Intellectual and Developmental Disabilities Functional Literacy Intervention for Postsecondary Students with Intellectual and Developmental Disabilities: A Pilot Study --Manuscript Draft--

Manuscript Number:	IDD-D-21-00072R2
Article Type:	Research
Keywords:	inclusive postsecondary education; intellectual and developmental disabilities; literacy; reading comprehension
Corresponding Author:	Alison Hessling Baylor University Waco, TX UNITED STATES
First Author:	Alison Prahl
Order of Authors:	Alison Prahl
	Carly Gilson, PhD
Manuscript Region of Origin:	UNITED STATES
Abstract:	The rapid growth of inclusive higher education opportunities for young adults with intellectual and developmental disabilities (IDD) has contributed to improvements in students' academics, employment, social, and independent living outcomes. However, many college programs lack a focus on functional literacy, a critical skill for success in adulthood. This study evaluated whether a functional literacy intervention was associated with an increase in the percentage of reading comprehension strategies implemented accurately for college students with IDD. A multiple probe across functional literacy stimuli (e.g., academic assignments, employment emails, social text messages) was replicated across four students. Results indicated an association between the intervention and percentage of strategies implemented accurately. Suggestions for future research and implications for practice are provided.

Functional Literacy Intervention for Postsecondary Students with Intellectual and Developmental Disabilities: A Pilot Study

Acknowledgments

These findings were presented previously via an oral presentation at the Southeastern

Postsecondary Education Alliance Conference.

Funding support for this work came from the U.S. Department of Education Transition and Postsecondary Programs for Students with Intellectual Disabilities (TPSID) grant (Cohort 3, 2020-2025), Award Number P407A200057. Both authors read and approved the final manuscript. The authors have no conflict of interest to disclose. Functional Literacy Intervention For Postsecondary Students

Abstract

The rapid growth of inclusive higher education opportunities for young adults with intellectual and developmental disabilities (IDD) has contributed to improvements in students' academics, employment, social, and independent living outcomes. However, many college programs lack a focus on functional literacy, a critical skill for success in adulthood. This study evaluated whether a functional literacy intervention was associated with an increase in the percentage of reading comprehension strategies implemented accurately for college students with IDD. A multiple probe across functional literacy stimuli (e.g., academic assignments, employment emails, social text messages) was replicated across four students. Results indicated an association between the intervention and percentage of strategies implemented accurately. Suggestions for future research and implications for practice are provided.

Key words: Inclusive postsecondary education, intellectual and developmental disabilities, literacy, reading comprehension Functional Literacy Intervention for Postsecondary Students with

Intellectual and Developmental Disabilities: A Pilot Study

Literacy, or understanding written communication, for all individuals is essential for societal advancement and to ensure sustainable development, peace, and democracy (UNESCO, 2006). The global literacy rate for adults with disabilities is as low as 3% (United Nations Development Program, n.d.). In the United States, 23% of adults with disabilities have basic literacy skills (Kirsch et al., 2002). This number is likely much lower for adults with intellectual and developmental disabilities (IDD), who often experience challenges with intellectual functioning and conceptual skills (American Association on Intellectual and Developmental Disabilities, n.d.).

Emerging research in adults with IDD demonstrates that limited literacy achievement persists for individuals with IDD into adolescence and beyond (e.g., Eldblom et al., 2021; van Wingerden et al., 2014). Given the ubiquity of technology in higher education and integrated employment settings, there is an especially urgent need for adults with IDD to understand reading opportunities that intersect with activities of daily living, such as reading emails and text messages related to personal and professional networks. These skills are often characterized within a functional literacy context (Kirsch et al 1977). For the purpose of the present study, we operationally defined *functional literacy* as the ability to read and/or write to engage in activities of daily living (e.g., texting, emails).

College as a Critical Environment for Functional Literacy Skills

The need to equip adults with IDD with functional literacy skills is especially timely and relevant, given the rapidly increasing prevalence of higher education opportunities for students with IDD. Since the authorization of the Higher Education Opportunity Act (HEOA) in 2008,

many higher education institutions have opened their doors to students with IDD by offering certificate-based programs (i.e., rather than degree-based) focusing on academics, career development, social skills, and independent living. According to most recent estimates from Think College (2022), approximately 312 college programs for students with IDD exist across the United States, with at least one program in every state. The graduation outcomes of inclusive postsecondary education (IPSE) students are promising; indicating higher levels of competitive, integrated employment, independent living, and community participation. Specific outcome data is available annually for model demonstration programs appropriated by the HEOA (2008) to fund Transition and Postsecondary Programs for Students with Intellectual Disability (TPSID) within the U.S. Department of Education. Within the second cohort of TPSID recipients (funded 2015-2020), 59% of students who exited their programs between 2015-2019 had a paid job one year after graduation (Grigal et al., 2021). This is almost three times the national employment rate of 19% for adults with IDD (National Core Indicators, 2019). These promising postgraduation outcomes can likely be attributed to a growing shift toward inclusive participation in college settings.

Alongside more inclusive opportunities come elevated expectations to communicate formally and informally with peers, instructors, and supervisors, exhibited through reading, writing, and oral language. With word reading and reading comprehension likely in the first to third grade range (e.g., Eldblom et al., 2021; van Wingerden, 2014), students with IDD may encounter many barriers to accessing the full academic and social benefits of postsecondary education due to persistent communication deficits. Unlike in K-12 settings, students with IDD needing additional support do not have guaranteed access to related services such as speech, physical, or occupational therapy. Because most IPSE programs (approximately 63%, Whirley et al., 2020) require their students to have exited high school before enrolling, IPSE students often cannot receive related services publicly available in school districts. For example, IPSE students typically cannot access speech-language pathology services to support their functional communication and functional literacy skills, such as decoding and reading comprehension (e.g., Moni et al., 2011). Even among students with disabilities who receive accommodations through disability services on campus, those supports are often limited to academic settings and texts. However, much of the daily literacy opportunities presented to college students come in the form of nonacademic texts, many of which are on technology-based platforms such as emails and text messages. Thus, persistent literacy difficulties may limit the extent to which IPSE students can fully participate in an inclusive college experience, given the continued spoken and written language demands across domains (e.g., academics, employment).

Supporting Functional Literacy

Proficient reading comprehension—constructing meaning from written text—is the ultimate goal of reading (Catts & Kamhi, 1999), regardless of the context (e.g., academic, functional). Reading comprehension strategies, which are specific procedures that guide readers to become aware of how well they are comprehending as they attempt to read and write, are known to yield increases in literacy (e.g., comprehension, recall, summarization) for struggling readers (National Reading Panel, 2000). Whereas proficient readers normally acquire comprehension strategies informally, struggling readers benefit from explicit instruction in these strategies which leads to improved text understanding and information use. Further, Morgan and Moni (2008) suggest that for individuals with IDD, "successful engagement with, and construction of meaning from text necessitates the implementation and use of specifically designed and adapted teaching strategies and resources." Thus, improvements in reading

comprehension strategy use with functional texts that individuals with IDD encounter in their activities of daily living (e.g., text messages, assignments) is likely to support comprehension of those texts—the ultimate goal of functional literacy. Further, literacy skills such as these enhance vocational and independent living opportunities for young adults with IDD (Young et al., 2004).

Improving Literacy Outcomes for Young Adults with IDD in Postsecondary Settings

Inclusive postsecondary programs promote continued learning for individuals with IDD in the academic, employment, social skills, and independent living domains; however, the development of functional literacy skills that underpin many of these life skills is not evident. Researchers only recently have begun to investigate the effects of interventions aimed at improving literacy outcomes for IPSE students, with the majority of research focusing on literacy in the academic domain. Whirley et al. (2020) conducted a scoping review of all research pertaining to IPSE programs in the United States between 2008 and 2018, which revealed only nine of the 68 total studies included interventions aimed at improving academics (e.g., reading, writing, math). This represents a small fraction (13%) of studies reviewed, with reading-specific interventions even less prevalent across this body of literature.

Outside of the United States, there have been postsecondary initiatives specifically dedicated to supporting literacy skills for adults with IDD. The Literacy and Technology Handson (LATCH-ON) literacy program was established at the University of Queensland to support functional literacy skills of young adults with IDD in the community who had recently completed compulsory education (Moni & Jobling, 2000; Moni & Jobling, 2001). The two-year program includes four semester-length modules that gradually build students' knowledge and skills across several strands of literacy (e.g., reading, writing) that are interwoven in the teaching and learning activities. To encourage reading, a range of mostly functional texts such as advertisements, magazines, websites, and popular novels are selected based on the current interests of students. Based on findings from a longitudinal study that evaluated treatment effects for 191 adults with IDD who participated in the program, Moni and colleagues (2018) found that when taking individual participant differences into account, improvements in receptive vocabulary, word reading, and reading comprehension were observed.

Results from a systematic review of six studies conducted by a single research team who evaluated the effects of academic-based literacy interventions for IPSE students further supports that IPSE students can benefit from explicit literacy instruction (Hua et al., 2019). The research team evaluated the effects of various evidence-based reading strategies on oral reading fluency, narrative comprehension, vocabulary, and expository comprehension. The Reread-Adapt and Answer-Comprehend (RAAC; Therrien et al., 2006) intervention aims to improve students' oral reading fluency via repeated readings as well as improve their comprehension via comprehension monitoring. In a series of multiple baseline across participant design studies, Hua and colleagues evaluated the effects of the RAAC intervention on correct words per minute, decoding errors, and reading comprehension for IPSE students with autism spectrum disorder or IDD (Hua et al., 2012a; Hua et al., 2012b; Hua et al., 2016). Although participants' response to the RAAC intervention varied, in general, participants demonstrated substantial gains in oral reading fluency and reduced number of errors per passage as well as modest gains in comprehension. Some participants with IDD demonstrated modest change from baseline only after the intervention was adapted by adding a reward contingency due to lack of response.

In the most recent study with five IPSE students with IDD, Hua and colleagues (2018) did not observe a functional relation between RAAC and improvements in the three dependent variables—correct words per minute, decoding errors, and narrative retell. The authors hypothesize that the students required a higher intervention dosage or more intensive intervention to observe a functional relation or that perhaps students needed more systematic decoding support that was not included as a main focus of this intervention. In addition to evaluating the effects of RAAC, Hua and colleagues have evaluated the effects of constant time delay as well as a Paraphrasing Strategy (Schumaker et al., 1984) for IPSE students. Although mixed results were found for improvements in expository text comprehension, constant time delay was found to result in greater vocabulary acquisition for four IPSE students with ID (Hua et al., 2013). Lastly, in a small group design study, Hua and colleagues (2014) evaluated the effects of the RAP Paraphrasing Strategy (Schumaker et al. 1984) and found that IPSE students in the experimental group recalled significantly more main ideas (d = 4.11) and details (d = 2.72)as compared with the control group. Across these studies, participants engaged with either narrative or expository texts. Although expository texts are the most commonly occurring academics texts at the postsecondary level, they only represent the types of texts that students access in academic contexts, such as science, technology, and history, rather than functional literacy contexts (e.g., emails, text messages).

Despite recent research focused on tertiary education programs supporting continued literacy development for young adults with IDD, there remains a critical need to design and evaluate a relatively brief, supplementary intervention focused on functional rather than academic literacy. To address the need to expand functional literacy skills for IPSE students in particular, we employed an implementation science framework which encourages efficient development and early validation of innovative interventions to facilitate the uptake of evidencebased practice intro regular use by practitioners (e.g., Eccles & Mittman, 2006). Within this framework, we began by engaging in interprofessional discussions to understand the literacy needs within the IPSE setting. From there, we developed the present study which takes the IPSE context and identified needs into consideration to develop and evaluate a translational evidence based practices—functional literacy intervention for postsecondary students (FLIPSS). By conducting research that takes the context into account up front, this is the first step in a body of research that aims to accelerate translational research findings and improve implementation of evidence based practices to maximize functional literacy outcomes for young adults with IDD.

Purpose of the Present Study

Although academic literacy skills are important for academic success, functional literacy acquisition is the pathway toward greater independence and enhanced employment opportunities. The current study aimed to determine whether FLIPSS administered as an individualized intervention targeting functional literacy, was effective for IPSE students with IDD. The following research questions guided this study: (1) Is the introduction of FLIPSS associated with an improvement in the percentage of reading comprehension strategies implemented accurately for IPSE students with IDD? (2) How do IPSE students with IDD perceive the acceptability of the intervention goals and procedures?

Method

Research Design

We employed a multiple probe across stimuli design (Gast et al., 2018) that was replicated across four participants to explore the relationship between FLIPSS and reading comprehension strategy implementation. For each participant, baseline data were collected concurrently across all stimuli, and all participants completed a minimum of five baseline sessions prior to the introduction of intervention for the first functional literacy stimuli. The staggered introduction of intervention across stimuli followed a stable baseline (i.e., 80% of the data occurring within 20% of the median for at least five sessions; Gast & Spriggs, 2010) without an accelerating therapeutic trend. Once the participant demonstrated behavior change and met the criterion of at least 60% accuracy in two out of three consecutive sessions, the intervention was introduced for the next functional literacy stimuli. The use of a single case research design controlled for many threats to internal validity (e.g., history, testing). Replicating the multiple probe across stimuli intervention across multiple participants provided the opportunity to demonstrate intrasubject replication as well as intersubject replication. Hence, a functional relation observed across stimuli for multiple participants is argued to provide stronger evidence of an intervention effect and greater external validity (Gast et al., 2018). The combined multiple probe design also allowed for intervention adaptations that could be individualized for each participant and thus distinctions can be made about why individuals with certain characteristics may or may not respond to the intervention or adapted intervention.

Participants and Setting

We recruited students from an IPSE program at a large public research university in the south-central United States. The four-year residential IPSE program is a TPSID recipient for Cohort 3 (2020-2025) and provides an inclusive and immersive college education to equip young adults with IDD for employment in the community. Prior to launching the study, the first author met with the IPSE program staff, who voiced a critical need to design a study that emphasized functional literacy skills for their IPSE students, many of whom had trouble accessing functional literacy platforms such as emails and text messages.

After receiving approval from the Institutional Review Board, we led an initial virtual informational meeting with students who were interested in learning about the study. After the meeting, six students expressed interest in participating and were consented. To ascertain study

eligibility, participants completed an eligibility testing session. Four students met the study inclusionary criteria: (a) adult student in an IPSE program for individuals with IDD, (b) able to follow multiple-step directions and attend for 30 minutes with minimal breaks, (c) uses oral communication as their primary means of communication. (d) have functional literacy needs across at least two of the three program domains—academic, employment, social (e) score a reading grade equivalent of at least 1.7 on the Woodcock Reading Mastery Tests-III (WRMT-III; Woodcock, 2011), and (f) referred by the program director based on their knowledge of the students' interest, abilities, and domain-specific functional literacy skills. The eligibility criteria were established to assist in identifying participants who were able to participate in study procedures such as sustained attention, requisite first-grade word-level reading skills, and ability to complete the dependent variable probe which required an oral think-aloud of the reading strategies. The inclusionary criteria also ensured that participants' literacy needs aligned with the FLIPSS intervention. Two IPSE students consented but were not eligible for participation due to either scoring below the criteria on the WRMT-III or not demonstrating functional literacy needs (i.e., literacy skills were too advanced). See Table 1 for participant characteristics.

All research sessions were one-on-one and were led by the first author (heretofore, interventionist), a female certified speech-language pathologist. Participants completed the eligibility session in person on their campus. All remaining sessions took place virtually using Zoom video conferencing software (Zoom Video Communications Inc, 2020). Due to the COVID-19 global pandemic, students participated in the sessions from an IPSE office conference room or their on-campus apartment.

Materials

Zoom software ensured the confidentiality of the data transmission through 256-bit advanced encryption and offers a built-in feature to record audio and video media files. For the dependent variable probe and intervention, a library of researcher-developed functional literacy text samples (e.g., text or GroupMe messages, academic or employer emails, assignments) were created based on examples provided by IPSE staff. The text samples, which were designed to map on to the main IPSE program domains—academic, employment, and social—aimed to optimize student engagement and to allow for IPSE students with IDD to engage with texts in positive, enjoyable, and meaningful ways (Morgan & Moni, 2008). See text samples in the supplemental materials. Various text sample parameters were established (e.g., number of words and sentences, average number of syllables per word, Flesch reading ease, Flesch-Kincaid grade level) to develop multiple functional literacy texts that were similar in length, complexity, and grade-level. Lastly, a graphic organizer (Figure 1 panel A) outlining the reading comprehension strategies was utilized as visual support within each session. A modified outline version of the graphic organizer was displayed in the probe task (Figure 1 panel B).

Functional Literacy Intervention for Postsecondary Students (FLIPSS)

FLIPSS intervention development was informed by research on the phenotypic patterns of strengths and areas of needs in commonly occurring IDDs (e.g., Lemons et al., 2015; van Wingerden et al., 2017) as well as reviews and practice guides on scientifically supported instructional practice for reading comprehension (e.g., National Reading Panel, 2000; Shanahan et al., 2010). The FLIPSS intervention consisted of multiple evidence-based reading comprehension strategies (e.g., comprehension monitoring, summarizing) selected to address specific areas of functional literacy needs that students would most likely benefit from. For example, use of a graphic organizer provides visual and working memory support, visualization provides multimodal sensory-cognitive support, and comprehension monitoring provides executive functioning support (National Reading Panel, 2000; Shanahan et al., 2010). Detailed descriptions of each reading comprehension strategy, all of which have proven to be effective for struggling readers (e.g., Duke & Pearson, 2009; Shanahan et al., 2010), are included in the supplemental material. Using the aforementioned library of functional literacy text samples, the interventionist provided explicit instruction for each strategy, emphasizing the importance of using the strategies before, during, and after reading to facilitate comprehension at multiple timepoints within the reading process. All ten strategies were introduced from the outset of the intervention and reinforced during each intervention session. The interventionist followed an I Do-We Do-You Do framework to facilitate instruction of the complete set of ten comprehension strategies. Within this approach, systematic supports such as the graphic organizer and verbal supports were faded within and across intervention sessions to gradually release responsibility and promote independent strategy implementation (Duke & Pearson, 2009). Thus, the interventionist modeled use of the graphic organizer (visual support) and provided verbal supports frequently during the "I Do" phase of the intervention sessions and then with increasingly less frequency in the "We Do" and "You Do" phases of the intervention session. General praise such as "You're doing great, keep up the good work!" was provided occasionally during all research sessions.

Dependent Variable

The dependent variable was the participants' percentage of reading strategies implemented accurately. Using the Zoom video recordings, a trained coder scored the dependent variable probe in which one point was awarded for the correct implementation of each operationally defined reading comprehension strategy (see Table 2) as well as whether the strategies were implemented appropriately before, during, and after reading. Because we expected participants to read the text across all study phases, reading comprehension strategy #4-Read Text Aloud was not included in scoring for the dependent variable, resulting in nine strategies that were coded. Thus, a percent accuracy score was calculated based on the total number of strategies implemented correctly (out of nine) and implementing the strategies at the appropriate time (before, during, after reading) to earn up to three additional points (max score = 12). The percent accuracy scores were then graphed for visual analysis.

Intervention Procedure

The study procedures were reviewed by the university Institutional Review Board and determined to be exempt as the research activities were deemed to be established, normal educational practices. Participants provided written consent.

The probe task was administered at the end of each research session. Using screenshare, the interventionist displayed an outline of the FLIPSS graphic organizer alongside the text sample. Then, the interventionist prompted the participant: "You may begin when you are ready." For each participant, each administration of the probe task involved a unique text sample. In other words, a different text sample was used in each baseline, intervention, maintenance and generalization probe. Three or four functional literacy stimuli such as text messages, employment emails, or academic assignments (represented as separate tiers) were selected for each participant based on their specific needs as identified by the IPSE program coordinator. The functional literacy stimuli were counterbalanced across participants to minimize the risk of sequencing effects and they were probed in a fixed order—the order in which they were introduced into intervention----during each session.

Baseline phase sessions involved a brief period of informal conversation to build rapport followed by administration of the probe task. The interventionist did not provide any literacy instruction. The average length of a baseline session was 20 min (SD = 17 min, range: 16-28).

Intervention phase sessions involved explicit instruction for all of the reading comprehension strategies using the functional literacy text samples. Though we intended to implement the I Do-We Do-You Do framework, we modified the approach because the participants needed less support. For each functional literacy stimuli, initial intervention sessions included only the I Do and We Do phases and later intervention sessions included only the We Do and You Do phases. The probe task was administered at the end of each session. The length of the intervention sessions freely varied ($M = 36 \min, SD = 9 \min$, range: 12-54 min) because the session continued until the participant had progressed through the intervention and completed the probe task.

Maintenance (average length = 28 min) and generalization sessions (average length = 31 min) were identical to sessions in the baseline phase, except that authentic text samples were used for generalization probes. Maintenance data was collected one, two, and four weeks after cessation of the intervention phase to measure participants' maintenance of the acquired skills. Generalization probes were collected at two time points in between the maintenance sessions. Generalization was assessed by having participants complete the probe task with authentic functional literacy texts. For example, participants completed the probe task with an assignment from one of their professors or with GroupMe messages with peers.

Data Analysis

To determine whether the FLIPSS intervention was associated with improvements in the dependent variable, data were visually analyzed for changes in level, trend, and stability within

phases (baseline and intervention) as well as immediacy, consistency, and overlap across phases (baseline to intervention; Kratochwill et al., 2010). Additional analytic measures (e.g., phase means) are reported to supplement the primary visual analysis of the data.

Interobserver Agreement

A secondary observer collected interobserver agreement (IOA) data for at least 25% of sessions across all participants and phases by viewing the recorded sessions. The coder was blind to the study phase (e.g., baseline, intervention, maintenance), and the interventionist was blind to which sessions were coded for IOA. IOA was calculated using a point-by-point method, dividing the total number of agreements by the number of agreements plus disagreements, and multiplying by 100. Average IOA ranged from 95%-100% across participants.

Procedural Fidelity

An independent, trained coder conducted procedural fidelity (PF) checks on the probe task and intervention procedures for 25% of sessions across all participants and phases using the Zoom video recordings. Sessions coded for PF were chosen at random and the interventionist was blind to which sessions were coded for PF. To calculate PF values, the number of intervention steps (e.g., reviewing the strategy, I Do, We Do, You Do, session wrap-up) completed correctly was divided by the number of steps that should be completed according to the procedures outlined above and multiplied by 100. Fidelity was 100% for the probe task across each participant and each phase. Across all participants, PF was 95% for the baseline, maintenance, and generalization sessions and 98% for the intervention sessions.

Social Validity

To evaluate social validity of the intervention goals and procedures (Wolf, 1978), at the completion of the study, the participants completed an electronic survey on whether (1) the goals

of FLIPSS were valued and (2) the procedures were socially acceptable. The survey included six questions using a 5-point Likert scale (5 = strongly agree to 1 = strongly disagree) and five openended questions (e.g., what did you like/not like about the reading intervention?).

Results

Evaluation of Functional Relation

In this multiple probe across stimuli design with four participants, a functional relation was evaluated across the stimuli of each participant. Thus, it was possible to observe four functional relations in this study. Figures 2-5 show the percentage of reading strategies implemented accurately for each participant. Introduction of FLIPSS was associated with an improvement in the dependent variable for three out of the four participants. One participant, Cassie, demonstrated improved reading comprehension strategy implementation; however, interdependency across the functional literacy stimuli precludes us from establishing experimental control. All participants demonstrated at or near 100% accuracy by the end of intervention and maintained the skill post-intervention. Participants completed between 18 and 26 sessions (M = 22.75, SD = 3.59) delivered across 15 weeks (see Table 3 for FLIPSS dosage). **Cassie**

For Cassie, academic assignments, social GroupMe messages, employment emails, and academic emails were intervened upon in this order. Based on visual analysis, baseline for academic assignments was low and stable with all scores at 0% accuracy. Once intervention was introduced, a rapid increase in level was observed by the second intervention session. Cassie exceeded the criterion (i.e., 60% accuracy across two out of three sessions) in her second intervention session with her scores remaining near 100% accuracy for the remainder of the intervention phase. A change in level was observed across the remaining three functional literacy

stimuli prior to the introduction of intervention and instead, concurrent with introduction of intervention for the first functional literacy stimuli-academic assignments. Because scores were not consistently at the ceiling level and thus there was still room for improvement, intervention was introduced for social GroupMe messages following a decelerating therapeutic trend in baseline. Cassie then began consistently demonstrating accuracy levels at or near 100% accuracy. A similar pattern was observed when intervention was introduced for employment emails. Intervention was not introduced for academic emails due to an accelerating therapeutic trend in baseline. Due to the carryover and dependency across tiers, a functional relation was not established for Cassie. It is important to note that by the end of the intervention phase, Cassie demonstrated scores at or near 100% accuracy for all four functional literacy stimuli. The increased percentage of reading comprehension strategies implemented accurately (>95% accuracy) maintained one, two, and four weeks post-intervention for all stimuli. Cassie demonstrated the ability to consistently generalize the strategies with authentic text samples. For each functional literacy stimuli, Cassie's average percentage of reading comprehension strategies implemented accurately increased from baseline to intervention. See Table 3 for phase means.

Justice

Three functional literacy stimuli—social GroupMe messages, academic emails, and employment emails—were intervened upon in this order. Baseline for social GroupMe messages was low and stable with all scores at 0% accuracy. Once intervention was introduced, a delayed treatment effect was observed. After six intervention sessions with little change in level, the intervention was adapted so that the modified outline version of the FLIPSS graphic organizer was used in intervention (Figure 1, panel B). This adaptation reduced the level of visual support in intervention to increase Justice's independence in implementing the strategies. The adaptation also more closely aligned the intervention activities with the probe task. Justice did not respond to this initial adaptation so in intervention session seven, a second adaptation—utilizing multiple, different functional literacy text samples within a single intervention session—was introduced. Providing diverse opportunities for practice ultimately resulted in longer intervention sessions as well. Following the introduction of these two adaptations that were maintained throughout the rest of the study, a consistent increase in level was observed. Justice demonstrated accuracy levels at or near 100% in the final five intervention sessions. Academic emails and employment emails stayed consistently at 0% accuracy during the extended baseline phase. Next, the adapted FLIPSS intervention was introduced for academic emails. Once intervention began, an immediate intervention effect was observed and scores were all at or near 100% accuracy. When intervention began for the third functional literacy stimuli-employment emails, immediacy of intervention effect was observed. Although her percentage accuracy returned to baseline levels on the second intervention session, her scores were consistently near 100% accuracy for three out of the four intervention sessions. Justice's increased percentage of reading comprehension strategies implemented accurately (>90% accuracy) maintained one, two, and four weeks post-intervention for all stimuli. She also consistently generalized the strategies with authentic text samples. For each functional literacy stimuli, Justice's average percentage of reading comprehension strategies implemented accurately was 0% in baseline which increased once intervention was introduced (Table 3).

Leanne

Employment emails, academic assignments, and academic emails were intervened upon in this order. Baseline for employment emails was low and stable with all scores at 0% accuracy. Once intervention was introduced, a delayed treatment effect was observed. After three sessions with no change in level, an adaptation was introduced to extend the length of intervention sessions so that Leanne had additional time to practice the strategies. Following introduction of the adaptation, a consistent increase in level was observed. During the extended baseline phase, academic assignments and academic emails stayed consistently at 0% accuracy. Next, intervention was introduced for academic assignments. An immediate change in level was not demonstrated. Although some variability was observed, the majority of the data points (67%) were at or near 100% accuracy. When intervention began for the third stimuli—academic emails, immediate change was not observed. Despite variable intervention scores, a change in level was ultimately demonstrated—her accuracy score across sessions was 2% in baseline and 44% in intervention. Leanne's increased percentage of reading comprehension strategies implemented accurately (>80% accuracy) maintained one, two, and four weeks post-intervention for all stimuli. She also generalized the strategies with authentic text samples. For each stimuli, Leanne's average baseline percentage of reading comprehension strategies implemented accurately was less than 5% which increased to a mean greater than 40% accuracy once intervention was introduced, reflecting a modest treatment effect (Table 3).

Randall

Lastly, social text messages, employment emails, academic assignments, and academic emails were intervened upon in this order for Randall. Baseline for social text messages was low and stable with all scores at 0% accuracy. Once intervention was introduced, an immediate intervention effect was observed. Randall exceeded the criterion in his initial intervention sessions with his scores remaining near 100% accuracy for the remainder of the intervention phase. All other functional literacy stimuli stayed consistently at 0% accuracy during the extended baseline phase. Next, intervention was introduced for employment emails. An immediate increase in level was observed with some variability. Randall consistently scored at or near 100% accuracy in the final four intervention sessions. When intervention was introduced for the third functional literacy stimuli—academic assignments, an immediate change in level was not observed. As intervention continued, three out of six scores reflected an increase in level over baseline (i.e., greater than 0% accuracy). Intervention was not introduced for academic emails due to an increase in level and thus unstable baseline scores which appeared to be concurrent with the introduction of intervention for the third functional literacy stimuli. The increased percentage of reading comprehension strategies implemented accurately (>95% accuracy) maintained one, two, and four weeks post-intervention for all stimuli. Further, Randall generalized the strategies with authentic text samples. For each functional literacy stimuli, Randall's average percentage of reading comprehension strategies implemented accurately increased from baseline to intervention (Table 3).

Social Validity

Results from the social validity measure indicated that all participants approved of FLIPSS and thought that the reading comprehension strategies were easy to use. Although one participant provided a neutral response for "I liked the reading sessions," all four participants strongly agreed that (a) the reading sessions helped them understand what they were reading, (b) they would like to receive the reading support again, and (c) the reading sessions helped them socially, in their job, and academically. All participants found all but one reading comprehension strategy to be very or extremely helpful and one participant reported that the summarization strategy was only somewhat helpful. In response to the open-ended questions, participants reported that the intervention helped them read the text and understand hard words, ultimately helping them to get better at reading. When asked whether they would use the reading strategies

in the future and why, participants responded yes because it helps with assignments and one participant explained that "then I can read the everything that I want to read."

Discussion

The purpose of this study was to (a) evaluate the extent to which FLIPSS was associated with improved accuracy of reading comprehension strategies implemented for IPSE students with IDD and (b) assess the acceptability of the intervention from IPSE students' perspectives. This pilot implementation science study is novel in its approach, modality, and target population of IPSE students with IDD. Reading is most often viewed as an academic task and is typically assessed in an academic context with allowable modifications and accommodations (e.g., text is read aloud; Kettler, 2012). However, these modifications and accommodations are not readily available across all functional literacy stimuli such as for emails and text messages, which may preclude full participation in these activities. Although there is evidence on effective strategies for improving literacy outcomes for IPSE students in an academic context (Hua et al., 2019), less is known about effective strategies for facilitating functional literacy. In the present study, we evaluated a functional literacy intervention that consisted of implementing reading comprehension strategies across functional literacy stimuli-academic, employment, social. Our findings extend the literature on providing continued literacy supports for IPSE students with IDD in several ways.

First, our findings demonstrate that young adults with IDD benefit from targeted literacy support and highlight the importance of providing literacy support in functional contexts that relate to their activities of daily living (Hua et al., 2019). Three participants demonstrated improvements in the percentage of reading comprehension strategies implemented accurately following introduction of FLIPSS, and all four students maintained the skill post-intervention.

Based on the participants' pattern of results, it is apparent that some students required explicit instruction across domains, while other students generalized new knowledge without explicit instruction. Although it compromised experimental control, Cassie and Randall began generalizing strategy use to untaught stimuli, which is a desirable learning outcome for young adults with IDD. Anecdotally, when compared to the other participants, Cassie and Randall were both quick learners in that they demonstrated an immediate response when the intervention was initially introduced, possibly due to higher nonverbal intelligence and motivation, respectively. This may suggest that the needed duration of the intervention may vary for each student as some students may respond with more immediacy and generalizability than others. Overall, these findings suggest that FLIPSS is a promising intervention to support long-term literacy gains that sustain over time.

Second, IPSE students reported high degrees of personal satisfaction with FLIPSS. Functional literacy interventions could also be implemented in settings such as the students' home, community, and workplace to optimize generalization. Further, the social validity results and anecdotal evidence reveal that the students were motivated to participate in FLIPSS. We aimed to incorporate text samples and topics that IPSE students would be interested in and motivated to read which likely contributed in part to students' engagement and overall satisfaction with the intervention. Our findings support utilizing specifically designed teaching strategies and resources for individuals with IDD to not only engage with texts in a positive way, but also to facilitate comprehension strategy use (Morgan & Moni, 2008).

Third, the participants generally considered the strategies to be helpful in honing their reading skills. All of the participants indicated that four out of the ten strategies were extremely helpful—reviewing the strategy, reading the text, looking for words they did not know, and

asking if more information is needed. The one strategy that some participants reported as only being somewhat or very helpful was summarizing what they read. Given that this was one of the final reading comprehension strategies to be implemented as outlined in the graphic organizer, it may be that students found this step to be redundant or unnecessary given the other supports.

Implications for Practice

Our findings offer several important implications for practitioners supporting young adults with IDD across postsecondary education settings and community-based contexts. First, this study emphasizes the importance of functional literacy skills across domains, including educational, employment, and social contexts. Additionally, our findings demonstrate that the FLIPSS intervention may need to be customized for students to optimize outcomes. Thus, educators in both K-12 and higher education should embed individualized functional literacy instruction into their pedagogy as a means to expand access and inclusion for students with IDD. Second, given that this intervention was delivered on the widely available, web-based Zoom platform, this study demonstrates the initial promise of telepractice as an effective, low cost vehicle to deliver a functional literacy intervention to IPSE students. Although the primary reason for telepractice was to limit face-to-face interactions during the COVID-19 pandemic, this is a cost-effective and sustainable practice that offers an opportunity for IPSE students to access supports from a trained professional at a distance if needed. Additionally, future adaptations of FLIPSS could include peer-delivered implementation to promote natural supports and long-term sustainability.

Third, collaboration with related service providers is essential for facilitating a continuum of services in IPSE settings (e.g., speech therapy, occupational therapy, physical therapy). While this is often mandated by the Individuals with Disabilities Education Act (2004) in K-12 contexts

for eligible students, colleges and universities do not typically offer multidisciplinary related services to students with or without disabilities. Thus, it is critical that faculty at institutions with IPSE programs make intentional efforts to partner with experts from fields aligned with these services (e.g., speech-language pathology, occupational therapy, physical therapy) to provide continued support for students with disabilities who would benefit from additional services. These partnerships offer a feasible and cost-effective approach to provide IPSE students with inclusive access to support services. Given that related-service personnel prep programs and IPSE programs often co-exist on university campuses, intercampus collaborations harnessing telepractice could be established, as modeled in the present study.

Lastly, interdisciplinary collaborations provide a venue for reciprocal benefits between IPSE staff and speech-language pathology professionals. For example, speech-language pathology professionals can offer informal, yet valid and reliable measures to include in the selection process to evaluate functional literacy skills of applicants prior to admission. This is especially helpful if former reading evaluations conducted by the school system are outdated. This partnership also offers new insights for literacy experts to fine-tune their skills with an adult population that is often underserved when considering reading services or interventions.

Limitations and Future Research

Several limitations of this study are important to consider. First, our findings must be interpreted within the context by which the intervention was delivered—via a virtual modality and in one-on-one sessions— which may not be feasible across all IPSE programs. Although it demonstrated promise in a collegiate setting with individualized administration, future research should explore alternative as well as more inclusive modalities (e.g., in-person intervention or small group sessions) and settings (e.g., community or workplace). Second, we assessed

maintenance at one, two, and four weeks post intervention; however, it is unknown whether the students maintained these strategies implemented accurately beyond one-month postintervention. Future research should extend data collection to determine whether students' progress maintains long-term (i.e., 3- to 6-months post-intervention). Lastly, we evaluated the effect of FLIPSS on a proximal outcome measure—percentage of reading comprehension strategies implemented accurately. The extent to which FLIPSS is associated with more distal literacy outcome measures such as fluency and reading comprehension remain unknown. Understanding the many ways to improve an individuals' functional literacy and communication is critical to long-term success.

Conclusion

This study adds new findings to the literature on effective methods to support IPSE students in academics, employment, social skills, and independent living. The results of this study suggest that FLIPSS is an effective method to teach reading comprehension strategies that can be implemented across various text domains and that generalize to authentic text samples encountered in IPSE students' activities of daily living. Functional literacy interventions for IPSE students should continue to be examined in future research.

References

- American Association on Intellectual and Developmental Disabilities. (n.d.). *Definition of intellectual disability*. <u>https://www.aaidd.org/intellectual-disability/definition</u>
- Catts, H., & Kamhi, A. (1999). Defining reading disabilities. In H. Catts & A. Kamhi (Eds.), Language and reading disabilities, (pp. 50-72). Allyn & Bacon.
- Duke, N. K., & Pearson, P. D. (2009). Effective practices for developing reading comprehension. Journal of Education, 189(1-2), 107-122. <u>10.1177/0022057409189001-208</u>
- Eccles, M. P., & Mittman, B. S. (2006). Welcome to implementation science. *Implementation Science*, *1*(1), pp. 1-3.
- Eldblom, J., Boström, P., Broberg, M., & Åsberg Johnels, J. (2021). Word reading, vocabulary, and mental health problems in adolescent girls and boys with intellectual and developmental disabilities. *International Journal of Developmental Disabilities*, 67(2), 131-139. https://doi.org/10.1080/20473869.2019.1626168
- Gast, D. L., Lloyd, B.P., & Ledford, J. (2018). Multiple baseline and multiple probe designs. In
 J.R. Ledford & D.L. Gast (Eds.), *Single case research methodology: Applications in special education and behavioral sciences* (3rd ed., pp. 239-282). Routledge.
- Gast, D. L., & Spriggs, A. D. (2010). Visual analysis of graphic data. In D. L. Gast (Ed.), *Single subject research methodology in behavioral sciences* (2nd ed., pp. 199-233). Routledge.
- Grigal, M., Hart, D., Papay, C., Wu, X., Lazo, R., Smith, F., & Domin, D. (2021). Annual report of the cohort 2 TPSID model demonstration projects (Year 5, 2019–2020). Boston, MA: University of Massachusetts Boston, Institute for Community Inclusion.
- Higher Education Opportunity Act, Pub. L. No. 110-315 [HEOA]. (2008).

https://www2.ed.gov/policy/highered/leg/hea08/index.html

- Hua, Y., Ford, J. W., Yuan, C., Monroe, K., & Therrien, W. J. (2016). Implementing the rereadadapt and answer-comprehend intervention and reinforcement contingency for learners with intellectual disability. *Journal of Evidence-Based Practices for Schools*, *15*(1), 110-132, 10.3109/17518423.2016.1139011
- Hua, Y., Hendrickson, J. M., Therrien, W. J., Woods-Groves, S., Ries, P., & Shaw, J. W. (2012).
 Effects of combined repeated reading and question generation intervention on young adults with autism. *Focus on Autism and Other Development Disabilities*, 27, 135-146.
- Hua, Y., Therrien, W. J., Hendrickson, J. M., Woods-Groves, S., Ries, P. S., & Shaw, J. W.
 (2012). Effects of combined repeated reading and question generation intervention on young adults with cognitive disabilities. *Education and Training in Autism and Developmental Disabilities*, 47(1), 72-83. https://www.jstor.org/stable/23880563
- Hua, Y., Woods-Groves, S., Ford, J. W., & Nobles, K. A. (2014). Effects of the paraphrasing strategy on expository reading comprehension of young adults with intellectual disability. *Education and Training in Autism and Developmental Disabilities*, 49(3), 429-439. https://www.jstor.org/stable/23881264
- Hua, Y., Woods-Groves, S., Kaldenberg, E. R., & Scheidecker, B. J. (2013). Effects of vocabulary instruction using constant time delay on expository reading of young adults with intellectual disability. *Focus on Autism and Other Developmental Disabilities*, 28(2), 89-100. <u>https://doi.org/10.1177/1088357613477473</u>
- Hua, Y., Woods-Groves, S., & Yuan, C. (2019). Literacy interventions for young adults with intellectual and developmental disabilities in the inclusive postsecondary education settings: A review of a program of research. *Journal of Inclusive Postsecondary Education*, 1(1), 1-20. <u>https://doi.org/10.13021/jipe.2019.2456</u>

Hua, Y., Yuan, C., Monroe, K., Hinzman, M. L., Alqahtani, S., Alwahbi, A. A., & Kern, A. M. (2018). Effects of the reread-adapt and answer-comprehend and goal setting intervention on decoding and reading comprehension skills of young adults with intellectual disabilities. *Developmental Neurorehabilitation*, 21(5), 279-289.

https://doi.org/10.3109/17518423.2016.1139011

Individuals with Disabilities Education Act Amendments of 2004, Pub. L. No. 108-446 [IDEA]. (2004).

https://uscode.house.gov/view.xhtml?path=/prelim@title20/chapter33&edition=prelim

- Kettler, R. J. (2012). Testing accommodations: Theory and research to inform practice. *International Journal of Disability, Development and Education*, 59(1), 53-66. <u>http://dx.doi.org/10.1080/1034912X.2012.654952</u>
- Kirsch, I., & Guthrie, J. T. (1977). The concept and measurement of functional literacy. *Reading Research Quarterly*, 13(4), 485–507. https://doi.org/10.2307/747509
- Kirsch, I., Jungeblut, A., Jenkins, L., & Kolstad, A. (2002). Adult literacy in America: A first look at the findings of the National Adult Literacy Survey. Washington, DC: National Center for Education Statistics, U.S. Department of Education.
- Kratochwill, T. R., Hitchcock, J., Horner, R. H., Levin, J. R.,Odom, S. L., Rindskopf, D.M., & Shadish, W. R. (2010). Single-case designs technical documentation. http://ies.ed.gov/ ncee/wwc/pdf/wwc_scd.pdf
- Lemons, C. J., King, S. A., Davidson, K. A., Puranik, C. S., Fulmer, D., Mrachko, A. A., Partanen, J., Otaiba, S. A., & Fidler, D. J. (2015). Adapting phonological awareness interventions for children with Down syndrome based on the behavioral phenotype: A

promising approach?. *Intellectual and Developmental Disabilities*, *53*(4), 271-288. 10.1352/1934-9556-53.4.271

- Moni, K. B., & Jobling, A. (2000). LATCH-ON: A program to develop literacy in young adults with Down syndrome. *Journal of Adolescent & Adult Literacy*, *44*(1), 40-49.
- Moni, K. B., & Jobling, A. (2001). Reading-related literacy learning of young adults with Down syndrome: Findings from a three year teaching and research program. *International Journal of Disability, Development and Education*, 48(4), 377-394.

http://dx.doi.org/10.1080/10349120120094275

- Moni, K., Jobling, A., & Baffour, B. (2018). Literacy learning outcomes in a longitudinal study of a postschool literacy education program for young adults with intellectual disabilities. *Journal of Policy and Practice in Intellectual Disabilities*, 15(2), 155-165.
- Moni, K. B., Jobling, A., Morgan, M., & Lloyd, J. (2011). Promoting literacy for adults with intellectual disabilities in a community-based service organisation. *Australian Journal of Adult Learning*, 51(3), 456-478. <u>https://files.eric.ed.gov/fulltext/EJ954476.pdf</u>
- Morgan, M. F., & Moni, K. B. (2008). Literacy: Meeting the challenge of limited literacy resources for adolescents and adults with intellectual disabilities. *British Journal of Special Education*, 35(2), 92-101. <u>https://doi.org/10.1111/j.1467-8578.2008.00378.x</u>
- National Core Indicators (2019). 2018-19 In-person survey 2018-19: Work. National Association of State Directors of Developmental Disabilities Services and Human Services Research Institute. <u>https://www.nationalcoreindicators.org/upload/core-</u>

indicators/Employment_4_16.pdf

National Reading Panel. (2000). Report of the national reading panel: Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction: Reports of the subgroups. National Institute of Child Health and Human Development, National Institutes of Health.

- Schumaker, J. B., Denton, P. H., & Deshler, D. D. (1984). *Learning strategies curriculum: The Paraphrasing Strategy*. Lawrence, KS: The University of Kansas.
- Therrien, W. J., Wickstrom, K., & Jones, K. (2006). Effects of combined repeated reading and question generation intervention on reading achievement. *Learning Disabilities Research* & *Practice*, 21(2), 89-97. <u>https://doi.org/10.1111/j.1540-5826.2006.00209.x</u>
- Shanahan, T., Callison, K., Carrière, C., Duke, N., Pearson, P.D., Schatschneider, C., & Torgesen, J. (2010). *Improving Reading Comprehension in Kindergarten through 3rd Grade: IES Practice Guide*. NCEE 2010-4038.
- Think College. (2021). *Find the college that is right for you! [PSE program database]*. <u>https://thinkcollege.net/college-search</u>
- UNESCO (2006). Literacy for life. Education for All Global Monitoring Report 2006. www.unesco.org/education/GMR2006/full/chapt6_eng.pdf
- United Nations Development Program. (n.d.). *Disability and higher education: Better architectural choices for inclusive campuses*. <u>https://www.un.org/en/academic-</u> <u>impact/disability-and-higher-education-better-architectural-choices-inclusive-campuses</u>
- van Wingerden, E., Segers, E., van Balkom, H., & Verhoeven, L. (2014). Cognitive and linguistic predictors of reading comprehension in children with intellectual disabilities. *Research in Developmental Disabilities*, 35(11), 3139-3147.

https://doi.org/10.1016/j.ridd.2014.07.054

- van Wingerden, E., Segers, E., van Balkom, H., & Verhoeven, L. (2017). Foundations of reading comprehension in children with intellectual disabilities. *Research in Developmental Disabilities*, 60, 211-222. <u>https://doi.org/10.1016/j.ridd.2016.10.015</u>
- Whirley, M. L., Gilson, C. B., & Gushanas, C. M. (2020). Postsecondary education programs on college campuses supporting adults with intellectual and developmental disabilities in the literature: A scoping review. *Career Development and Transition for Exceptional Individuals*, 43(4), 195-208. <u>https://doi.org/10.1177/2165143420929655</u>
- Wolf M. M. (1978). Social validity: the case for subjective measurement or how applied behavior analysis is finding its heart. *Journal of Applied Behavior Analysis*, 11(2), 203– 214. 10.1901/jaba.1978.11-203
- Woodcock, R. W. (2011). Woodcock Reading Mastery Tests-Third edition (WRMT-III). Pearson.
- Zoom Video Communications, Inc. (2020). ZOOM cloud meetings (Version 4.6.9) [Computer software].



Figure 1. FLIPSS graphic organizer used in (a) intervention and (b) dependent variable probe task.



Figure 2. Cassie's functional literacy behavior performance during the baseline, intervention, maintenance, and generalization phases.



Figure 3. Justice's functional literacy behavior performance during the baseline, intervention, maintenance, and generalization phases; GO = graphic organizer.



Figure 4. Leanne's functional literacy behavior performance during the baseline, intervention, maintenance, and generalization phases.



Figure 5. Randall's functional literacy behavior performance during the baseline, intervention, maintenance, and generalization phases.

Participant Characteristics

					K-BIT 2			WRMT-III Word Identification		
Participant	Gender	Age	Ethnicity	Race	Score	Percentile	90% CI	Score	Percentile	Grade Equivalent
Cassie	F	22;7	Not Hispanic or Latino	White	76	5	(70-84)	55	0.1	1.8
Leanne	F	20;6	Hispanic or Latino	White	40	< 0.1	(36-49)	55	0.1	1.7
Justice	F	23;10	Not Hispanic or Latino	White	52	0.1	(47-61)	55	0.1	1.9
Randall	М	21;1	Not Hispanic or Latino	Black or African American	53	0.1	(49-59)	55	0.1	1.9

Note. KBIT-2 = Kaufman Brief Intelligence Test-Second Edition (Kaufman, 2004); WRMT-III = Woodcock Reading Mastery Tests-Third Edition (Woodcock,

2011); CI = confidence interval; F = female; M = male.

Reading Comprehension Strategy Operational Definitions and Scoring Criteria

Step	Operational definition	No credit
	Naming the "FLIPSS strategy"; mention	
	completing tasks before, during, and after	No review of strategy,
1. Kevlew strategy	reading; name each step or at least 4/10	reading strategy
	steps, ten steps	
	Identifying whether the text is text	
2. Identify functional	message, GroupMe message, email,	Vague description
literacy task	assignment, etc.	
3. Identify person	Name person(s) or role (e.g., professor,	
corresponding with friend)		No response
	Read text aloud or to themselves (e.g.,	
4. Read text	looking at screen, eyes scanning text, silent	If don't finish text in
	pause, "I'm done")	its entirety, no reading
	Identify a word they don't know,	
5. Look for words I need	acknowledge that they know all the words	Very quick scan of
help with	or that they looked at back at the text	text, don't look at text
	Repeat any part of the text, describing or	
	expanding on the text, draw or visually	Summarize and not
6. Re-read and visualize	represent text	read directly, "I can
	[credit given for re-reading or visualizing]	see/imagine it"

Verbalize the question, acknowledge that	No self-monitoring,	
they understand everything (e.g., "I've got	obvious lack of	
it!")	comprehension	
Verbal (mostly correct and complete)	Vague or incomplete	
summary of text, list notes	summary	
Verbalize the question, acknowledge that	No cho la ferraciación	
they don't need more information (e.g.,	information	
"I'm good")		
State salest to de mart	No verbal comment or	
State what to do next	unrelated comment	
	Verbalize the question, acknowledge that they understand everything (e.g., "I've got it!") Verbal (mostly correct and complete) summary of text, list notes Verbalize the question, acknowledge that they don't need more information (e.g., "I'm good") State what to do next	

Phase Means for Each Participants' Percentage of Reading Strategies Implemented

Accurately

Participant (intervention dosage)				
functional literacy behaviors	Baseline	Intervention	Maintenance	Generalization
Cassie (9 hours, 32 minutes)				
Assignments	0%	76%	100%	100%
Group Messages	32%	94%	94%	100%
Emails (Employment)	48%	100%	100%	96%
Emails (Academic)	52%		100%	100%
Justice (15 hours, 32 minutes)				
Group Messages	0%	41%	100%	100%
Emails (Academic)	0%	90%	89%	92%
Emails (Employment)	0%	69%	100%	100%
Leanne (13 hours, 15 min)				
Emails (Employment)	0%	52%	94%	92%
Assignments	0%	56%	89%	67%
Emails (Academic)	2%	44%	83%	88%
Randall (8 hours, 40 min)				
Social Text Messages	0%	80%	100%	100%
Emails (Employment)	0%	64%	97%	100%

Assignments	0%	44%	100%	96%
Emails (Academic)	33%		100%	100%

Phase <u>M</u>means for <u>E</u>each <u>P</u>participants' <u>P</u>percentage of <u>R</u>reading <u>S</u>strategies <u>I</u>implemented

<u>A</u>accurately

Participant (intervention dosage)				
functional literacy behaviors	Baseline	Intervention	Maintenance	Generalization
Cassie (9 hours, 32 minutes)				
Assignments	0%	76%	100%	100%
Group Messages	32%	94%	94%	100%
Emails (Employment)	48%	100%	100%	96%
Emails (Academic)	52%		100%	100%
Justice (15 hours, 32 minutes)				
Group Messages	0%	41%	100%	100%
Emails (Academic)	0%	90%	89%	92%
Emails (Employment)	0%	69%	100%	100%
Leanne (13 hours, 15 min)				
Emails (Employment)	0%	52%	94%	92%
Assignments	0%	56%	89%	67%
Emails (Academic)	2%	44%	83%	88%
Randall (8 hours, 40 min)				
Social Text Messages	0%	80%	100%	100%
Emails (Employment)	0%	64%	97%	100%

Assignments	0%	44%	100%	96%
Emails (Academic)	33%		100%	100%

Supplemental Material

Click here to access/download Supplemental Material Supplemental Material 2.pdf Supplemental Material

Click here to access/download Supplemental Material Supplemental Material 1.docx