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The Effects of Technology Based Self-Monitoring on Behaviors Related to Academic Engagement of a University Student with a Disability

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THE EFFECTS OF TECHNOLOGY BASED SELF-MONITORING ON BEHAVIORS RELATED TO ACADEMIC ENGAGEMENT OF A UNIVERSITY STUDENT WITH A DISABILITY

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College students with disabilities often experience difficulties with meeting the demands of university level courses due to challenges with time management and impulse control (Shmulsky & Gobbo, 2013). Self-monitoring has been proven effective for various populations and behaviors, although limited research has been conducted with college students with disabilities. I-Connect, a technology-based self-monitoring tool, is a digital application that utilizes momentary time sampling where users can select a behavior and interval of time to be prompted to self-monitor that behavior (University of Kansas, 2022). The app also collects real time data and automatically creates graphs to depict the responses collected during self-monitoring. A reversal design was used to examine the effects of self-monitoring via I-Connect on behaviors related to academic engagement for a college student with a disability during a structured study time. This study also examined the social validity of the goals, procedures, and outcomes of the procedures. Results demonstrated no functional relation between self-monitoring via I-Connect and behaviors related to academic engagement. Limitations of the current investigation and future directions for research are described.

THE EFFECTS OF TECHNOLOGY BASED SELF-MONITORING ON BEHAVIORS RELATED TO ACADEMIC ENGAGEMENT OF A UNIVERSITY STUDENT WITH A DISABILITY

by

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INTRODUCTION

College-age students with disabilities often experience struggles with important skills such as time management, impulse monitoring, and critical thinking (Shmulsky & Gobbo, 2013). Deficits in these skills can affect many areas of post-secondary life, such as one's ability to successfully schedule their time and meet the academic demands of university-level courses. These challenges students face may in turn negatively impact long-term academic and employment outcomes. Newman et al. (2011) reported that only 40% of young adults with disabilities who pursue post-secondary education graduated, compared to 52% of their non-disabled peers. Prior research has aimed to support college-age students in these areas by utilizing a variety of interventions.

Thomas and Thomas (2018) aimed to increase exam scores and decrease exam absences for 122 college students in an introductory psychology course. Participants were divided into control and experimental groups, then further divided into "succeeding" or "struggling" groups based on an overall course grade of above or below 70%, resulting in a total of four groups. These groups changed over the course of the study as participants' grades changed. The researchers implemented Instructional-Communications Feedback as the independent variable. This intervention was delivered to the experimental group via postal-mail before the second, third, and fourth exam and included at least two of the following components each time feedback was delivered: "(a) personalization-based conversational language; (b) positive messages and statements; (c) specific exam success strategies; (d) tailored content" (Thomas & Thomas, 2018, p.12). The combination of components included and the wording of components varied based on each student's grade throughout the semester. Dependent measures included (a) mean post intervention exam scores for each group as measured by permanent product measurement and (b)

the proportion of students that skipped each exam per group. Results indicate that struggling students that received the independent variable scored significantly higher on exam two and three, but not exam four. For exam skipping, there was a statistically significant decrease for the experimental group for only exam two.

Another study examined the effects of game activities during class on quiz scores of graduate students (Neef et al., 2011). Eight practitioners enrolled in a graduate-level applied behavior analysis course participated in this study. The whole class of 11 students were randomly split into four teams, two of which were assigned to the control group and the other two to the experimental group. For 20 minutes of each class period, the control group teams met with a graduate teaching assistant to review progress on a project, while the students in the experimental groups participated in a review game, which was the independent variable. Each student was required to submit four questions and corresponding answers in order to be eligible to participate in the game each week. Each team took turns asking the other team the questions they had prepared, and points were awarded for each correct answer. Members on the team with the most points at the end of the game were each awarded extra credit. The dependent measure for this study was the mean percentage of correct quiz responses to questions on the previous week's material. Results indicate that students in the game groups earned significantly higher quiz scores than those in the control group for five of the eight weekly quizzes. However, for the week 8 quiz, the no game groups had a higher mean percentage correct.

While these studies show promising results, these interventions did not directly target or promote independence of post-secondary students. The transition to a post-secondary setting comes with unique challenges, especially for those with disabilities. Often, the services provided during this transition do not compare to what they were previously receiving (Reinecke et al.,

2016). Independence is a valuable skill for all adults with disabilities to have, including college students, because it increases marketability and expands job opportunities (Reinecke, et al., 2016). Self-management is one skill that is valuable to teach, as it assists those with disabilities in independently improving work efficiency, meeting their goals, acquiring new skills, and maintaining and generalizing those skills over time and across contexts (Cooper et al., 2020). Self-monitoring is a self-management strategy that involves an individual taking data on their behavior to increase desirable behavior or decrease interfering (i.e., problem) behavior. Self-monitoring has also been examined as a way to support students' academic outcomes.

A search of the literature using an advanced search engine of a university library was conducted to locate research examining the effects of self-monitoring for students. The key terms used were college, college students, postsecondary, goal setting, disabilities, applied behavior analysis, self-monitoring, performance feedback, classroom management, teacher behavior, and teacher performance. From this search, studies deemed to be most relevant to the current study are described below.

Plavnick and colleagues (2010) examined the effects of a self-monitoring checklist on (a) the treatment integrity of a token economy behavior intervention for special education staff working with young children with developmental disabilities in a public school and (b) the academic readiness behaviors exhibited by the children. The participants included one teacher, two paraprofessionals, one four-year-old student with autism, and one three-year-old student with Williams syndrome and a specific language impairment. The independent variable was the completion of a treatment integrity checklist for the token economy during two sessions of participants choice per day. The dependent measures were (a) the percentage of treatment integrity scores for each participant and session and (b) the percentage of intervals that students

engaged in both academic readiness behaviors. The academic readiness behaviors defined for these participants were appropriate sitting and appropriate vocalizing. Results show that self-monitoring via treatment integrity checklists was effective at improving treatment integrity for all three teacher participants. Additionally, both students engaged in higher levels of academic readiness skills during the self-monitoring phase.

Bruhn et al. (2022) examined the effects of MoBeGo, a self-monitoring digital application, on levels of academic engagement and disruptive behavior of elementary and middle school students in both general and special education classrooms. There were 57 pairs of third to eighth grade student participants and teacher participants in general and special education classrooms, split into control and MoBeGo test groups. Nine percent of students in each group had a special education eligibility. The independent variable, MoBeGo, is a "multicomponent self-monitoring app that has automated, data-based decision rules that gradually adjust students' behavioral goals over time as a method for prompting prolonged improvements in behavior (Bruhn et al., 2022, p. 30). Both teachers and students received instruction on how to use the app. MoBeGo was used by each teacher in the test group to rate the behavior of students during baseline conditions, after which the app generated a goal for the student. During treatment conditions, the student would rate their own behavior immediately after the teacher, which was followed by both the teacher and student examining the graphed data of the students' behavior and comparing to their goal. The dependent measure was a percentage of sessions engaged in academic engagement behavior. Duration and count of disruptive behavior were collected. Results showed a significant increase in academic engagement and decrease in disruptive behavior from baseline to treatment for the MoBeGo treatment group. Additionally, those levels maintained in the post-intervention phase.

Bichard et al. (2012) examined the effects of a self-monitoring intervention on the punctuality to class of collegiate athletes that were at risk for academic failure. The four 19 to 22 years old male student athlete participants had histories of unacceptable levels of attendance in their college courses, per NCAA guidelines, and had not engaged in higher attendance behavior with previous interventions. The independent variable was self-monitoring in the form of sending a text message to an academic counselor upon each student's arrival to class. The students first met with their respective academic advisors, who asked them to engage in the self-monitoring behavior every time they arrived to class and provided them with an opportunity to practice. The dependent measure was the number of minutes that each student was late to class every week, as captured by a duration measure recorded by an observer positioned outside the classroom. Results indicated this intervention was effective at decreasing the number of minutes students were tardy to class, but higher levels of tardiness returned in subsequent no texting phases.

More recent studies have examined the effects of technology to support learners in self-monitoring. Technology-based self-monitoring utilizes technology, such as digital applications, to facilitate self-monitoring by delivering prompts and automatically recording collected data (Bruhn et al., 2017). This shift from paper and pencil to digital applications allows for self-monitoring to be done with more ease and less preparation (Bruhn et al., 2017).

The effectiveness of I-Connect, a self-monitoring digital application with an emergent literature base, has been examined for increasing on-task behavior of various ages of students, such as elementary students with autism (Beckman et al., 2019; Rosenbloom et al., 2016), adolescents with disabilities (Clemons et al., 2015; Rosenbloom et al., 2019), and one post-secondary student with autism (Huffman et al., 2019). I-Connect uses momentary time sampling

prompts to engage the user in self-monitoring of the behavior of their choice by asking yes or no questions such as, “Am I in my seat”, or “Am I using my phone appropriately”. The app then creates graphs that reflect the data input by the user. More research is needed to determine whether I-Connect is an effective tool, especially for increasing academic engagement in post-secondary students with disabilities. For example, while results of Huffman et al. (2019) were promising, a functional relation could not be established due to confounding variables and limitations with the experimental design. Although not with post-secondary students, Beckman et al. (2019) were also unable to establish a functional relation between I-Connect and on-task behavior due to overlap in data for some participants and other limitations of the study.

In an effort to learn from the prior literature, the following limitations of some of these previous studies were considered while designing the present study. First, Rosenbloom et al. (2019) highlighted how assessing the effects of self-monitoring via I-Connect for adolescents across multiple academic tasks would be beneficial to mimic the natural environment. Taking that consideration into account, the present study was conducted in the natural environment, where students could work on any academic tasks that they deemed important. Second, Huffman et al. (2019), which most closely aligned with the current study because they examined the effects of self-monitoring via I-Connect for a post-secondary student, noted that having only one participant limited their ability to demonstrate the effects of self-monitoring via I-Connect with a more diverse population of students. To mitigate these concerns, the present study was originally designed to recruit three to five participants using a multiple baseline across participants design to attempt to do just that. Overall, due to the nature of the independent and dependent variables, as well as the setting, difficulties with recruitment and attrition of participants, many of the limitations from previous studies were unavoidable.

The researchers chose to prioritize conducting research in the natural environment, with all possible academic tasks, at the expense of experimental control for several reasons. First, the social validity of the study was prioritized. Social validity is defined by Wolf (1978) as the social validation of a study on three levels: (a) the social significance of the behavioral goals of an intervention, or the behavior targeted for change; (b) the social appropriateness of the procedures used during intervention; and (c) the social importance of the effects as determined by consumer satisfaction of all results, predicted and unpredicted. Attempting to mitigate some of the limitations of previous studies may have detrimentally affected the social validity of the present research. Second, the ecological validity, which is described by Fahmie et al. (2023) as "how closely an experiment aligns with real-world phenomena" (p. 302) was prioritized by researchers. Examples of limitations that were not prioritized over the social and ecological validity of the present study can be found in Huffman et al. (2019) and Clemons et al. (2016), who both highlighted that measuring task completion and/or academic outcomes by a permanent product measure should be considered in future studies to obtain a more direct measure of outcomes for students. However, coordination of obtaining those permanent products and academic outcomes would have required a higher response effort on the part of the participant, as well as a higher level of invasion of privacy which may have affected the social validity of the procedures of the present study. Additionally, sharing their grades and completed assignments with researchers is not something that would have necessarily occurred in the students' natural environment at the post-secondary level, which may have affected ecological validity.

The following research questions were addressed in this study: (1) What are the effects of self-monitoring via I-Connect on phone use during a designated study time for a college student with a disability? (2) What are the effects of self-monitoring via I-Connect on behavior

incompatible with academic engagement during a designated study time for a college student with a disability? and (3) What is the social validity of using I-Connect to self-monitor these behaviors, as reported by the participant?

METHOD

Participant and Setting

The participant in this study, Holly, was an undergraduate college student at an urban, public university in the Midwestern United States, with approximately 18,000 students. Holly was receiving services through a university program that provided support to students with autism and other disabilities. Holly, whose pronouns are she/her, was a sophomore, 20-year-old white female, not of Hispanic, Latino, or Spanish origin, whose primary language was English. Holly answered yes to all other questions on the intake questionnaire including: “Have you ever received instruction on self-management, self-monitoring, or tracking your own behavior?”. The study took place on the main university campus during Structured Study Time (SST) in the University Study Zone (USZ)**.** The USZ was an area where all university students can come to study, receive tutoring, and use computers and printers. There were tables and tutors located throughout the room that students can utilize. SST was a predesignated study time for students that received support from the autism program that had staff available to specifically support those students. The purpose of SST was to provide a dedicated place of study for these students where they received support in the form of: (a) prompts to begin, continue, or reengage in academic tasks; (b) check-ins on progress related to specific tasks or assignments; and (c) general support related to navigating course syllabi, drafting emails, accessing tutor resources.

Recruitment and Consent

All recruitment and consent procedures followed the [REDACTED] Institutional Review Board (IRB) approval (see Appendix A). Participants were recruited via a mass email (see Appendix B) sent out to all students from the director of the program. Any students interested in participating completed a form that provided the student researcher with their contact information. The student researcher then met with the student to confirm they met inclusion criteria and discussed the study's details. Inclusion criteria included received services from the autism/disability program, regularly attended SST (at least two hours a week), enrolled in at least one [REDACTED] university credit, able to fluently use an apple iPad and cellular phone and owned a personal cellular phone. Students who met inclusion criteria were then provided with detailed information about the study and an opportunity to ask questions. After this, students were offered the opportunity to provide informed consent either in the meeting or to take the consent form with them and provide consent at a later time. Once they indicated they would like to provide consent, they signed the consent document (see Appendix C). After informed consent was given, students were asked to complete a demographic and intake questionnaire (see Appendix D).

Materials

Apple iPads and I-Connect App

An Apple iPad, generation nine, was used to run the I-Connect (University of Kansas, 2022) app for each participant. The iPad was equipped with the I-Connect app that the participant used for self-monitoring. The I-Connect app was used to prompt the student on a variable interval schedule to monitor a behavior that they self-identified would better help them stay on task during SST as identified in the intake questionnaire. The researchers set up an I-

Connect Mentor account that had access to the participant's student account. The participant was assigned a username and password, neither of which contained any identifiable information. The student researcher and autism/disability program director were the only people that had access to the login information.

The variable interval schedule on the I-Connect app has the capacity to be set at 30 seconds or one, two, three, five, ten, or 30 minutes. The variable interval schedule was set at three minutes for the participant. We decided on this interval length by examining all phone use data collected during baseline 1 and then considering potential interval length by conducting two different calculations. The first calculation used the number of 10-second intervals between each instance of phone use throughout initial baseline conditions multiplied by 10, then divided by 60 to obtain an approximate interresponse time (IRT) expressed in minutes. Then, an average IRT for each session was calculated by adding all IRTs together and dividing by the total number of IRTs in each session. Finally, an average of those averages was calculated, for an overall average IRT of 3.6 minutes for baseline 1. The traditional calculation of mean IRT consists of "dividing the total duration of all baseline measurements by the total number of responses recorded during baseline" (Cooper, Heron, and Heward, 2020, p. 604). However, this calculation resulted in a mean IRT of 4.7 minutes. The researcher set the variable interval schedule at 3 minutes to avoid ratio strain and ensure that Holly was more likely to have the opportunity to select "yes" when self-monitoring.

Data Collection Sheets

Data was collected on phone use and behavior incompatible with academic engagement using 10-second partial interval recording on paper data sheets (see Appendix E). Data collection

sessions were twenty minutes in length. The start and end times were noted at the top of each data sheet. A description of the data collection procedures is outlined below.

MultiTimer App

The digital application MultiTimer was downloaded on the data collectors' personal devices and used to facilitate collection of data on an interval schedule.

Experimental Design

An ABABA reversal design was used to assess the effects of self-monitoring using the I-Connect App on the behavior of interest and behavior incompatible with academic achievement for Holly.

Independent Variable

The independent variable for this study was self-monitoring of the participant behavior of interest (phone use) using the I-Connect App. At the beginning of each treatment session, Holly was instructed to self-monitor her phone use. When the app chimed, Holly would interact with the app by selecting "yes" or "no" in response to the pre-determined prompt "Am I off of my phone?".

Measures

Dependent Variables

Participant Behavior of Interest-Phone Use. During the intake process, Holly was asked to identify what behaviors she hoped to change during SST. Holly's behavior of interest she identified was phone use and she developed the definition in collaboration with the student researcher. Phone use was defined as having her phone screen illuminated and in line of vision for at least five seconds. This excluded scanning documents using her phone, which was defined

as holding her phone above and approximately parallel to the table with a piece of paper on the table underneath the phone. Phone use was collected using 10-second partial interval recording.

Behavior Incompatible with Academic Engagement. The secondary dependent variable was behavior incompatible with academic engagement. This proxy measure was collected using 10-second partial interval recording. Behavior incompatible with academic engagement was defined as; (a) tapping, scrolling on or looking at cellular phone screen, or talking on the phone for any length of time; (b) any part of the head being in contact with any part of the table, instructional materials, wall, or computer for 5 or more seconds; (c) talking to anyone about anything not pertinent to a relevant academic task for 5 or more seconds; (d) orienting gaze towards a computer with social media visible on the screen for 5 or more seconds; (e) moving body at least three feet away from academic tasks, such as walking away from computer or table for 5 or more seconds.

Social Validity. The social validity of the goals, procedures, and outcomes (Wolf, 1978) for the participant was assessed using two different questionnaires, one administered in the middle of the study and the other after the final data collection session (see Appendix F). Snodgrass et al. (2018) suggested that social validity be assessed before intervention to allow researchers to adjust goals and/or procedures prior to consumers experiencing them. Due to unforeseen circumstances described in the limitations section, the survey administered prior to the first session was unusable and was readministered partway through data collection. Nonetheless, the results of the original pre-survey indicated high social validity, and researchers would not have adjusted any goals or procedures as a result.

Data Collection

Observation sessions, which spanned a six-week period, were 20 minutes in length and only ended early when Holly left the BSZ with her belongings (after her body passes the threshold of the door to the BSZ). Holly left two minutes and twenty seconds early during session 14. All other sessions were the full 20 minutes in length. Data collection was paused when the participant left the BSZ without her belongings (e.g., to take a break or use the restroom) and resumed when she returned to her seat, with the corresponding times noted on the data sheet. Data were collected on paper data sheets, with pens, by trained data collectors (see training procedures below). Data collectors were trained before the beginning of the first data collection session. Data collectors sat approximately 3 to 6 feet away from the participant. Data collection sessions occurred up to eight times per week with up to six data points collected per day.

Interobserver Agreement

Interobserver agreement (IOA) was collected for 50% of all sessions, exceeding the recommendations put forth by Kratochwill et al. (2013). These sessions were spread over multiple days of the week and each phase: 46.7% of baseline 1 sessions, 66.7% of treatment 1 sessions, 50% of baseline 2 sessions, 66.7% of treatment 2 sessions, and 33% of baseline 3 sessions. Interval by interval IOA and scored interval IOA was calculated for each session to avoid only reporting inflated or accidental agreements (Cooper et al., 2020). Interval by interval IOA score averages were 96% (range 77.5 - 100%) overall, 96% (range 93 - 99%) for baseline 1, and 99.5% (range 99 - 100%) for treatment 1. Interval by interval scores for baseline 2 sessions were 77.5% and 98%, 98% and 99% for treatment 2, and 94% for baseline 3. Scored interval IOA score averages were 78% overall, 81% (range 69 - 90%) for baseline 1 sessions and 94%

(range 87.5 - 100%) for treatment 1. Scored interval scores for baseline 2 sessions were 40% and 78%, 50% and 87% for treatment 2, and 80% for baseline 3.

When IOA was lower than 80% for any session, extra training was provided to the secondary data collector and/or both the secondary data collector and student researcher reviewed the behavior definitions before resuming data collection to calibrate their behavior more closely to the definitions (Cooper et al., 2020). This occurred for sessions 5, 10, and 15 (baseline 1), sessions 19 and 21 (baseline 2), and session 25 (treatment 2). After each of these sessions, the student researcher reflected on their own behavior and met with the secondary data collector for that session and asked them to do the same. Together, any problems with the environment or data collection procedures were identified and a plan was executed to resolve said problems. When applicable, review of the behavior definitions and data collection procedures were provided to secondary data collectors.

Treatment Integrity

To assess the extent to which the independent variable was applied as planned and described, data were collected on treatment integrity for 50% of all sessions. These sessions were spread over multiple days of the week and each phase: 46.7% of baseline 1 sessions, 66.7% of treatment 1 sessions, 50% of baseline 2 sessions, 66.7% of treatment 2 sessions, and 33% of baseline 3 sessions. Treatment integrity checklists were used during baseline and treatment sessions (see Appendices G and H). All treatment integrity scores for baseline and treatment were 100%. Should treatment integrity fall below 80% during any session, further sessions would not take place until the student researcher reviewed the treatment integrity checklists to calibrate their behavior more closely to the checklists (Cooper et al., 2020). Because treatment integrity never fell below 100%, this was never necessary.

Procedures

Data Collector Training

Data collectors were trained in several group training sessions. In these sessions, the student researcher utilized behavior skills training (BST) to teach behavioral definitions and data collection procedures to each data collector (Parsons et al., 2012). Data collectors were considered sufficiently trained and ready to collect data when IOA between the trainer and data collector was at least 90% during practice sessions. The actual IOA scores during the training were 96 and 98% for interval-by-interval IOA and 91 and 95% for scored interval IOA.

Preliminary Observations

Following the preliminary meeting with Holly, where she provided informed consent and completed the intake questionnaire, including demographic information and questions about behaviors of interest to target, the student researcher conducted a preliminary observation session. The procedures of this session were identical to baseline conditions and data were used to determine if the student may not be eligible to participate due to their behavior of interest not being amenable to direct observation in the BSZ or occurring to a degree that could pose a potential ceiling or floor effect. During Holly's preliminary observation session, she engaged in phone use and behavior incompatible with academic engagement for 0% of intervals. After consulting the autism/disability program director, the student researcher proceeded into baseline for two reasons: (1) the autism/disability program director and Holly agreed that Holly typically engaged in phone use that prevented her from completing work in a timely manner at SST; and (2) the autism/disability program director and student researcher suspected that observer effect was responsible for the low levels of behavior. The student researcher had a professional

relationship with Holly, and some instructional control in other settings, prior to the present study.

Baseline

During baseline sessions, Holly arrived at SST and used a QR code near the entrance to check in and inform staff of what she planned to work on. This routine was identical to the natural environment and was not altered for this study. Data were collected on the primary and secondary dependent variables for Holly, as described above. The data collector(s) refrained from prompting or interacting with the participant, which was defined as prompting the student to (a) engage in their identified participant behavior of interest; (b) engage in academic tasks; (c) stop engaging in behavior incompatible with academic tasks. This also included refraining from asking the participant any academic related questions or gesturing towards them with a thumbs up. Data were collected on the number of times that this occurred, which was zero. Staff at SST were not instructed to refrain from prompting, as it was part of their role to periodically check in with students to assess their progress, as well as redirect them back to their work should they become distracted. Because these prompts from SST staff could have affected Holly's behavior, data was collected on the number of times this occurred. This occurred once during treatment 1 phase session 17 (treatment 1 phase), and once during session 20 (baseline 2).

Student Training Session

Three hours after the last baseline 1 session and 18 hours before the first treatment session, Holly received instruction on self-monitoring using I-Connect during a meeting with the student researcher (see Appendix I). She was provided the operational definition of her selected behavior of interest (phone use) and collaborated with the student researcher to develop the

language of the prompt that would appear at the end of each self-monitoring interval. The selected language was “Am I off of my phone?”.

Holly was trained to use I-Connect using behavioral skills training (BST; Parsons et al., 2012). Because self-monitoring does not need to be accurate to be effective in changing behavior (Cooper et al., 2020), Holly did not receive extensive training on how to *accurately* self-monitor. Rather, she was given sufficient opportunities to practice self-monitoring with the I-Connect app until she engaged in self-monitoring for 90% of intervals for one 5-minute practice session before treatment sessions began.

Treatment

During treatment sessions, Holly went through the usual SST check in process, identical to baseline, and researchers continued to refrain from prompting or check-ins. To start each session, the researcher placed an iPad set up with Holly’s account on her table within arm's reach. While placing the iPad on the table, the researcher delivered the following script:

> “Here is an iPad so you can self-monitor your behavior today. What prompt type would you like to use? [Researcher selects prompts type]. The app will let you know it is time to self-monitor by [vibrating, flashing, or chiming]. I will come back to collect the iPad when your session is over. Do not click away from this page. Let me know if you run into any problems. Do you have any questions?”

After answering any questions the participant had, the researcher then clicked the start button on the I-Connect app, which started the first self-monitoring interval and proceeded with data collection. At the end of each session, the researcher approached the student, stopped the I-Connect app, removed the iPad, and delivered the following script.

> “Your session is over. Do you have questions for me?”

Follow-Up

Following the final data collection session, the researcher reached out to the participant via email. The purpose of this follow-up was to give Holly the opportunity to select her preferred username and password and to communicate that she was welcome to download the app on her personal device and use it whenever she wanted. The autism/disability program director will also follow up during the next semester to provide Holly with any additional training or support she may need to successfully access and utilize the I-Connect app.

Data Analysis

The data were analyzed using visual analysis of each graph. Data were analyzed by visually examining the level, trend, variability, immediacy of effect, overlap, and consistency of data patterns across similar phases (Kratochwill et al., 2013).

RESULTS

By examining the single-case data, we were able to assess the effects of self-monitoring using the I-Connect app on the phone use and behavior incompatible with academic engagement for Holly. Additionally, data from the social validity survey assessed the social validity of the goals, procedures, and outcomes of this study for Holly.

Phone Use

Figure 1 depicts the percentage of intervals that Holly engaged in phone use during each session and the percentage of self-monitoring opportunities that Holly selected “yes” (to the question “Am I off of my phone?”). During baseline 1, the average level of the data was 11.25% of intervals with variability from 0% to 27.5%. While there was no trend overall in this phase, there were trends within subsets of the data. An upward trend was observed during sessions 1, 2, and 3, and a downward trend during sessions 12, 13, and 14.

Upon introduction of self-monitoring via I-Connect, immediacy of effect was demonstrated in session 16 with phone use occurring in 0.8% of intervals compared to 13.3% in session 15. The average level of phone use during treatment 1 was 2.47%, with variability from 0.8 to 5.8%. There was no trend in the data during this phase and the nonoverlap of data from treatment 1 session compared to baseline one session was 0%. As described in Kratochwill et al. (2012), "the greater the nonoverlap, the more compelling the demonstration of an effect" (Kratochwill et al., 2013, p. 25).

Upon the removal of the independent variable at the transition to the baseline 2 phase, no immediacy of effect was observed, with session 18 being 5.8% of intervals and session 19 (baseline 2) being 5%. The average level of phone use in baseline 2 was 7.08% with variability from 0.8% to 15% and no trend was observed. The nonoverlap of these data compared to data in the treatment 1 phase was 50%.

When the self-monitoring intervention was reintroduced at the start of the treatment 2 session, no immediacy of effect was observed, with phone use during session 22 being 15% of intervals compared to 8.3% in session 23. The average level of phone use in treatment 2 was 5.8% of intervals with variability from 0.8% to 8.3%. There was no trend observed and the nonoverlap of data from this phase compared to the previous was 0%.

With removal of self-monitoring via I-Connect at the onset of baseline session 3, no immediacy of effect was observed, with phone use during session 25 (treatment 2) being 0.8% of intervals compared to 2.5% in session 26. The average level of phone use in this phase was 11.4% of intervals, with variability from 2.5% to 19.2% and no trend in the data. The nonoverlap of data from this phase compared to the previous was 66%.

Across all baseline phases, similar levels and variability of phone use were observed, as well as a lack of trend. Across all treatment sessions, similar levels and variability of phone use were observed, as well as a lack of trend.

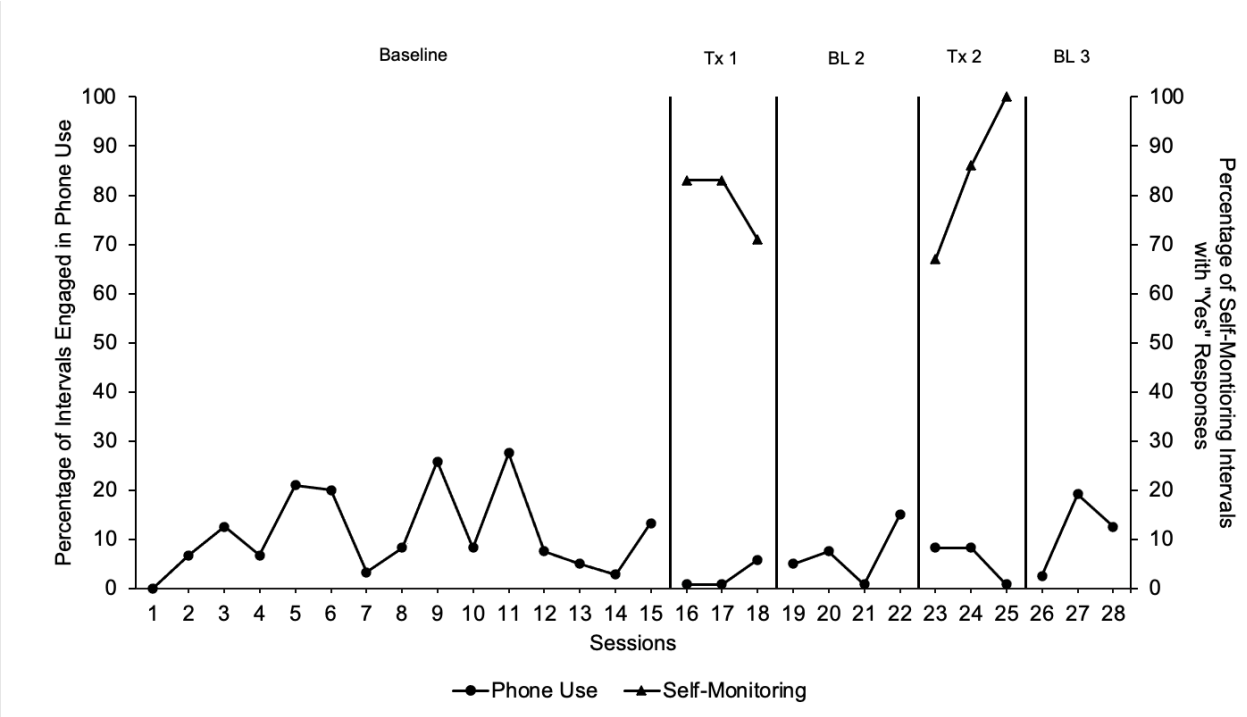

Figure 1. Percentage of intervals Holly engaged in phone use and percentage of opportunities that Holly responded ”yes” during self-monitoring via I-Connect.

Behavior Incompatible with Academic Engagement

Figure 2 depicts the percentage of intervals that Holly engaged in behavior incompatible with academic engagement (IA) and the percentage of self-monitoring opportunities that Holly selected “yes” (to the question “Am I off of my phone?”). During baseline 1, the average level of the data was 16.67% of intervals with variability from 0% to 35%. While there was no trend overall in this phase, there were trends within subsets of the data. An upward trend was observed during sessions 1 through 4 and a downward trend during sessions 5 through 8 and 12, 13, and 14.

Upon introduction of self-monitoring via I-Connect, immediacy of effect was demonstrated with IA occurring during 21.7% of intervals in session 15 (baseline 1) compared to 1.7% in session 16 (treatment 1). The average level of IA during treatment 1 was 3.37% of intervals, with variability from 1.7% to 6.7%. There was no trend in the data during this phase and the nonoverlap of data from treatment 1 session compared to baseline 1 session was 0%.

Upon the removal of the independent variable at the transition to the baseline 2 phase, immediacy of effect was observed, with IA in session 18 being 6.7% of intervals and session 19 being 16.7%. The average level of IA in the baseline 2 phase was 15.23% with variability from 7.5% to 25% and no trend was observed. The nonoverlap of these data compared to data in the treatment 1 phase was 100%.

When the self-monitoring intervention was reintroduced at the start of treatment 2 session, immediacy of effect was observed, with IA occurring during 25% of intervals in session 22 compared to 9.2% in session 23. The average level of IA in treatment 2 was 7.8% of intervals with variability from 1.7% to 12.5%. There was no trend observed and the nonoverlap of data from this phase compared to the previous phase was 33%.

With removal of self-monitoring via I-Connect at the onset of baseline session 3, no immediacy of effect was observed, with occurrence of IA during session 25 being 1.7% of intervals compared to 6.7% in session 26. The average level of IA in this phase was 16.67% of intervals with variability from 6.7% to 27.5% and no trend in the data. The nonoverlap of data from this phase compared to the previous was 66%.

Across all baseline phases, similar levels and variability of IA were observed, as well as a lack of trend. Across treatment sessions, similar phases and somewhat similar variability were observed, as well as a lack of trend.

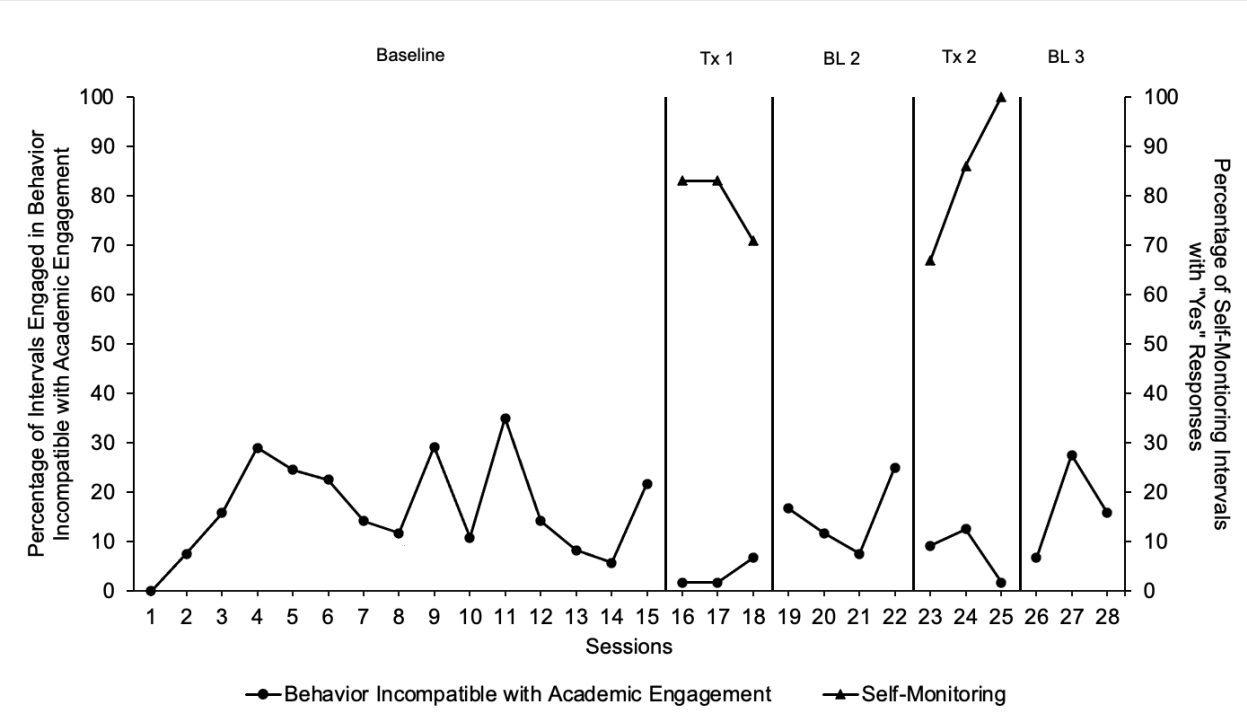

Figure 2. Percentage of intervals Holly engaged in behavior incompatible with academic engagement and percentage of opportunities that Holly responded "yes" during self-monitoring via I-Connect.

Self-Monitoring

To examine Holly's self-monitoring data in relation to levels of phone use and behavior incompatible with academic engagement (IA), Figures 1 and 2 depict the percentage of self-monitoring intervals that Holly responded with yes to the question "Am I off of my phone?" for each treatment session. Visual analysis of self-monitoring in the treatment 1 phase compared to both phone use and IA shows a slight inverse relationship. As phone use and IA increased, "yes" self-monitoring responses decreased. For the treatment 2 phase, a slight inverse relationship was observed for sessions 23 and 25, but not session 24. It is especially noteworthy that during session 25, phone use and IA data were near 0%, and "yes" responses for self-monitoring were 100%.

Excluded Sessions

Although Holly reported during the intake process that she did not use her phone to complete any academic tasks, it became apparent that she was indeed doing so during some sessions. Because phone use data were inflated during sessions where she was using her phone to complete academic tasks, if the researcher suspected appropriate phone use (to complete schoolwork) during a session, at the end of that session, the researcher asked Holly if she used her phone at any time to complete schoolwork. If Holly responded affirmatively that she did use her phone for schoolwork at any point during the session, the data for that session were excluded from the data display. Four sessions were excluded for this reason. Those sessions occurred once between sessions 9 and 10 (baseline 1 condition), once between sessions 16 and 17 (treatment 1 condition) and twice between sessions 17 and 18 (treatment 1 condition).

Additionally, one baseline session between sessions 1 and 2 was excluded. This was due to several logistical challenges in the environment that made it impossible for both data collectors to acquire adequate and identical vantage points for direct observation, such as where Holly was sitting and how far away data collectors had to sit due to a large number of students utilizing the space at the BSZ.

Social Validity

The results of the social validity pre-survey indicated that the goals of this study were socially valid for Holly. Holly strongly agreed that it is important that she complete her schoolwork during SST and that she would like to learn how to monitor her behavior during SST. She agreed that she would like to complete more schoolwork during SST than she usually does and that she thought monitoring her behavior during SST would help her complete more work and be less distracted by other things other than her schoolwork.

The results of the social validity post-survey indicated that the procedures and outcomes of the study were socially valid for Holly. Holly strongly agreed that (a) she was glad she participated in the study; (b) she enjoyed using the I-Connect app; (c) she enjoyed using the iPad to monitor her behavior; (d) she enjoyed the procedures of each session; (e) she enjoyed her one-on-one meeting with the researcher outside of SST; (f) she thought that monitoring her behavior helped her be less distracted by things other than her schoolwork; (g) she would recommend using I-Connect to a friend or classmate; (h) she would like to continue using I-Connect in SST; and (i) she would like to use I-Connect in other places. Holly agreed that monitoring her behavior helped her complete more schoolwork and that she would like to use I-Connect to monitor other behaviors (in any location). Holly indicated that the most beneficial part of participating in the study was that she could identify when she was checking her phone instead of studying. The least beneficial part of participating, for Holly, was having the interval between prompts set at three minutes instead of a longer interval.

DISCUSSION

The purpose of this study was to examine the effects of self-monitoring via I-Connect on phone use and behavior incompatible with academic engagement for a college student with a disability and to examine the social validity of using I-Connect to self-monitor phone use. Upon visual analysis of the data for level, trend, variability, immediacy of effect, overlap, and consistency of data patterns across similar phases (Kratochwill et al., 2013), results indicated that there was no functional relation between self-monitoring via the I-Connect app and the dependent variables (phone use and behavior incompatible with academic engagement).

This study adds to the limited literature base that examines the effects of various interventions on the academic performance of post-secondary students. Thomas and Thomas

(2018) found mixed results when the effects of an Instructional-Communications Feedback package on academic outcomes were examined for a class of post-secondary students. Neef et al. (2011) examined the effects of game activities during class on the quiz scores of students in a graduate level course, and also found mixed results. A study that did find promising results was Bichard et al. (2012), who examined the effects of a self-monitoring intervention on punctuality of at-risk college athletes. The present study, while not similar in procedures, had a similar goal of supporting post-secondary students' academic outcomes. While Bichard et al, (2012) did not use I-Connect, a self-monitoring procedure was implemented as the independent variable.

Additionally, this study contributes to the emerging research being conducted on the effectiveness of the I-Connect app for a variety of populations and behaviors. For example, Huffman et al. (2019) was also not able to demonstrate a functional relation between use of the I-Connect app and on-task classroom behavior but laid the groundwork for using I-Connect with post-secondary students and demonstrated a moderate level of social validity while doing so. Rosenbloom et al. (2019) demonstrated experimental control using I-Connect for increasing on-task behavior for four adolescent students, but they only examined on-task behavior in the context of one specified academic task per student: either (a) typing sentences about a picture; (b) completing handwriting worksheets; or (c) filling out a job application. They did not examine the impact of I-Connect on other academic tasks or a variety of tasks for each participant. The current literature base should be extended to more thoroughly examine the effects of self-monitoring via I-Connect on a variety of behaviors related to college students' academic outcomes, especially those with disabilities. Although a functional relation was not achieved for the current study, limitations from the current study can help inform future research.

Limitations and Future Directions

Recruitment and Attrition

Only one participant was recruited for this study. While other students were interested in using the I-Connect app to self-monitor their behavior at SST, with two additional students initially providing informed consent, they were not comfortable being observed as participants in the study. This is a consideration working with this population that the researchers had not anticipated. Future studies could attempt to identify ways to mitigate these concerns, such as utilizing virtual observations or eye tracking technology.

Design

Due to having one participant in this study, a reversal design was used instead of a multiple baseline across participants, as originally planned. This was not ideal due to the nature of the independent variable. Although the I-Connect app and iPad could be removed, the skill of self-monitoring could not be unlearned. Future studies could use a multiple baseline across participants design.

Behavior Incompatible with Academic Engagement

While the definition for behavior incompatible with academic engagement was intended to capture a wide range of behaviors exhibited by various students that attended SST and might have been interested in participating in this study, it was functionally very similar to the phone use definition that Holly identified. Except for a few instances of leaving the workspace, phone use was the only topography captured with that definition. If the researchers had known that Holly would be the only participant at the onset of data collection, the definition for behavior incompatible with academic engagement would have been adjusted to better reflect Holly's behavior specifically. Future studies could wait until all participants are identified to create behavioral definitions and begin data collection.

Participant Identified Behavior of Interest

While Holly self-reported that using her phone was impeding her ability to complete necessary tasks while at SST, levels of phone use never exceeded 27.5% of intervals per session. While this was a barrier when attempting to demonstrate experimental control, due to a floor effect, this behavior target was socially valid for Holly, which was a priority for the student researcher. Future studies could identify behaviors that students engage in at higher levels, while keeping in mind that those behaviors may not always be the most socially valid ones to target.

Additionally, the topography of phone use proved problematic at times. Holly occasionally used her phone to communicate with group mates for her end of semester projects and presentations. This was not something that Holly, nor the student researcher, had anticipated beforehand and as such was not captured in the behavioral definition. Also, even if anticipated, the topography of coordinating with group mates was identical to Holly using her phone in other ways (e.g., texting group mates versus texting a friend about something not related to schoolwork). Future studies could attempt to access more sophisticated data collection technology such as screen recording for phones, although participant privacy would be lessened, which is another consideration for adequate recruitment and participation.

Potential Confounding Variables

Setting. The setting of the BSZ was different every session, which was not something the researcher could control. Other students used the space, and the amount of noise produced as a result varied each session. Additionally, Holly did not sit in the same spot every session. Lastly, once in two separate sessions, a staff member prompted Holly to see if she needed help. Although it did not appear to have an immediate effect on her behavior to researchers, there is no way to be certain that her phone use would not have been higher in the absence of that prompt.

Future studies could attempt to identify a more controllable location to conduct sessions, although that may be difficult given the nature of post-secondary academic work and could also affect the ecological validity of the research.

Academic Contingencies. The due dates of various assignments that Holly worked on at SST could have affected her behavior in ways the researcher could not control. If an assignment was due the same day as a session, phone use may have been lower than expected in baseline. Additionally, this study took place towards the end of an academic semester. As such, the nature of tasks that Holly was completing shifted from routine weekly assignments to bigger projects and presentations. Future studies could attempt to conduct research at a time where academic contingencies may be more consistent or even identify which specific academic tasks need to be completed and develop a permanent product measure.

Phone Use. While the student researcher made an effort to identify and exclude sessions where Holly used her phone to complete schoolwork, it was not possible to accurately discriminate between appropriate and inappropriate phone use due to their identical topographies. Future studies could target behaviors unrelated to phone use or have participants self-report appropriate phone use every session, although self-reporting is not always a reliable measure either.

Observer Effect/Reactivity. Holly engaged in zero levels of phone use and behavior incompatible with academic engagement during the preliminary session and first session of baseline 1. Due to the previous working relationship that the student researcher had with Holly, it is possible that Holly's behavior was impacted by the student researcher being physically present in SST during those first few sessions. Although it appears to have eventually worn off in subsequent sessions, it is impossible to rule out the effects of Holly being directly observed as a

confounding variable during any sessions. Future researchers could conduct procedures similar to those used by Pantermuehl et al. (2015), who utilized recording technology and Fuesy et al. (2024), who used inconspicuous data collectors that were already in the participants' natural environment to determine if reactivity to observers is present.

Measures

Due to the varied nature of anticipated academic tasks that participants may be completing during SST, the dependent variables of phone use and behaviors incompatible with academic engagement was not a direct measure of academic engagement or task completion itself. Holly may have not been engaging in behaviors incompatible with academic engagement or phone use but could still complete no work while at SST. Future studies could define academic engagement for a more direct measure of academic work completion or develop a permanent product measure.

Social Validity Survey

Due to a second participant opting out of the study partway through, the researchers tried to identify which social validity survey was Holly's, but this was impossible, as the responses were indistinguishable. To remedy this, Holly was asked to fill out the social validity pre-survey for goals a second time, towards the end of the study. Additionally, because Holly was the only participant, anonymity with these questionnaires was not possible. Holly was informed of this and expressed no concerns about this change; however, lack of anonymity could have possibly affected her responses.

Experimental Control

Minimal claims can be made regarding the effectiveness of the I-Connect app due to high variability, lack of change in level and immediacy of effect, and minimal nonoverlap of data

between baseline and treatment phases. While this study laid some groundwork, future studies could attempt to control for the above confounding variables to gain experimental control and possibly demonstrate a functional relationship between the dependent variables and self-monitoring via I-Connect.

Lack of Maintenance and Generalization Measures

Another limitation of this study was the absence of fading procedures and a personal device phase to promote maintenance and generalization of self-monitoring. This was due to an extended baseline as a result of unforeseen challenges with recruitment and retention of participants. Future studies could examine the effects of I-Connect with a fading procedure and with a transition to using the tool on students' personal devices.

Time Constraints

Due to the nature of this study being conducted over the course of an academic semester, there was insufficient time to conduct additional sessions for all phases following initial baseline. This resulted in three to four sessions per phase after Baseline 1, which was less than ideal given the variability and overlap in the data. Future researchers could begin the recruitment process at the very beginning of the academic semester to allow for ample time for sessions.

Implications for Practice

Although the current study did not demonstrate a functional relation between self-monitoring via I-Connect and phone use and behavior incompatible with academic engagement for Holly, minimal guidance for practice can be gleaned. Should practitioners decide to use the I-Connect app, they might consider what behavior students identify would be meaningful to self-monitor, and how to support them in selecting behaviors that directly impact their progress towards goals. For example, targeting phone use may result in increased academic task

completion, but it is not guaranteed to do so. Additionally, I-Connect may be an appropriate application for practitioners seeking to promote independence in the populations that they work with, such as post-secondary students. Lastly, because of the high acceptability of the I-Connect app for Holly, as assessed by the social validity surveys, practitioners might consider this modality of self-monitoring as a potential viable option for their students.

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WESTERN MICHIGAN UNIVERSITY
Human Subjects Institutional Review Board

A: IRB Approval Letter

Date: March 11, 2024

To: Kourtney Bakalyar, Principal Investigator
Rachel Mickelson, Student Investigator for thesis

From: Amy Naugle, Ph.D., Chair

Re: IRB Project Number 20-12-21

This letter will serve as confirmation that the change(s) requested to your research project titled Western Michigan University Autism Services Center Services for Students with Autism and Other Disabilities has been approved by the Western Michigan University Institutional Review Board (WMU IRB).

Rachel Mickelson may use data collected as part of this study for her Master's thesis project titled "The Effects of Technology Based Self-Monitoring on Behaviors Related to Academic Engagement of a University Student with a Disability."

The conditions and the duration of this approval are specified in the Policies of Western Michigan University.

Please note that you may conduct this research exactly in the form it was approved. You must seek specific only board approval for any changes in this project. You must also seek reapproval if the project extends beyond the termination date noted below.

In addition, if there are any unanticipated adverse reactions, unanticipated events, or expected problems associated with the conduct of this research, you should immediately suspend the project and contact the Director Research Compliance for consultation.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: February 9, 2025.

251 W. Walwood Hall, Kalamazoo, MI 49008-5456
PHONE: (269) 387-8293, FAX: (269) 387-8276

B: Recruitment Email

Rachel Mickelson, one of our [REDACTED] staff members is conducting her thesis this semester. She is looking for [REDACTED] students to participate who:

- attend structured study time at least twice a week
- are interested in better using their time at SST
- Are interested in learning to monitor their own behavior while at SST using a digital app

Your participation in this study would mostly take place during your regularly scheduled SST time, over the course of several weeks. **If you are interested in participating in this study, please fill out this form. If you have any questions, feel free to reach out to Rachel via email at rachel.mickelson@wmich.edu.**

C: Informed Consent Form

[REDACTED] University

Department of Psychology

Principal Investigator: Dr. Kourtney Bakalyar, Ed.D., BCBA, LBA

Student Investigator: Rachel Mickelson, BS

Title of Study: [REDACTED] University Autism Services Center Services for Students with Autism and Other Disabilities

You are invited to participate in this research project titled *"[REDACTED] Autism Services Center Services for Students with Autism and Other Disabilities"*

STUDY SUMMARY: This consent form is part of an informed consent process for a research study and it will provide information that will help you decide whether you want to take part in this study. Participation in this study is completely voluntary. The purpose of the research is to: continuously evaluate the effects of the [REDACTED]'s instruction and services with our students and to change our procedures accordingly and will serve as Rachel Mickelson's master's program for the requirements of the Master's of Arts degree. If you take part in the research, you will not be asked to do anything beyond what we are asking you to do as part of your services with the [REDACTED]. There is no time commitment for this study above and beyond the time you spend for services with the [REDACTED]. Participation in this research project does not involve any known risks, discomfort, or inconvenience above what you experience in the academic or employment setting and there are no costs associated with this study. The potential benefits of taking part may be improvements to the services provided by [REDACTED]. Your alternative to taking part in the research study is not to take part in it.

The following information in this consent form will provide more detail about the research study. Please ask any questions if you need more clarification and to assist you in deciding if you wish to participate in the research study. You are not giving up any of your legal rights by agreeing to take part in this research or by signing this consent form. After all of your questions have been answered and the consent document reviewed, if you decide to participate in this study, you will be asked to sign this consent form.

What are we trying to find out in this study?

The purpose of this research project is to continuously evaluate the effects of our instruction and services with our students and to change our procedures accordingly. We want the students directly involved in the [REDACTED] to immediately benefit from their involvement. We also want students who are not involved in the program to benefit from the findings through the continuous quality improvement of services and interventions.

Who can participate in this study?

You are being invited to participate because of your participation in the [REDACTED]at [REDACTED] University.

Where will this study take place?

In-person on [REDACTED]'s main campus or online using Webex or Google Meet, if necessary.

What is the time commitment for participating in this study?

There is no time commitment above and beyond the time you spend for services with the [REDACTED].

What will you be asked to do if you choose to participate in this study?

You will not be asked to do anything beyond what we are asking you to do as part of your services with the [REDACTED]. If you choose to participate in this study, these evaluation, training, and assessment data may be used in presentations and publications.

What information is being measured?

Data collection by Dr. Kourtney Bakalyar, Dr. Sacha Pence, Dr. Sarah Pinkelman, Rachel Mickelson, and [REDACTED] graduate and undergraduate students will focus on your behavior, including students' acquisition of desirable skills and reduction of undesirable behaviors. These data might include percentage of correct responses, frequency and duration of skill deficits or hindrances, and assessment of skills obtained throughout their time receiving services. Examples of areas that will be addressed in this project include acquisition of social skills, job readiness skills, communication skills, time management and planning skills, study skills, and self-management skills.

What are the risks of participating in this study and how will these risks be minimized?

Participation in this research project does not involve any known risks, discomfort, or inconvenience above what you experience in the academic or employment setting.

What are the benefits of participating in this study?

The primary objective of the [REDACTED] is to provide opportunities for active learning to establish skills that will allow students with ASD and other disabilities to make a successful transition to college and continue with their education until graduation. We collect data to

continuously attempt to improve the services provided by [REDACTED] to meet these objectives.

Are there any costs associated with participating in this study?

There are no costs associated with this study.

Is there any compensation for participating in this study?

There is no compensation for participating in this study.

Who will have access to the information collected during this study?

Dr. Bakalyar, Dr. Pence, Dr. Pinkelman, Rachel Mickelson, and [REDACTED] graduate and undergraduate students will be collecting all the data for this study; they will have access to the information. Any individual data will not be disclosed. Rachel Mickelson will keep your records for this project private in a secure location in [REDACTED] or on the [REDACTED] OneDrive on [REDACTED]'s network. The drive is only accessed by those who are provided permission by [REDACTED] staff. After data analysis, your records will be transported to [REDACTED]. We may present the deidentified information from this research project at meetings or conferences, or include this data in a manuscript for publication.

What will happen to my information or biospecimens collected for this research project after the study is over?

The information collected about you for this research will not be used by or distributed to investigators for other research.

What if you want to stop participating in this study?

You can choose to stop participating in the study at anytime for any reason. You will not suffer any prejudice or penalty by your decision to stop your participation. You will experience NO consequences either academically or personally if you choose to withdraw from this study.

The investigator can also decide to stop your participation in the study without your consent.

Should you have any questions prior to or during the study, you can contact Dr. Kourtney Bakalyar at [REDACTED] or kourtney.k.bakalyar@wmich.edu. You may also contact the Chair, Human Subjects Institutional Review Board (HSIRB) at [REDACTED] or the Vice-President for Research at [REDACTED] if questions arise during the course of the research project.

This consent document has been approved for use for one year by the [REDACTED] University Institutional Review Board ([REDACTED] IRB) as indicated by the stamped date and signature of the board chair in the upper right corner.

I have read this informed consent document. The risks and benefits have been explained to me. I agree to take part in this study.

Please Print Your Name

_____

Participant's signature

_____ Date: _____

D: Demographic and Intake Questionnaire

First Name: _____ Age: _____

Last Name: _____ Year in School (i.e. Freshman): _____

Gender: ❑ Male ❑ Female ❑ Nonbinary ❑ Other: _____ ❑ Prefer not to disclose	Pronouns: ❑ She/her/hers ❑ He/him/his ❑ They/them/theirs ❑ Other: _____ ❑ Prefer not to disclose
Are you of Hispanic, Latino, or Spanish origin? ❑ No, not of Hispanic, Latino, or Spanish origin ❑ Yes, Mexican, Mexican American, Chicano ❑ Yes, Puerto Rican ❑ Yes, Cuban ❑ Yes, other _____ ❑ Prefer not to disclose	What is your race? ❑ White ❑ Black or African American ❑ Native American or Alaskan Native ❑ Chinese ❑ Filipino ❑ Asian Indian ❑ Vietnamese ❑ Korean ❑ Japanese ❑ Native Hawaiian ❑ Samoan ❑ Other:_____ ❑ Prefer not to disclose
Do you regularly attend SST for at least two hours a week? ❑ Yes ❑ No	Do you have access to a personal cellular phone? ❑ Yes ❑ No

Are you willing to download a free app on your personal phone or tablet/iPad? ❑ Yes ❑ No	Have you ever received instruction on self-management, self-monitoring, or tracking your own behavior? ❑ Yes ❑ No
When do you currently attend SST? List the specific times for each day of the week (write none if you are not scheduled to attend at that time). (i.e. Monday- 2:00 pm – 4:00 pm) Monday-	Tuesday-
Wednesday-	Thursday-
What behaviors in SST do you want to do more of or less of? List your top 3 in order of priority. 1st priority- 2nd priority- 3rd priority-	

Operational definitions for each behavior- (developed by participant and student researcher) **Describe how someone else would be able to tell you are or are not doing each behavior. Use examples/nonexamples.* 1st priority- 2nd priority- 3rd priority-

Demographic questions adapted from 2020 Census questionnaire

E: Data Collection Sheet

Direct Observation Data Sheet

Student ID: **P1** Date: _____ Primary Data Collector: _____ Session: _____

IOA Data Collector: Start Time: End Time: Paused Time:

Phone Use (PH)	Phone screen in line of vision- **5s**. **Excludes** scanning docs: holding phone a parallel to table with document on table under phone.
Behavior Incompatible w/ Academic Engagement (IA)	-Tapping/scrolling/talking/looking at phone screen for **any length of time** -Head/face on table/materials/wall/computer - 5s. -Away from task at least 3 feet >5s - Looking at social media websites for >5s -Talking about not academics > 5s
Prompt	-Any thumbs up, gesture, or verbal prompts to: start work tasks, stop doing IA or PH, asking academic questions.

Neither behavior occurred.	~~PH~~ ~~IA~~
Phone use occurred, but behavior incompatible with academic engagement did NOT occur.	~~PH~~ IA
Behavior incompatible with academic engagement occurred, but phone use did NOT occur.	PH ~~IA~~
Both behaviors occurred.	~~PH~~ ~~IA~~
Self-monitoring occurred (tapped on screen of iPad)	PH IA

Prompt Tally
IOA=

Interval	0-10s	11-20s	21-30s	31-40s	41-50s	51-60s	Interval by Interval Agreement	Scored Interval Agreement	PH Total	IA Total
1-6	PH IA	PH IA	PH IA	PH IA	PH IA	PH IA	Y= N=	Y= N=		
7-12	PH IA	PH IA	PH IA	PH IA	PH IA	PH IA	Y= N=	Y= N=		
13-18	PH IA	PH IA	PH IA	PH IA	PH IA	PH IA	Y= N=	Y= N=		
19-24	PH IA	PH IA	PH IA	PH IA	PH IA	PH IA	Y= N=	Y= N=		
25-30	PH IA	PH IA	PH IA	PH IA	PH IA	PH IA	Y= N=	Y= N=		
31-36	PH IA	PH IA	PH IA	PH IA	PH IA	PH IA	Y= N=	Y= N=		
37-42	PH IA	PH IA	PH IA	PH IA	PH IA	PH IA	Y= N=	Y= N=		
43-48	PH IA	PH IA	PH IA	PH IA	PH IA	PH IA	Y= N=	Y= N=		
49-54	PH IA	PH IA	PH IA	PH IA	PH IA	PH IA	Y= N=	Y= N=		
55-60	PH IA	PH IA	PH IA	PH IA	PH IA	PH IA	Y= N=	Y= N=		
61-66	PH IA	PH IA	PH IA	PH IA	PH IA	PH IA	Y= N=	Y= N=		
67-72	PH IA	PH IA	PH IA	PH IA	PH IA	PH IA	Y= N=	Y= N=		
73-78	PH IA	PH IA	PH IA	PH IA	PH IA	PH IA	Y= N=	Y= N=		
79-84	PH IA	PH IA	PH IA	PH IA	PH IA	PH IA	Y= N=	Y= N=		
85-90	PH IA	PH IA	PH IA	PH IA	PH IA	PH IA	Y= N=	Y= N=		
91-96	PH IA	PH IA	PH IA	PH IA	PH IA	PH IA	Y= N=	Y= N=		
97-102	PH IA	PH IA	PH IA	PH IA	PH IA	PH IA	Y= N=	Y= N=		
103 -108	PH IA	PH IA	PH IA	PH IA	PH IA	PH IA	Y= N=	Y= N=		
109-114	PH IA	PH IA	PH IA	PH IA	PH IA	PH IA	Y= N=	Y= N=		
115-120	PH IA	PH IA	PH IA	PH IA	PH IA	PH IA	Y= N=	Y= N=		
CALCULCATIONS: **Interval by Interval IOA %:** Total Ys / Total intervals (120) **Scored IOA %:** Total Ys / Total scored intervals (Y+N) **PH & IA %:** Total PH/IA intervals / Total intervals (120)					**TOTALS**		Y= N=	Y= N=		
					PERCENTAGES					

F: Social Validity Measures

Social Validity of Goals

To what degree do you agree with the following statements (circle your answer)?

1. It is important that I complete my schoolwork during SST.

Strongly Agree Agree NeutralDisagree Strongly Disagree

2. I would like to complete more schoolwork during SST than I usually do.

Strongly Agree Agree NeutralDisagree Strongly Disagree

3. I would like to learn how to monitor my behavior during SST.

Strongly Agree Agree NeutralDisagree Strongly Disagree

4. I think that monitoring my behavior during SST would help me complete more work.

Strongly Agree Agree NeutralDisagree Strongly Disagree

5. I think that monitoring my behavior during SST would help me be less distracted by things other than my schoolwork.

Strongly Agree Agree NeutralDisagree Strongly Disagree

Social Validity of Procedures and Outcomes

To what degree do you agree with the following statements (circle your answer)? Please answer honestly, as your answers will remain anonymous.

1. I am glad that I participated in this study.

Strongly Agree Agree NeutralDisagree Strongly Disagree

2. I enjoyed using the I-Connect app.

Strongly Agree Agree NeutralDisagree Strongly Disagree

3. I enjoyed using the iPad to monitor my behavior.

Strongly Agree Agree NeutralDisagree Strongly Disagree

4. I enjoyed the procedures of each session in SST (i.e. being given an iPad/told to start the app on my own device, having someone nearby taking data on my behavior, etc.).

Strongly Agree Agree NeutralDisagree Strongly Disagree

5. I enjoyed my 1:1 meetings with Rachel outside of SST.

Strongly Agree Agree NeutralDisagree Strongly Disagree

6. My meetings with Rachel helped me learn how to use the I-Connect app.

Strongly Agree Agree NeutralDisagree Strongly Disagree

7. I think that monitoring my behavior helped me complete more schoolwork at SST.

Strongly Agree Agree NeutralDisagree Strongly Disagree

8. I think that monitoring my behavior helped me be less distracted by things other than my schoolwork.

Strongly Agree Agree NeutralDisagree Strongly Disagree

9. I would recommend using I-Connect to a friend or classmate.

Strongly Agree Agree NeutralDisagree Strongly Disagree

10. I would like to continue using I-Connect in SST.

Strongly Agree Agree NeutralDisagree Strongly Disagree

11. I would like to use I-Connect in other places (i.e. at home, in class, in meetings, at work).

Strongly Agree Agree NeutralDisagree Strongly Disagree

12. I would like to use I-Connect to monitor other behaviors (in any location).

Strongly Agree Agree NeutralDisagree Strongly Disagree

13. What was the **most** beneficial part of participating in this study?

14. What was the **least** beneficial part of participating in this study?

15. Is there anything else you would like to share about your experience?

G: Baseline Treatment Integrity Checklists

Date:_____ Treatment Integrity Checklist Participant:_____

Session: _____ Baseline Sessions Data Collector:_____

Baseline Sessions- Procedural Steps	Yes	No	N/A
1. The data collector (and IOA data collector) sit or stand approximately 3-6 feet from the participant.			
2. The data collector (and IOA data collector) start a 10 second interval timer.			
3. When a secondary observer is collecting IOA data, both data collectors start their interval timers at the same time.			
4. The data collector (and IOA data collector) and SST staff refrain from prompting the participant to a) engage in their identified participant behavior of interest, b) engage in academic tasks, c) stop engaging in behavior incompatible with academic tasks, & d) having them share their screens via Webex. (This includes gestures such as thumbs up and asking any academic related questions, such as "how is working going?" or "what progress have you made)"?			mark each prompt here with a tally
5. If a participant leaves the USZ (body passes the threshold of the door to the USZ) without their belongings, the data collector (and IOA data collector) pause their interval timer and notes the corresponding interval on the data sheet.			

6. If a participant leaves the USZ, the data collector (and IOA data collector) will resume data collection as soon as the participant has sat down on a chair (buttocks make contact with a chair).			
7. When a secondary observer is collecting IOA data, both data collectors restart their interval timers at the same time.			
8. When a secondary observer is collecting IOA data, each data collector's data will not be visible to the other data collector.			
9. At the end of the session, all data sheets are given to the researcher.			
Total Score: calculate by Y/Y+N			
	/ =		

H: Treatment Session Treatment Integrity Checklist

Date:_____ Treatment Integrity Checklist Participant:_____

Session: _____ Treatment Sessions Data Collector:_____

Treatment Sessions- Procedural Steps	Yes	No	N/A
1. The researcher logs into the correct participant's I-Connect account.			
2. The researcher places the iPad on the table within arm's reach of the participant.			
3. The researcher delivers the following script:			
3a. "Here is an iPad so you can self-monitor your behavior today."			
3b. "What prompt type would you like to use?"			
3c. Researcher selects prompt type.			
3d."The app will let you know it is time to self-monitor by [vibrating, flashing, or chiming]."			
3e. "I will come back to collect the iPad when your session is over."			
3f. "Don't click away from this page."			
3g. "Let me know if you run into any problems."			
3h. "Do you have any questions?"			
4. The researcher answers any questions the participant asks.			
5. The researcher clicks the start button on the I-Connect app.			
6. The data collector(s) sit or stand approximately 3-6 feet from the participant.			
7. The data collector(s) start a 10 second interval timer.			
8. The data collector(s) use a count up timer when applicable.			
9. When a secondary observer is collecting IOA data, both data collectors start their interval timers at the same time.			
10. The data collector(s) refrain from prompting the participant to a) engage in their identified participant behavior of interest, b) engage in academic tasks, c) stop engaging in behavior incompatible with academic tasks, & d) having them share their screens via Webex. (This includes gestures such as thumbs up and asking any academic related questions, such as "how is working going?" or "what progress have you made)"?			mark each prompt here with a tally
11. If a participant leaves the USZ (body passes the threshold of the door to the BSZ) without their belongings, the data collector(s) pause their interval timer and notes the corresponding interval on the data sheet.			

12. If a participant leaves the USZ, the data collector(s) will resume data collection after the participant has returned to their seat (buttocks make contact with a chair).			
13. When a secondary observer is collecting IOA data, both data collectors resume their interval timers at the same time.			
14. **If a participant has not engaged in self-monitoring by selecting yes or no when prompted on the I-Connect screen for more than three times the self-monitoring interval,** the researcher does and says the following:			
14a. Approaches the participant.			
14b.“I’ve noticed you haven’t been self-monitoring for a while.”			
14c.“Remember to select yes or no when the prompt pops up on the screen and the app [chimes, flashes, or vibrates]”.			
14d.Would you like to switch to a different prompt type [chime, flash, or vibrate]?”			
15. If the participant would like to switch prompts, the researcher provides support in facilitating that switch (i.e. helping connect headphones).			
16. At the end of the session, the researcher removes the iPad from the table.			
17. When removing the iPad, the researcher delivers the following script (if the participant is still in the USZ).			
17a. “Your session is over”.			
17b. “Do you have any questions for me?”			
18. The researcher logs out of the participant’s I-Connect on the iPad.			
19. When a secondary observer is collecting IOA data, each data collector’s data is not visible to the other data collector.			
20. At the end of the session, the data collection sheet will be given to the researcher.			
Total Score: calculate by Y/Y+N			
	/	=	

I: Participant Training Checklist

Participant Training Checklist
1. Review participant selected behavior definition (phone use) a. Having phone screen on and in line of vision for at least five seconds. This excluded scanning documents, which is defined as holding phone above and approximately parallel to the table with a piece of paper on the table underneath the phone. b. Examples/non examples
2. Define self-monitoring a. “Self-monitoring is a way of keeping track of your own behavior in an attempt to do more of what you want to do, and less of what you don’t want to do”.
3. Introduce I-Connect app a. “This app will ask you a question every three minutes related to your phone use. Our hope is that it will help you be less distracted by your phone and more focused on your work”.
4. Determine prompt language a. “The prompt can be changed to whatever you’d like”. b. Encourage framing the questions positively.
5. Determine prompt type a. “The app can either chime or have the screen flash to let you know it is time to self-monitor" b. Show both options and support in selecting a prompt type to practice with.
6. Instruction on self-monitoring phone use

a. “When the prompt happens, you will answer yes or no based on what you were doing in the moment that the prompt appears. Focus on only that moment, not anything previous”.
7. Practice opportunities a. Practice while using phone b. Practice while not using phone i. Working on computer ii. Talking iii. Sitting c. Practice until participant responds to the self-monitoring prompt for 90% of opportunities.
8. Answer questions