidelity for after the student's work shift included: (1) the job coach asks the student how he felt performing the behaviors, (2) the job coach helps the student self-reflect using the self-reflection form, (3) the job coach provides performance feedback which includes: (a) behavior specific praise, (b) constructive feedback, (c) behavior specific praise, and (d) prompts the student to come up with one or more things (goals) they will do differently to be more successful next time. Behavior specific praise was repeated at the end to ensure job coaches ended with positive feedback. See Appendix B for a copy of the fidelity measure tool.

Social Validity

All three students participated in an interview to assess social validity. They responded to 17 questions asked by the first author. All questions were read to students and provided clarifications if they stated they did not understand the question. The questionnaire consisted of 10 questions with answer options: yes, no, I don't know. After they responded, the lead researcher asked why (e.g., Why do you believe it helped you become a better employee?). The remaining seven items consisted of open-ended questions. Questions were related to the results, the intervention, if they enjoyed it, would choose to use video-based instruction in the future, and anything they would change. See Table 2 for a summary of student feedback.

Materials

YouTube and Vita

We filmed all videos with an iPhone XS and uploaded all videos to YouTube as unlisted to ensure privacy and confidentiality. Each participant had their own playlist that only they and the job coach could access. Another free app, Vita, was used to edit the videos and add labels (e.g., job coach, name of the student, customer, and coworker) to the individuals in the videos. Labels for initiations and responses were also added inside a floating text bubble (e.g., Initiation #1 "Do you have anything planned for this weekend?, Response 1: "Answer and ask, "What about you?"). Students watched the videos on an iPad before their shift started.

Data Analysis

We visually analyzed our data using Lane and Gast (2014) within-condition and between-condition analysis. We also analyzed the effects using nonparametric methods via statistical analysis. Tau-U was used to determine an effect size. Tau-U controls for trend in the baseline phase, where all other nonoverlap indices (i.e., percentage of nonoverlapping data, percentage of data exceeding the median, percentage of all nonoverlapping data, robust improvement rate difference, nonoverlap of all pairs) do not and considers overlap data (Kratochwill et al., 2021). Furthermore, Tau-U has a more rigorous statistical power than other nonoverlap indices and produces conservative effects with smaller results (Parker & Vannest, 2009). In a similar study by Kearney et al. (2022), the authors used Tau-U to establish an effect size in their withdrawal design used to evaluate the effect of covert audio coaching on small talk for one participant enrolled in an inclusive postsecondary education program at a university.

Results

We introduced VBI to Michael first, then Freddy, and then Jason. Across all three students there was an average of seven baseline sessions with a range of five to nine, an average of 12 intervention sessions with a range of 10 to 14, and an average of five sessions in the generalization phase with a range of five to five.

Visual Analysis of ERSB

We visually analyzed our data using Lane and Gast (2014) within-condition and between-condition analysis and determined that a functional relation was not evident across participants. See Figure 1 for a summary of the percentage of intervals with independent ERSB. During baseline, Michael had a median of 13% of intervals with independent ERSB, while in intervention median increased to 33% of intervals. Freddy's baseline levels had a median of 7% of intervals with independent ERSB and 15% of intervals in intervention. Finally, Jason had a baseline median of 6% of intervals with independent ERSB and increased to 21% during the intervention. These changes in median suggest that all students demonstrated growth in their independent social interactions during VBI.

Effect Size Calculations of ERSB

All students had small to moderate effect sizes. According to Vannest and Ninci (2015), 80% above suggests a very large effect, 60% - 80% suggests a large effect size, 20% - 60% suggests a moderate effect, and 0% - 20% is indicative of a small effect size. Tau-U effect size for Michael shows a small effect size of 12%. Tau-U effect size for Freddy was 51% and 48% for Jason, which is considered a moderate effect.

Some of the variability seen across all students could be explained by more covert events. For example, in session 14, Jason was observed to be "upset" and stated that he would not do well at work due to conflicting leisure activities with some of his friends. Freddy expressed that he felt "stressed" greeting or making small talk with coworkers.

Michael mentioned that he felt “disrespected” by one of his workers because the coworker interacted for long durations with another coworker.

Task Engagement

All participants maintained high levels of engagement while working in their jobs, even when ERSB increased. Across all participants they had an average median of 99% in baseline with a range of 92%-100%, average median of 97% in intervention with a range of 84%-100%, and an average median of 100% in generalization with a range of 85%-100%.

Generalization

Generalization probes are displayed in Figure 1. Michael’s ERSB had a median of 71% of intervals with independent ERSB, Freddy had a median of 56% of intervals with independent social ERSB, and Jason had a median of 31% of intervals with independent ERSB. All three had higher medians in the generalization phase than in the VBI phase.

Social Validity

Participant responses to the social validity survey are summarized in Table 2. All students felt that video-based instruction was effective in improving their ERSB and helped them become better employees. Each participant expressed a willingness to watch more videos to learn new skills. Michael said, *“It’s helping me understand what I should do better in workplace like interact, have a good day, smile, and just to talk to people.”* Freddy said, *“It helped me a lot. I speak up more. And I felt really confident by saying things on my own.”*

Treatment Validity

Michael’s treatment fidelity was assessed in 36% of all intervention sessions with 100% for *during* and *after* the student’s shift. For Freddy, 7% of the intervention sessions were assessed. Five different attempts were made to collect treatment fidelity *during*, however, only one attempt was successful and at 100% accuracy. Treatment fidelity *after* for Freddy was not able to be assessed due to scheduling conflicts with job coaches, data collectors, and other participants. For Jason, treatment fidelity was assessed 40% of all intervention sessions with fidelity for *during* with 100% accuracy and *after* with 100% accuracy.

Discussion

The purpose of this study was to evaluate video-based instruction on employment-related social behaviors of three college students with IDD. Specifically, we used researcher-created YouTube videos to improve social interactions among coworkers, customers, and supervisors at their on-campus internships. Effect size calculations indicated that the intervention demonstrated promise with small to moderate effects across all participants. Thus, the findings from this study can contribute to the field as a

novel application of VBI that provides practitioners with a free, sustainable way to support the ERSB of their students in transition settings and IPSE programs. We discuss several contributions that present opportunities for future research and practical applications.

The primary contribution of this work is its expansion of the research base on ERSB, specifically in applied settings within IPSE programs. Based on the knowledge that social skills are critical to employment success (Agran et al., 2016) and due to the rapid growth of IPSE programs for students with IDD, we sought to conduct an applied study that could be easily refashioned into a practitioner-friendly instructional approach that capitalizes on widely available technology. Specifically, the present study expands the work of Gilson and Carter (2018), which evaluated the use of VBI on the ERSB for students with intellectual disability in a high school transition program. All training, instruction, and data collection for this study were conducted in competitive, integrated employment settings with IPSE students, responding to an urgent call for more research needed in these settings (Kearney et al., 2022). Further, even the videos used for participants were filmed in their actual place of employment to program common stimuli for participants to assist with skill acquisition (Cooper et al., 2020).

Although the importance of conducting research in inclusive, nonclinical settings is uncontested, the unpredictable nature of real work environments presents considerable challenges for researchers conducting single case experimental design needing to exhibit experimental control. These aforementioned challenges contributed to participant behavioral changes and the variability observed across participants and in this study. We believe it is important for scholars and practitioners alike to engage in dialogue about the real challenges of supporting young adults with IDD in employment settings so that future researchers can design interventions that confront these issues directly. One of the issues we observed was that participant behavior changed drastically depending on who their coworker was and how they felt about their coworker. This is not atypical for people with or without disabilities, as it is expected that people demonstrate stronger affinities for some people over others, or may feel naturally more comfortable around some people than others (Shtayermman, 2007). However, this phenomenon is often not addressed when teaching social skills, nor is it reviewed during employment training for new employees. Future research focusing on ERSB for young adults with IDD should address how emotions may influence the quality of social interactions and provide a comprehensive way to support students in this way.

Additionally, this study represents a novel application of how visual analysis can be supplemented with statistical (i.e., nonparametric) analyses. Although an initial goal of this study was to identify a functional relation between VBI and ERSB, we realized through visual analysis that the graphic demonstration alone could not tell the full story. As such, we decided to conduct additional analyses (i.e., Tau-U) to answer our research questions and determine the efficacy of the intervention. Tau-U has been widely affirmed and used often in other corners of the field of special education (Parker et al., 2011), but is still gaining traction in transition and inclusive higher education. In addition to Kearney et al. (2022), Walters et al. (2021) also used Tau-U to establish an effect size. Moving forward, it is important to advance the field of transition so that researchers conducting SCED studies can diversify their analysis methods, whereby visual analysis can be

supplemented with other measures that allow for more complexity and nuance and position outliers within context.

Implications for Practice

One of the primary goals of this study was to design an intervention that could be easy, sustainable, and free. We believe this is critical to narrowing the research-to-practice gap that is pervasive across all subfields of education. The intervention was designed entirely using free apps (i.e., YouTube, Vita) that are widely available on all computers and smartphones and are easy to navigate. Given the ubiquitous nature of technology, handheld devices offer a naturalistic approach to teaching social skills that transcends beyond the classroom and into the communities. When a job coach is no longer available to assist the student, technology can be there to provide daily reminders that will promote long-term maintenance and widespread generalization into new environments. In addition to employment contexts, using VBI to teach social behaviors can also promote communication in a college course, such as interactions with professors or peers.

Limitations and Implications for Future Research

The findings from this pilot study should be interpreted in the context of several important limitations. First, although a strength to the study is that we collected data at multiple timepoints in the shift to capture different behaviors, this may have misrepresented some of the true behavior (i.e., either underestimated or overestimated) because the data points graphed were an average across multiple sessions rather than one session. Additionally, there were limited opportunities in which treatment fidelity was recorded for Freddy due to scheduling conflicts. Future research should represent each data collection period as its own probe on the graph so that each observation period can be accounted individually. Second, our target behavior (ERSB) was calculated based on the percentage of intervals with independent social interactions across all intervals rather than only calculating based on the number of intervals with opportunities to engage in social interactions. This likely underestimates the true nature of participants' social interactions because there were many instances across all participants and phases where there were no plausible possibilities for social interactions because no one was nearby to engage. Future research should capture the demonstration of ERSB in the context of opportunities to engage, such as including a measure of proximity to others in the workplace (Gilson & Carter, 2016; 2018). Third, another possible limitation was Michael having two different job coaches due to limited availability from a single coach. Kratochwill et al. (2021) argue that any change in the dependent variable may be attributed to the change in teacher rather than the intervention itself. Future research should aim for stability in interventionists and data collectors to ensure that these changes do not contribute to variability in participant behavior.

Conclusion

Our study shares the findings of a pilot study evaluating the effects of video-based instruction on the employment-related social behaviors of three college students with IDD

enrolled in an IPSE program. This study affirms the importance of ERSB and offers a free, accessible, and sustainable way to teach these skills to students with IDD using YouTube and handheld technology. Practitioners can apply this type of instructional approach in classroom and community settings to equip students for competitive, integrated employment.

Acknowledgments

Project funding was partially provided by the U.S. Department of Education Transition and Postsecondary Programs for Students with Intellectual Disabilities (TPSID) federal grant (Award: 404931-00001). The authors would like to acknowledge Megan Hanratty for her assistance with this manuscript.

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Table 1*Summary of Overall Interobserver Agreement by Measure*

Michael			
% M (range)			
Measures	Baseline	VBI	Generalization
Engagement	99 (98-100)	92 (91-100)	100 (100-100)
ERSB	92 (82-100)	94 (60-100)	90 (93-100)
Task duties	87 (47-100)	98 (78-100)	96 (89-98)
Freddy			
% M (range)			
Measures	Baseline	VBI	Generalization
Engagement	96 (84-100)	99 (98-100)	100 (100-100)
ERSB	95 (91-100)	92 (84-98)	89 (89-89)
Task duties	95 (93-100)	94 (89-98)	89 (89-89)
Jason			
% M (range)			
Measures	Baseline	VBI	Generalization
Engagement	99 (98-100)	99 (98-100)	100 (100-100)
ERSB	97 (89-100)	97 (87-100)	88 (69-100)
Task duties	98 (93-100)	99 (96-100)	87 (49-100)

Table 2*Student Social Validity Survey Responses*

Questions/Statements	Michael	Freddy	Jason
Do you believe you improved your employment skills?	Y	Y	Y
Do you believe the training was helpful in helping you become a better employee?	Y	Y	Y
Do you believe training helped you in your job?	Y	Y	Y
Are you happy with the results of the study?	Y	Y	Y
Do you believe this training will help you outside of your work? For example, at a different job?	Y	Y	Y
I liked watching the videos before doing my job.	Y	Y	Y
I think the videos helped me do my job better.	Y	Y	Y
In the future, I would like to watch more videos like this to learn new things.	Y	Y	Y
I would like to work and interact with other people in my future job.	Y	Y	Y
I am able to do the tasks I need to do without having the job coaches near me at all times.	Y	Y	Y

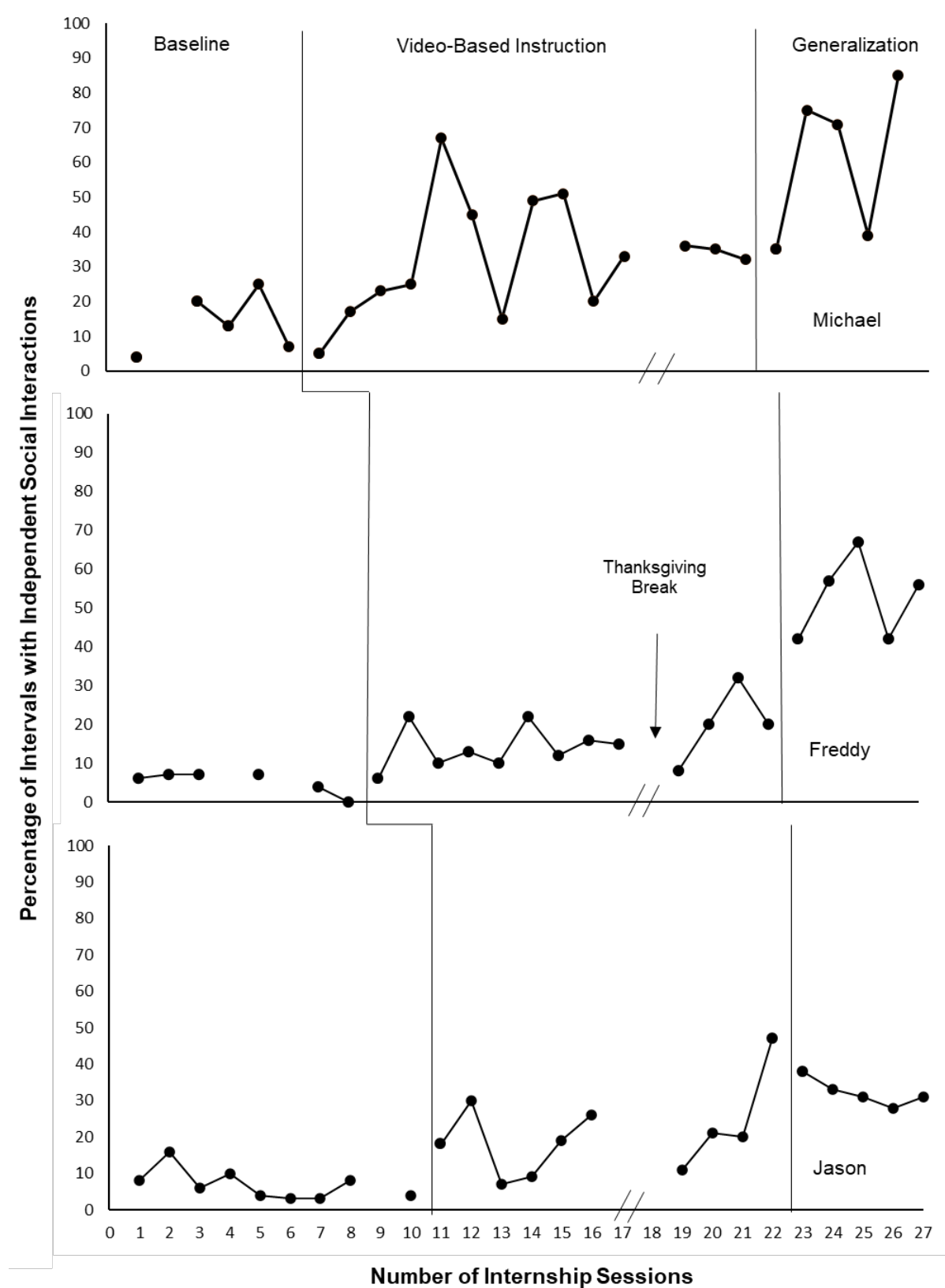
Note: 15-minute observations of 20-second intervals were used.

ERSB = Employment-related social behaviors

VBI = video-based instruction

Y = Yes

Figure 1



APPENDIX A

Self-Reflection

Student name:

Date:

Job Coach:

Write any notes you observed about the student during the behaviors of interest:

How did the student evaluate his or her performance? (initiation)

- "Yes, I did it."
- "Yes, I did it but I could have done better."
- "No, I did not do it."
- Unsure

How did the student evaluate his or her performance? (responses)

- "Yes, I did it."
- "Yes, I did it but I could have done better."
- "No, I did not do it."
- Unsure

How did YOU (job coach) evaluate the student's performance? (Provide feedback)

- "Yes, I did it."
- "Yes, I did it but I could have done better."
- "No, I did not do it."
- Unsure

Indicate any action steps or areas of focus you and the student have planned for next time:

APPENDIX B

Fidelity Measure

CHECK WHICH OF THE FOLLOWING STRATEGIES THE JOB COACH USED AFTER THE STUDENT'S WORK SHIFT
The job coach asks the student how he/she felt performing the behaviors
The job coach helps the student self-reflect using the self-reflection form
The job coach provides performance feedback to the student which include:
behavior-specific praise (e.g., I really like how you answered that phone call by saying, "This is student XYZ.")
Constructive criticism (e.g., Also, make sure you follow the script "This is student XYZ at ABC facility. How can I help you?")
behavior-specific praise (e.g., I really liked how you told the person on the line to please hold while you helped the person at the front desk
Prompts the student to come up with one or more things they will do differently to be more successful next time the student completes this behavior
CHECK WHICH OF THE FOLLOWING STRATEGIES THE JOB COACH USED DURING THE STUDENT'S WORK SHIFT
The job coach lets the student watch the video 1x before starting the shift
The job coach will prompt students he/she will put iPad away
The job coach prompts student to "go work" after watching the videos
The job coach provides additional assistance if needed (e.g., least to most prompting if student does not respond after 10 seconds)