A Single-Case Experimental Investigation of Sketch and Speak Expository Intervention for Adolescents with Language-Related Learning Disabilities via Telepractice

Amy K. Peterson
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A SINGLE-CASE EXPERIMENTAL INVESTIGATION OF SKETCH AND SPEAK EXPOSITORY INTERVENTION FOR ADOLESCENTS WITH LANGUAGE-RELATED LEARNING DISABILITIES VIA TELEPRACTICE

by

Amy K. Peterson

A dissertation submitted in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

in

Disability Disciplines

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UTAH STATE UNIVERSITY
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2022
ABSTRACT

A Single-Case Experimental Investigation of Sketch and Speak Expository Intervention for Adolescents with Language-Related Learning Disabilities via Telepractice

by

Amy K. Peterson, Doctor of Philosophy
Utah State University, 2022

Major Professor: Dr. Teresa A. Ukrainetz
Program: Disability Disciplines

Purpose: This study investigated the effects of Sketch and Speak strategy intervention for expository discourse on note-taking, oral reports, and short-answer recall questions for adolescents with language-related learning disabilities delivered via telepractice. During the summer prior to their 9th grade year, three students with language-related learning disabilities who had current IEPs with academic language goals participated.

Method: This study utilized a multiple baseline across participants design with synchronous instruction via telepractice. All sessions were completed during the same 6-week period during the summer of 2021. Participants completed three, six, or nine baseline sessions and twelve 45-60 minute individual treatment sessions. Outcome data of Oral Reports and Short-Answer Recall questions were collected through Session Tests in all sessions. Session Tests had varied levels of instructional support based on session type. Students independently used strategies to complete tasks in baseline and odd-
numbered treatment sessions prior to Independent Session Tests. Guided Session Tests were administered at the end of the even-numbered sessions in the treatment phase to examine the efficacy of the intervention. Guided Session Tests followed two sessions of instruction on note-taking and systematic oral practice on a topic. A distal, age-referenced, semi-standardized expository task and social validity questionnaires were administered pre/post. Social validity questionnaires were used to measure perceptions of carryover feasibility, usefulness of the intervention and telepractice delivery.

**Results:** Primary efficacy measures of Oral Report quality and Short-Answer Recall outcomes in Guided Session Tests in the treatment phase were compared to Independent Session Tests in the baseline phase. Visual and statistical analyses revealed significant effects of treatment for all three participants on Oral Report Quality, but no effect of treatment on Short-Answer Recall questions. The lack of treatment effect on Short-Answer Recall questions may have been due to methodological issues. There was a significant effect of treatment on the secondary outcomes of Note Quantity and Note Quality for all three participants in Guided Session Tests. Treatment effectiveness comparisons of Independent Session Test data in baseline to Independent Session Test data in treatment revealed a treatment effect on Oral Reports for two participants and on Note Quality for one participant. All three participants improved from pre- to post-test on the distal expository measure. Analysis of responses to social validity questionnaires showed participant awareness and buy-in of taught strategies, with potential for generalization into educational activities at the high school level. Overall results supported the use of this strategy intervention for older students to improve comprehension and expression of grade-level expository discourse.
Conclusion: This study provides evidence to support *Sketch and Speak* as an expository language intervention that helps adolescent students take meaningful notes and comprehend and express complex ideas from informational texts. The results of this study provide evidence of the efficacy and effectiveness of this treatment and adds to the existing literature base for expository interventions with adolescent students who have language-related learning disabilities. Further, this study provides groundwork for future studies to explore *Sketch and Speak* within this population.
PUBLIC ABSTRACT

A Single-Case Experimental Investigation of Sketch and Speak Expository Intervention for Adolescents with Language-Related Learning Disabilities via Telepractice

Amy K. Peterson

This study investigated the effects of Sketch and Speak expository language intervention for adolescent students with language-related learning disabilities (LLD). Students with LLD have trouble understanding and using academic language for reading and writing and often benefit from explicit instruction in these areas. Sketch and Speak is an expository language intervention that teaches students to take notes in two forms and to systematically use oral practice to facilitate understanding and memory of notes. First, students learn to take notes using simple sketch writing, or pictography, which allows them to focus on the ideas of the text rather than the spelling, letter formulation, and other cognitive demands of written language. Students then generate full oral sentences from their pictographic note and practice saying the sentences aloud to solidify the information in their memory. In the second session, students transfer their pictography notes and full sentences to the more traditional form of bulleted notes by identifying key words from their well-formed oral sentences. Students are also scaffolded into practicing full oral reports from their notes in each session. This combination of repeated oral practice of sentences and full reports and two types of note-taking helps students to comprehend and express information from complex informational texts.

This study is a multiple baseline across participants single-case experiment. Participants completed three, six, or nine baseline sessions before moving into the
treatment phase. All participants completed 12 45-minute sessions of intervention. This study is the first to investigate *Sketch and Speak* with adolescent students. Three ninth grade students with LLD participated in one-on-one instruction sessions via telepractice in the summer of 2021. Data was collected in each baseline and treatment session on participants’ abilities to generate Oral Reports and answer Short-Answer Recall questions about a novel topic. In baseline, participants followed along with a read-aloud informational text and then took notes on the article with no further instructional support prior to the Independent Session Test. In treatment, participants were provided with instruction on two different types of notes and systematic oral practice prior to the Guided Session Tests (Oral Report and Short-Answer Recall). Additionally, participant’s notes were examined for Note Quantity and Note Quality across session types (i.e., baseline and treatment). All three students significantly improved on their ability to compose accurate oral reports and generate more high-quality notes about the topic after participating in the intervention.

Participants also completed an expository oral reporting task about a different expository content area at pre-/post-treatment. This semi-standardized activity allows for comparisons of oral report performance to typically developing peers of the same age. Though a pre-/post-treatment test is not common in a single-case design like this one, this test allowed the researcher to examine whether learned note-taking and oral reporting skills were used independently by the students in a different expository content area than was taught in treatment. All three students made significant gains in note-taking and oral reporting at post-test when compared to their independent pre-test performance.
The perceived importance of the intervention and delivery mode was also examined through social validity questionnaires. Participants, parents, and speech-language pathologists answered social validity questions about the intervention and study strategies for adolescents at pre- and post-test. Responses for all three groups indicated that the intervention was viewed as meaningful. Participants reported that they had learned strategies that they could apply independently in the high school setting. The participants also answered questions about the telepractice delivery mode, with most responses indicating that it was viewed as a positive experience. This study provides evidence for the use of Sketch and Speak intervention with older students and lays the groundwork for future studies with this population. This study also contributes to the literature base on telepractice service delivery for intervention, which is important as this delivery style has become more popular after the onset of COVID-19.
DEDICATION

This work is dedicated to the participants: three teenagers who gave up part of their summer for this study and persevered through technology troubles, early mornings, and 5 meetings a week. The work you did will advance this intervention, the practice of speech-language pathologists who work with students like you, and your own academic success. I can’t thank you enough!
ACKNOWLEDGMENTS

As a land-grant institution, Utah State University campuses and centers reside and operate on the territories of the eight tribes of Utah, who have been living, working, and residing on this land from time immemorial. These tribes are the Confederated Tribes of the Goshute Indians, Navajo Nation, Ute Indian Tribe, Northwestern Band of Shoshone, Paiute Indian Tribe of Utah, San Juan Southern Paiute, Skull Valley Band of Goshute, and White Mesa Band of the Ute Mountain Ute. I acknowledge these lands carry the stories of these Nations and their struggles for survival and identity. I recognize Elders past and present as peoples who have cared for, and continue to care for, the land. In offering this land acknowledgment, I affirm Indigenous self-governance history, experiences, and resiliency of the Native people who are still here today.

First, I need to acknowledge my family who encourages me, loves me, and supports me always. Emily, thank you for being my person, my first phone call, my “muppet”, my favorite human, and my safe place. Mom, thank you for paving the way for me as an SLP, knowing the importance of my work, and being my best cheerleader. Dad, your careful reading and commiseration on the woes of “reviewer 2” made light of difficult situations. Daniel, you always push me to succeed and inspired me to follow in your Ph.D. footsteps – forever my buddy! Angela and Addie, thank you for your hugs and endless support. Neo, my sidekick for the last decade – the endless road trips, walks to clear my head, excited barking, and dog smiles got me through this program.

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wing and always being ready to listen, coach, and commiserate. To my USU doc student cohort – especially Kristen Rolf whose friendship and encouragement have pulled me into worlds less familiar to an SLP – I am beyond excited for the projects we will do together! And finally, thanks to all my other family and friends who have kept me smiling, hugged me when times were hard, and always knew I would pull this off!

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Amy K. Peterson
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CHAPTER I: INTRODUCTION

Narrating events, explaining the rules of a game, understanding social media feeds, and watching the nightly news are common activities that highlight the importance of language in society. Language envelopes our every action and provides the basis of our thought as a “code whereby ideas about the world are expressed through a conventional system of arbitrary signals for communication” (Lahey, 1988, p. 2). This agreed-upon code creates meaning and expands world knowledge with each new experience, starting in infancy. By the time children enter the school system, language understanding and expression has adult-like qualities that are further refined throughout the school years.

Language as a structure of societal success may cause early difficulties for some. In a descriptive study of children entering kindergarten, Tomblin and colleagues identified nearly 7.5% of participants as having a language disorder at this early age (Tomblin et al., 1997). This is a similar number to the statistics from 2016, where roughly 7.5% of the total US population of students were served under eligibility categories of Specific Learning Disability or Speech/Language Impairment (Snyder et al., 2019). Students who have these diagnoses, among others, typically receive services from a speech-language pathologist (SLP) to support their academic language needs. To encompass the heterogeneous population of students who receive services from a speech-language pathologist (SLP) for language needs, this dissertation uses the term language-related learning disabilities (LLD). Students with LLD receive services for language, writing, or reading on an Individualized Education Plan (IEP) through three main
eligibility categories: Speech or Language Impairment, Specific Learning Disability, and Other Health Impaired (for Attention Deficit Disorder).

Students with LLD are unlikely to “grow out” of a need for continued support in academic and literacy areas throughout their school careers (Conti-Ramsden et al., 2012; Dockrell et al., 2009). SLPs are tasked with supporting these students in language learning and use across academic contexts and are particularly suited to support reading and writing skills through speaking and listening activities. Teaching students underlying language and learning skills and scaffolding them into independence in a one-on-one or small group environment allows SLPs to target individual student needs in a way that often cannot be done in the general education classroom.

SLPs in the schools work with students across the grade levels. This “across the ages” feature requires SLPs to know the different discourse expectations of the school and classroom to provide quality intervention to struggling students. Students as early as kindergarten are expected to understand differences between narrative and expository discourse and use these forms in the classroom to meet academic standards, such as the Common Core State Standards (NGA-CCSSO, 2010). As expectations and demands on learning increase in later grades, more students are identified with language and learning difficulties.

SLPs supporting students in the middle grades have limited resources for discourse-level interventions that have a meaningful impact on student learning. A recent systematic review revealed only a handful of high-quality controlled studies of discourse-level interventions for students in grades 4-8 (Peterson et al., 2020). The seven interventions in this review focused on expository language production or use, with only
two studies, Ukrainetz (2019) and Hebert et al. (2018), having large effect sizes for proximal tasks that were taught within the intervention. No studies had large effects on distal generalization or maintenance tasks. The Ukrainetz (2019) study of *Sketch and Speak* intervention was the only study in this review to include fidelity checklists and treatment descriptions that could facilitate researcher replications or SLP use of the innovation in practice. The small number of studies in this review, the small effect sizes overall, and the lack of researcher-provided materials emphasize a gap in the available literature for SLPs implementing evidence-based practices for adolescents with LLD.

Strategy interventions, like note-taking or summarizing, have been shown to be helpful in increasing student understanding and performance (Kobayashi, 2005, 2006; Kamil et al., 2008; NRP, 2000). Explicitly teaching strategies across topic areas with repeated opportunities for practice may increase student generalization more than decontextualized skill interventions where the students seem to “leave their skills” in the speech room (Ukrainetz, 2016). Research and reviews of “dosage” suggest that the active participation of students in the session is more important than the total amount of treatment time (Frizelle et al., 2021; Justice, 2018). This suggests that active student participation as a result of explicit instruction and repeated opportunities for practice may be even more important than the number of service minutes on an IEP.

One of the ways SLPs can support students in active participation is through strategy intervention. A strategy intervention called *Sketch and Speak*, which teaches note-taking and oral practice to enhance comprehension and expression of expository discourse. First, students learn to take notes using simple sketch writing, or pictography, which allows them to focus on the ideas of the text rather than the spelling, letter
formulation, and other cognitive demands of written language. Students then generate full oral sentences from their pictographic note and practice saying the sentences aloud to solidify the information in their memory. In the second session of treatment, students transfer their pictography notes and full sentences to the more traditional form of bulleted notes by identifying key words from their well-formed oral sentences. Students are also scaffolded into practicing full oral reports from their notes in each session.

Previous research on Sketch and Speak revealed promising results for students in grades 4-6 with LLD (Ukrainetz, 2019; Peterson et al., 2021). Students, teachers, SLPs, and administrators who have used the program have expressed enthusiasm about effects of treatment on improving student note-taking and oral reporting skills. Explicit instruction in this combination of note-taking and oral practice strategies for sentences and whole reports supports comprehension and expression of complex material in a way that is accessible to a variety of student abilities. Younger students in two previous studies learned to take better quality notes and to use oral practice as a way to remember specific details from the article while generating sentences in their own words (Peterson et al., 2021; Ukrainetz, 2019). For example, a sixth grader in Peterson et al. (2021) was more aware of strategy use and application to other settings, which hints at the promise of this strategy intervention for adolescent students with LLD. The current study is the first to explore Sketch and Speak with adolescents.

Not only has the Sketch and Speak intervention never been tested with adolescent students, but it has also not been delivered via telepractice. Intervention and instruction for students of all levels changed drastically in 2020 as a result of COVID-19. With an immediate need for social distancing, learning across all levels of education was shifted
to an online, remote delivery (or telepractice) format. Though not ideal to participate in socially distanced learning, the need for intervention and instruction in an online synchronous or asynchronous format drastically increased in the past two years. Students, teachers, and related service professionals were faced with moving learning online with little to no warning or time to prepare. Many school-based SLPs felt unprepared and inadequate at providing services through telepractice overall (Sylvan et al., 2020). SLPs also reported a decrease in job satisfaction as a result of the online service delivery and changes to job expectations due to COVID-19 (Farquharson et al., 2022). This study will provide feasibility data about the adaptability of Sketch and Speak to a new delivery method.

Returning to in-person learning in the wake of COVID-19 is highly anticipated, though it seems unlikely that telepractice service delivery will become a thing of the past. This “new way” of delivering services to students through telepractice comes with its own challenges and presents yet another challenge to researchers designing interventions for adolescent students. The current study combined the strategy intervention of Sketch and Speak with telepractice service delivery for adolescent students with LLD to answer questions of effectiveness, social validity, and practicality of the intervention in a meaningful way.
CHAPTER II: LITERATURE REVIEW

This study investigated an expository strategy intervention, *Sketch and Speak*, delivered to adolescents with LLD via telepractice. This review examines current literature relevant to the treatment target of expository discourse, the population of adolescents with LLD, treatment strategies of written and pictographic note-taking, and systematic oral practice. These elements come together to form expository strategy intervention, *Sketch and Speak*. The existing research on *Sketch and Speak* will also be discussed prior to the current study.

**Expository Discourse**

The term *discourse* may be defined differently dependent on the context and purpose. For the purposes of this study, discourse is any organized unit of language that is longer than one sentence that allows us to communicate ideas, feelings, and thoughts with others (van Dijk, 1997).

Discourse creation is an active process in which multi-sentence language is used to interact with others in either verbal or written form within social and academic contexts. Discourse requires the rapid coordination of many layers of cognitive and language performance (Graesser et al., 1997). For example, we rarely use one sentence or less to express our thoughts and ideas in writing or speaking. Graesser and colleagues highlight the importance of studying expressive discourse where we rapidly combine phonemes, words, and sentences using syntactic rules to convey a global message. Studying discourse comprehension is equally important as it taps into several cognitive functions, including memory and problem-solving, and can be used to assess a person’s ability to complete tasks in their everyday life (Graesser et al., 1997).
Discourse can take the form of a story, or narrative, where a person describes life-events that have problems, solutions, and emotional responses. Expository or informational discourse is the more formal, academic-type language commonly seen in classrooms and other learning environments. Discourse of any genre is made up of more than the word and sentence combinations alone – necessarily relying on context to support the message. For example, expository discourse in written form, or “texts”, includes not only the words, but the accompanying pictures and figures which enhance the meaning for readers (Alvermann & Wilson, 2011).

Expository discourse has a high variability of demands that change across genres with potential for different student performance dependent on schooling experiences, topic knowledge, audience, and purpose (Mosenthal, 1985; van Dijk, 1997). Expository discourse includes informational, topic-oriented, academic, and “true for all time”-type language that purposefully increases knowledge (Mosenthal, 1985; Berman & Nir-Sagiv, 2007; Ukrainetz, 2006). Expository discourse is the primary language of learning in classroom instruction in both oral and written forms, especially beyond the early grades.

Understanding expository discourse development and use is imperative to researcher and educator support of students at all levels.

To better understand typical discourse development and use from preschool through adulthood, Berman and Nir-Sagiv (2007) conducted a descriptive study where they collected narrative and expository language samples in verbal or written form dependent on the age of the participants. Participants were typically developing preschoolers, children in grades 4, 7, and 11, and adults. This study found that typically-developing preschool children produced oral expository and narrative samples with
results showing more complex sentence structure and vocabulary use in expository discourse than in narrative. This suggests that children as young as preschool are able to distinguish differences in expectations and structure for narrative and expository discourse production. All of the other participants provided written discourse samples. The overall written performance of the other age groups suggested a similar developmental pattern to that of the preschoolers, with narratives being longer but less complex than expository discourse samples. This difference in production suggests a paradoxical nature of language development: the general structure of narrative discourse is mastered earlier in both oral and written forms, but more complex words and sentences are present in expository discourse. This study highlights the influence of discourse type on the complexity of language and the covert importance of understanding expectations that come with different language tasks.

There has long been evidence of a shift from narrative-based discourse to more expository-based instruction in the later grades as students move from “learning to read” to “reading to learn” (Mosenthal, 1985). Students who struggle to understand the different discourse structures may fall behind their more language-capable peers, especially as the demands on student-directed learning from text increase. Background knowledge, memory, and text structures play a large part in a learner’s ability to both learn from and use expository discourse, and to regulate their own comprehension and use of new information (Meyer & Freedle, 1984; Wiley et al., 2005). Learning from a text is difficult without careful reading and regulating one’s own understanding is even more difficult. Even typically developing readers across the ages may unknowingly fill in perceived gaps in the text or infer meanings based on background knowledge when the
discourse is difficult to understand (Graesser et al., 1997). Given the variety of expository discourse structures, specific instruction in identifying and using text structures may improve overall academic performance (Williams et al., 2004).

**Interventions for School-age Students with Language Learning Disabilities**

As typically developing language users struggle to master expository discourse and monitor their own understanding of complex texts even into adulthood, it should come as no surprise that students with disabilities also have trouble with different discourse forms. Students who have difficulties in reading, writing, and language often receive services from a speech-language pathologist (SLP). SLPs who support these students are tasked with not only understanding the discourse structure and content expected in schools across grade levels, but with finding interventions to support student comprehension and use.

**Population**

Language-related learning disability (LLD) is a general term for a heterogeneous population of students who struggle with language in spoken or written form, without established causes such as intellectual disability, sensory impairment, or emotional disorder. This generic label, though not included in the diagnosis categories of the Individuals with Disabilities Education Act (U.S. Department of Education, 2007), encompasses many of the students an SLP will serve when working in the schools. Researchers may use terms of Developmental Language Disorder (DLD), Specific Language Impairment, or Language Disorder to describe this population, with many using DLD per recommendation of the CATALISE Consortium (Bishop et al., 2016). The IDEA category of Speech/Language Impairment is an umbrella “catch all” which
covers all of the researcher-driven categories above, plus many children with speech disorders such as articulation disorders and stuttering, and allows SLPs to provide speech-language services for children starting at age three. Young children who have below average performance in oral discourse may later be diagnosed with language-related learning disabilities (Fey et al., 2004; Griffin et al., 2004). Using language-related learning disability (LLD) to describe a more heterogeneous population of students, allows a combination of research and practice in language disorders, behavior analysis, reading and education, psycholinguistics, and cognitive psychology to emphasize the learning abilities and performance of the student over the diagnostic category or academic research area (Gerber, 1993; Murza & Ehren, 2020).

Students who have learning difficulties in reading, writing, and other language-related areas are part of the LLD umbrella. It is estimated that at least half of students with LLD will continue to need academic and language support beyond the elementary years (Conti-Ramsden et al., 2012; Dockrell et al., 2009). The shift from “learning to read” to “reading to learn” in the middle elementary grades is sometimes referred to as a fourth grade slump (Chall & Jacobs, 1991). This shift often leaves students with LLD further behind their typically developing peers and in more need for language supports to increase academic success. With an increased focus on reading to learn in the later grades, students with limited language skills are required to decode and comprehend complex material, which are also now more often expository in nature and moving away from the familiar structure of narrative language.

Adolescent students also have higher demands on their executive functioning skills, including organization and time management as they move from the comfort of
one classroom in elementary school to a different classroom and teacher for each subject area. These changes in setting and demands on executive functioning skills often happen in conjunction with expectations for independent student learning through reading, homework, and lecture-based instruction. Fortunately for students with LLD, SLPs can provide repeated opportunities and individualized instruction in language-related areas that may not always be provided in whole class instruction. To do this, SLPs are tasked with understanding the needs of students across grades and curricular areas to identify strategies that will help students to independently access information. Published literature reviews for discourse-level interventions for adolescents with LLD can be particularly useful for practitioners searching for evidence-based practices. There is, however, a relative dearth of interventions in this area for older learners (Peterson et al., 2020; Pyle et al. 2017; Ward-Lonergan & Duthie, 2016).

**Strategy Interventions**

Strategy intervention includes teaching students necessary skills to access, process, remember, and express information that they need to learn to be successful academically. This kind of intervention can include specific instruction in note-taking or “thinking aloud” strategies that help students to make meaning of the information they are learning. Strategy instruction has a large body of supporting evidence in education for students of all ages. Recommendations for evidence-based strategy instruction come from the Institute of Education Sciences (IES) *What Works Clearinghouse* guidelines and the National Reading Panel.

In 2010, the IES published a practice guide for improving reading comprehension in the early grades (Shanahan et al., 2010). The authors suggest that strategy intervention
includes intentional mental actions and deliberate efforts to better understand or remember information. According to Shanahan and colleagues, strategy intervention does not include activities or practice exercises without explicit instruction of metacognitive skills needed to actively participate in learning. Examples of strategy interventions with strong research evidence for young students include questioning, visualization, inferencing, and retelling. These strategies facilitate active learning across discourse structures (Shanahan et al., 2010).

The need for continued explicit strategy instruction does not decrease after the early grades, though the expectations may change. For adolescent students, specific strategy instruction in summarizing, using graphic organizers, asking and answering questions, completing semantic webs, and identifying the main idea help students to better understand academic discourse (Kamil et al., 2008). These strategies are similar to those suggested as meaningful for younger students by Shanahan and colleagues (2010), but with differences in the amount of teacher direction, difficulty of the texts, and the sophistication of the required answers. In their IES practice guide for improving adolescent learning outcomes, Kamil and colleagues state the importance of explicit strategy instruction. This practice guide provides recommendations on teaching strategies through: application to different texts with repeated opportunities for practice, demonstration and discussion of the metacognitive components for critical thinking, individualization of instruction for struggling students, and selection of appropriate strategies in relation to the difficulty of the activity (Kamil et al., 2008). A recent systematic review by Biggers and Luo (2020) offers support for use of strategies like structured notes in which readers are fill in key words and important information as a
meaningful learning process for older students that works even into adulthood. This review and the practice guides discussed above suggest that explicit strategy instruction across the grade levels is critically important to student success and has potential for a lifelong effect on learning ability and comprehension.

To examine the effectiveness of instruction on different learning strategies, researchers often compare one strategy to another. For example, Ponce and colleagues (2020) conducted two quasi-experimental group studies with Spanish speaking fourth grade students in Chile. To examine treatment effects on memory and comprehension, this study compared two experimental groups: a) graphic organizer instruction and b) structured questions instruction; to two control groups: a) independent note-taking and b) reading only. In total, 192 fourth grade students were recruited from four schools through researcher contacts. The four schools were divided into treatment or control conditions: schools 1 and 2 provided treatment, schools 3 & 4 served as control. Within each school, participants were balanced by pre-test scores and then randomly assigned to an instructional group (i.e., graphic organizer or answering questions). Treatment groups in schools were given 90 minutes of instruction on graphic organizer use or answering structured questions about a text. Control groups either took notes on a text or simply read a text with no strategy instruction (although teachers reported that students were learning main idea identification and note-taking in the classroom). To assess effectiveness of the trained strategies of answering questions and use of graphic organizers on comprehension compared to control groups, all four groups read researcher-designed texts about Indigenous peoples in Chile, answered questions about the text, and provided written responses to prompts. During testing, participants were
given a graphic organizer, structured questions about the text, or a blank piece of paper for taking notes (control) based on their experimental condition. Participants in the treatment groups and in the note-taking control were allowed to use their structured question responses, their graphic organizers, or their notes to write their summaries. Participants in the read-only control group did not have any external support to write their summaries. Participants in all groups answered the questions about the text with no instructional materials.

Ponce and colleagues (2020) found beneficial effects of both strategies based on treatment groups’ performance when compared to control groups. Effect sizes were reported by the authors using Cohen’s $d$ whereby 0.36 is a moderate effect and 0.86 or greater is a strong effect of treatment (Lipsey et al., 2012). Moderate effects of instruction were found on memory tasks ($d = 0.5$) for both treatment groups. The graphic organizer and structured question groups outperformed the control groups on a memory test designed by the researcher and comprehension as measured by participants’ written summaries of the article. There were large effects of treatment on comprehension with both treatment groups significantly outperforming the control groups ($d = 1.2$). Control group comparisons revealed that the note-taking group outperformed the read-only condition, but with small effects on both memory and comprehension. This study shows the benefit of explicit instruction of learning strategies for students as young as fourth grade.

Another study investigating the use of strategy instruction was conducted by DiCecco and Gleason (2002). DiCecco and Gleason investigated the impact of direct instruction on graphic organizer use to improve expository writing performance for
middle school students with LLD. Twenty-four participants completed the study, all of whom were receiving services in a pull-out resource setting in one of two middle schools. Participants were randomly assigned to treatment or control conditions at the building level with twelve participants in each condition. There was no significant difference in pretest performance for students in the treatment graphic organizer condition (GO) and control no graphic organizer condition (No GO). Both GO and No GO groups were provided with graphic organizers to complete during science lessons. The treatment GO group also received explicit instruction on how to fill out the graphic organizer with important information. Participants in both conditions wrote an essay about the topic. This essay was used to examine the participants’ use of relational knowledge for topic organization and across content areas between treatment and control groups. The instructor-guided use of graphic organizers was more effective in increasing adolescent student’s relational knowledge of science information than independent use of a pre-made form. There was no difference in group performance on factual recall as measured by multiple-choice tests and quizzes. Results of this study suggest that explicit instruction on graphic organizer use may increase relational knowledge of topics and organization of written discourse for students with LLD.

Another commonly taught learning strategy is generating keywords from a text. de Bruin and colleagues (2011) examined the role of keyword generation on metacognition and recall in two experiments. In the first experiment, American students in 7th grade were randomly assigned to treatment or control groups and given instructions to: read five causal expository texts from the science curriculum, rate their own understanding of the text by indicating the number of test questions they thought they
could answer correctly (metacomprehension or self-awareness of understanding), and then take a test. All participants were also told that they might be asked to generate keywords as part of the experiment, but no explicit strategy training for generating keywords was provided. Participants in both groups read five expository texts, self-rated their comprehension based on the title of the text, and then took comprehension tests on each topic. After reading the texts, participants in the experimental condition generated five keywords that they felt represented the key ideas of the text before completing a self-rating of comprehension. After taking the comprehension tests, both groups wrote the titles of texts they would want to restudy as a measurement of their metacognition. Participants in the experimental group who generated keywords had better metacognition and awareness of which tests and texts they would like to revisit for better comprehension than their peers in the control group.

De Bruin et al.’s (2011) second experiment explored similar questions with Dutch students in grades 4 and 6, but explicit instruction on generating keywords was included for the experimental groups. In this version, participants in the experimental group were trained on how to generate keywords from an expository text prior to their reading and self-rating of comprehension. There was no significant effect of keyword instruction on metacomprehension performance, or their ability to self-rate their understanding, for participants in the sixth-grade group. Fourth grade students who did not receive any keyword instruction had higher metacomprehension, as evidenced by their ability to determine which test they would like to revisit, than those that received delayed-keyword instruction. The results of this study suggest that the benefits of explicitly teaching this self-regulation strategy may be more evident in older students who are better at
monitoring their own learning of complicated material, though the sixth graders’ performance was not significantly different across treatment and control groups.

The studies described, and the larger body of strategy research, show how explicit instruction can improve students’ strategy use and resultant text comprehension. As these examples show, students with LLD can benefit from this instruction.

The previous strategy intervention studies of structured note-taking, keyword generation, and use of a graphic organizer support explicit strategy instruction to improve expression and comprehension of expository information. This study explores the use of a strategy intervention Sketch and Speak that combines instruction in note-taking and oral practice. Through a combination of quick and easy, just enough to remember notes in two forms and systematic oral practice of complete sentences and oral reports, Sketch and Speak teaches students strategies to access and understand grade-level expository texts.

Before explaining the treatment procedure in its entirety, it is important to discuss the benefits of instruction in each strategy independently.

**Note-taking, Pictography, and Oral Practice Strategies**

**Note-taking**

The intervention under investigation involves teaching students with LLD to take notes about what they read. Taking notes is a valuable learning strategy that can be employed across tasks and subject areas (Arnold et al., 2017; Boyle, 2012; Kobayashi, 2005, 2006; Piolat et al., 2004; Ponce et al., 2020). Meta-analyses of note-taking suggest that instruction on how to take notes, actively taking notes, and later reviewing notes improves processing and memory of new material, especially for younger and lower performing students (Kobayashi, 2005, 2006). Note-taking, when done correctly,
transforms the information from a text into a few key words or phrases that can be used later to cue comprehension and expression. Active note-taking is one way students can increase learning and recall of information, with a focus on purposeful procedures that require more cognitive effort than rote sentence copying (Arnold et al., 2017).

To actively take notes from a text, students need skills in decoding, comprehension, working memory, and handwriting or typing to encode the information for future use. Taking notes from a text requires fewer cognitive demands and less time urgency than taking notes from a lecture, with less resources consumed by working memory and auditory processing, but it still requires more cognitive effort than simply reading new information (Piolat et al., 2004). Despite the importance of specific strategy instruction in note-taking, adolescent students are often expected to know how to independently take quality notes that enhance their comprehension and recall (Boyle, 2012). The quick pace of secondary classrooms, combined with assumptions of underlying knowledge and independence in note-taking, can further compound learning difficulties for students who struggle (Boyle, 2010). Without explicit instruction on how to take notes in different learning contexts, students may have to learn by watching a teacher or more competent peer. Observing a more competent peer or teacher can help students learn a new strategy that is above their current level of independent performance by fostering their learning in the Zone of Proximal Development (Vygotsky, 1978). Teachers often emphasize key details within writing or reading activities through bolded words in a text or repeated definitions, but students are not necessarily given explicit instruction on the process of note. Without specific instruction on strategies, however, students with LLD will be at a loss for how to independently apply new
learning. Lack of instruction can lead to frustration and poor implementation of the use of this important strategy.

In a systematic review of the literature, Boyle and Rivera (2012) found that explicitly teaching note-taking skills to students with learning disabilities improves their accuracy with taking notes and their performance on later measures of comprehension. Of the nine studies included in this review, the explicit teaching of note-taking strategies resulted in higher student performance than the specific note format or topic area. Boyle and Rivera’s review suggests that note-taking strategy instruction, especially for students with disabilities who are behind the performance of their peers, may be more important than the note format used by different topic area teachers. Further, this review found that when students are explicitly taught to take notes, they may also be more likely to generalize use of this strategy to other note formats or subject areas. Though it may not always be adequate, strategy instruction like that on note-taking often occurs in late elementary grades and adolescent years due to the increased demands on cognitive and metacognitive skills needed to assess learning in the “reading to learn” years. A recent meta-analysis suggests that self-regulated learning strategies, like identifying important information and self-checking for comprehension, have positive correlations with academic achievement after sixth grade (Dent & Koenka, 2016). Though Dent and Koenka’s review suggests that there are higher correlations in later grades, there are also benefits of strategy instruction in younger years on later academic performance.

Chang and Ku (2015) investigated the benefits of explicit note-taking instruction on reading comprehension for 349 Taiwanese students in fourth grade. In a quasiexperimental design, note-taking instruction was provided to the experimental group in a
5-week whole-class format to compare with no-instruction note-taking and free-recall writing conditions. In addition to the three levels of note-taking, groups were divided into high reading and low reading performance. The students in the experimental group were taught note-taking strategies explicitly: identifying main ideas, reducing the amount of information in paragraphs, using graphs and tables in the text, and identifying different types of text structure (e.g., comparative, causal). The quality of notes in the experimental group was significantly better than the notes in the two control conditions, though the quantity of notes was not significantly different. Students in the experimental group had fewer instances of verbatim copying and more use of alternate words. Students in the experimental group also had more ideas in their notes than those in the control conditions. Further, with texts from the same subject area, students had improved comprehension of non-taught material compared to the other two conditions. Finally, students who were low-performing readers showed the most gains in taking notes when provided with explicit instruction. This study further supports the benefits of explicit instruction of note-taking strategies for students as young as fourth grade.

Even with the demonstrable benefits of explicit instruction in note-taking, it remains difficult even for typically developing learners to learn to take good notes. For example, when taking notes during a lecture, the entire process of note-taking happens within seconds, creating a sense of urgency and placing significant demands on the cognitive system (Piolat et al., 2004). For students with LLD, this increased demand on the cognitive system, already taxed by poor reading and writing skills, makes actively taking meaningful notes even more difficult. SLPs can support explicit teaching of note-taking for written language formulation in later grades (Koutsoftas, 2016). For students
who are hesitant to write because of spelling and grammar difficulties, another form of note-taking, such as pictography or sketch writing, may be useful to increase student buy-in and active note-taking behavior.

**Pictography**

Pictography, or picture writing, is the act of using quick, representational sketches to take notes in place of words or phrases. The use of iconic symbols to represent groups of words or phrases instead of word-by-word representation has been a part of human development since before the orthographic written representation (Gelb, 1952). Alphabetic and other writing systems, and their accompanying literacy requirements necessitate direct instruction to use correctly (Applebee & Langer, 1983). Unlike learning to speak, writing can be a difficult and unnatural task for many learners. When pressures of writing and spelling get in the way, simple sketches can be an alternative way to cue recall of information or help problem-solve new materials. Children as young as 7 years old may create their own iconic representations to solve problems when encoding with written words is difficult (Karmiloff-Smith, 1979).

Pictography has been used to improve narrative discourse for a variety of student learner profiles with both research and anecdotal evidence to support its use. In a group experimental study, McFadden (1998) explored the use of pictography in narrative generation tasks for second and third grade students. McFadden found that planning a story with “quick and easy” sketching technique produced longer oral narratives with more temporal organization than planning with drawing a picture or writing a rough draft. Ukrainetz (1998) also found pictography improved children’s oral narratives by allowing a focus on content over spelling when children were writing story plans and later telling
their stories from those plans. Students who struggle with writing could use pictography to act in cooperative or “scribe” roles during collaborative writing with peers. Since these early studies, pictography has been used in a variety of narrative interventions and assessments with pictographs generated by both students and instructors (e.g., Gillam et al., 2008; Gillam et al., 2018; Gillam & Ukrainetz, 2006; Petersen et al., 2014).

Though it has not been extensively studied as an expository note-taking tool, use of sketches and symbols to improve recall has been noted even in college student learners. Mayer and Gallini (1990) found that students with limited prior knowledge of a topic could use pictographic sketches to represent parts and steps of complex systems when studying a text. Studies of pictography as an expository note-taking strategy show promise for improving recall of new information (Peterson et al., 2021; Ukrainetz, 2019). When used as an active note-taking strategy, the benefits of pictography on recall are evident across learners of different ages and abilities and across discourse types. More discussion on these studies which combine pictography with other learning strategies can be found in the Sketch and Speak section of the literature review.

**Systematic Oral Practice**

Systematic oral practice, sometimes also referred to as verbal rehearsal, can be a powerful study strategy for students of all ages. Oral formulation of sentences, revision of sentences when needed, and repetition of sentences and reports can help a speaker to solidify information in their mind before presenting it to an audience. For adolescents, systematic programs like Language for Scholars with repeated oral practice prior to speeches or interviews have been shown to be effective in increasing oral fluency (Olszewski et al., 2017). Though not an intervention study to improve comprehension,
Olszewski and colleagues found that students who participated in oral practice strategies prior to an interview were more competent in communicating their overall point than those who had not yet had instruction on this strategy. This study is one example of the benefits of explicit training in oral practice for adolescents that may be applied across settings and tasks.

The use of oral practice is not unique to older students and can be a valuable learning strategy for all ages. Young toddlers who are learning language often construct their understanding of the world through verbal narration of their actions (Vygotsky, 1978). Vygotsky further suggests that using inner speech to plan actions or self-narrating when solving difficult problems may be a cognitive prerequisite to developing memories and learning new information in adults. Covert oral practice, like silently preparing for a speech or thinking through the steps in a difficult task, are akin to an internalized version of the self-talk we see in young learners.

Not only is oral practice important in learning and idea formulation, but it also affects language development. In young children with LLD, explicit instruction on word retrieval improved recall of new vocabulary words in both immediate and delayed tests (Leonard et al., 2019). In this study, 10 5-year-old children with LLD and their age-matched typically developing peers learned the form (i.e., written representation) and meaning of novel, researcher-created vocabulary words. Conditions of: a) active retrieval through repeated retrieval with contextual reinstatement (RRCR) and b) repeated exposure to a word with no verbal practice were balanced across words and participants to allow for within-subject and between group comparisons. Participants in the RRCR experimental condition were asked to retrieve the word and then asked contextual
questions about the plant or animal that had been presented with the initial word learning. For all study participants, within-subject comparisons indicated that active retrieval of vocabulary words improved recall at both testing points over a repeated exposure to the word in context. Between group comparisons indicated that active retrieval improved recall of related vocabulary to identical levels of performance at both testing points. Repeated retrieval of information and oral practice of these novel words was a beneficial learning strategy for all participants in this study.

Other studies of oral practice indicate that it can be a beneficial strategy for improving working memory and recall in students with learning disabilities. Peng and Fuchs (2017) investigated the impact of oral practice combined with working memory instruction in 58 first grade students with learning disabilities. Participants were randomly assigned to one of three conditions: working memory instruction combined with rehearsal training, working memory instruction without explicit rehearsal, or a no treatment control. Participants in the working memory plus rehearsal strategy instruction group significantly improved on untrained verbal working memory tasks, passage listening comprehension, and listening recall compared to the other groups. Though not instructed to do so, some students in the no strategy instruction group spontaneously used oral practice when learning (approximately 28% of opportunities in the no strategy instruction group). The participants who spontaneously used oral practice in the second group showed benefits compared to those in the same group who did not. Despite this apparently being a simple, natural strategy even for some first graders, many students will need explicit instruction, especially those with LLD. It is important to consider the role of oral practice, both overtly and covertly, in studying and preparing for academic
discourse activities. Oral practice may be studied more often in older learners or explicitly taught in public speaking classes in later grades, but benefits of learning verbal rehearsal behavior are evident even at a young age.

The benefits of explicit oral practice on recall have also been supported by research studies with students with mild cognitive impairments, speech-language disorders, and learning disabilities. Recall, attention, and working memory are the most commonly mentioned improvements when given explicit strategy training in oral practice (Dawson et al., 1980; Swanson et al., 2010). Oral practice has also been studied in students with intellectual disabilities. In a comparison study, Poloczek and colleagues (2016) examined the oral practice of 90 adolescents with intellectual disabilities on memorization tasks as compared to a mental-age matched control. The results indicate that oral practice behaviors of participants with intellectual disabilities are akin to those of the mental-age matched controls. This study supports the use of oral practice across differing mental capacities since the performance was similar across groups. Prior to this study, it was thought that students with intellectual disabilities could not learn oral practice behaviors. This study, along with other studies of active retrieval training (Karpicke & Roediger, 2008; Smith et al., 2013), support explicit instruction and oral practice as a learning strategy to improve recall across ages and abilities.

The benefits of oral practice across subject areas and for students with a variety of learning abilities do not disappear after students graduate from high school. To investigate the effects of oral practice in college students, McDaniel et al. (2009), conducted a group study with 72 undergraduate students assigned to three conditions: a read/re-read condition, a note-taking condition, and a Read, Recite, Review (3R)
condition. In the experimental condition of Read, Recite, Review, participants read, verbally rehearse information they remember from the article, and then self-check for correct comprehension of the material they read. Participants in each condition read a text, participated in their assigned study strategy, and then completed free recall, short answer, and multiple-choice tests about the text. Participants in the 3R condition had significantly better recall than those in the other conditions at immediate and delayed testing points. Further, those in the 3R condition had higher performance on multiple-choice and short answer tests than those in the re-read only condition and a shorter study time than those in the note-taking condition. Benefits of oral practice as part of the 3R group further support this as a study strategy for older learners.

With evidence of benefits from young children with LLD to typically developing college students, oral practice has potential as a study strategy for a variety of learners. Given that SLPs are often looking to target language skills through speaking and listening activities, this systematic oral practice may be a strategy worth explicitly teaching to students of all ages.

**Sketch and Speak: Bringing Three Strategies Together**

With the research support for note-taking, pictography, and systematic oral practice separately, the combination of these learning strategies into a single intervention has potential for a variety of learners. The core components of Sketch and Speak are *note it simply in two ways, say it fully, and say it again*. In this intervention, the SLP uses the strategies of pictographic and written note-taking and systematic oral practice to teach comprehension and expression of the ideas and language of expository texts.
An intervention that can be taught primarily through listening and speaking with low reading and writing demands would fit the features of learning that SLPs commonly support (Ukrainetz & Peterson, 2021). With specialized training on oral language instruction, time to scaffold skills, the ability to individualize treatment goals, and lack of direct responsibility for teaching the curriculum, SLPs are uniquely suited to provide this strategy intervention. Sketch and Speak strategy intervention combines these learning strategies into a procedural whole that is accessible to students. SLPs may use the strategies in a guided format within treatment or may aim for students to take them beyond the treatment setting. As students learn to use these strategies and gain confidence in their abilities, the strategies learned in such an intervention could be used as independent student learning tools throughout the academic environment. The research evidence for Sketch and Speak is still in early stages, but results are promising.

The procedure for this intervention will be further described in the Methods section but provided here is a brief introduction to the core Sketch and Speak procedures. In a paired session format, the first session involves the SLP reading a grade-level expository text aloud and guiding the student to create pictographic notes on a 2-column note sheet about ideas from the article. After each note is created, the student formulates a complete sentence in their own words about what is represented in the pictograph. After the student and SLP settle on a good sentence, the student repeats that sentence fully. After the student systematically practices their sentences aloud at least twice for each pictograph and notes are taken for the whole article, the learner generates and repeats a full oral report from the notes.
In the second session, students learn to generate written bulleted notes from their pictographic notes. They say their sentences cued from their pictographs and turn them into bulleted notes. They then re-formulate and practice their complete sentences at least twice for each bulleted note. At the end of that session, a full report with opening and closing statements is generated and rehearsed from the written notes. The two-session format is repeated on in treatment on a novel text: in this study, there are six repetitions of the pair.

Teaching two kinds of note-taking gives students choices of ways to remember information. Pairing the two note-taking formats for each idea provides double the opportunities to encode, recall, and rehearse the information. Requiring immediate individual sentence generation and rehearsal helps the student remember the ideas and language associated with each individual note. Requiring full oral reports from the notes each session allows the student to move from the isolated sentences into a longer discourse form. With rehearsal, students start to internalize the language and ideas of the article, using their notes to support their memory of article information. The core process also teaches students the strategies of pictography, written notes, and oral practice of sentences and whole reports. Students would likely be able to use those strategies in activities similar to the teaching context, but more extensive intervention would be required for students to independently generalize use to other academic contexts.

The first study of Sketch and Speak was Ukrainetz (2019). This experimental study investigated the effects of this intervention on note-taking and oral reporting expository discourse skills in students with language-related learning disabilities in grades 4 to 6. A total of 44 students enrolled in the study. Students were assigned
randomly to treatment or control conditions and then groups were balanced on multiple
demographic and achievement features including grade and oral language scores. Nine
school-based SLPs provided intervention in six 30-minute individual sessions over the
course of three weeks. Students in the treatment group received instruction from the SLP
who worked in their school setting. The control group received “business as usual”
school practices including regular services from their SLPs and resource teachers.

Proximal pre-/post-test procedures in Ukrainetz (2019) included a shared reading
of a text in a different expository area than used in treatment, independent student notes,
an oral report from the notes, and a written report from notes 1-2 days later. At post-test,
the intervention group had significantly improved quantity and quality of notes and
notably improved oral reporting skills compared to both their pre-test scores and the
students in the control group. Another notable finding of this study comes from the SLP
reflection essays, where SLPs commented on the perceived effectiveness and positive
benefits of the Sketch and Speak intervention for themselves and their students. Five
themes on the reasons for the noticeable improvement of student expression and
comprehension emerged: simplicity, quick and easy visuals, oral creation of sentences,
repeated practice, and visible progress of students. The results of this group study led to
another investigation the following year in one of the study schools with one of the group
study SLPs as the interventionist.

The second study (Peterson, Ukrainetz, & Risueño, 2021) was a descriptive
multiple case study with three students. This study built upon the results of Ukrainetz
(2019) by exploring ways this intervention could be modified and expanded in the school
setting. Two fourth grade students and one sixth grade student with language disorders
participated in sixteen 20-minute sessions over the course of nine weeks. This study investigated a longer, more varied version of *Sketch and Speak* with a similar population. This study employed shorter treatment session time, more intervention sessions over a longer period of time, instruction on “whisper rehearsal” of full reports, and application to a different expository topic. The need for more oral practice became evident in Ukrainetz (2019) when, at post-test, many of the students had trouble writing and reading their notes – if they had rehearsed more when created their notes, as done in treatment, even poor notes could have cued recall of their sentences. Ukrainetz described one example of a student at post-testing who engaged in visible indicators of mental rehearsal (i.e., eye gaze to notes, counting items on his fingers, and asking clarification questions) of his sentences at post-testing and clearly benefited from doing so. This use of rehearsal prior to a report was an important demonstration of strategy generalization to an independent performance in a different setting. In the case study (Peterson et al., 2021), instruction on whisper rehearsal, or quiet but overt oral practice, was introduced as a way for students to practice reports without disrupting classmates. In treatment, the SLP-instructor and students discussed the importance of practicing before a presentation and how whisper rehearsal could be generalized into other classroom activities. Pre/post-testing followed Ukrainetz (2019) procedures but added examination of the preparation period and a learner interview to further examine student awareness and use of the taught strategies. In addition, students presented a final treatment oral report from their notes to their teachers and peers to showcase their skills.

Peterson and colleagues (2021) found that all three students benefitted from the intervention in different ways based on their individual learning needs. One fourth grader
with mild autism learned to work toward an academic goal and speak with purpose about a topic instead of living in “his world” with no concern for his communicative partners. The second fourth grader had lower language and cognitive skills at the outset of the intervention and benefitted from increased adult support throughout the study and into the final presentation, as evidenced by her looking to the SLP instructor for support and validation of the information while presenting. She did not independently use pictography at post-test and had better success with the strategies when provided with continued adult support. The sixth grader, who had higher language skills entering the study, was also more able to direct his own learning when compared to the fourth graders throughout the study. He was more aware of ways he could use the strategies outside of the study and was eager to teach his peers about the strategies so that they could create reports and projects about preferred topics. The variety of benefits for these different learner profiles suggests potential for this strategy combination in older students who may be more ready to independently generalize learning to increase expository comprehension and performance.

These two studies show that this treatment can improve the quality of notes and oral reports for later elementary students with LLD. SLPs and students expressed excitement about the two different forms of note-taking and the idea of oral practice to reinforce learning. Older students in both of these studies were more aware of the strategies learned based on their behaviors at post-test and their learner interviews. The current study was designed to examine the outcomes of Sketch and Speak using telepractice with an older population of students, therefore this intervention service delivery approach will be described next.
Telepractice

Telepractice is the preferred umbrella term on the ASHA Practice Portal, an EBP resource for clinicians, though it may also be referred to as telemedicine, telehealth, teletherapy, telerehabilitation, teleservices, remote learning, online learning, virtual schooling, and a variety of other terms throughout the literature. There has been a growing body of evidence supporting telepractice as a medical and educational service delivery option since the onset of the COVID pandemic in 2020. In a search of the ASHAWire, a database that hosts American Speech-Language and Hearing Association (ASHA) publications from 1969 to the present day, 858 articles that mentioned telepractice delivery were found at the outset of this project in February 2021. One year later, in February 2022, a follow-up search using “telepractice OR telehealth OR virtual OR teletherapy” revealed 1,458 articles. The increased number in articles during the year between searches can likely be attributed to the increased use of telepractice as a service delivery model during the COVID-19 pandemic and the increased need for evidence-based practices for clients of all ages.

In February 2021, systematically reviewing these articles by the year of publication revealed the first mention of “telehealth” in the ASHA literature in 1999. Zingeser (1999) suggests to practitioners in a Perspectives article that “telehealth” service delivery could be used for follow up appointments to “see” patients but should not replace in-person services for supervision and practice. This article appears within three years of a survey of school-based SLPs nationwide that revealed that more than one third of the respondents were never using a computer in practice and less than half of respondents used a computer more than once a month (McRay & Fitch, 1996).
The next article specifically related to telepractice is in the ASHA Code of Ethics published in December, 2001. Pietranton (2001) provides an overview of the updated code of ethics, explaining the changes and additions of permissions for SLPs and audiologists to provide services in a telepractice format. Though more articles related to telepractice start to appear in the ASHA literature, they are primarily practitioner pieces or non-peer reviewed Perspectives articles about how to include telepractice clinically. The first research article with telehealth is published in 2004 and consists of 5 case studies adapting the Lidcombe program for stuttering to a telehealth delivery by telephone (Wilson et al., 2004). Though extremely important to the literature on fluency training, delivering services by telephone is very different than telepractice through video conferencing as comes to mind in the 2020s. A pilot study by Hill and colleagues (2006) explored the effectiveness of assessment in a face-to-face setting compared to using internet-based (telerehabilitation) for speech-language pathologists diagnosing motor speech disorders. This pilot study is one of the earliest research articles about telepractice effectiveness published in ASHA journals.

ASHA’s Special Interest Groups (SIG) provide a place for researchers and clinicians to specialize in areas of the field. SIG 18 focuses on telepractice, allowing members of the group to stay up-to-date on the latest literature, participate in online webinars to earn CEUs, and to share information through publications in Perspectives articles around telepractice. Since the mid-2000s, case studies and articles related to getting started in telepractice for school-based SLPs have been published by ASHA journals, though the majority of these focus on developing telepractice services in schools or as a private practitioner. Current systematic reviews on the AHSA database of the
telepractice literature focus on adult clients receiving SLP services in general, specific telepractice for adults with acquired brain injuries, and adult teleaudiology rehabilitation for hearing aid use (Weidner & Lowman, 2020; Coleman et al., 2015; Tao et al., 2018). All of these reviews suggest a need for high-quality research in telepractice effectiveness and efficacy for SLPs and audiologists to better support implementation in practice.

Though there is currently no systematic review addressing the topic of telepractice effectiveness for child learners, there is an increase of SLP-focused telepractice articles during and after COVID-19 worldwide (e.g., Aggarwal et al., 2020; Fong et al., 2021; Lam et al., 2021; Todihast et al., 2020; Zughni et al., 2020). Topic-focused journals like the *International Journal of Telerehabilitation* and *Telemedicine and eHealth* provide researchers and clinicians with access to research related to telepractice.

With the shift in focus to social distancing and provision of online services even for school-based SLPs in the U.S. during the pandemic, the need for effective telepractice has been even more pronounced. In a survey of school-based SLPs in the US about their comfort and provision of services during the COVID pandemic, SLPs expressed an overwhelming amount of difficulty with the transition to online-only practice (Sylvan et al., 2020). SLPs struggled to adapt to online service delivery with many having little-to-no experience with synchronous or “live” telepractice services and minimal guidance on expectations from administration. Difficulties with student access, especially in underprivileged populations, were also a concern for the surveyed SLPs. Many participants expressed low levels of self-confidence in online service delivery, but found some support in SLP community members by turning to ASHA, familiar colleagues, and
social media groups or blogs. A lack of interventions that are specifically developed for online delivery further complicates the pressures SLPs were already feeling. During the pandemic there was also a decrease in job satisfaction for many school-based SLPs due to the level of support and training they had in service provision (Farquharson et al., 2022). Both of these surveys further support the need for high quality research in the telepractice domain for increasing evidence-based practices of SLPs.

**Social Validity and Implementation**

An effective intervention is important for student outcomes, though the perception of the benefits may be more important to stakeholders than the intervention itself. Implementation science is “the study of factors that influence the full and effective use of innovations in practice” (Fixsen et al., 2019, p.10). Though it may be newer to the social sciences and education, the idea of studying how innovations are perceived and implemented in the “real world” has been studied for decades in other fields (Morris et al., 2011; Olswang & Prelock, 2015). Implementation research in medicine shows that on average there is a 17-year gap between the initial/effectiveness research for an innovation and the implementation of the innovation in practice (Morris et al., 2011) which is in essence the “research-to-practice gap”. Implementation science examines both the perceptions of importance of an intervention for key stakeholders like parents, study participants, practitioners, administration, and interventionists; and whether they adopt (and how they modify) treatments developed and tested in structured research settings. One way to study the importance of a study for stakeholders is through asking questions about the social validity.
Examination of the social importance, or social validity, of a study is not new to single-case designs. First discussed by Wolf (1978), social validity is defined as a way to find the “heart” of a study through asking the stakeholders what is most meaningful or impactful about an intervention and about their overall experience with participation. Aspects of social validity may be explored through questionnaires and interviews with key stakeholders before, during, and after a study to examine feasibility and provide evidence for future iterations. A recent review of the articles published in ASHA journals from 2017-2019 found that only 21.5% of the included treatment studies reported social validity measures (Olszewski & Rae, 2021). Social validity components are important for promoting evidence-based implementation of interventions in practice as they promote further understanding of an intervention by practitioners, researchers, and the community. Though not often reported, Olszewski and Rae found that questionnaires, interviews, and observations were the most common methods of measuring social validity in speech-language pathology. This review highlights the need for increased reporting of social validity throughout SLP to increase evidence-based practice in the field.

**The Current Study**

The purpose of this study was to investigate the effects of *Sketch and Speak* intervention on Oral Reports and Short-Answer Recall responses for adolescent learners (9th graders) with language-related learning disabilities delivered in a telepractice format. The current study builds on the existing research base by applying it to older student participants with LLD who may be better cognitively suited to learn and then use the strategies independently. It was designed to experimentally examine the effects of the intervention on participants’ abilities to: a) learn the strategies, b) use the strategies
independently and to c) retain the ideas of the texts. This latter purpose has not been examined directly in either previous study of this intervention (Peterson et al., 2021; Ukrainetz, 2019). In addition, outcome measures examined the independent use of strategies with novel texts as well as performance on oral reports without the support of notes. Idea expression without the use of notes is certainly a more difficult task for these older students than previously investigated and relies more on memory and self-regulated expression skills. Idea recall was examined in both the oral report and in a more prescriptive short-answer recall test that has not previously been used in studies of this nature. The distal measure of strategy use was examined with a semi-standardized task of explaining a familiar game or sport (Miller & Iglesias, 2012).

Finally, the intervention was delivered via Zoom. Given the dearth of high-quality discourse level interventions available for SLPs to use with adolescent populations (Peterson et al., 2020) and the increased difficulties SLPs face in providing supported, remote-learning services in the COVID-19 era and beyond (Farquharson et al., 2022; Sylvan et al., 2020), this study will provide valuable information for future practice and research in these areas. The effects of synchronous telepractice through HIPAA protected video-Zoom meetings, shared documents with real-time editing, and immediate instructor feedback for learning will provide valuable information about how interventions may be adapted for use in telepractice to support adolescent learners with LLD.

Adaptions of this intervention for telepractice could be useful tools for SLPs even if services are not consistently delivered online. Students are often familiar with using devices in the classroom to support learning now, so having adapted strategies that can be done on shared screens with immediate instructor feedback could further benefit both
students and school-based SLPs. Meetings and questionnaires with participants, parents/caregivers, and the high school SLPs will address social validity of continuing the use of these strategies during the regular school year. There are many different family combinations, so anyone in the role of caregiver will be referred to as “parent” for the duration of the study description.

The first aim of this study was to investigate the effects of Sketch and Speak on expression of expository material through oral reporting skills; comprehension of grade-level expository texts through short-answer recall questions; and independent strategy use on texts not taught in treatment for adolescent learners with language-related learning disabilities. A single-case multiple baselines across participants design was used to address the following research questions:

1. What are the effects of Sketch and Speak intervention on expression and comprehension of expository information as measured by Oral Reports and Short-Answer Recall questions in Guided Session Tests in the treatment phase as compared to Independent Session Tests in baseline?

2. What are the effects of Sketch and Speak intervention on strategy use as measured by Note Quantity and Quality scores in Independent and Guided Session Tests taken during treatment as compared to Independent Session Tests in baseline?

3. What are the effects of Sketch and Speak intervention on independent expression and comprehension of information as measured by Oral Reports and Short-Answer Recall questions in Independent Session Tests in treatment as compared to Independent Session Tests in baseline?
4. What are the distal effects of *Sketch and Speak* intervention on Note Quantity and Quality and expository expression (Oral Reports) as measured by a semi-standardized age-referenced task at pre- and post-treatment?

The second aim of this study is to explore the social validity of *Sketch and Speak* intervention for key stakeholders: participants, parents, and the high school SLPs who would be working with the participants in the fall. The social validity questionnaires were designed to briefly explore the implementation science ideas of *readiness* of stakeholders to use the intervention and *exploration* for SLPs who may be interested in adopting this intervention for use with older students, and the older student population as it applies to implementing strategy use in the high school setting. The following social validity questions were asked:

1. What are the perceptions of *Sketch and Speak* intervention for the participants and parents as it applies to expression and comprehension of grade-level expository texts, participant-awareness of outcomes, and strategy use beyond the treatment context as measured by brief questionnaires administered before and after treatment?

2. What are the participants’ perceptions of telepractice delivery of *Sketch and Speak* as measured by brief questionnaires administered after the treatment period?

3. What are the SLPs’ perceptions of potential applications and barriers to successful implementation of *Sketch and Speak* in the high school setting, either as a supported practice in treatment or as an independent student strategy, as measured by questionnaires and interviews after a brief treatment demonstration?
CHAPTER III: METHODS

This study was designed to investigate the effectiveness of Sketch and Speak strategy intervention on improving expression and comprehension of expository information for 9th grade students who have language-related learning disabilities in a synchronous telepractice delivery format. All baseline and treatment sessions were completed in a span of six consecutive weeks during Summer 2021 (i.e., June 7 - July 9). Participants had 4-5 sessions per week based on availability and scheduling. Participants completed 15-21 sessions depending on the length of their baseline phase. Participants were recruited through researcher contacts with SLPs at the junior high level in the approved school districts. After talking with the researcher, the junior high SLPs recruited study participants by sending home an IRB-approved letter about the study to all caseload students who fit the study criteria. Participants were receiving services from an SLP for academic language goals, enrolled in a junior high school in Laramie County School District #1 (LCSD1) or Albany County School District #1 (ACSD1), and planning to attend a high school in the same district for 9th grade in Fall 2021. None of the participants were receiving SLP services during the summer, so this intervention was the only instruction on note-taking strategies and expository language comprehension and expression that was provided during the duration of the study. All sessions were video and audio recorded.

Experimental Design

This single-case experimental study utilized a multiple baseline across participants design. Participants completed three, six, or nine baseline sessions before moving into treatment. Baseline phase lengths were pre-determined to ensure staggered
baselines across participants without extending baseline for longer than the study allowed due to materials and time constraints. All three participants started baseline tasks on the same day. After three baseline sessions, the researcher used data-driven decision-making and stability of baseline outcome data to determine which participant would move into the treatment phase in session 4. After completing Independent Strategy Use tasks and Independent Session Tests in baseline, all three participants completed 12 30-45 minute sessions of treatment. Data was collected in all baseline and treatment sessions through Oral Reports and responses to Short-Answer Recall questions in Guided and Independent Session Tests. Independent Session Tests were administered at the end of baseline sessions and at the beginning of odd-numbered treatment sessions, except for treatment session one which would have been considered an extension of baseline and not resulted in a meaningful data point.

The researcher acted as the interventionist for this study. The researcher acted as an interventionist in two prior studies of Sketch and Speak (Peterson et al., 2021; Ukrainetz, 2019) and is a certified speech-language pathologist with 8 years of clinical practice.

Participants and Setting

Participants

Three 9th grade adolescents with LLD completed this study during the summer prior to their 9th grade year. Four participants started the study by completing the pre-test measures on the same date in June 2021, but one withdrew from the study during baseline. All participants had a current IEP with academic language goals and SLP services for a diagnosed language-related learning disability with no concomitant
cognitive or behavioral disorders (e.g., autism, emotional disorders). The most recent evaluation information, including receptive and expressive language test scores and cognitive standard scores, for each participant are described in Table 1. After parental consent was obtained, the referring SLPs completed a questionnaire with case history information (e.g., diagnoses, language goals, service times, most recent standardized evaluation scores). Prior to the start of the study, participants self-selected a pseudonym and are referred to by their pseudonym in this manuscript.
Table 1

Participant Demographics

<table>
<thead>
<tr>
<th></th>
<th>Thomas</th>
<th>Garcia</th>
<th>Cat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at start of study</td>
<td>14;6</td>
<td>15;1</td>
<td>14;11</td>
</tr>
<tr>
<td>Evaluation Year</td>
<td>2019</td>
<td>2019</td>
<td>2020</td>
</tr>
<tr>
<td>Eligibility Categories</td>
<td>1- Specific Learning 2- Speech/Language 1- Speech/Language 1- Specific Learning 2- Speech/Language</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language Composite</td>
<td>CELF-5 Core: 79</td>
<td>TOLD: I-5 Spoken Language 61 Listening 78</td>
<td>CELF-5 Core: 70</td>
</tr>
<tr>
<td>Receptive Language</td>
<td>PPVT-4 88</td>
<td>PPVT-5 79</td>
<td>CELF-5 Receptive 75</td>
</tr>
<tr>
<td>Expressive Language</td>
<td>EVT-2 78</td>
<td>EVT-3 76</td>
<td>CELF-5 Expressive 70</td>
</tr>
<tr>
<td>Working Memory</td>
<td>WISC-V 74</td>
<td>WISC-V 88</td>
<td>N/A</td>
</tr>
<tr>
<td>Full Scale IQ</td>
<td>N/A</td>
<td>WISC-V 80</td>
<td>KBIT-2 86*</td>
</tr>
<tr>
<td>Verbal IQ</td>
<td>DAS-II 80</td>
<td>WISC-V 78</td>
<td>KBIT-2 104*</td>
</tr>
<tr>
<td>Nonverbal IQ</td>
<td>DAS-II 83</td>
<td>N/A</td>
<td>KBIT-2 73*</td>
</tr>
</tbody>
</table>

* = most recent cognitive evaluation was in 2013. Tests are as follows: CELF = Clinical Evaluation of Language Fundamentals; TOLD = Test of Language Development; PPVT = Peabody Picture Vocabulary Test; EVT = Expressive Vocabulary Test; WISC = Wechsler Intelligence Scale for Children; DAS = Differential Ability Scale; KBIT = Kaufman Brief Intelligence Test.
**Thomas.** Thomas was a 14;6-year-old male entering ninth grade. He was on an IEP with a primary eligibility category of Specific Learning Disability and a secondary category of Speech-Language Impairment. Thomas received services for language and language-related academic skills including writing, math, and study skills. In 2019, Thomas was evaluated by his IEP team with the Clinical Evaluation of Language Fundamentals, 5th Edition (CELF-5, Wiig et al., 2013), the Peabody Picture Vocabulary Test, 4th Edition (PPVT-4, Dunn & Dunn, 2007), the Expressive Vocabulary Test, 2nd Edition (EVT-2, Williams, 2007), the Differential Ability Scale, 2nd Edition (DAS-II, Elliot, 2007), and the Wechsler Intelligence Scale for Children, 5th Edition (WISC-V, Wechsler, 2014).

The referring SLP indicated that the difference in receptive and expressive language performance was notable clinically, with his expressive language being a bigger area of concern in IEP goals and academic supports. The referring SLP also reported that Thomas would be a good candidate for this study because had trouble with academic language, particularly in the area of writing, and that he was easily distracted. In the pre-test social validity interview, Thomas indicated awareness of his difficulties with writing and a desire to learn strategies that would help him in high school. Throughout the study, Thomas was attentive and motivated, often commenting on his own learning during sessions and reflecting on what strategies would have helped him remember more information during independent strategy use tasks in the treatment phase.

**Garcia.** Garcia was a 15;1-year-old male entering ninth grade. He was on an IEP with a primary eligibility category of Speech-Language Impairment. Garcia received services for language and language-related academic skills including reading, writing,
math, science, social studies, and study skills. In 2019, Garcia was tested by his IEP team with the Test of Language Development - Intermediate, 5th Edition (TOLD-I5, Hammill & Newcomer, 2019), the Peabody Picture Vocabulary Test, 5th Edition (PPVT-5, Dunn, 2018), the Expressive Vocabulary Test, 3rd Edition (EVT-3, Williams, 2018), and the WISC-V (Wechsler, 2014).

The SLP who completed the referral paperwork reported that Garcia was a good candidate for this study because he could decode information quickly, but he often didn’t comprehend the material unless it was presented aloud. She also stated that Garcia had trouble with academic language, particularly with understanding grade level vocabulary words. In the pre-test social validity questionnaire, Garcia reported that he felt confident in his reading and writing skills with little to no support from adults or peers, despite the low standard skills he earned on the standardized tests, the IEP team goals and reports, and his performance across academic areas. Throughout the study, Garcia moved quickly through tasks and needed multiple prompts from the instructor to slow down and reflect the information from the article in his notes and oral reports accurately.

**Cat.** Cat was a 14;11-year-old female entering ninth grade. She was on an IEP with a primary eligibility category of Specific Learning Disability with a secondary diagnosis of Speech-Language Impairment. Cat received services for language and language-related academic skills including reading, writing, and math. In 2020, Cat was tested by her IEP team with the CELF-5 (Wiig et al., 2013), providing standardized scores for language relevant to her performance in this study. Her most recent cognitive scores were on the Kaufmann Brief Intelligence Test (KBIT-2, Kaufman & Kaufman, 2004) from her evaluation in 2013.
The referring SLP reported that Cat was a good candidate for this study because she had limited access to academic vocabulary because of her difficulties with decoding and encoding that severely impact her reading and writing. She also stated Cat needed continued support to improve her academic speaking and listening skills to compensate for her literacy weaknesses. In the pre-test social validity questionnaire, Cat reported that she needed a lot of help from teachers and peers in reading, writing, and speaking academically but that she felt that she could be successful if given the right tools. Throughout the study, Cat demonstrated understanding of material presented to her verbally and was attentive and engaged in the activities with little to no instructor prompting.

**Setting**

Participants completed all sessions in a private or semi-private room in their homes via scheduled Zoom meetings using researcher-created Gmail accounts. All three participants completed 4-5 sessions of baseline or treatment each week during the same 6-week period (June – July). Conditions of the study were kept as similar as possible across participants to maintain experimental control. For example, all participants had access to a secure internet connection that was capable of supporting both video conferencing and real-time document editing on shared files. All participants were provided with a tablet and stylus to use during the study, which they kept as an incentive for their participation upon completion. All of the participants participated in a quiet environment in their homes with minimal interruption from family members, although this varied across participants. All meetings and sessions were conducted by the first author from a private office with a secure internet connection.
All Zoom meetings were video and audio recorded and stored in password-protected files under the participant’s pseudonym hosted by Utah State University’s Box drive. Participants logged into their researcher-created Gmail accounts and used researcher-created Google Jamboard documents with real-time editing capabilities to participate in all session tasks. At the end of each session, the documents were downloaded as PDF files and saved in the participant’s protected file on the USU Box drive. All data collected was stored on Box and accessible only to the researcher, the faculty advisor, and research assistants.

**Baseline and Treatment Procedure**

Variable-length continuous baselines were utilized across participants with three, six, or nine sessions. Baseline and the 2-session treatment procedures are outlined in Figure 1.
Note. Baseline sessions included Independent Strategy Use with a novel text and an Independent Session Test. These procedures were identical to those at the beginning of odd-numbered treatment sessions.
Baseline and Independent Strategy Use

Baseline sessions were originally planned to include a 10-15 minute science or social studies game between the participant’s independent note generation and the session test, but this distractor task was abandoned due to technical issues of running multiple applications simultaneously on Zoom. Instead, participants were instructed with the Independent Strategy Use steps with no intermediary activity before the Independent Session Test (Figure 1). For the Independent Strategy Use task in baseline and treatment phases, participants were instructed to Listen and follow along as I read this text aloud. You will take notes in whatever way helps you to remember the information best. You can use words or pictures to record important details on your note form. Participants listened to the text and followed along on the shared screen as it was read aloud. After the read-aloud, participants were asked if they had any questions about the note form and were given eight minutes to independently take notes with the article in view. Participants took notes on a researcher developed 2-column note form (Appendix A) about a researcher-developed expository text (Appendix B). No additional instruction was provided by the researcher. When the participant indicated that they were finished taking notes or when the timer went off, the researcher administered the Independent Session Test. Independent Session Tests included the three-minute note review, an independent oral report, and six short-answer recall questions about the topic. Independent Session Test procedures are described in the testing section.

Treatment and Guided Strategy Use

During the treatment phase, each participant completed twelve 45-minute treatment sessions. In each treatment session, the participants completed half of the
*Sketch and Speak* procedure on a text (Table 2). Odd-numbered sessions started with the Independent Strategy Use and Independent Session Test (described in previous section) on a novel text. Independent Session Tests during the treatment phase were used to examine the potential generalization of strategies and improved reporting of expository information and followed the same procedures as baseline. These tests also allowed the researcher to collect data in all treatment sessions without abandoning the two-session treatment pair that is designed to give participants multiple opportunities for practice with one expository article. Guided Session Tests were administered at the end of even-numbered treatment sessions to test the efficacy of treatment in the two-session pair.
## Table 2

**Sketch and Speak 2-Session Treatment Procedure**

<table>
<thead>
<tr>
<th><strong>Odd-numbered Sessions: Pictography</strong></th>
<th><strong>Even-numbered Sessions: Bulleted Notes</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Preview session learning aims, matched to early, mid, later sessions</td>
<td>12. Say full report from pictography</td>
</tr>
<tr>
<td>2. Read first 1-2 paragraphs</td>
<td>13. Re-start, say first full sentence from picto</td>
</tr>
<tr>
<td>3. Identify important or interesting idea(s) and which box it could go on note form</td>
<td>14. Reduce sentence to key words for quick &amp; easy, just enough to remember simple bulleted written note</td>
</tr>
<tr>
<td>4. Guide <em>quick &amp; easy, just enough to remember</em> simple pictography in selected box</td>
<td>15. From bulleted note, say full sentence</td>
</tr>
<tr>
<td>5. From pictography, say full sentence</td>
<td>16. Briefly explain/elicit idea or vocabulary from note, repair or revise sentence as needed</td>
</tr>
<tr>
<td>6. Repair or revise picto or sentence as needed (speak like a scientist, use only text evidence), then say new sentence</td>
<td>17. Say full sentence again</td>
</tr>
<tr>
<td>7. Say full sentence again</td>
<td>18. Turn each pictograph into sentence then bulleted note then sentence</td>
</tr>
<tr>
<td>8. Briefly explain/elicit idea or vocabulary for each paragraph and generate note</td>
<td>19. Generate open/close sentence (e.g., <em>I want to tell you about an interesting X, I hope you enjoyed this report on X</em>)</td>
</tr>
<tr>
<td>9. Approximately halfway through article, student gives report from notes</td>
<td>20. Make notes at top/bottom of form, say sentences again</td>
</tr>
<tr>
<td>10. Aim for 10 simple picto notes and full oral sentences (1-3 per category)</td>
<td>21. Say full report from notes twice with open/close statements</td>
</tr>
<tr>
<td>11. Say full report from pictography twice</td>
<td>22. Session test on topic and show photo sheet</td>
</tr>
</tbody>
</table>
After the Independent Session Test in odd-numbered treatment sessions, the participant and researcher made their way through a novel text, with the participant learning to take *quick-and-easy, just-enough to remember* pictography notes with the text on the shared screen. All texts were read aloud by the researcher with the print in view to facilitate the participant’s ability to follow along. During the pictography sessions, the researcher stopped after each paragraph to ask the participant what interesting ideas they wanted to remember and discuss where the idea would be located on the 2-column note form. After each note was sketched, the participant was scaffolded in formulation of a full well-formed sentence from the note oral practice of the sentence until they could repeat it fluently. Approximately halfway through taking notes on the article, the participant practiced a “half oral report” using their notes and complete sentences. Pictography notes included at least one note per paragraph and one idea in each note category for a total of 7-12 notes. After the participant finished taking pictography notes on the entire article, they were instructed to give a full oral report from their notes twice.

In even-numbered treatment sessions, the researcher scaffolded participants in creating *quick-and-easy, just-enough to remember* written bulleted notes. Participants did not return to the article on the topic in even-numbered sessions, but instead based their written notes on their pictography notes and recall of their rehearsed sentences. This process promotes learning by providing repeated opportunities for use of the pictography, idea transformation from pictography to full oral sentences and then to bulleted notes, and retrieval of the sentences from memory.

At the beginning of even-numbered treatment sessions, participants gave a full oral report from the pictography notes they created in the previous session. After giving
the full oral report, participants said the sentence for each pictograph aloud and were guided on how to reduce their complete sentences down to key words and phrases. The researcher would ask the participant to identify the most important words from their sentence and to create a bulleted note on the blank note form. Each bulleted note started with a bullet on the left-hand side to clearly separate the notes from one another. Participants were told that bulleted notes just needed to be readable and remind them of the idea, but did not need to contain correct spelling or punctuation. In the event that a student could not use the handwritten notes in this format, the Google Jamboard “sticky note” feature was used. The sticky notes served the purpose of a bullet since they separate the notes clearly and make them easier to read, reducing the cognitive load of handwritten notes when appropriate. After the participants wrote each bulleted note, they orally generated their complete sentence and then said it again. Approximately halfway through the transfer of pictography notes to bulleted notes, participants were cued to say their “half oral report” from their bulleted notes.

After all ideas were transferred to bulleted notes, participants were cued to add opening and closing statements to their report using their bulleted note strategy to create a new note. Participants orally generated a complete open and closing sentence, created a bulleted note and then said the full sentence again. Finally, participants gave their full oral report with open and closing statements twice. After these oral practice opportunities were complete, participants were given up to three minutes to review their notes prior to each session test. The Guided Session Tests at the end of this two-session treatment pair are represented in Figure 1 and described further in the testing section.
Materials, Testing Procedures, and Scoring

Materials

Researcher-developed expository texts were used in all baseline and treatment sessions. A total of 20 texts were developed to be of similar sentence length, expository structure, and content vocabulary. A Lexile Text Analyzer was used to determine approximate grade level. Lexiles are a widely used measure of reading difficulty calculated from word length, sentence length, word frequency, and other proprietary features (MetaMetrics, 2021). High-Lexile texts can be made more accessible by building on a student’s existing knowledge, using thematically linked topics, or tying into classroom content. Text topic areas for this study were: (a) unusual animals, (b) professional athletes, (c) interesting objects, and (d) historical peoples. All texts were within the Lexile range for 9th grade (1000-1100) and between 490-505 words in length. Texts were counterbalanced across phases and cycled across participants to decrease the threats of coincidental events and instrumentation to internal validity (Table 3).

Researcher-developed 2-column note forms with note categories specific to each topic area were used to accompany the expository texts. The note forms followed the same 2-column note format as was used in previous studies, which is often found in classroom settings (Appendix A). The note forms were simple with a space for a topic at the top, categories on the left, and space for notes on the right, allowing for different types of notes to be taken on the same form. The note forms were uploaded as a picture file to Google Jamboard to allow for participants and the researcher to write on the note-form with live-editing on a shared screen.
Table 3

Session Test Topic Schedule by Tier

<table>
<thead>
<tr>
<th>Session</th>
<th>Tier 1</th>
<th>Tier 2</th>
<th>Tier 3</th>
</tr>
</thead>
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<tr>
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<td><em>SALT 1, Social Validity</em></td>
<td><em>SALT 1, Social Validity</em></td>
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<td>Base 1 - Peoples 2</td>
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<td>2</td>
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<td>Base 2 - Animal 4</td>
<td>Base 2 - Animal 2</td>
</tr>
<tr>
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<td>Base 3 - Object 4</td>
<td>Base 3 - Object 2</td>
</tr>
<tr>
<td>4</td>
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<td>Base 4 - Athlete 4</td>
<td>Base 4 - Athlete 3</td>
</tr>
<tr>
<td>5</td>
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<td>Base 5 - Peoples 4</td>
<td>Base 5 - Peoples 1</td>
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<td>Base 8 - Athlete 1</td>
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<td>Ind - Athlete 5</td>
<td>Base 9 - Object 4</td>
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<td>Guided - Object 1</td>
<td><strong>Tx 1 - no test</strong></td>
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<td>Guided - Athlete 5</td>
<td>Ind - Athlete 2</td>
<td>Guided - Object 3</td>
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<td>12</td>
<td>Ind - Peoples 3</td>
<td>Guided - Animal 1</td>
<td>Ind - Peoples 3</td>
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<tr>
<td>13</td>
<td>Guided - Object 5</td>
<td>Ind - Object 3</td>
<td>Guided - Athlete 2</td>
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<td>Ind - Animal 5</td>
<td>Guided - Athlete 1</td>
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<td>16</td>
<td>Guided - Peoples 3</td>
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<td></td>
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<tr>
<td>17</td>
<td>Ind - Object 2</td>
<td>Guided - Animal 3</td>
<td></td>
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<td>Guided - Athlete 3</td>
<td>Ind - Peoples 2</td>
<td></td>
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<td>19</td>
<td></td>
<td>Guided - Athlete 2</td>
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</tr>
<tr>
<td>20</td>
<td></td>
<td>Ind - Object 5</td>
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<tr>
<td>21</td>
<td></td>
<td>Guided - Animal 5</td>
<td></td>
</tr>
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<td><em>SALT 2, Social Validity</em></td>
<td><em>SALT 2, Social Validity</em></td>
<td><em>SALT 2, Social Validity</em></td>
</tr>
</tbody>
</table>

Note: Text topics cycled and counterbalanced across phases and testing points. Guided = Guided Session Test; Ind = Independent Session Test. The first session of treatment is indicated in bold for each participant, baseline sessions indicated in gray.
**Test Procedure**

Data was collected during baseline and treatment phases through session tests. Session tests included an Oral Report without notes and six Short-Answer Recall questions about the topic. During baseline and the beginning of odd-numbered treatment sessions, Independent Session Tests were administered after a shared reading of a novel text and Independent Strategy use: participant note formulation with the article in view and no instruction from the interventionist. Guided Session Tests were administered at the end of even-numbered treatment sessions to allow for instruction in the whole two-session procedure (outlined in Table 2) prior to the session test. The intervention included scaffolded note formulation in two forms and oral practice of full sentences and oral reports. Session tests were administered in every session except treatment session one. An Independent Session Test at the beginning of treatment session one would have been an extension of baseline and not provided meaningful information about strategy use or changes in participant performance.

To start the session tests, participants were instructed: *You now have a few minutes to review your notes. You are going to give me an oral report about what you just read, like you are a scientist presenting to a class. You do not get to use your notes to give an oral report or answer questions about the text.* The participants had up to 3 minutes for note review without the use of the article. When the participant indicated readiness to start speaking, the researcher removed the notes from the screen and had the participant exit the Google Jamboard document. Participants were then instructed: *Now give me an oral report about the [topic] that you learned about today. Use information from the text, not your own ideas to create your report.* After the participant stopped
speaking, the researcher asked if they were finished before moving on to the short-answer recall questions. Participants answered six short-answer questions about the session topic. Questions included explicit and locally-inferred information on main ideas and details, parallel across texts within a topic area, and as much as possible, across topic areas.

**Scoring**

Outcome measures from session tests were Oral Report quality and accuracy of Short-Answer Recall responses. Student notes were also collected in every session and scored for Quantity and Quality using researcher-developed rubrics. Scoring procedures are described by outcome measure.

**Oral Report.** Oral Report quality scores were calculated using Appendix C. Oral Reports were video recorded and transcribed following the Systematic Analysis of Language Transcripts (SALT; Miller & Iglesias, 2012) guidelines by trained research assistants. To check for reliability of transcription, a second research assistant watched the video and read along with the transcription, editing and saving any differences noted in a separate file. The researcher then checked the transcription and created a final copy of the Oral Report transcript with codes for correct information, mazes, colloquial fillers, and extraneous information or self-talk of each participant. The finalized transcripts were used in conjunction with the video of reports for scoring.

The Oral Report rubric was revised twice due to poor reliability in pilot scoring and to increase sensitivity to the effects of treatment on oral report quality. Oral Reports were scored on a 0-2 point scale in the following areas: information, topic & open/close, vocabulary, sentences, discourse, and fluency. The information score was doubled to when calculating the final score to reflect the importance of participants’ ability to report
factual information from the text. The increased information score helped to reduce confounding variables of fluency or extraneous comments that would be counted in a total word or utterance score. The scale had multiple categories that involved language structure (e.g., discourse, sentences, fluency), but the information score is the only one that directly reflects the quality of the information. The final rubric allowed for Oral Report scores ranging 0-14.

**Short-Answer Recall.** Short-Answer Recall scores were calculated using the rubric described in Appendix D. Responses to Short-Answer Recall questions were transcribed in SALT using the same double-coding procedure as was used for Oral Reports. The researcher made a final check on the Short-Answer transcripts prior to scoring. Six Short-Answer questions followed the same general format across topic areas: 1) general detail, 2) first specific detail, 3) second specific detail, 4) how question, 5) why question, 6) vocabulary definition. Recall questions were scored on a 0-2 point scale with a maximum score of 12.

**Note Quantity.** Note Quantity scores were calculated by counting the number of distinct notes the participant generated about a topic (Appendices E, F). To determine the number of notes, scorers used a video of the participant’s oral report, carefully watching for the notes to match the number of different ideas in the report. Notes were marked as independent from another note when there was space between items or when the notes started with a bullet or other note indicator. Space between different pictographs is more subjective than space between a bulleted list of notes, so an example of the guidance to score pictography can be found in the rubric (Appendix E). For bulleted notes, listing of notes vertically or separating notes by sentences counted toward the note quantity score
when appropriate (Appendix F). The quantity of notes has no maximum score as the participants had the opportunity to take as many notes as would fit on the note form.

**Note Quality.** Note Quality scores were calculated using researcher-created rubrics (Appendices E or F dependent on note type) and recorded oral reports on the topic for each participant. Note Quality for bulleted notes and pictography notes had a maximum score of 15. Bulleted notes were scored on a 0-3 point scale across five areas: topic & open/close, bullets (good) & periods (bad), quick & easy, enough to remember, use your own words (Appendix F). Pictography notes were scored on a parallel 0-3 point scale with five performance areas with differences in “used pictography” in place of using bullets and “differentiated images” instead of using one’s own words (Appendix E). Quality of notes was compared to the Oral Report videos for clarity and consistency of content with the participant’s notes. The comparison between Notes and Oral Reports was more subjective in the “enough to remember” category than others as the participants were not using their notes as a guide for the report. In cases where the participant’s Oral Report skipped a note, the scorer defaulted to the note not being sufficient for them to remember the information.

**Pre/Post-Treatment Distal Measure**

Within 3 days prior to the first baseline session and after the final treatment session, participants took independent notes and then gave an oral explanation of a familiar sport or game. This task followed the test administration and scoring protocol for the Systematic Analysis of Language Transcripts Expository Task which is scored by the Expository Scoring Scheme (ESS) (SALT; Miller & Iglesias, 2012). In this semi-standardized task, students were given a SALT 2-column planning sheet with 10
categories (Appendix G). They were told to write or draw ideas for each category and then use those notes to explain the game orally for at least 5 minutes with a timer visible on the screen. Participants were prompted twice to continue explaining the topic if they stop prior to five minutes by the researcher asking, “Can you tell me anything else?”

To avoid an order effect of sport/game preference, before beginning the first SALT task, participants were asked to list three sports or games they liked and thought they could explain. Using a random number generator, one of those topics was selected for the pre-test session and one of the final two choices was selected at post-test. This explanation was transcribed and compared to age-related normative scores for typically developing children in the SALT database. To account for the ages of all three participants, the age window for the SALT ESS score was 13;6 – 15;6, resulting in roughly 50 reports in the comparison group for each report. This final task is a distal measure of transfer of skills to a non-investigator designed measure with quite different topic area and relies on the participant’s preexisting knowledge. It also provides age-referenced scores allowing comparison of performance to peers at the two testing points.

Though not part of the SALT ESS, note quantity and quality scores were also calculated at pre-/post-treatment. Note-taking strategies that impact quantity and quality are a key component of this intervention, so this is an important distal measure of performance and learning. The researcher also used the note scoring rubric designed for Sketch and Speak to score pre-/post-test performance on SALT notes for each participant.

**Social Validity Procedures and Materials**

Participants completed a questionnaire about the social validity of the intervention at pre-/post-intervention time points. Questions were presented verbally with the
questions in view to reduce the cognitive demand on participants for independent decoding and comprehension of written information. At pre-treatment, the questions addressed the participant’s perceptions of themselves as learners and helped them to self-identify a need for treatment. Participants rated themselves on a 1-5 Likert scale for 7 different skills, including how they felt about their independent ability to read, write, and orally present information for classes (Appendices H, I). At post-treatment, the questions also addressed their perceptions of the elements of the treatment, the strategy intervention as a whole, the participant’s perceptions of their learning/outcomes, and their overall perceptions of the telepractice service delivery.

Parents and high school SLPs also completed short social validity questionnaires, either through a written survey or through verbal conversations with the researcher (Appendices J, K, L). Parents answered questions about their child’s learning abilities at pre-/post-treatment and shared their perceptions of their child’s performance during the study. For the post-treatment questions, after the study sessions were completed, the researcher created a 5-10 minute video of each participant to share with parents and the high school SLPs demonstrating their use of notes and oral practice during treatment and ending with a full oral report. Parents watched the video with or without their child and then answered questions about overall performance and impressions of the intervention. After the start of the fall 2021 school year when the participants had time to meet their new high school SLPs, the SLPs were sent a link to the same social validity video. All meetings were conducted via Zoom for consistency across participants. The SLP, participant, and researcher watched the social validity video together and talked about strategies and potential uses in the high school setting. Then, SLPs extended the
conversation with the researcher about potential barriers and facilitators for implementing *Sketch and Speak* for the participant and for their caseload in general. The SLPs were asked to share their perceptions of the intervention based on this brief video demonstration.

**Testing and Treatment Training, Fidelity, and Reliability**

**Training**

The researcher was very familiar with the *Sketch and Speak* procedures, having served as an interventionist in two previous studies (Peterson et al., 2021; Ukrainetz, 2019). The researcher has also worked closely with the primary developer of the *Sketch and Speak* intervention to revise and co-develop the current iteration of the intervention and measures. To examine the feasibility of the procedures, the telepractice service delivery, use of the intervention with an older population, and the effectiveness of the new intervention measures, the researcher conducted a pilot study in Spring 2021. Following the pilot study, the procedures were revised for the short-answer recall questions, expository texts, scoring, and fidelity of the intervention as administered via telepractice delivery. The revisions, researcher’s interventionist experience, and the pilot study served as training for testing and treatment procedures in this study.

The researcher completed SALT ESS training prior to the pilot study by reading the SALT guide and published procedural articles like (Heilmann & Malone, 2014) and completing a 1.5 hour online training course on the SALT website (saltsoftware.com). The online training includes step-by-step practice activities with guided instruction and five independent scoring tasks that can be compared to the SALT-assigned scores for each sample. The researcher passed a quiz and earned a certification in scoring the ESS.
The researcher also modified instructions and the note form to be used during the telepractice delivery (Appendix G). Finally, the researcher administered the SALT expository task during the pilot study as part of the task training.

**Treatment and Testing Fidelity**

To examine fidelity of testing and treatment procedures, a trained research assistant scored 33% of baseline and treatment sessions for each participant using the treatment fidelity checklists (Appendices M, N, O). The research assistant was trained to assess fidelity using the pilot study videos and videos from previous studies and instructions in Appendix P. The researcher and the assistant watched the video together, independently scored treatment fidelity using checklists in Appendices M-O based on treatment procedures in Table 2 and discussed any discrepancies in scoring. Revisions to the checklist were made to focus on the key components of the treatment rather than the specific wording of instructions. Once the research team was in agreement, the research assistant scored the testing and treatment fidelity for the study participants.

Scored sessions were selected at random with a random number generator. At least 33% of each type of session (baseline, odd-numbered and even-numbered treatment sessions) was checked for each participant. Fidelity checklists differed by the session type with 18 items for baseline, 28 items for even-numbered treatment sessions, and 34 items for odd-numbered treatment sessions. In baseline, procedural fidelity was 100% for all three participants. In treatment sessions, procedural fidelity was 97.4% (148/152) for Thomas, 96.6% (114/118) for Garcia, and 99.4% (161/162) for Cat. During the treatment phase, the majority of points missed were due to therapeutic responses to student
questions or short-answer responses in session tests instead of neutral tester-type responses as suggested by the fidelity checklist.

**Reliability**

Three research assistants were trained on the scoring procedures. The research assistants served as the primary scorers and the researcher scored 33% of all sessions to conduct independent point-to-point intra-rater reliability for outcome measures. Reliability of scoring is described by task. For each reliability percentage, the point-to-point agreement ratios are also listed. The research assistants were each responsible for scoring one outcome measure (e.g., Oral Reports, Short-Answer Recall responses, or Note Quantity and Quality) to increase interrater reliability. Raters were trained using pilot data or previous study videos and transcripts when appropriate. After training was complete, research assistants scored participant data using the treatment videos, the transcriptions of the Oral Reports and Short-Answer Recall responses, PDFs of the note forms when appropriate, and rubrics in Appendices C, D, E, and F.

**Oral Report.** Oral Report reliability training followed the procedures in Appendix Q until the research assistant was at least 95% reliable in scoring non-study data with the researcher. The Oral Report scoring procedure was more subjective than the Note Quantity/Quality and Short-Answer Recall scoring and therefore led to poor reliability during pilot scoring. The rating scale was modified to reduce the subjectivity in scores, reducing it from a 0-3 point scale to a 0-2 point scale. The researcher revised the score form a second time, doubling the “information” score to better reflect changes in participant behavior. The scale had multiple categories that involved language structure, but the "information” score is the only one that directly reflects the accuracy of the
participant’s report. The “information” section was scored on a 0-2 point scale akin to the other sections and then doubled when calculating the final score for the Oral Report quality. The research assistant independently scored all oral reports and then the researcher randomly double-scored 33% of each participant’s data for each phase. Discrepancies in scoring were discussed to consensus. Independent point-to-point intra-rater reliability of Oral Report scoring using the third rating scale exceeded the 80% threshold for all three participants: Thomas – 100% (25/25), Garcia – 93% (28/30), Cat – 97% (34/35).

**Short-Answer Recall.** Short-Answer Recall reliability training followed the procedures in Appendix R until the research assistant was at least 95% reliable in scoring non-study data. The research assistant was the primary scorer for all Short-Answer Recall responses. After the research assistant finished scoring, the researcher randomly double-scored 33% of each participant’s data for each phase. Discrepancies in scoring were discussed to consensus. Independent point-to-point intra-rater reliability of Short-Answer Recall responses exceeded the 80% threshold for all three participants: Thomas – 93% (28/30), Garcia – 100% (36/36), Cat – 88% (37/42).

**Note Quantity and Quality.** Note Quantity and Quality reliability training followed the procedures in Appendix S until the research assistant was at least 95% reliable with the researcher in scoring non-study data. The research assistant was the primary scorer for all notes. After the research assistant independently scored the Note Quantity and Quality for each participant, the researcher randomly double-scored at least 33% of the notes for each participant in each phase. Independent point-to-point intra-rater reliability for Note Quantity scores was Thomas – 83% (5/6), Garcia – 100% (6/6), and
Cat – 71% (5/7). Any discrepancies in scores were discussed to consensus. With the small number of data points for each participant, the reliability scores were significantly impacted by 1-2 disagreements. Cat’s note quantity in baseline and two of five independent session tests was particularly hard to score due to her indecipherable handwriting where words and sentences overlapped with no clear break between notes. The lower reliability score from Thomas, though over the 80% threshold, was due to only one disagreement in the quantity of notes on a guided session test, with consensus leading to the higher quantity score. Independent point-to-point intra-rater reliability for Note Quality scores was: Thomas – 100% (36/36), Garcia – 90% (27/30), and Cat – 89% (31/35). The quality reliability scores all met the threshold of 80% set by the researcher.

**SALT Expository Task.** SALT Expository Task is scored with the SALT Expository Scoring Scheme (ESS). Reliability for the ESS was completed through an online training course offered by the SALT company using practice tasks (saltsoftware.com). The course includes a recorded lecture, a slide deck, a chapter in the SALT manual, and multiple training opportunities on scoring. In order to have reliability of scoring this subjective measure, the researcher’s SALT scores had to be within one point of the SALT master scores for each area. The researcher was within one point of all SALT scores and earned a certificate for the course. Because of the pilot nature of this task as a distal measure in this study, the researcher independently scored the participant’s performance and no other reliability checks were done on the study data.

**Data Analysis**

The design of this study allowed for data to be collected in every session through session tests except the first session of treatment. In odd-numbered treatment sessions,
data was collected through independent session tests at the beginning of the session with a novel text, thereby making any data in the first session of the treatment phase an extension of baseline. Outcome data of oral report quality, short-answer recall responses were analyzed for all session tests. Note quality and quantity were secondary outcome measures collected in each session test to evaluate participant strategy use and learning.

To test the primary efficacy of the treatment, performance on these outcome data was compared across baseline and guided session tests. Effectiveness of the study was determined through comparisons of baseline and independent session test data, the SALT distal measure, and the responses to the social validity questionnaires. Primary outcome measures of oral reports and short-answer recall responses and secondary outcome data of note quantity and quality were visually and statistically analyzed.

Oral report quality, short-answer recall responses, and note quantity and quality scores are graphically represented for each participant. Visual analyses include trend, level, variability, percent of overlap, immediacy of effect, and consistency of data across phases, per the What Works Clearinghouse standards for single-case study designs (Kratochwill et al., 2010). Descriptive summary statistics of Mean Phase Difference and Percent of Overlapping Data Points were also calculated.

Data was statistically analyzed with Tau-U for within-participant comparisons of treatment effect. Tau-U is a nonparametric approach to data statistical data analyses for single-case research that complements visual analysis and can provide statistical measures of significance, like p-values (Lee & Cherney, 2018). According to Lee and Cherney (2018), Tau-U calculates the overlap between phases like in typical visual analyses, but also accounts for trend in baseline and treatment phases that may not be
measurable with visual analyses alone. Parker and colleagues (2011) describe Tau-U as a combination of four summary statistics which account for trend in baseline and treatment phases and nonoverlapping data across phases to determine an overall effect of treatment. Though often less conservative than visual analyses alone, Tau-U is the most sophisticated calculation of nonoverlapping data points and can be used to complement visual analyses (Rakap et al., 2020). Tau-U was calculated for all session test data on oral report quality, short-answer recall responses, and note quantity and quality outcome measures. Tau-U was calculated with a freely available online calculator (Vannest et al., 2011; http://singlecaseresearch.org/calculators/tau-u). Effect sizes are measured whereby large effects of treatment are closer to +/-1.

A Design Comparable Effect Size (D-CES) was also calculated to examine an omnibus treatment effect for each task across participants. D-CES calculations allow researchers to compare average performance for each outcome measure across participants from baseline to taught probes. This effect size was calculated to adhere to What Works Clearinghouse standards 4.1 for rigorous research in single-case design (v. 4.1, WWC, 2020). According to WWC, these effect sizes are similar to hierarchical linear models in group designs whereby each participant’s data is nested within the overall outcome measure. The D-CES were calculated using a freely available web application (https://jepusto.shinyapps.io/scdhlm/) and interpreted using What Works Clearinghouse guidelines and tutorials (4.1, WWC, 2020; Valentine et al., 2016)

Distal SALT Expository oral report performance data were analyzed through the complete and intelligible verbal utterances comparisons in SALT (C&I Verbal Utts). After the researcher coded for abandoned, incomplete, unintelligible, and nonverbal
utterances following SALT guidelines, the C&I Verbal Utterances analysis was used to compare participant data to database samples of the same within the selected age band of 14;0 – 15;6 years (Miller & Iglesias, 2012). An age range of six months on either side of the participants’ collective chronological ages was appropriate due to the small amount of developmental change in language complexity that occurs during this period (Nippold, 2007). Though there is no note-taking component of the ESS, this was an important distal measure for this study. Note Quantity and Quality were analyzed for the SALT task using the *Sketch and Speak* note rubric. Social validity questionnaire comparisons at pre-/post-intervention time points are compared by Likert rating and supportive quotes by participants and parents on the effectiveness and generalization of strategies. Participants also commented on perceptions of the telepractice service delivery. The social validity questionnaires for the high school SLPs are analyzed with general impressions and qualitative comments regarding *Sketch and Speak* intervention at the high school level.
CHAPTER IV: RESULTS

This multiple baseline across participants time series study with additional pre/post measures was completed during six consecutive weeks in summer 2021. Three students with LLD who had designated language services on an IEP completed pre-/post-intervention activities, three, six, or nine baseline, and 12 treatment sessions. All participants are referred to by self-selected pseudonyms.

The time series results are described by outcome measure. Primary outcome measures were Oral Reports and Short-Answer Recall responses collected in all session tests. Secondary outcome measures of Note Quantity and Quality were also analyzed for all session tests. Primary efficacy comparisons included baseline Independent Session Tests and Guided Session Tests in treatment. Secondary effectiveness comparisons of Independent Session Tests in treatment and baseline were used to examine potential generalization of strategies and learning. Oral Reports, Short-Answer Recall responses, Note Quantity scores, and Note Quality scores were visually and statistically analyzed. Visual analyses included trend, level, variability, consistency across phases, percent of nonoverlapping data, and mean difference between phases. Mean phase difference by outcome is presented in Table 4. Statistical analyses included Tau-U and Design-Comparable Effect Sizes (DCES). Tau-U effect sizes and p-values for primary outcome measures are presented in Table 5. Tau-U is the most sophisticated statistical analyses of nonoverlapping data that considers trend in baseline and treatment phases that is appropriate for single-case design studies which produces an inferential probability statistic where results are not due to chance at a 95% or greater level of confidence (e.g., $p \leq .05$) (Lee & Cherney, 2018; Parker et al., 2011; Rakap et al., 2020).
Table 4

Mean Performance by Outcome Measure and Session Test Type

<table>
<thead>
<tr>
<th></th>
<th>Thomas</th>
<th>Garcia</th>
<th>Cat</th>
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<td>BL</td>
<td>G</td>
<td>Ind</td>
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<td>Oral Report</td>
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<td>Short-Answer Recall</td>
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<td>6.8</td>
<td>4.4</td>
</tr>
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<td>Note Quantity</td>
<td>5.0</td>
<td>9.8*</td>
<td>5.2</td>
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<td>Note Quality</td>
<td>5.3</td>
<td>13.7*</td>
<td>6.2</td>
</tr>
</tbody>
</table>

Note. BL = Baseline Independent Session Test, G = Guided Session Test, Ind = Independent Session Test in treatment phase. * = significant difference in performance based on Tau effect sizes, $p \leq .05$. 
Table 5

**Tau-U Effect Sizes for Guided and Independent Session Tests by Task and Participant**

<table>
<thead>
<tr>
<th></th>
<th>Thomas</th>
<th></th>
<th></th>
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<th>Garcia</th>
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<th>Cat</th>
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<td>Tau-U</td>
<td><em>p</em>-value</td>
<td>Tau-U</td>
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<tr>
<td>Guided</td>
<td>1.06</td>
<td>.014</td>
<td>1.08</td>
<td>.002</td>
<td>.833</td>
<td>.008</td>
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<td>Independent</td>
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<tr>
<td>Guided</td>
<td>0.33</td>
<td>.439</td>
<td>0.722</td>
<td>.037</td>
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<td>.099</td>
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<tr>
<td>Independent</td>
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<td>.351</td>
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</tr>
<tr>
<td><strong>Note Quantity</strong></td>
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<td></td>
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</tr>
<tr>
<td>Guided</td>
<td>1.06</td>
<td>.014</td>
<td>1.11</td>
<td>.001</td>
<td>1.07</td>
<td>.0006</td>
<td></td>
<td></td>
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<tr>
<td>Independent</td>
<td>0.2</td>
<td>.65</td>
<td>0</td>
<td>1</td>
<td>0.867</td>
<td>.009</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Guided</td>
<td>1.06</td>
<td>.014</td>
<td>0.97</td>
<td>.005</td>
<td>1.11</td>
<td>&lt;.0001</td>
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<tr>
<td>Independent</td>
<td>0.4</td>
<td>.371</td>
<td>0.97</td>
<td>.008</td>
<td>0.84</td>
<td>.011</td>
<td></td>
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</table>

*Note.* Effect sizes were calculated with a freely available online Tau-U calculator (http://singlecaseresearch.org/calculators/tau-u). Strong effects of treatment are closer to +/-1.00. Statistically significant treatment effects are indicated in bold.
Oral Reports

Oral Report outcomes were scored with a six-category rubric using the recorded Zoom sessions and SALT transcriptions of the reports. The quality of the Oral Report was scored on a 0-2 point scale with a maximum score of 14. Participant Oral Report quality scores are graphically represented by session in Figure 2.
Figure 2

*Oral Report Quality Scores by Participant*
For Oral Report quality in Guided Session Tests, the D-CES across participants was 2.78 with a standard error of 0.61 and auto correlation of -0.10 when compared to baseline. For Oral Report quality in Independent Session Tests during the treatment phase, the D-CES was -1.34 (SE =0.31, auto correlation = 0.75) when compared to baseline performance. These scores suggest a strong effect of treatment overall on Oral Report quality in the Guided Session Test with a null effect of treatment on Independent Session Test performance. Visual and statistical analyses for Oral Report performance are described by participant.

**Thomas**

Thomas’s Oral Report quality in Guided Session Tests, when compared to baseline, revealed an immediate effect of treatment. Thomas’s level of Oral Report performance in Guided Session Tests was noticeably higher than in baseline. The effect of treatment on Oral Report quality during Guided Session Tests was further supported by the low variability and zero trend in baseline performance. There was more variability in his Oral Reports in Guided Session Tests with a slight downward trend during the treatment phase, though all data points are higher in treatment than baseline. Most scores in treatment were near the median level performance of 10, with few outliers. Thomas’s data in baseline and Guided Session Tests was consistent within phases, with scores ranging from 1-3 in baseline in 8-13 in treatment. There was 0% overlapping data across these data and a mean phase difference of +8.8. Tau-U comparison of Oral Reports in Guided Session Tests in treatment to baseline (Tau-U = 1.06, \( p = .014 \)) indicated a strong effect of treatment. Visual and statistical analyses revealed a treatment effect on Oral Reports from Independent Session Tests in baseline to Guided Session Tests in treatment.
Thomas’s Oral Report performance in Independent Session Tests during the treatment phase, when compared to baseline, reveals a slight, but immediate effect of treatment. Thomas’s Oral Report performance in Independent Session Tests had low variability and zero trend across phases. Thomas’s level of oral report performance in Independent Session Tests during the treatment phase was higher than his performance in baseline. His performance within phases was consistent, which further supports the slight generalization of skills in Oral Reporting from Guided Session Tests to Independent Session Tests in the treatment phase when compared to baseline performance. One data point occurs in both baseline and treatment phases, creating a 20% overlap in data points and a mean phase difference of +2.8 Tau-U comparison of Oral Report performance on Independent Session Tests to baseline performance support visual analyses with a significant effect of treatment (Tau-U = 1.0, \( p = .025 \)). Both visual and statistical analyses supported a slight small effect of treatment and generalization of skills Oral Report quality in Independent Session Tests in the treatment phase.

**Garcia**

Garcia’s Oral Report performance in Guided Session Tests, when compared to baseline, revealed an immediate effect of treatment. Garcia’s level of performance in treatment was noticeably higher than in baseline, with the exception of two higher-scoring oral reports. Garcia’s highly variable and inconsistent performance in baseline, with zero trend created a less-visible treatment effect in visual analyses. There is low variability in his Oral Report performance in Guided Session Tests and zero trend with high consistency of scores in treatment. Garcia had a percent of overlapping data of 83% with one data point overlapping and a mean phase difference of +6.7. Tau-U comparison
of Oral Report performance in Guided Session Tests to baseline (Tau-U = 1.08, \( p = .002 \)) indicated a strong effect of treatment. Both visual and statistical analyses supported a strong effect of treatment on Garcia’s Oral Report performance in Guided Session Tests compared to Independent Session Tests in baseline.

Garcia’s Oral Report performance in Independent Session Tests during the treatment phase, when compared to baseline, revealed no immediate effect of treatment. Garcia’s highly variable performance with low consistency in baseline led to similar levels of performance across Independent Session Tests in baseline and treatment. There was zero trend in his Oral Report performance in all Independent Session Tests across phases. Garcia had a percentage of overlapping data of 100% and a mean phase difference of +0.4. Tau-U comparison of Oral Report performance in Independent Session Tests from treatment to baseline support visual analyses with no significant effect of treatment (Tau-U = 0.4, \( p = .273 \)). Visual and statistical analyses revealed no generalization of skills or effect of treatment on Garcia’s Oral Report scores in Independent Session Tests in the treatment phase.

**Cat**

Cat’s Oral Report performance in Guided Session Tests in treatment, when compared to Independent Session Tests in baseline, revealed an immediate effect of treatment. Cat’s level of Oral Report performance was noticeably higher in Guided Session Tests than it was in baseline. There was zero trend in her baseline performance and a slightly increasing trend of scores in Guided Session Tests. There was low variability in Oral Report quality during Guided Session Tests with high consistency of scores in treatment. Cat had moderate variability and inconsistent Oral Report scores in
baseline, though that did not impact the evidence of a treatment effect. The percentage of overlapping data is 0% for Independent Session Tests in baseline to Guided Session Tests in treatment with a mean phase difference of +6.1. Tau-U comparison of Cat’s Oral Report quality in Guided Session Tests to Independent Oral Reports in baseline (Tau-U = 0.833, \( p = .008 \)) indicates a strong effect of treatment. Both visual and statistical analyses suggested a strong effect of treatment on Cat’s Oral Reporting skills in Guided Session Tests when compared to baseline.

Cat’s Oral Report performance on Independent Session Tests in treatment, when compared to Independent Session Tests in baseline, revealed no immediate effect of treatment. Cat’s moderately variable and inconsistent performance in Independent Session Tests across phases resulted in a similar level of performance. There was zero trend to the scores on Oral Reports on Independent Session Tests in either phase. She had a percentage of overlapping data of 80% and a mean phase difference of 0 across phases. Tau-U comparison of Oral Reports in Independent Session Tests in treatment to baseline performance support visual analyses with no significant effect of treatment (Tau-U = -0.244, \( p = .463 \)). There was no generalized effect of treatment on Cat’s Oral Reporting skills from baseline to Independent Session Tests in the treatment phase based on these visual and statistical analyses.

**Short-Answer Recall**

Short-Answer Recall tests on each topic consisted of six questions about the presented text. Answers to each Short-Answer Recall question were scored on a 0-2 point scale for correctness with a maximum of 12 points possible per text. Participants’ scores are graphically represented by session in Figure 3.
Figure 3

Short-Answer Recall Scores by Participant
For Short-Answer Responses in Guided Session Tests, the D-CES across participants was 1.05 with a standard error of 0.33 and auto correlation of -0.14 compared to baseline. For Short-Answer Recall responses in Independent Session Tests during the treatment phase, the D-CES was -0.59 (SE =0.33, auto correlation = -0.19) compared to Independent Session Tests in baseline. D-CES results suggest that there was a slight effect of treatment on improved Short-Answer Recall scores in the Guided Session Tests, but a null effect of treatment on Independent Session Tests. Visual and statistical analyses are discussed for each participant.

**Short-Answer Recall Scores in Guided Session Tests**

Visual analysis revealed no immediate effect of treatment on Short-Answer Recall scores for any of the participants on Guided Session Tests compared to Independent Session Tests in baseline. Garcia’s performance on the Short-Answer Recall task in Guided Session Tests was slightly higher than in baseline, though the immediate effects are hard to determine using visual analysis alone. All three participants had highly variable performance on this measure with low consistency within phases and zero trend. Thomas and Cat each had a similar level of performance on Short-Answer Recall questions during Guided Session Tests to their baseline Independent Session Tests. Garcia’s level of performance in Guided Session Tests during the treatment phase was higher than his baseline performance, but with high variability and low consistency. The percent of overlapping data and mean phase difference (MPD) for each participant between baseline and Guided Session Tests in the treatment phase was: Thomas 83%, MPD +0.8; Garcia 50%, MPD +3.0; Cat 83%, MPD +2.0. Garcia had the most improvement in performance from baseline to Guided Session Tests and the fewest
overlapping data points. Garcia also had the most potential impact of treatment, which was supported by the Tau-U analyses of his data (Tau-U = 0.722, \( p = .037 \)) indicating a moderate effect of treatment. Statistical analyses for Thomas (Tau-U = 0.33, \( p = .439 \)) and Cat (Tau-U = 0.519, \( p = .099 \)) revealed no effect of treatment on Short-Answer Recall in Guided Session Tests. Visual and statistical analyses support a small effect of treatment on Short-Answer Recall questions for Garcia in Guided Session Tests, but no effect of treatment for Thomas or Cat.

**Short-Answer Recall Scores in Independent Session Tests**

Visual analysis revealed no immediate effect of treatment for any of the participants on Short-Answer Recall responses in Independent Session Tests in the treatment phase. The level of performance on Independent Session Tests was very similar across phases, with no noticeable difference from baseline to treatment. Performance on Short-Answer Recall in Independent Session Tests was highly variable with low consistency across phases and zero trend for all three participants. The percent of overlapping data and mean phase difference between baseline and treatment phases for Independent Session Tests was: Thomas 80%, MPD -1.6; Garcia 60%, MPD -0.1; and Cat 80%, MPD -1.6. All three participants had a slight decrease in their level of performance based on the mean phase differences. Tau-U analyses supported the lack of generalization, or no effect of treatment on Short-Answer Recall in Independent Session Tests in the treatment phase for all three participants: Thomas (Tau-U = -0.27, \( p = .551 \)), Garcia (Tau-U = -0.033, \( p = .927 \)), Cat (Tau-U = -0.311, \( p = .351 \)). There was no effect of treatment on Short-Answer Recall in Independent Session Tests for any participant based on these visual and statistical analyses.
Note Quantity

Participant-generated notes for each session test were collected and scored as a secondary outcome measure. Note Quantity was scored to examine the effect of treatment on the number of distinguishable notes generated for a given topic. Note Quantity scores by session test are reflected in Figure 4. The goal of instruction in treatment was to scaffold participants into producing 8-12 notes for each article prior to the Guided Session Test. The actual number of notes on each article varied by participant and topic. All three participants had a significant effect of treatment on their Note Quantity in Guided Session Tests when compared to baseline, with all of them creating more an average of 8-9 notes per session (Table 4). For Independent Session Tests in the treatment phase, Thomas and Garcia had no significant treatment effect with negligible change in the number of generated notes compared to baseline. Cat had the most noticeable difference in Note Quantity from baseline (mean of 2.1 notes per text) to Independent Session Tests in the treatment phase (mean of 5.8 notes per text). This noticeable change in performance is a result of her using pictography to prepare for three of the Independent Session Tests, with 7-8 notes each.
Figure 4

*Note Quantity Scores by Participant*
Note Quality

Note Quality outcomes were scored to determine if treatment had an impact on participant generation of meaningful, efficient notes. Notes were scored with a researcher-created five category rubric on: topic and open/close statements, use of bullets or pictography, quick and easy, enough to remember, and use of own words or differentiated pictography. Each note quality category was scored on a 0-3 point scale with a maximum quality score of 15. Participant Note Quality scores are graphically represented by session in Figure 5, mean phase calculations are in Table 4.
Figure 5

Note Quality Scores by Participant

[Graph showing note quality scores for participants Thomas, Garcia, and Cat across different sessions.]
A D-CES was calculated to determine the average effects of treatment on Note Quality performance across all three participants. Results showed a significant effect of treatment on Note Quality in Guided Session Tests with a D-CES of 2.03 (standard error 0.44, auto correlation of 0.39) as compared to Independent Session Tests in baseline. There was no overall effect of treatment or generalization of strategy use on Note Quality in Independent Session Tests during the treatment phase as compared to baseline with a D-CES of -1.05 (SE =0.27, auto correlation = 0.78). Visual and statistical comparisons of Note Quality for baseline to Guided and Independent Session Test in treatment are described for each participant.

**Thomas**

Thomas’s Note Quality during Guided Session Tests, when compared to Independent Session Tests in baseline, revealed an immediate effect of treatment. Thomas had low variability and zero trend in baseline, with higher scores on Note Quality in Guided Session Tests in treatment than in Independent Session Tests in baseline. Thomas’s performance was consistent within and across phases, with higher scores of 13-15 in treatment and lower scores of 5-7 in baseline. There was 0% overlapping data between Guided Session Test scores in treatment and Independent Session Test scores in baseline with a mean phase difference of +8.4. Tau-U comparison of Guided Session Tests in treatment to baseline (Tau-U =1.06, p = .014) indicated a strong effect of treatment. Both visual analyses and statistical analyses suggest an effect of treatment on Thomas’s Note Quality.

Thomas’s Note Quality in Independent Session Tests in the treatment phase, when compared to Independent Session Tests in baseline, revealed no immediate effect of
treatment on generalization of strategy use. Thomas had low variability and high consistency of scores within phases. There was zero trend in baseline, but a slightly increasing trend in Independent Session Test scores in the treatment phase. Thomas’s level of Note Quality scores in Independent Session Tests in the treatment phase was near the same level as his baseline cores. There was a 100% overlap of data points across phases and consistent data across phases with a mean phase difference of +0.9. Tau-U comparisons of Independent Session Tests to baseline performance supported visual analyses with no noticeable effect of treatment (Tau-U = 0.4, \( p = .371 \)). Visual and statistical analyses suggest no generalization effect of treatment on Note Quality in Independent Session Tests.

**Garcia**

Garcia’s Note Quality scores in Guided Session Tests, when compared to Independent Session Tests in baseline, revealed an immediate effect of treatment. Garcia’s level of Note Quality performance in Guided Session Tests was noticeably higher than his level of performance in baseline. Garcia had low variability and high consistency of Note Quality scores within phases. There was zero trend in Note Quality data across phases. When compared to baseline, Garcia had 0% overlapping data in Guided Session Tests and a mean phase difference of +5.7. Tau-U comparison of Note Quality scores in Guided Session Tests to baseline performance (Tau-U = 0.972, \( p = .005 \)) indicated a strong effect of treatment.

Garcia’s Note Quality scores in Independent Session Tests during the treatment phase is similar to his performance in baseline. There was no significant or immediate effect of treatment on generalization of strategy use to improve Note Quality. Garcia’s
level of Note Quality score in Independent Session Tests was similar across phases, but his overall performance in the treatment phase was slightly higher than in baseline. Garcia’s Note Quality scores had zero trend, low variability, and high consistency across phases. The percentage of overlapping data between baseline and Independent Session Tests in the treatment phase was 100% with a mean phase difference of +1.7. Tau-U comparison of Note Quality scores in Independent Session Tests in the treatment phase to baseline scores suggests a significant effect of treatment (Tau-U = 0.967, \( p = .008 \)). Though visually there is only a slight difference in performance, with higher scores in the treatment phase, the statistical analyses indicate a stronger treatment effect.

**Cat**

Cat’s Note Quality scores on Guided Session Tests in the treatment phase, when compared to baseline, revealed an immediate effect of treatment. The level of Cat’s Note Quality scores was noticeably higher in Guided Session Tests than in baseline. She had a slight decreasing trend in Guided Session Tests but zero trend in baseline performance. There was low variability and high consistency of scores within phases. There was a 0% overlap in performance for Guided Session Tests and a mean phase difference of +11.9. Tau-U comparison of Cat’s Note Quality scores in Guided Session Tests to baseline (Tau-U = 1.111, \( p < .0001 \)) indicated a strong effect of treatment. Both visual and statistical analyses support a strong effect of treatment on Cat’s Note Quality when comparing Guided Session Test performance to baseline.

Cat’s Note Quality scores in Independent Session Tests during the treatment phase, when compared to Independent Session Tests in baseline, revealed no immediate effect of treatment on generalization of strategy use when considering only the first
Independent Session Test of treatment. There was, however, a noticeable treatment effect when considering an average of the first three Independent Session Test Note Quality scores in the treatment phase. The overall level of Cat’s Note Quality in Independent Session Tests was higher than her Note Quality scores in baseline. Cat’s highly variable performance in Independent Session Tests across phases created an inconsistency within phases and zero trend in either phase. The percentage of overlapping data between Independent Session Tests in treatment and baseline phases was 40% and the mean phase difference was +5.7. Tau-U comparison of Note Quality scores on Independent Session Tests in treatment to those in baseline supported visual analyses with a significant effect of treatment (Tau-U = 0.844, \( p = .011 \)). Both visual and statistical analyses support a generalization effect of treatment on Cat’s Note Quality.

**SALT Expository Task**

The Expository Scoring Scheme (ESS) uses a Likert-type rating scale of 0-5 for each category on a 10-category note form with a maximum score of 50 points. The researcher administered this task at pre-/post-intervention to examine the potential distal effects of treatment on Oral Reporting skills and Note Quantity and Quality in a different expository task than used in treatment. The ESS Composite raw and Z-scores, along with the note quantity and quality scores, are represented in Table 6 for each participant.
Table 6

*SALT Expository Task Oral Report ESS Composites and Note Scores*

<table>
<thead>
<tr>
<th>Participant</th>
<th>Composite Raw Score</th>
<th>Composite Z-score</th>
<th>Note Quantity</th>
<th>Note Quality</th>
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<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
<td>Pre</td>
<td>Post</td>
</tr>
<tr>
<td>Thomas</td>
<td>15</td>
<td>23</td>
<td>-3.25</td>
<td>-1.95</td>
</tr>
<tr>
<td>Garcia</td>
<td>10</td>
<td>19</td>
<td>-4.06</td>
<td>-2.60</td>
</tr>
<tr>
<td>Cat</td>
<td>9*</td>
<td>16</td>
<td>-4.23</td>
<td>-3.09</td>
</tr>
</tbody>
</table>

*Note.* *Pre*-test notes and report performance not independent. **Pictography notes.
Thomas

Thomas took notes and produced an Oral Report on soccer at pre-test and football at post-test. He used longer sentence-like notes with no punctuation at pre-test, but did not use most of his notes for his oral report. At post-test, his performance was noticeably different in all areas of notes and Oral Reports. Thomas’s composite raw score at post-test was 23, an 8-point increase over his oral reporting skills at pre-test. His Z-score of -1.95 at post-test was more than one point better than at pre-test, indicating an improved performance in Oral Reporting skills after intervention. Both Note Quantity and Quality scores also improved from pre- to post-test. At post-test, Thomas had higher scores in both Quantity and Quality of 2 points. His Note Quality improved through shorter notations and more use of his notes when generating his Oral Report. Thomas’s performance on the ESS and note-taking measures suggest a distal effect of the Sketch and Speak treatment on note-taking strategy use and independence with oral reporting skills.

Garcia

Garcia took notes and produced an Oral Report on soccer at pre-test and volleyball at post-test. At pre-test, Garcia used short notes consisting of words, acronyms, or short phrases and accurately used all of his notes in his Oral Report. At post-test, his Oral Report performance was noticeably better than pre-test but his scores were identical for Note Quantity and Quality. His Z-score of -2.60 at post-test was more than one point better than pre-test, indicating a notably improved performance in Oral Reporting skills after intervention. At post-test, his Note Quantity score of 8 and Note Quality score of 6 were identical to his pre-test scores. Though his Quantity and Quality scores were the
same, there was a notable improvement in his use of the note form with notes that better represented his ideas. At post-test, Garcia’s Note Quality improved as he made more meaningful notes with information about the sport instead of using acronyms like “IDK” (i.e., I don’t know). The increased use of representative words in his notes likely supported his improved performance on the ESS, suggesting a distal effect of the Sketch and Speak treatment on note-taking strategy use and independence with Oral Reporting skills.

Cat

Cat took notes and produced an Oral Report on volleyball at pre-test and the card game Uno at post-test. Due to technological issues at pre-test, Cat’s parent was in the room and provided instruction on spelling, note categories, and structure of the game, so Cat’s notes and Oral Report are not representative of her independent performance. At pre-test, Cat used short notes consisting of words or short phrases with parent-directed spelling of the individual words when necessary. Cat did not independently use the note form or her notes to form her oral report and did not address many of her notes in the report. At post-test, Cat’s note-taking skills were significantly better, she used her notes to generate her report, and her Oral Report provided more meaningful information. Cat completed all post-test without any scaffolding, so the scores are representative of her independent note-taking and oral report performance. Cat’s composite raw score at post-test was 16, a 7 point increase over her scaffolded Oral Report score at pre-test. Her Z-score of -3.09 at post-test was more than one point better than pre-test, indicating a notably improved performance in Oral Reporting skills even without adult support. At post-test, her Note Quantity and Quality scores were also greatly improved compared to
pre-test. Cat spontaneously used pictography as her note-taking tool in post-test, supporting the usefulness of the strategy intervention on her independent performance. The use of notes in an Oral Report is difficult to assess when pictography is used as the note-taking format due to the nature of the simple sketches and their inherent meaning to the author. However, based on the researcher’s interpretation of the notes, Cat used the majority of her pictographs in her ESS Oral Report, which was a noticeable difference from pre-test where the report was nearly independent of her notes. The increased meaningfulness of her notes, the use of pictography at post-test, and the increased organization of her Oral Report suggest a distal effect of the Sketch and Speak treatment on note-taking strategy use and independence with oral reporting skills.

**Social Validity**

Participants completed a pre- and post-intervention social validity questionnaire. The researcher analyzed participant responses through Likert ratings and responses to open-ended questions. The participant’s self-ratings are presented in Table 7 and open-ended responses are in Appendix T.
### Table 7

**Social Validity Self-Ratings by Participant at Pre-/Post-Intervention**

<table>
<thead>
<tr>
<th>Question</th>
<th>Thomas Pre</th>
<th>Thomas Post</th>
<th>Garcia Pre</th>
<th>Garcia Post</th>
<th>Cat Pre</th>
<th>Cat Post</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Student in general:</strong></td>
<td></td>
<td></td>
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<tr>
<td>1. How do you feel about yourself as a student?</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2. When I have to read high school level texts, I feel:</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3. When I have to write papers or essays, I feel:</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4. When I have to give a presentation in class:</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>5. Overall, when I consider my reading and writing, I feel:</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td><strong>Strategy Use (post only):</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>6. Sketch and Speak independence</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Comfort using S &amp; S in high school</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. How do you feel about yourself as a student after S &amp; S intervention?</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Likert rating scale values are as follows: 1 = I have a very hard time doing this by myself and need a lot of help from teachers and peers; 2 = It is pretty hard for me to do confidently and independently, but not impossible with some help; 3 = I feel okay about doing this independently, but I’m not very confident in my skills and still want help; 4 = I feel pretty good about doing this independently and think I’m okay at it with little to no help; 5 = I am able to do this independently and with confidence, with no help from teachers or peers.
**Student Capabilities**

All three participants had similar self-ratings of their abilities as a student at pre- and post-test, based on their responses to questions 1-5. All three participants rated themselves as needing at least some support (rating of 1-3) from adults or peers in writing or speaking prior to and following the intervention. Garcia and Cat also rated themselves as needing some support in reading, while Thomas rated himself higher in reading skills, stating that he felt confident in his independent reading abilities. It was anticipated that the students would perceive a difference in their overall skills as a student after completing the treatment, but their similar self-ratings suggest that the short treatment did not impact their beliefs in themselves as learners. Based on these self-ratings, there was no noticeable impact of Sketch and Speak on general student capabilities reflected in social validity responses at post-test.

**Student Perceptions of the Intervention**

When asked about the Sketch and Speak intervention post-intervention, all three participants felt confident in their ability to use the strategies independently. Thomas and Garcia reported that they could independently use the strategies learned in treatment with no adult support (rating of 5), while Cat reported that she would use note-taking and oral reporting strategies better with a little bit of adult assistance (rating of 4). Thomas commented that he would use some of the strategies, like “bulleted notes - tiny notes would use and also the repeating.” Garcia shared that he would use the treatment strategies “re-reading it - because I could write words instead of pictures; probably use pictography.” Cat expressed that she recognized the importance of “Taking my time - the little notes will be helpful and the little writing/drawing.”
All three participants had less confidence about using the strategies in the high school setting, with Thomas and Garcia reporting that they would like a little adult assistance (rating of 4) to generalize Sketch and Speak to the new learning environment. Thomas shared “In English or like Math I could use the bulleted notes (other one I don't know its name) - taking notes for a paper I guess - notes for me and then repeat and repeat and I can remember. Like studying for a test but like you study this.” Garcia said he could apply the strategies when reading: “if have to read paragraph I would re-read it and write a word from it and then say that's my sentence.” Cat indicated that she would like more adult assistance (rating of 3) when trying to use the full intervention in her new learning environment. All three participants had similar responses (rating of 3-4) about their perceptions of themselves as learners in the first 5 general questions to their perception of themselves specifically related to student capabilities with Sketch and Speak. Cat was the only participant to express an improved ability as a student in relationship to the intervention as compared to her perception of a learner in general (i.e., 3 in general, 4 for intervention effect).

**Perceptions of Telepractice**

Participants answered two open-ended questions about telepractice: “how did you feel about telepractice?” and “what would you tell others about telepractice?” at post-treatment (Appendix T). All three participants reported that they felt okay about the telepractice experience. Cat and Garcia expressed that they enjoyed learning via telepractice for the convenience of being at home and the use of technology. Garcia said “It feels good, can just be at home.” Thomas had a slightly different opinion about telepractice, saying “It was good, we had some tech difficulties, but it was good I think.
A weird experience writing on a tablet!” He also stated that he felt that it took longer than it would have to complete tasks on telepractice than in person because of the short lag in response times and technical issues. All three participants reported that they would tell other students to do the treatment, but Thomas felt he would have liked the treatment better with in-person delivery.

**Parent Perceptions of the Intervention**

A parent or guardian viewed a treatment video excerpt and completed the post-intervention questionnaire for all three participants. All of the parents reported noticing a difference in their child’s ability to understand the information, to use information appropriately, and commented on their confidence in reporting. Parent responses can be found in Appendix U.

**Thomas.** Thomas’s parent rated him as mostly independent as a learner and with reading and writing at pre-test, giving him a score of 4 in each area. At post-test, after watching the video, Thomas’s parent said “I enjoyed watching the activity. I am impressed with the amount of facts Thomas remembered. I definitely see the benefits in this activity.” Thomas’s parent said they would like him to continue using the strategies in high school, stating “I think Thomas did well with this type of organization to help speak & I think Thomas will succeed in public speaking if he continues to use this tool.” Thomas also reported to his parent throughout the study that he was enjoying the activities. His parent also reported that he had a positive attitude about attending sessions.

**Garcia.** Garcia’s parent reported at pre-test that Garcia needed a lot of support as a learner and with reading and writing skills (ratings of 2). At post-test, his parent reported that they could see a big difference in the amount of information he presented
and in his confidence in reporting, commenting “I listened to his voice/speech. He started out not being sure of his sketch, to refining his sketch and delivering a very confident oral report video.” The parent also commented on his attitude toward the treatment study, saying “Garcia started out as a Debbie Downer. I reminded him that the program was to help him if he wanted. His commitment to finish til the end mattered. Yes, on occasion, I had to redirect his attitude. I also emphasized the reward of the tablet ‘that he earned’. Garcia finished the program strong and very confident in his abilities to earn a reward.”

Cat. Cat’s parent reported at pre-test that they felt Cat was independent as a learner (rating of 4), but that she struggled with reading and writing (rating of 2). Cat’s parent watched many of the live treatment sessions and reported that this was a strategy that Cat could easily use independently in high school. At post-test, Cat’s parent commented that “she was getting more information than she usually did” through the use of strategies. Cat was already implementing the strategies outside of the treatment study and her parent commented that the alternative way of learning really made a difference in her performance and understanding.

**SLP Perceptions of the Intervention**

Due to the exploratory nature of this task, brief comments from the discussions are used to support the potential of *Sketch and Speak* as an intervention in high school. All four of the SLPs who participated in the social validity tasks reported being impressed with the student’s performance in note-taking and oral reporting skills. They expressed interest in learning more about the intervention because of the lack of high quality, easily applied interventions available to them working in the high school setting. Thomas’s SLP reported that he really liked the applicability of the strategies to all
academic areas without feeling like “another thing he had to learn” or a package intervention that would eventually go by the wayside. Garcia’s SLPs reported that watching the video was the most they had seen him talk across settings and meetings they had with him in the first month of school – they were impressed with how much information he shared! Cat’s SLP reported that she could easily see herself supporting Cat to use these strategies in other settings and hoped that it would continue to benefit Cat in the higher-level courses of high school. All of the SLPs expressed a need for continued exploration and evidence for this intervention at the high school level.
CHAPTER V: DISCUSSION

This multiple baseline across participants single-case experimental study investigated the effects of an expository intervention on Oral Reports and Short-Answer Recall tests when used with adolescent students with language-related learning disabilities. The intervention was intended to improve student comprehension and expression of grade-level expository texts through explicit strategy instruction in note-taking and oral practice. Three participants between the ages of 14-15, pseudonyms Thomas, Garcia, and Cat, participated in the study during the same six consecutive weeks of the summer in 2021. Outcome measures in each session consisted of Oral Reports and Short-Answer Recall questions about a text. Notes from each session were also scored for Quantity and Quality.

Though not typically part of a single-case design, participants also completed pre-/post-intervention activities to examine the potential effects of treatment on a distal expository task and explore the meaningfulness of this intervention for older students. Pre-/post-intervention measures included a distal SALT Expository task and a social validity questionnaire for the students. Parents and each participant’s new SLP at the high school level also completed social validity tasks. All participants made significant and clinically relevant gains in Oral Reporting skills and note-taking strategy use on Guided Session Tests in treatment. All three participants also had significantly improved Oral Reports during distal measures of performance at post-test, which can reasonably be attributed to explicit instruction in the treatment phase. Short-Answer Recall measures did not demonstrate an effect of treatment. Social validity outcomes support this as a useful tool for students in this age group and a potential intervention tool for SLPs to use.
in the high school setting. This discussion is organized by outcome measure with notes about each participant embedded in each section.

**Oral Report**

Oral Reports were collected in all session tests. All three participants had a significant effect of treatment on Oral Report quality based on performance in Guided Session Tests in the treatment phase. Thomas and Cat had 0% overlapping data between baseline and Guided Session Tests, which demonstrates the improved quality of Oral Reports as a result of treatment. Garcia had two higher-quality reports in baseline, which made his treatment effect harder to detect through visual analyses. His higher scoring Oral Reports were both about animals and he included more details from the text which could have been impacted by his interest or previous knowledge in the topic. Garcia also had a direct oral reporting style with few mazes and extraneous comments which earned a higher Oral Report score across phases. Though the effect of treatment is not as prominent for Garcia’s Oral Reports, all three participants improved in Oral Reports with more article information, grammatically correct sentences, and familiarity with the topic in Guided Session Tests.

To examine potential generalization of skills, Independent Session Tests in baseline were compared to Independent Session Tests in the treatment phase. Due to the nature of the Independent Session Tests occurring throughout the treatment phase, strong effects of treatment on generalization were not expected until near the end of the study when the participants had time to learn and practice the strategies. Garcia and Cat had similar Oral Report performance in Independent Session Tests across phases. Thomas’s Oral Report quality improved in Independent Session Tests in the treatment phase,
though this improvement is not significant based on visual analyses. The low-to-null effect of treatment on Oral Reports in Independent Session Tests in the treatment phase is not surprising given the increased cognitive demand on remembering details from the article and applying newly learned strategies without scaffolded instruction. Participants delivered their Oral Reports in all session tests without the use of notes, which may have resulted in lower fluency of reporting. The increased cognitive demand would likely have had an inverse effect on fluency, which may have led to a lower Oral Report quality overall.

One challenge was capturing the quality of the free recall oral reports with the oral report rubric. The oral report rubric was revised several times during the scoring process to improve intra-rater reliability on this task, which is more subjective than the other outcome measures in this study (Appendix C). In the final rubric, the information score was doubled to better reflect the importance of including factual information in a report, which was explicitly taught during the treatment phase. Previous iterations of oral report scoring for Sketch and Speak used a more holistic approach to scoring that lent itself well to agreement between raters on a broad scale. The revisions to the rubric for this study were an important step toward creating a more objective rating of oral reports. Along with the doubled information score, this rubric included scores for fluency of reporting, use of filler words and abandoned utterances, and organization of information to help reduce the natural tendency of scorers to rate longer reports as better when they may not have included as much correct information as a shorter report.

All three participants included more correct information in Guided Session Tests than in Independent Session Tests in baseline with less use of filler words, abandoned
utterances, or incorrect information. The Oral Report quality in Guided Session Tests was lower than expected due in part to the fluency scores. Fluency scores were impacted by the participants’ use of mazes, abandoned utterances, self-comments, and pauses in the report. The increased demand on memory when reporting without notes often resulted in longer pauses and more disorganization of reports, even in Guided Session Tests. During reports in Guided Session Tests, participants would ask to start their report over, use observable rehearsal strategies like lip movement or counting, and would comment about forgetting material. These behaviors showed an awareness of the material and the intervention strategies even with increased cognitive demands on memory. In contrast, during reports in Independent Session Tests in baseline, the mazes and pauses were often filled with self-talk or extraneous comments that did not come from the expository text or add meaningful information to the report.

**Short-Answer Recall**

Overall, there was no effect of treatment on Short-Answer Recall scores for any of the participants. Though the questions were developed systematically to be similar across topics and text areas, checked for clarity and difficulty by a trained graduate assistant, piloted with similar-aged students, and revised several times prior to this study, they were not sensitive enough to measure the improvements in student performance as a result of treatment. Tau-U calculations revealed a statistically significant difference from Independent Session Tests in baseline to Guided Session Tests for Garcia, though the visual analysis does not suggest his performance differed across phases. It is common for a statistical analysis to reveal a stronger effect of treatment than visual analysis in single-case designs (Yucesoy-Ozkan et al., 2020).
A potential reason for the lack of treatment effect on Short-Answer Recall responses across participants could be attributed to the variable performance in baseline for all three participants. For baseline, the planned distraction activity between reading the text and answering the questions was abandoned due to technological difficulties. Participants could not maintain the distractor activity and Zoom call on their tablet, creating potential for a recency effect whereby participants were able to store accurate information in working memory from the articles. It is also possible that the participants remembered more information from topics of interest across phases, independent of session type. To examine a potential effect of topic on test performance, the researcher compared Short-Answer Recall scores for each participant across Session Test types. None of the Short-Answer Recall scores were unusually high or low independent of test type based on these preliminary comparisons. Guided Session Tests generally had higher scores than Independent Session Tests, which would be expected based on the increased instruction on the topic even though scores did not reveal a treatment effect.

During treatment, participants may have self-selected information for notes and oral reports that did not directly answer the comprehension questions. A primary example of how student choice of important or interesting ideas could lead to a null effect of treatment on Short-Answer Recall responses is the vocabulary word (i.e., question six on each test). If the participant did not choose to use the vocabulary word in their oral report, then they may not have remembered the word at all when asked for a definition in the session test. Though the researcher highlighted the vocabulary word in the treatment phase, it was not explicitly taught and participants were not required to use the word in their independent oral report. In the ninth grade-level expository texts developed for this
study, there may have been several words that the students were more familiar with after treatment but were not the chosen vocabulary words for the short-answer test. This preliminary test of the short-answer questions provides insight into how to revise the questions or focus of instruction on instructor-chosen important ideas for future studies to better reflect the effects of treatment.

**Notes: Quantity and Quality**

Participants created notes about an expository topic in all sessions. The different session test types (baseline, guided, and independent) refer to the level of instruction provided on note-taking strategies. In baseline and independent session tests, participants received no direct instruction on how to take notes. The guided session tests were administered after participants completed two sessions of note-taking instruction on the same topic. The note quantity and quality scores are based on the bulleted notes the participants generated in the second treatment session of each picto+notes session pair. These outcomes are a secondary outcome measure of the intervention and not a measure of intervention efficacy. Note quantity and quality scores provide valuable information on strategy use before treatment (baseline), as a result of instruction (guided session tests), and as generalized by students in independent session tests on a novel topic.

**Note Quantity**

The secondary outcome measure of note quantity was a meaningful comparison of the number of distinguishable notes participants created about each topic. All three participants had significantly more notes in the guided session tests than in baseline sessions, which was an expected result of the instruction. Thomas and Garcia had a limited change in note quantity score from baseline to independent session tests, which
could be due to pre-study capabilities with note-taking, reduced self-direction or attention to tasks, or a desire to complete tasks quickly. Across baseline and independent session tests, Thomas had an average note quantity score of 5 and Garcia had an average of 4, suggesting that there was no immediate generalization of strategy use for either of these participants.

Cat, however, had a significant difference in note quantity from baseline to independent session tests. The difference in her performance could have been due to her new understanding of how to take notes independently after treatment. It is also a notable that she chose to use pictography or sticky notes during self-directed sessions prior to independent session tests, which markedly improved her number of decipherable. Cat used pictography independently to take notes that supported her learning for three of the independent session tests with 7-8 decipherable notes in each session.

**Note Quality**

Note quality was scored on notes from all session tests. Explicit strategy instruction on note-taking, scaffolded throughout the intervention, had a direct impact on the participants’ understanding and use of two different notation forms. In the first session of treatment with a text (i.e., odd-numbered sessions), participants were instructed to take pictographic notes on a topic. Though the scaffolding and instruction was reduced throughout the treatment, with each new text participants first took notes with pictography. In even-numbered sessions, participants transferred their pictography notes to bulleted notes prior to the guided session test. Notes for the odd-numbered sessions were not scored for quantity or quality. It is difficult to determine the level of independence across sessions due to the nature of the session procedures (see Table 2,
presented earlier). Though the structure of the treatment may be a confounding variable in performance due to the nature of scaffolding, there is a visually obvious effect of treatment on note quality in guided session tests for all three participants.

At the beginning of odd-numbered treatment sessions, participants were asked to independently take notes on a novel topic prior to independent session tests. These independent session tests were designed to examine effectiveness of note-taking instruction and to allow for data collection in all sessions. There was no significant difference in note quality for Thomas or Garcia when comparing independent notes in baseline and independent session tests based on visual analyses or holistic ratings of performance.

Thomas’s notes prior to independent session tests are similar to his baseline notes, though he has shorter key word notes and more information in each category of the note form which could hint at a generalization of strategies (Figure 6). Thomas also frequently commented in independent session tests that he could not remember specific information when giving his oral report because he hadn’t written down the topic or other important information. These comments further suggest that he was aware of the usefulness of taking specific notes, even though he did not always use the strategies independently.

Garcia’s notes from independent session tests, though not significantly different from his baseline notes, have shorter phrases with more decipherable handwriting and notes in each category of the form (Figure 7). It is possible that if participants had been able to use their notes during the oral report portion of session tests, their note quality scores would have been more sensitive to a treatment effect.
Figure 6

*Thomas's Notes Across Session Test Type*

<table>
<thead>
<tr>
<th>Topic</th>
<th>2-Column Animal Notes</th>
<th>2-Column Animal Notes</th>
<th>2-Column Animal Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group &amp; Location</td>
<td>Axolotl Location Mexico</td>
<td>Tropical Forest South Asia</td>
<td>Orchid Mantis Flowers</td>
</tr>
<tr>
<td>Habitat</td>
<td>Water</td>
<td>Flowers</td>
<td>Flowers</td>
</tr>
<tr>
<td>Appearance &amp; Behavior</td>
<td>Pink/White Kind Looks</td>
<td>They can be Pink Brown</td>
<td>They can be Pink Brown</td>
</tr>
<tr>
<td>Food</td>
<td>Tastes like fish the bottom with legs</td>
<td>Musc Butterflies</td>
<td>Musc Butterflies</td>
</tr>
<tr>
<td>Special Characteristics</td>
<td>It can regrow legs</td>
<td>They can camouflage</td>
<td>They can camouflage</td>
</tr>
</tbody>
</table>

*Note.* A) Baseline 2 - Axolotl, B) Independent 5 - Orchid Mantis, C) Guided 10 – Legos
Figure 7

Garcia's Notes Across Session Test Type

### A) Baseline 4 - Hammock

<table>
<thead>
<tr>
<th>Topic</th>
<th>Uses</th>
<th>History</th>
<th>Description</th>
<th>Manufacture</th>
<th>Interesting Information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pay on it in summer</td>
<td>We in war</td>
<td></td>
<td>Fabric</td>
<td>In the arm</td>
</tr>
</tbody>
</table>

### B) Independent 5 - Bubble Gum

<table>
<thead>
<tr>
<th>Topic</th>
<th>Uses</th>
<th>History</th>
<th>Description</th>
<th>Manufacture</th>
<th>Interesting Information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Chewning</td>
<td>100 Year's Age</td>
<td>Flavor</td>
<td>Voo</td>
<td>Pink</td>
</tr>
</tbody>
</table>

### C) Guided 8 - Jim Thorpe

<table>
<thead>
<tr>
<th>Topic</th>
<th>Early Life</th>
<th>About the Sport</th>
<th>Professional Highlights</th>
<th>Other Accomplishments</th>
<th>Fun Facts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1887/1901</td>
<td>Football</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. A) Baseline 4 - Hammock, B) Independent 5 - Bubble Gum, C) Guided 8 - Jim Thorpe
Cat had the most noticeable difference in independent note quality. In three of the five note-taking opportunities prior to independent session tests, she chose to use pictography as her primary notation method. Her indecipherable handwriting and overlapping notes in baseline (Figure 8) made pictography a more functional form of notes for her to use. Cat’s independent use of pictography and sticky notes (Figure 7, C and D) greatly improved her note quality. The quality of her oral report in these sessions was also improved over the other independent session tests, potentially as a result of her more meaningful notes guiding her memory of correct information from the text. Her note quality scores may have been more sensitive to treatment effects if she had been able to use her notes during the oral report, especially when she employed pictography and sticky notes independently.

In two of the five non-taught sessions, Cat used her indecipherable hand-written notes instead of pictographs, reducing her quality score to near baseline performance. The reasons for this change in behavior can only be hypothesized by the researcher. In the first session it may have been unclear to her that she could use the note-taking strategies from treatment. In the last session, it is possible that Cat was distracted by a family member in her environment or less-motivated to complete the treatment as the study concluded. It is clear from the difference in scores that when she was motivated and engaged, Cat understood the functional use of pictography as a note-taking tool that could help her be more independent with accessing complex expository text information.
Figure 8
Cat's Notes Across Session Test Type

Note. A) Baseline 1 - Axolotl, B) Independent 3 - Cassowary, C) Independent 4 - Inca, D) Guided 2 - Mia Hamm
Pre-/Post-Intervention Outcomes

*SALT Expository Task – Distal Measure*

Participants completed a distal measure of note-taking and oral report performance using the semi-standardized expository task from SALT. The oral reports for this task are scored with the Expository Scoring Scheme (ESS). All three participants demonstrated improvements in their note-taking skills and oral report performance at post-test. Participants were allowed to use their notes when giving the oral report in the SALT task at both pre- and post-test, which is different from the Session Tests that were administered during intervention and may have led to more information and more fluent reports at both time points. Though different than the intervention, the use of higher-quality notes and inclusion of more relevant information at post-test may further support the generalization of strategies to this distal measure.

At post-testing, Thomas had shorter notes with more information in each note that led to a stronger Oral Report. Both his Note Quantity and Quality scores improved on the *Sketch and Speak* note rubric ratings. When using the Note Quantity and Quality rubric to score notes, the researcher noted that at post-test his oral report was more fluent and included more details and use of category names as sentences instead of prompts. He also had fewer instances of extraneous speech in post-test and improved in overall performance, indicating that he was generalizing some of the skills he learned in treatment to this distal task.

Garcia used more detailed notes and fewer acronyms at post-test than at pre-test. Though he only used one note in each category at both pre-/post-intervention time points and had the same note quality score, his brief notes led to better oral report performance
post-intervention. Garcia used the note categories more functionally, provided more information about the game instead of saying “I don’t know about that” or saying the note categories as independent sentences, and had a longer and more fluent oral report at post-test.

Cat chose to use pictography post-intervention, which was a significant improvement over her parent-scaffolded notes at pre-test. Her pictography notes were easily identified, guided her report more, and were greatly improved in both quantity and quality based on the Sketch and Speak rubric. Her oral report was more focused, longer, and had more information in it at post-test than at pre-test and included an opening and closing statement. Though this was a preliminary test of this distal measure, the performance of all three participants at post-test supports the generalization of skills from treatment into independent, distal note-taking and oral report tasks.

**Social Validity**

Participants, parents, and high school SLPs completed social validity questionnaires or brief interviews to help the researcher explore the importance of this intervention at the high school level. All three groups noticed differences in performance, discussed usefulness of the strategies outside of the treatment, and commented on satisfaction with the study overall. Participants mentioned specific strategies like bulleted notes, saying sentences aloud, using pictography and sticky notes, and creating full reports from notes as being meaningful tools for them as learners entering high school. Parents and SLPs watched short video clips of the participants that demonstrated a portion of the treatment session and ended with an oral report. Both groups commented on the improved confidence of the participants and how much they shared about the
topic. All SLPs expressed interest in learning more about the intervention and researcher-coaching of use, highlighting a need for evidence-based practices in the high school level.

Making Sense of Learning Across Learners

Researcher notes and observations support clinically relevant gains for all three participants that may not have been evident in the outcome measures due to the challenging research context and controlled nature of an experiment. Each participant benefitted from the explicit instruction in different ways, which are an important part of the story of this intervention for older students.

For Thomas, there was a noticeable difference in his attitude toward the activities in the first session of treatment after baseline. Thomas moved into treatment first, in part due to the researcher’s perception of his lower tolerance for baseline activities. After moving into treatment, Thomas’s interactions with the researcher in the sessions were more animated and he was actively participating in the activities with more energy. His sessions were often noticeably longer than the session duration for the other two participants because he asked informed follow-up questions about the topics, took his time to make each note distinct and decipherable, and independently rehearsed sentences more than once without the researcher cueing him to do so. When Thomas forgot to write information down during non-taught probe tasks, he would state in his report that he would have had a better report if he had written down information like the topic of the report. He also had noticeable practice of his full oral reports during the note review time prior to the probe tasks in the majority of taught/non-taught treatment probes with lip movements and some audible whispering. This is a clinically significant change in his behavior from baseline probes where he did not demonstrate an overt rehearsal of the
information. In the final social validity meetings, Thomas thanked the researcher for working with him and helping him learn which is significant since he was giving up his early summer mornings to participate in the study with sessions starting at 8am.

Garcia also made clinically relevant gains in following the structure of the study and recall of information. In the initial study activities, Garcia was quick to say “I don’t know” or skip over details that he didn’t immediately remember. During even-numbered treatment sessions when rehearsing his full oral report from pictography notes, Garcia often said “I don’t remember what that one is” and would skip the note or wait for the researcher to fill in the information for him. When the researcher responded with simple prompts and did not give him the information readily, he actively changed his behavior to remember the information. His disinterested or apathetic behavior significantly decreased throughout the treatment sessions when he was encouraged to remember the information without the researcher telling him the answer. In later sessions, Garcia would pause or state that he couldn’t remember the note, but would then overtly cue his memory of the information by returning to the note later or repeating the sentence for the previous note. This is a clinically relevant behavior that demonstrates the importance of oral practice on increasing his confidence as a speaker and his ability to remember the facts from the articles. Though his desire to do note review prior to his oral reports did not change, with little to no overt rehearsal before any probe tasks, the benefit of oral practice was evident when he stopped himself mid-report to include information he had “skipped”. During the final social validity conversations, Garcia also talked about specific topics he learned in treatment in a way that demonstrated mastery of the information. For example, throughout the treatment sessions, Garcia referred to the famous person Jim Thorpe as
Jimmy T, potentially to save himself time or to reduce the seriousness of the study demands; however, during the social validity questionnaire he specifically mentioned that he enjoyed learning about Jim Thorpe.

Cat’s clinically relevant gains are apparent in her note-taking and oral reporting skills starting with the first treatment session. Cat’s indecipherable handwriting and her ability to remember specific information related to a note were significantly altered with the introduction of pictography as a strategic tool. Cat was a very verbally fluent presenter, though she abandoned sentences, added incorrect information, or added filler words like “and stuff” to the end of sentences. The addition of these filler words made her reports feel cohesive, but added very little information and often covered up the fact that the information in the sentence was either incorrect when compared to the article or a repetition of information she had already shared. In the first few sessions of treatment, Cat changed the sentences related to each note nearly every time she was asked to repeat herself. It is difficult to discern whether this is a compensatory behavior or an indication of a low verbal working memory where she cannot repeat her sentences verbatim. Changing her sentences each time was a difficult behavior for her to change and a lot of scaffolding and instructor prompts were required to get her to repeat the factual, grammatically correct sentence she had initially used without a researcher model.

As the treatment continued, Cat was better about remembering the information that went with each note and she required fewer researcher prompts to produce her oral report from her notes. Cat’s reports were longer when she was using her pictography notes than when using bulleted/sticky notes on the same topic, potentially due to the increased cognitive demands of spelling and typing reducing the amount of information
she included in the sticky notes. Oral practice from notes of both forms also significantly reduced Cat’s use of extraneous comments and filler words and phrases. During her taught oral reports, if she forgot information or could not produce the whole thing fluently, she would ask to start the report over or cue herself to the information by repeating part of the report. This was noticeably different from her baseline behavior of adding non-related information or repeating the same ideas multiple times in a different format.

**Telepractice**

The telepractice service delivery offered both benefits and challenges for this intervention. One of the primary benefits of delivering the treatment remotely was obviously the completion of an intervention study during the COVID-19 precautions for in-person research. Re-creating the materials to allow for live editing with shared screen capabilities during a Zoom meeting with video and audio recording led to a host of unexpected new skills for the researcher. Many of the tasks for transferring information online happened prior to the pilot study. Revisions to the type of files and presentation were made prior to the study when needed, which made the pilot study even more beneficial. Many of the technical challenges included low bandwidth of internet during sessions, difficulty with shared screen and concurrent Zoom video recordings of the participant and researcher, and lag in the response time for explicit feedback. These issues were mostly unavoidable, though the importance of internet “health” and reduced demands on the internet during a session cannot be understated. From a clinical perspective, the lag in feedback time and prompting was difficult to navigate. Participants and the researcher often spoke at the same time and the amount of prompting to repeat
full sentences or oral reports was difficult to reduce in later sessions due to the lag in response time. The nature of a telepractice intervention, while it provides a feasible alternative to in-person intervention, also creates its own drawbacks in lacking the personal interaction and real-time explicit feedback that is so crucial to strategy intervention.

Though not specifically limited to the telepractice delivery, the use of tablets to take notes on a shared screen instead of a paper and pencil note form like in previous studies of Sketch and Speak also created a host of benefits and drawbacks in this study. The use of paper and pencil, or even a tablet and stylus like in this study, during in-person sessions allows for a better match between student need and instructor support, along with real-time explicit feedback on strategy use. The use of a tablet and stylus with the technology-friendly format could easily be used in-person to facilitate student use of devices and potentially encourage generalization to other classes where notes are taken on an iPad or computer instead of with paper and pencil.

The downside of using a tablet and stylus in this study was primarily a result of the small, shared screen and need for multiple applications to be running simultaneously for data collection. If participants were only taking notes on their tablet instead of also trying to follow along with the researcher and the article or transferring notes from one form to another without the Zoom screen also showing, the use of the stylus and tablet may not have been so difficult. Participants in this study were tasked with multiple screens open on an eight-inch tablet, which made taking notes within the note form difficult. The size of the note forms, text size for the shared articles, and small writing space for the notes may have also impacted some of Note Quantity and Quality scores.
Sometimes, the participants could not get their stylus to write or were using their finger to complete the pictography, which could have led to some overlap in the pictures. Further, when their handwriting went outside of the boxes or was unintelligible because of space issues, their note quantity or quality scores could have been impacted in ways that would not have otherwise been true if writing on a piece of paper or a device with a larger screen. Though the benefits of using technology in this intervention for explicit strategy instruction are emerging, there remains a lot to be learned about how to best implement this intervention in student-friendly ways.

**Internal and External Validity**

Internal validity is commonly defined as the way a researcher can demonstrate a cause-effect relationship between the intervention and the change in behavior. In single-case designs, there are several threats to internal validity that researchers must be aware of when planning a study including: participant maturation, history, coincidental events, instrumentation, and testing. This study controlled for participant maturation by competing the study within the same six-week window for all participants. The study attempted to control for history through the use of researcher-developed expository texts that would most likely be unfamiliar to an adolescent student. To address the threat of coincidental events, texts were counter-balanced by topic across tiers (Table 3 presented earlier). By assigning texts to different session types and presenting them on different days for each participant, this allowed the researcher to control for events outside the study (e.g., a field trip to the zoo to see unusual animals) influencing participant knowledge. By presenting session tests only one time per topic and testing only once in each session, the researcher controlled for the threat of testing. Instrumentation may be
the biggest threat to internal validity as all of the treatment and testing materials were created by the researchers and have not been validated outside of the study.

Another component of internal validity is creating a replication of treatment effect across tiers. In this study, the effect of treatment on Oral Reports and Note Quality was demonstrated across participants to provide preliminary evidence for the use of this intervention with adolescents. The demonstration of a treatment effect across participants provides insight into how this intervention may be applied to a similar population in a similar setting. In this study, adolescents with LLD were provided with one-on-one instruction via telepractice, from a researcher/interventionist who was well-versed in the intervention. Due to the level of control and internal validity of the study, one could expect that the outcomes of this study are externally valid for students of a similar population using Sketch and Speak intervention with the same level of fidelity.

Limitations

Methodology

The design of this study meets the What Works Clearinghouse standards of high-quality single-case design research “with reservations” (v. 4.1, WWC, 2020). The current WWC standards recommend at least five baseline points for each participant to meet standards without reservations, so the pre-determined start points with only three baseline sessions for the first participant only meets standards “with reservations”. The baseline phase lengths of three, six, and nine sessions were determined a priori due to the amount of time available in the summer to complete the study, the potential for boredom in baseline sessions, and potential testing effects whereby participants would improve on outcome measures through repeated opportunities. The baseline lengths were determined
to best adhere to the WWC standards of overlapping data points that provide evidence of a treatment effect on participant behavior. A limitation of this study design involved two decisions that occurred after the baseline session plan was set. One was the lack of data collection in the first treatment session, reducing the overlapping data points to two prior to another phase change. The other was that the use of Independent Session Tests for generalization of strategy use in the third treatment session reduced the number of Guided Session Tests overlapping baseline to one. Despite these design weakness, beneficial effects of treatment on Guided Session Tests is replicated across participants on Oral Reports and secondary measures of Note Quantity and Quality across participants.

Though ideally SCD studies aim for a stable baseline prior to moving into the treatment phase, all three participants had a lot of variation in their baseline performance across outcome measures. Participants were moved into treatment through data-driven decisions of baseline tolerance. Variation in baseline scores could be attributed to previously learned strategies and the participant’s interest level in different topics. Despite the variable baseline performance, there are clear treatment effects on Oral Reports and Note Quality for all three participants from Independent Session Tests in baseline to Guided Session Tests in the treatment phase. The Short-Answer Recall responses did not show an effect of treatment, which could be due to methodological factors related to the outcome measure itself.

*Telepractice*

The primary limitations of the telepractice delivery were the lack of device capability for a distractor activity between the Independent Strategy Use tasks and
Independent Session Tests. Other limitations of bandwidth, small screen size, and implementation of this intervention in a virtual format were discussed in-depth in the previous telepractice section. The telepractice delivery introduced a host of challenges that likely reduced the impact of the treatment on the outcomes.

**Contributions to the Literature**

This dissertation contributes to both the larger literature on interventions for adolescents with LLD and the *Sketch and Speak* intervention research base in meaningful ways. Efficacy data from the controlled experimental design, along with the preliminary social validity measures of this study, suggest that this treatment is effective and can easily be used by adolescent students entering high school. All three participants had significant effects of treatment on their Oral Reports and Note Quality measures in the Guided Session Tests. Oral Reports and Note Quantity and Quality scores were also improved at post-test on the distal outcome SALT Expository task, which can reasonably be attributed to strategies learned in treatment.

This is the first study of *Sketch and Speak* with adolescent students and the first delivered via telepractice – providing evidence to support using the intervention for both the population and delivery style. This study also looked at the benefits of the intervention in different ways than the previous studies. One important difference was the expectation for participants to produce their Oral Report without the use of their notes in both Guided and Independent Session Tests. By disallowing notes for reports, there were more demands on student memory and organization of information than in previous studies and the effects of treatment were significant. Thomas’s Oral Report scores were significantly better during Independent Session Tests in the treatment phase and can be
attributed to the intervention and awareness of expectations of informational reporting. Cat’s use of pictography in the Independent Session Tests during the treatment phase demonstrates her buy-in for the use of these strategies and supports the use of pictography with students who may be aversive to hand-written notes. This study further builds upon the previous studies of *Sketch and Speak* intervention by providing meaningful data on the impact of guided strategy use on student performance. In both of the previous studies (Peterson et al., 2021; Ukrainetz, 2019), the impact of guided instruction on oral report performance was measured primarily through SLP reflections and clinical observations. This study directly measured the impact of intervention on Oral Reporting skills and use of note-taking strategies through Guided Session Tests in the treatment phase.

This was also the first study to test the potential carryover of strategies and learning into a distal expository task through the distal SALT Expository task at post-test. Improvements in performance at post-test can be reasonably attributed to the intervention, especially in the area of note-taking. Two participants had improved Note Quantity and Quality of notes at post-test with one participant using pictography. The third participant, Garcia, had clinically relevant improvements, though the note rubric was not sensitive enough to the changes to show a difference in post-test performance. All three participants had improved Oral Reports at post-test with more information, better organization, and more fluency in reporting. Though the participants did not improve to a level of reporting within the average range of their typically developing peers, they all improved more than one standard deviation from their pre-test reports.
This improvement on Oral Reports produced during the distal SALT Expository task can also be reasonably attributed to the intervention.

This study also adds to the literature on expository discourse interventions that are well-suited for SLP use with adolescent students who have LLD. *Sketch and Speak* is a strategy intervention that provides SLPs and their students with tools that can easily be used across academic settings in post-elementary grades. The two different types of note-taking and oral practice with explicit instruction from an SLP can be applied to a variety of topics. SLPs working with students who have language disabilities are uniquely suited to teach students to use systematic oral practice of discourse in one-on-one or small group settings. Oral practice of sentences and full reports can allow SLPs to capitalize on a student’s oral language skills to improve overall comprehension and expression of academic materials. Because this strategy intervention does not necessarily require specific materials outside of a way to take notes, SLPs could help students to use strategies in different expository texts and settings. Strategy interventions in general have a large support in the literature with teachers and other educators being encouraged to provide explicit instruction on strategies across the grades. Given the limited scope and availability of discourse-level interventions that SLPs have access to in later grades (Peterson et al., 2020), this study provides evidence of *Sketch and Speak* as a meaningful intervention for adolescent students.

In the broader literature, much work has been done to demonstrate the effectiveness of strategy intervention on learning. Research in note-taking for students with a variety of learning abilities supports explicit instruction across the grade levels (Arnold et al., 2017; Boyle, 2012; Kobayashi, 2005, 2006; Piolat et al., 2004; Ponce et al., 2020). Studies of
oral practice have also shown that this is a meaningful study strategy to improve comprehension and expression (Leonard et al., 2019; McDaniel et al., 2009; Olszewski et al., 2017; Peng & Fuchs, 2017). To the researcher’s knowledge, there are no other interventions that combine explicit instruction on notes and systematic oral practice strategies into a procedural whole like Sketch and Speak. Combining the well-researched strategies of note-taking and oral practice, Sketch and Speak is a unique intervention that has potential to improve student comprehension and expression of expository discourse. This study provides evidence of the positive impact of this intervention for adolescents with LLD through statistically significant differences in performance on Oral Reports and Notes in Guided Session Tests. The reasonably attributed effects of the treatment can also be seen in the SALT Expository scores on Oral Reports and Note Quantity and Quality. Though this study was carried out with only three participants in a new setting and only allows for limited conclusions, it provides a strong base for future research with this intervention, population, and setting.

**Clinical Implications** This study shows that adolescent students with LLD can be taught to take meaningful notes use systematic oral practice of sentences and reports to improve their comprehension and expression of information from grade-level expository texts. Explicit instruction on these strategies is reasonable for SLPs working with adolescent students. The core elements of *note it simply, say it fully and say it again* can be easily applied to a variety of subject areas and learning opportunities. This controlled research study with six repetitions of the two-session paired instruction may not be feasible for the SLPs or students in a high school setting. Though necessary for demonstrating efficacy of the intervention, instruction on six topic areas in 12 45-minute
one-on-one sessions is not a realistic treatment plan for SLPs working in the schools. Once the core strategies are learned in treatment and students are familiar with the usefulness of pictography, bulleted notes and oral practice, Sketch and Speak can be easily applied to new topics without the repetitive paired sessions. Two previous publications explore the clinical usefulness of Sketch and Speak with students in late elementary grades with speculation of how the core can be applied to many areas in adolescent intervention (Peterson et al., 2021; Ukrainetz & Peterson, 2021). This study provides evidence for Sketch and Speak instruction for adolescents. Responses to the social validity questionnaires suggested that the participants felt more successful as learners after explicit instruction on the strategies. Their responses suggested they could see ways to apply the intervention in the high school setting. Social validity responses from the high school SLPs reinforced the ideas of clinical application, usefulness, and excitement about an intervention targeting expository discourse that were expressed by the SLPs in the first exploration of this intervention (Ukrainetz, 2019). In the three studies of Sketch and Speak to date, SLPs have expressed excitement about the intervention itself and how easily it can be applied and learned. SLPs learn the strategies quickly and can see the benefits of instruction on student performance soon after implementation. This study demonstrates the potential benefits of Sketch and Speak for older learners as evidenced in the improved performance on Guided Session Tests data of Oral Reports and secondary Note Quantity and Quality outcomes. Further, it provides evidence of the potential for Sketch and Speak as a clinically meaningful intervention and hints at the possibility of adolescent student ownership of the strategies.
Future directions

Though the results are relatively limited with hints of efficacy and effectiveness, this study adds considerably to the research base of Sketch and Speak as an expository treatment for students with LLD. The hints of efficacy may be strengthened in future studies of this intervention with further development of the measures used to demonstrate the outcomes. This study did not involve coaching students to fully use the strategies independently and added to the cognitive demands by disallowing notes during oral reports, which may have negatively impacted the outcomes. Using notes to support oral reports may be more realistic to class expectations at the high school level and could be further explored with this population. Further exploration of Sketch and Speak for older students is warranted to inform evidence-based practice for high school students with language-related learning difficulties.

The use of electronic devices in this intervention is a new delivery method, independent of telepractice delivery. This is important as many students are tasked with using iPads or other computers to complete assignments for courses throughout the grades. Exploring use of Sketch and Speak with in-person service delivery and use of an electronic device with shared screen capabilities may offer both SLPs and students an easy way to use their new strategies across settings with minimal scaffolding from an instructor.

The pilot use of the SALT Expository task as a distal measure and the improved performance of all three participants at post-test suggests that this is a relevant tool for future studies to examine strategy generalization and efficacy. Finally, the social validity components indicate that more work is needed in this area to best support students, their
families, and the SLPs who are doing important work with adolescents who continue to need their services. The development of a treatment manual that can be used and adapted easily by SLPs will be an important next step in this research line.

Conclusion

This multiple baseline across participants single-case experimental study investigated the effects of Sketch and Speak expository intervention on comprehension and expression for adolescent students with LLD. Three students participated in baseline tasks and 12 one-on-one sessions of treatment via telepractice in the summer of 2021. Data was collected through Oral Reports and Short-Answer Recall questions in Guided and Independent Session Tests. Secondary data of Note Quantity and Quality was also collected for all session tests. All three participants had meaningful gains in their Oral Reports, Note Quantity, and Note Quality scores from Independent Session Tests in baseline to Guided Session Tests in the treatment phase. One participant also significantly improved performance in note-taking strategy use in her Independent Session Tests in the treatment phase. Distal measures of note-taking and Oral Report performance at pre-/post-test suggest hints of independent generalization of strategies to a new expository task for all three participants. Social validity questionnaires with the participants, parents, and SLPs showed uniform enthusiasm for the strategies taught. The results of this study indicate that this strategy intervention has potential to improve the expository discourse comprehension and expression of adolescent students with LLD. Though small in scope and limited in broad conclusions, this study contributes evidence supporting the use of Sketch and Speak intervention to the larger literature on discourse-level interventions for adolescent students.
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http://www.nationalreadingpanel.org/


APPENDICES
## Appendix A. Example 2-Column Note Form

Participant: ________________  Instructor: ________________  Date: ________________

Topic __________________________________

<table>
<thead>
<tr>
<th>Time Period &amp; World Region</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Events &amp; Activities</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Shelter &amp; Transportation</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Preferred Foods</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Distinctive Features</th>
<th></th>
</tr>
</thead>
</table>

Rev 2021.04
The Inca Empire

In ancient times, the Inca Empire was the largest and richest kingdom on the American continent. Its vast coastal and mountain territories were spread across the countries of Peru, Argentina, Chile, and more.

The capital city of Cuzco was deep in the Andes Mountains. In the Incan language, Cuzco meant “the navel of the Earth.” Gold statues, elaborate fountains, and elegant gardens were everywhere. Nobles in Cuzco adorned themselves with jewelry made out of glittering gold. The Coricancha temple, dedicated to the sun god Inti, was covered in gold and golden animal statues stood guard around the temple.

Despite all the wealth, most people were peasants who had to follow the strict laws of the empire. These workers turned steep mountain slopes into gardens with only manual labor and primitive tools. They broke up huge rocks and layered them into ascending rows of low walls and flat terraces. The stone walls absorbed heat from the sun during the day and radiated it back out after sunset, which kept crops from freezing in the chilly night temperatures.

The peasants’ effort and ingenuity allowed them to farm in this harsh terrain and climate. For example, they employed the “three sisters” planting method for corn, beans, and squash. First, they would plant corn. After the corn sprouted, they planted beans to wind up the cornstalks and inserted squash in the spaces between. The corn served as a ladder, the beans added nitrogen fertilizer to the soil, and the squash’s broad leaves protected the soil from drying and weeds.

Incas invented freeze-dried food. They would spread potatoes under a thin cloth outside in the frigid air for several nights. Each morning, the farmers would trample the frozen potatoes to squeeze out moisture. Eventually, they ended up with dehydrated, light flakes called chunyo that could be rehydrated later and cooked. Chunyo could be stored for several years in case of drought or crop failure.

Incas kept guinea pigs and llamas. The furry rodents were easy to raise and multiplied quickly for a steady meat supply. Llamas provided wool and served as pack animals but could also be eaten. Llamas were sure-footed on treacherous steep narrow trails and rope bridges swinging over mountain gorges. They were also used in religious ceremonies, with different colored llamas representing different gods.

Incas did not have a writing system. Instead they used long wool ropes called quipus to record events. Combinations of colors, types, and sizes of rope knots meant different things. Yellow referred to gold, green was about the land, and red, the color of blood, symbolized fighting or battles. The few people who could read the quipus were greatly esteemed in their communities.

Today, the gold is long gone and the Incan cities are in ruins. One city, called Machu Picchu, was not discovered until 1911. The city is hidden high in the Andes Mountains in Peru. Visitors must hike for 3 to 4 days on the Inca Trail to see the wonders of Machu Picchu.
### Appendix C. Oral Report Quality Rubric

<table>
<thead>
<tr>
<th>Participant:</th>
<th>Session:</th>
<th>Topic:</th>
<th>Scorer:</th>
<th>Date:</th>
</tr>
</thead>
</table>

**Quality** of formal oral report of article information. Information score double-weighted to reflect student performance. Scores based on written transcription and video recording. Compare to source article for information clarity and accuracy. Descriptors ordered in magnitude: all, almost all, mostly, many, some, few, very few, almost none, none.

**Total/14 =**

#### 1. Information
2 = Many idea statements with almost all different ideas AND all ideas match source article
1 = Some idea statements OR many very similar idea statements OR 1-2 ideas do not match source
0 = Very few idea statements OR 3+ ideas not matching source

**Score x 2 =**

#### 2. Topic & Open/Close
2 = Topic stated near beginning, relevant open/close performative statements (*I want to tell you...*, *I hope you enjoyed...*)
1 = Topic stated in last half OR open/close statements both weak OR missing one open/close statement
0 = No topic stated OR no open/close statements

#### 3. Vocabulary
2 = Many different specialized (e.g., *axolotl, metamorphosis*), advanced (e.g., *extraordinary, vast*), or very specific words (e.g., *Jim Thorpe, Olympics, Grand Slam*); no incorrect words or colloquial fillers (e.g., *whatchamacallits, thingamabobs, whatever they are*)
1 = Some specialized or advanced words OR many vague, incorrect, or filler words
0 = Very few specialized or advanced words AND many vague, incorrect, or colloquial fillers

#### 4. Sentences
2 = All well-formed sentences with some complex sentences
1 = Mostly well-formed sentences regardless of type OR all well-formed and all simple
0 = Almost no well-formed sentences, regardless of type

#### 5. Discourse
2 = Well-organized expository report with information grouped by subtopics or categories (e.g., *The X's habitat is; their diet consists of*)
1 = Somewhat well-organized: unrelated ideas grouped together OR idea statements repeated throughout
0 = Listing of items with no clear organization, report incoherent, information in incorrect categories

#### 6. Verbal Fluency
2 = Almost all fluently and expressively delivered: few short pauses or mazes; no more than one small instance of self-talk or extraneous comment (e.g., *I think, Or something like that*)
1 = Mostly fluently delivered, but lacking expression: some pauses, mazes, and filler words; few instances of self-talk or extraneous comments (e.g., *I forgot what that was called, What was that again?*)
0 = Mostly non-fluent: frequently uses long pauses, mazes, filler words, self-talk or extraneous comments
Appendix D. Short-answer Quality Rubric

<table>
<thead>
<tr>
<th>Question/Response</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General detail:</td>
<td></td>
</tr>
<tr>
<td>2. Specific detail 1:</td>
<td></td>
</tr>
<tr>
<td>3. Specific detail 2:</td>
<td></td>
</tr>
<tr>
<td>4. How:</td>
<td></td>
</tr>
<tr>
<td>5. Why:</td>
<td></td>
</tr>
<tr>
<td>6. Vocabulary:</td>
<td></td>
</tr>
</tbody>
</table>

Total Score ________/12
Appendix E. Pictography Notes Scoring Rubric

Participant:  Session Name:  Topic:  Scorer:  Date:  

Use rubric that matches primary notation form: written or pictography. Credit other form if present.

<table>
<thead>
<tr>
<th>A. Quantity – How Many Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Count number of separate items</td>
</tr>
<tr>
<td>• Not by close meaning consideration, can be repetitions</td>
</tr>
<tr>
<td>• Listed vertically or separated by spaces and arrangement</td>
</tr>
<tr>
<td>• 1 item for scene image with multiple elements even if separated spatially (Stick figure on a cliff with another stick figure a distance away falling to the ground)</td>
</tr>
</tbody>
</table>

**Quantity count =**

<table>
<thead>
<tr>
<th>B. Quality – Efficiency &amp; Effectiveness of Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Compare to source article for information clarity and accuracy</td>
</tr>
<tr>
<td>• Compare to oral report for reporter’s interpretations for ratings</td>
</tr>
</tbody>
</table>

**Quality total nontaught/15 =** _______  **Quality total taught/12 =**

1. **Topic & Open/Closed** – Note: This section is not scored in taught picto sessions
   
   3 = Relevant topic at top (Inca Empire, Apaches) and open or close note in words (interesting, thankyou) or image (smiley face)
   
   2 = Relevant topic at top but no open/close note
   
   1 = Topic identified within first category (Incas were in South America)
   
   0 = Topic identified other than in first category, not identified, or incorrect

2. **Used Pictography**
   
   3 = Three or more pictographs (separated images, not touching or creating a single scene)
   
   2 = Two pictographs
   
   1 = One pictograph
   
   0 = No pictography

3. **Quick & Easy**
   
   3 = All images are simple not detailed
   
   2 = More than half images simple
   
   1 = Some images simple
   
   0 = No simple images

4. **Enough to Remember**
   
   3 = All pictographs interpretable for reporter to generate coherent statement (ok if not well-formed or grammatical); score for each adequate note; credit once for each adequate note even if generates more than one statement; credit each note in category even if combined in single statement
   
   2 = More than half interpretable items: inadequate = misinterpreting own note, only category name + picto label that don’t go together; note or interpretation not from source; note skipped in report even if clear to rater; two notes across categories combined into single statement (only credit one)
   
   1 = Some interpretable items
   
   0 = No interpretable items

5. **Differentiated Images**
   
   3 = Each pictograph differs; not essentially the same image
   
   2 = More than half pictographs differ
   
   1 = Some pictographs differ
   
   0 = Pictographs essentially the same

Rev 10.2021
Appendix F. Bulleted Notes Rubric

Use rubric that matches primary notation form: written or pictography. Credit other form if present.

<table>
<thead>
<tr>
<th>A. Quantity – How Many Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Count number of separate items</td>
</tr>
<tr>
<td>• Not by closely examining meaning, can be repetitions</td>
</tr>
<tr>
<td>• Listed vertically or separated by sentences, periods, spaces, or link is and between two very different ideas (a lot of gold and houses didn’t have doors)</td>
</tr>
<tr>
<td>• 1 item for sentence or phrase list even if multiple ideas (they came before 1500 to Arizona, New Mexico, west Texas, and Colorado; potatoes, corn, guinea pigs, and llamas)</td>
</tr>
</tbody>
</table>

Quantity count = _______

<table>
<thead>
<tr>
<th>B. Quality – Efficiency &amp; Effectiveness of Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Compare to source article for information clarity and accuracy</td>
</tr>
<tr>
<td>• Compare to oral report for reporter’s interpretations for ratings</td>
</tr>
</tbody>
</table>

Quality total/15 = _______

1. Topic & Open/Close
   - 3 = Relevant topic at top (Inca Empire, Apaches) and open or close note (Interesting, thankyou)
   - 2 = Relevant topic at top but no open/close note
   - 1 = Topic identified incidentally within first category (Incas were in South America)
   - 0 = Topic identified other than in first category, not identified, or incorrect

2. Bullets (Good) & Periods (Bad)
   - 3 = All items initiated with bullets and no items use periods (exclamations or questions ok)
   - 2 = More than half items have bullets, regardless of period use
   - 1 = Some items have bullets or more than half items have no periods
   - 0 = No items have bullets

3. Quick & Easy
   - 3 = All brief items, info dense: lists, phrases, key words, abbreviations, sgw omitted, short sentences, no category rep: rode bareback; dogs carried loads; many kinds corn, potatoes
   - 2 = More than half brief or reduced items
   - 1 = Some brief or reduced items
   - 0 = No brief items

4. Enough to Remember
   - 3 = All items clear enough info for reporter to generate coherent report statement (ok if not well-formed or grammatical or decoding error): credit once for each adequate note even if generates more than one statement; credit each note in category even if combined in single statement; credit note if coherent sentence although misplaced category; credit isolated key word in correct category
   - 2 = More than half adequate items: inadequate = misinterpret own note, isolated word OR only category name and mismatched word (Transportation buffalo); note not from source; note skipped in report even if clear to rater; two notes across categories combined into single statement or repeated notes (only credit one)
   - 1 = Some adequate items
   - 0 = No adequate items

5. Use Your Own Words
   - 3 = All own sentences; part of longer source sentences (largest kingdom in ancient times, high mountain gardens, Apaches were fearsome fighters, They came to Arizona, New Mexico, west Texas, and southern Colorado); no almost verbatim sentences
   - 2 = More than half own sentences
   - 1 = Some own sentences
   - 0 = No own sentences

Rev11.30.2021
Appendix G. SALT Expository Task Procedure

1. Introduce task. I’m interested in finding out how well you do at giving explanations. I’m going to record this meeting so I can remember what you say. If you want, you can listen to the recording or watch the video when we’re finished. I want you to imagine that I am a student about your age. I’m visiting the United States from another country and I want to learn as much as I can about life in the U.S. You can help me by explaining how to play your favorite sport or game. You have lots of choices. For example, you could pick a sport, such as basketball or tennis. You could pick a board game, such as Monopoly or chess. Or you could pick a card game, such as poker or rummy.

2. Ask student for three favorite games or sports they think they can describe well. What are three of your favorite sports or games that you think you could describe well? Today you will describe one of these. We will randomly select which one you describe today and then later this summer, you will do this task again with another one of the games from your list.

3. Type the three topics on a numbered list in student view. If the student does not offer three appropriate choices, or if one of the choices is inappropriate (like a video game), reread the examples given above and/or add more examples to aid the student in making an appropriate choice. If the student is still having difficulty coming up with examples, suggest picking a game or sport recently played in the student’s physical education class.

4. Randomly select topic from the list of 3 using random number generator in student view.

5. Assume that in my country, we don’t play [name of sport or game]. I’d like you to explain everything I would need to know so I could learn to play. I’ll expect you to talk for at least five minutes. To help you organize your thoughts, here’s a list of topics I’d like you to talk about. Student logs in to Google Jamboard document with blank planning sheet in view. Instructor shares screen in Zoom meeting.

6. Please take the next few minutes to plan your explanation by taking notes in the blank spaces [indicate column on the right]. Don’t waste time writing sentences, just write some key words or quick sketches to remind you of what you want to say. You can talk about the topics in the order they are listed or else you can number the topics any way you wish. If you don’t want to take notes, you can use the blank space on this form to draw a diagram or make a graphic organizer. You can also use the blank space to the right to take more notes if you need to.

7. Go over the note form categories. Let’s look at the topic areas on the left to make sure you know what all of them mean before you get started. If the student has difficulty with understanding the vocabulary, give an example from a sport or game different from the one the student has chosen.

8. Instruct student to begin. Go ahead and start planning.

9. Give student up to 10 minutes to take notes – allowing enough time for them to write something on each topic box or to complete a diagram or graphic organizer.

10. If student stops writing or drawing before the planning sheet is finished, prompt Please do some planning for [topic names].

11. Now you will give a report about [topic]. You will be doing all the talking. I’m going to listen to what you have to say. Take as much time as you need to give a complete explanation. Remember, I expect you to talk for at least five minutes. There will be a timer on the screen to help you monitor how long you’ve been talking.

12. Start timer on shared screen when student starts talking. Continue sharing screen with notes and timer in student’s view.

13. If student stops speaking before five minutes has elapsed, prompt Is there anything else you can tell me?

14. After student is finished speaking from their planning sheet or indicates that they are finished with their explanation, say Thank you for explaining that [game/sport] to me. You did a great job. Do you want to watch the video of yourself speaking?

15. Save Jamboard document as a PDF and save Zoom recording in the student’s file.
Appendix H. Student Participant Social Validity Pre-Treatment Questions

Now I’m going to ask you some questions about being a student. The way you answer will only be seen by me and my research team, so please answer as honestly as you can. These answers might be used in the future, but nobody will know that you are the one who answered this way. Your answers will help me to understand how you feel about learning and how to make programs that help students like you in the future. There is no wrong answer and I really appreciate your honesty!

Feel free to ask questions when you have them and to tell me if something is confusing. Before we start, do you have any questions for me?

Student pseudonym:    Date:

<table>
<thead>
<tr>
<th>Student Social Validity Rating Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>I have a very hard time doing this by myself and need a lot of help from teachers and peers</td>
</tr>
</tbody>
</table>

1. Overall, rate how you feel about yourself as a student. (Rating 1-5 scale)
   a. Why did you rate yourself that way?
2. Rate yourself by completing the following statement: When I have to read high school level information, like textbooks, books, or articles:
   a. What strategies do you use to understand what you’re reading?
3. Rate yourself by completing the following statement: When I have to write essays, papers, or other writing assignments
   a. What strategies do you use to help yourself remember what you’re supposed to write about?
4. Rate yourself by completing the following statement: When I have to give a presentation in class
   a. What strategies do you use to prepare and to help yourself remember what you’re supposed to say?
5. Overall, rate how you feel about your reading and writing skills.
   a. Why did you rate your reading and writing skills that way?
6. Is there anything you wish you could do better as a student going into high school?
7. What do you want to get out of this study?
Appendix I. Student Participant Social Validity Post-Treatment Questions

Now that you have finished learning the Sketch & Speak intervention with me this summer, I’m going to ask you some questions about being a student. The way you answer will only be seen by me and my research team, so please answer as honestly as you can. These answers might be used in the future, but nobody will know that you are the one who answered this way. Your answers will help me to understand how you feel about learning and how to make programs that help students like you in the future. There is no wrong answer and I really appreciate your honesty! Please think about all of the work you did this summer when answering the questions.

Feel free to ask questions when you have them and to tell me if something is confusing. Before we start, do you have any questions for me?

Student pseudonym:   Date:

<table>
<thead>
<tr>
<th>Student Social Validity Rating Scale</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have a very hard time doing this by myself and need a lot of help from teachers and peers</td>
<td>It is pretty hard for me to do confidently and independently, but not impossible with some help</td>
<td>I feel okay about doing this independently, but I’m not very confident in my skills and still want help</td>
<td>I feel pretty good about doing this independently and think I’m okay at it with little to no help</td>
<td>I am able to do this independently and with confidence, with no help from teachers or peers</td>
<td></td>
</tr>
</tbody>
</table>

1. Overall, rate how you feel about yourself as a learner. (Rating 1-5 scale)  
   a. Why did you rate yourself that way?
2. Rate yourself by completing the following statement: When I have to read high school level information, like textbooks, books, or articles:  
   a. What strategies do you use to understand what you’re reading?
3. Rate yourself by completing the following statement: When I have to write essays, papers, or other writing assignments  
   a. What strategies do you use to help yourself remember what you’re supposed to write about?
4. Rate yourself by completing the following statement: When I have to give a presentation in class  
   a. What strategies do you use to prepare and to help yourself remember what you’re supposed to say?
5. Overall, rate how you feel about your reading and writing skills.  
   a. Why did you rate your reading and writing skills that way?
6. Rate yourself on using Sketch and Speak now that you completed the summer interventions.
7. Rate your level of comfort in using *Sketch and Speak* in high school
   a. What strategies do you think will be most beneficial?
   b. How do you see yourself using these strategies in high school?
   c. Would you like to share these strategies with other teachers and peers?
   d. What would you tell other students, teachers, parents about *Sketch and Speak*?
8. Now that the treatment is over, rate yourself on how you feel about entering high school
9. What did you learn in this study?
10. What was your favorite part of this study?
11. Do you feel like you got what you wanted out of this study?
12. How did you feel about doing the study over telepractice (Zoom)?
13. What would you tell other students, teachers, or your parents about this study in telepractice?
14. Is there anything else you’d like to share?
Appendix J. Parent Social Validity Pre-Treatment

Thank you for taking the time to answer these questions about your child’s learning prior to the start of our summer treatment study. You will also be asked to answer questions after the summer treatment is complete. This information will help me as a researcher to better understand the “social validity” of the Sketch and Speak treatment from a parent’s point of view.

Thank you for your valuable input and time invested in your child’s learning. Your answers will not be shared with your child and will only be used for the researcher’s information.

Parent name:     Student name:

<table>
<thead>
<tr>
<th>Parent Social Validity Rating Scale</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>My child has a very hard time doing this independently and need a lot of help from teachers and peers</td>
<td>It is pretty hard for my child to do this confidently and independently, but not impossible with some help</td>
<td>My child is okay about doing this independently, but not very confident and still needs help</td>
<td>My child is pretty good about doing this independently and can do it okay with little to no help</td>
<td>My child is able to do this independently and with confidence, with no help from teachers or peers</td>
<td></td>
</tr>
</tbody>
</table>

1. Rate your perceptions of your child’s overall learning abilities. (Rating 1-5 scale)
   a. Why did you rate your child that way?

2. Rate your perceptions of your child’s learning abilities in reading and writing specifically.
   a. Why did you rate your child that way?
Appendix K. Parent Social Validity Post-Treatment Questions

Thank you for taking the time to take fill out this questionnaire about your child's learning. Please watch the brief video of your child during a summer treatment session prior to answering these questions. The questionnaire and treatment video should take a maximum of 30 minutes. You and your child will receive a $25 gift card upon your completion of this questionnaire.

Thank you for your valuable input and time invested in your child's learning! Your answers will not be shared with your child and will be used only for the researcher's information.

Parent name:    Student Name:   Date:

| Parent Social Validity Rating Scale |
|-----------------|-----------------|-----------------|-----------------|
| 1               | 2               | 3               | 4               |
| My child has a very hard time doing this independently and need a lot of help from teachers and peers | It is pretty hard for my child to do this confidently and independently, but not impossible with some help | My child is okay about doing this independently, but not very confident and still needs help | My child is pretty good about doing this independently and can do it okay with little to no help |
| 5               | My child is able to do this independently and with confidence, with no help from teachers or peers |

1. After watching the video of your child in treatment, rate how you feel about your child’s performance using Sketch and Speak.
   a. Why did you rate your child this way?
   b. What are your general impressions of the treatment and treatment video?

2. Do you think your child will continue to use Sketch and Speak in the high school setting?
   a. MC: Yes independently; Yes with support; Maybe- unsure; Not likely; Definitely not
   b. Do you want your child to continue to use Sketch and Speak in the high school setting?

3. Did your child share information with you during the study? If so, what kinds of things did they share? Comment on emotions, experiences, and topic discussions if possible.

4. Did you watch your child during the live treatment sessions? If so, what were your impressions of the treatment?
5. How did you feel about the telepractice service delivery? Comment on feasibility, usefulness, or any difficulties you/your child had accessing the materials in remote learning delivery.

Is there anything else you’d like to share?
Appendix L. SLP Carryover Social Validity

1. After talking with your student about Sketch and Speak, what are your overall perceptions of their learning during the summer treatment?
   a. Helpfulness in acquiring skills?
   b. How do you think the students like the intervention?
   c. Do you think it helped them to prepare for high school?

2. Based on your brief exposure to the treatment and videos of student learning, what are your overall perceptions of Sketch and Speak intervention for this population?

3. What do you see as potential usefulness of this treatment for high school students?
   a. How do you think it could be useful for the student independently?
   b. How do you think it could be useful in SLP-directed activities?

4. Do you feel that this intervention could be valuable to other students on your caseload?
   a. If so, who?

5. What are potential facilitators to implementing this intervention in your practice at the high school level? (e.g., cost, time, buy-in)
   a. What do you think teachers would think of this intervention?
   b. What do you think about the buy-in of students, SLP, etc.?

6. What barriers do you see to implementing this intervention in your practice at the high school level? (e.g., cost, time, buy-in of admin and teachers, buy-in of students)

7. Can you think of any changes you’d make to the intervention based on what you know that would make it more feasible for high school students?

8. What types of factors would influence your decision to adopt use of this intervention in practice?

9. Is there anything else you’d like to share?
## Appendix M. Baseline Session and Session Test Fidelity Checklist

<table>
<thead>
<tr>
<th>Y/N</th>
<th>Baseline &amp; Independent Session Tests</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Session set-up: share text on screen</td>
<td></td>
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<tr>
<td></td>
<td>2. Instruct student to listen and follow along as the text is read aloud - without taking notes</td>
<td></td>
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<tr>
<td></td>
<td>3. Read text aloud at a moderate, expressive pace with text in view; no prompt/redirect of student attention</td>
<td></td>
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<tr>
<td></td>
<td>4. Instruct student to take notes on 2-column note form words or pictures, however helps you remember with text in view; review note form categories if needed</td>
<td></td>
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<tr>
<td></td>
<td>5. Student given adequate time to take notes, reminder of time at 1 minute; no prompt/redirect of student attention</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. Set-up: Article removed, notes remain with student</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Y/N</th>
<th>Guided and Independent Session Tests</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Instruct student to review notes, student stopped if they start to revise notes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Student given up to 3 minutes to review; no prompt or redirect of student attention; warn at 1 minute remaining</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Set-up: After student indicates readiness, remove student notes (black out screen/minimize screen); change screen to questions after oral report</td>
<td></td>
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<tr>
<td></td>
<td>4. Instruct student on oral report: now you will give an oral report on what you learned from the article; give the best report you can</td>
<td></td>
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<tr>
<td></td>
<td>5. Wait time after student finishes speaking; If unclear ending ask: are you finished with your oral report?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. Instruct on short-answer questions: Thank you for your report. Now you will answer a few questions about information in the article we read, not your own ideas.</td>
<td></td>
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<tr>
<td></td>
<td>7. Read questions aloud with moderate, expressive pace; give student brief “think time” after each question; no prompt or redirect to task</td>
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<tr>
<td></td>
<td>8. If student responds “I don’t know” prompt “try your best” one time per question.</td>
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<tr>
<td></td>
<td>9. Show photo sheet of article topic</td>
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<tr>
<td></td>
<td>10. On oral report, instructor follows standard testing procedure of showing interest but giving no feedback other than general encouragement (e.g., good job; great work).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11. On short answer questions, instructor follows standard testing procedure of showing interest but giving no feedback other than general encouragement</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12. Session set-up: share 2-column note forms for students to edit, share view of short-answer questions, record sessions with screen and participants in view</td>
<td></td>
</tr>
</tbody>
</table>

Total Independent Session Test Score ___________/18

OR

Total Guided Session Test Score ___________/12
Appendix N. Even-numbered Treatment Session Fidelity Checklist

<table>
<thead>
<tr>
<th>Y/N</th>
<th>Bulleted Notes – Even Numbered Sessions</th>
<th>Hit/Miss/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Instruct student to say their full oral report using full sentences from each picto note</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Instructor and student reduce spoken sentence to key ideas and generate quick and easy just enough to remember written bullets (hit/miss)</td>
<td></td>
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<tr>
<td></td>
<td>3. Initiate notes with bullet symbol; use telegraphic words or short phrases; no long sentences, few small grammatical words, no punctuation except ! ?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Formulate and say full sentence for each bulleted note (hit/miss)</td>
<td></td>
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<tr>
<td></td>
<td>5. Repeat full sentence for bulleted note at least once (hit/miss)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. Half-way through changing pictos to bullets, say half oral report from bullets</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7. After all bulleted notes and sentences created, give full oral report using bulleted notes at least once</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8. Create open/close statement; reduce to bullets on top and bottom of form</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9. Say full open/close statement again</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10. Student says full report with open/close statement</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11. Says full report at least once more.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Y/N</th>
<th>For Picto and Bulleted Note Sessions</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Session set-up: share 2-column note forms, record sessions with screen and participants in view, student and instructor logged in to same Jamboard document</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Learning goal #1 said or prompted at beginning of instruction: create quick and easy, just enough to remember notes to help remember ideas</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Learning goal #2 said or prompted at beginning of instruction: say and say again (or rehearse/practice) full sentences and full report to remember ideas and words</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Holistic judgment of support and challenge matched to student competence for taking notes and use of note form throughout session</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Holistic judgment of support and challenge matched to student competence for full sentences, full reports, and repetitions throughout session</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Treatment fidelity for all bolded elements in sessions?</td>
<td></td>
</tr>
</tbody>
</table>

Total for Bulleted Notes Session _____________/16

Note: Followed by Session Test Procedure Checklist (Appendix M). Total points for fidelity = 28.
# Appendix O. Odd-numbered Treatment Session Fidelity Checklist

<table>
<thead>
<tr>
<th>Y/N</th>
<th>Pictography – Odd Numbered Sessions</th>
<th>Hit/Miss/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Instruct or cue student to write topic of the article at the top of the note sheet.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. <strong>Read 1-2 paragraphs of the text aloud at moderate pace with text in view, then jointly identify 1-2 ideas to remember</strong> (hit/miss)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Cue or model pictography on shared screen, <em>quick and easy, just enough to remember</em> using only simple graphic images, symbols, and isolated letters or numbers – no words or detailed drawings</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. <strong>Cue or model full, well-formed, accurate sentences from note about article information</strong> (hit/miss)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. <strong>Repeat full sentence for each note at least one time</strong> (hit/miss)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. If picto interpretation is a problem, guide to revise or repair picto and say revised sentence twice</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7. As needed, brief explanations of vocabulary word or other ideas</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8. Half-way through article, guide to say half oral report from pictography</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9. Guide student to make 9-12 simple pictos and full oral sentences</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10. After all notes and sentences completed, say full oral report from notes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11. Repeat full oral report from notes.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Y/N</th>
<th>For Picto and Bulleted Note Sessions</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Session set-up: share 2-column note forms, record sessions with screen and participants in view, student and instructor logged in to same Jamboard document</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Learning goal #1 said or prompted at beginning of instruction: create quick and easy, just enough to remember notes to help remember ideas</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Learning goal #2 said or prompted at beginning of instruction: say and say again (or rehearse/practice) full sentences and full report to remember ideas and words</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Holistic judgment of support and challenge matched to student competence for taking notes and use of note form throughout session</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Holistic judgment of support and challenge matched to student competence for full sentences, full reports, and repetitions throughout session</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Treatment fidelity for all <strong>bolded</strong> elements in session?</td>
<td></td>
</tr>
</tbody>
</table>

Total for Picto Session ___________/16

*Note.* Independent session test fidelity checklist (Appendix M) precedes odd-numbered treatment checklist. Total points for independent session test fidelity = 34.
Appendix P. Treatment Fidelity Instructions

1. Watch 1/3 of the session videos for each participant and check Amy’s treatment fidelity.
2. Remember – you are checking Amy’s behavior, not necessarily the student’s response.
3. Use the Fidelity Checklists for baseline/even/odd sessions to count hits/misses (in bold) and comment on Amy’s performance following the procedure.
4. For Treatment Fidelity checklists with recurring prompts (e.g., say sentence, say sentence again)
   a. IF Amy prompts the student correctly, it counts as a “hit”. Indicate correctness with +/- (or other system) tally for each “hit”.
   b. IF Amy does not prompt the student’s behavior, it counts as a “miss”. Indicate incorrect/missed opportunities with +/- (or other system) for each “miss”.
5. If one or fewer opportunities are a “miss” for each item, indicate Y in the left column.
6. If one or more opportunities are a “miss” for each item, indicate N in the left column.
7. At the bottom of the form, indicate how many number of hit/miss for bolded items
8. Indicate how many total YES/16
9. Save in the participant’s corresponding fidelity folder using video name (e.g., SCD04 Tx9 Fidelity).
10. Document fidelity information on Excel sheet for each participant.

You will watch:

SCD01 – Cat: At least 7 videos
   - No more than 2 baseline videos
   - At least 3 even-numbered treatment videos

SCD02 – Garcia: At least 6 videos
   - No more than 2 baseline videos
   - At least 3 even-numbered treatment videos

SCD04 – Thomas: At least 5 videos
   - No more than 2 baseline videos
   - At least 3 even-numbered treatment videos
Appendix Q. Oral Report Scoring Procedures

Training:
1. Read oral report scoring system
2. Write session number/name, date, and your initials at the top
3. Read corresponding article if unsure of details
4. Watch full oral report at least twice before scoring
5. Score an oral report together (trainer and rater) using video and transcript
6. Discuss scoring to improve understanding
7. Rater and trainer score item independently using video and transcript
8. Input scores into Excel sheet
9. Compare scores until consensus is reached
10. Input consensus scores into Excel sheet
11. Repeat as needed

Independent rating:
1. Re-read oral report scoring system as needed
2. Write session number/name, date, first/second rating, and your initials at the top
3. Read corresponding article if unsure of details
4. Watch full oral report at least twice before scoring
5. Score oral report independently using video and transcript
6. Input scores into Excel sheet
7. After all reports are double scored, highlight scores that do not match
8. Compare scores section by section with other rater until consensus is reached
9. Input consensus scores into Excel sheet in final "consensus column"
Appendix R. Short-answer Recall Question Scoring Procedures

Training:
1. Read short answer question scoring system
2. Read example short answer responses for each score
3. Write session number/name, topic, and your initials at the top
4. Read corresponding article
5. Score short answer responses together (trainer and rater) using video and transcript
6. Discuss scoring to improve understanding
7. Rater and trainer score item independently
8. Input scores into Excel sheet
9. Compare scores until consensus is reached
10. Input consensus scores into Excel sheet
11. Repeat as needed

Independent rating:
1. Re-read short answer question scoring system as needed and keep examples in view
2. Write session number/name, date, first/second rating, and your initials at the top
3. Read corresponding article
4. Score short answer questions independently using video and transcript
5. Input scores into Excel sheet

Amy Reliability:
1. Independently score responses
2. Input scores on Excel sheet
3. Compare scores with other rater
4. If different, discuss until consensus is reached
5. Input consensus scores into Excel sheet
Appendix S. Notes Scoring Procedures

Training:
1. Read appropriate scoring system for notes (picto or bullets)
2. Write session number/name, date, and your initials at the top
3. Read corresponding article if unsure of details
4. Score a note form together (trainer and rater)
5. Discuss scoring to improve understanding
6. Rater and trainer score item independently
7. Input scores into Excel sheet
8. Compare scores until a consensus is reached
9. Repeat as needed

Independent rating:
1. Re-read appropriate scoring system for notes as needed (picto or bullets)
2. Write session number/name, date, first/second rating, and your initials at the top
3. Read corresponding article if unsure of details
4. Score notes independently
5. Input scores into Excel sheet
6. Compare scores with other rater until consensus is reached
7. Input consensus scores into Excel sheet
## Appendix T. Social Validity Responses by Participant

<table>
<thead>
<tr>
<th></th>
<th>Thomas</th>
<th>Garcia</th>
<th>Cat</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Overall student rating – “why”</strong></td>
<td>3 - Sometimes I feel like I need some help</td>
<td>3 - I do pretty good, but I have some trouble with some subjects - science and math</td>
<td>2 - Because I need a little extra help</td>
</tr>
<tr>
<td><strong>Reading strategies</strong></td>
<td>3 - Sometimes if I don't get it, I read it again but it depends - ask the teacher</td>
<td>2 - I just read it</td>
<td>1 - I have some stuff that helps me - A C-pen it automatically reads to me (listen to reading)</td>
</tr>
<tr>
<td><strong>Writing strategies</strong></td>
<td>2 - Read back what I am supposed to write about or ask the teacher for a little help to understand what I'm supposed to write about</td>
<td>4 - I feel pretty good about that because writing an essay seems pretty easy to me</td>
<td>2 - I ask the teacher for instructions again, I look - if I'm reading an article or something about it, I usually look at the front cover and that tends to help.</td>
</tr>
<tr>
<td><strong>Oral presentation strategies</strong></td>
<td>2 - Notes, read what I'm supposed to say - pretty shy, think too much, get off topic</td>
<td>2 - I always get nervous so I don't feel very good about it</td>
<td>2 - I usually just read it out loud to myself and then I keep it in my head or I say it to one of my friends and they kinda voice the words to me</td>
</tr>
<tr>
<td><strong>Reading and writing skills “why”</strong></td>
<td>4 - Sometimes hard to read, I can get it when I try harder, read really good. Writing I can get into details a lot</td>
<td>5 - I feel good about that because it's like easier to do because all you have to do is read something and write something</td>
<td>3 - Because if I have the tools that help me, I can do it</td>
</tr>
<tr>
<td><strong>Anything you want to do better as a learner in high school?</strong></td>
<td>Knowing the stuff faster, sometimes it takes me a little bit to realize what I'm supposed to do I guess</td>
<td>No</td>
<td>Reading more and focusing in</td>
</tr>
<tr>
<td><strong>What do you want to get out of this study?</strong></td>
<td>To understand more of how/what I'm supposed to do right away</td>
<td>I don't know- because it could help me with some of my skills</td>
<td>To have fun and to help with my problems - reading and actual talking and not shutting down</td>
</tr>
<tr>
<td><strong>Overall student rating – “why”</strong></td>
<td>3 - Can do it myself but still want some help - it's just sometimes hard to stay on task and commit to what I'm supposed to do. I can do it, but it's</td>
<td>4 - Don't need help, rather do independently</td>
<td>3 - I might need help in class and stuff</td>
</tr>
<tr>
<td>Strategy Type</td>
<td>Description</td>
<td>Rating</td>
<td>Notes</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>Reading strategies</td>
<td>4 - I kinda just - read a couple more times if I can/have the time to. If it's a &quot;get it done thing I don't&quot; usually I read it over a couple times. Rated a 4 cuz I'm good at reading - reading is fun I guess and it's fun to get to know stuff.</td>
<td>3</td>
<td>2 - Stretch it out, or use C-pen - because I don't see the same</td>
</tr>
<tr>
<td></td>
<td>3 - look at words - because I don't like reading that much so I try to read but I'm going to try to read a lot on textbooks</td>
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<tr>
<td>Writing strategies</td>
<td>2 - Because writing isn't my specialty I guess and I can do it, but it's hard for me to do it by myself cuz stuff confuses me with intro/conclusion paragraph. Hard to do this year, hard to get used to what to write and where to put it. Put more stuff into parag is hard. Sometimes I just go back to certain part that's like, that might help me with it - read a little bit of it. In case I forgot some stuff I guess.</td>
<td>5</td>
<td>3 - I like keep on reminding myself, ask a friend to remind - I like typing depends on what we are typing about</td>
</tr>
<tr>
<td></td>
<td>5 - Beginning, ending - who, what, when, where - because it seems easy to me and I don't need that much of the teachers help</td>
<td></td>
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<tr>
<td>Oral presentation strategies</td>
<td>3 - Because, well, I don't like presenting. I can do it, sometimes I usually forget cuz I'm in a rush or think of what to remember. When I get up there I forget. - Use notes and read it before to help if I can or sometimes I have little sticky notes to help me.</td>
<td>1</td>
<td>1 - I don't like doing that - I just usually look at friends, they mouth words to me or I look at teacher and she kinda like takes over I guess</td>
</tr>
<tr>
<td></td>
<td>1 - cuz I don't like to speak/say stuff kids learn on books and internet - not good at presentation; nothing</td>
<td></td>
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</tr>
<tr>
<td>Reading and writing skills “why”</td>
<td>4 - Because kinda like what we did - you read and I would write except I would do both. Kinda good with reading and writing.</td>
<td>3</td>
<td>3 - Because I like to read</td>
</tr>
<tr>
<td></td>
<td>3 - because I don't read and I like to write too, but I always forget about periods and where it stops at</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Usefulness of Sketch and Draw</td>
<td>5 - Bulleted notes - tiny notes would use and also the repeating</td>
<td>5</td>
<td>4 - Taking my time - the little notes will be</td>
</tr>
<tr>
<td></td>
<td>5 - re-reading it - because I could write words instead of</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Speak strategies</strong></td>
<td>pictures; probably use pictography</td>
<td>helpful and the little writing/drawing</td>
<td></td>
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<td>----------------------</td>
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<td>---------------------------------------</td>
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<tr>
<td>Application of <em>Sketch and Speak</em> in high school</td>
<td>4 - In English or like math I could use the bulleted notes (other one I don't know its name) - taking notes for a paper I guess - notes for me and then repeat and repeat and I can remember. Like studying for a test but like you study this.</td>
<td>4 - I don't know - I haven't been in high school yet - probably not that good last year; if have to read paragraph I would re-read it and write a word from it and then say that's my sentence</td>
<td></td>
</tr>
<tr>
<td>Would you share strategies with teachers and peers?</td>
<td>Yeah, well, so... I would - I don't know if I would remember it, but if I used it a lot this year then I'd probably do it</td>
<td>I don't think so</td>
<td></td>
</tr>
<tr>
<td>What would you tell others about <em>Sketch and Speak</em>?</td>
<td>I'd tell them that I learned about gum and stuff. Kinda just like repeat - you repeat stuff. Bulleted notes and drawings can help you remember stuff. Drawing one you could put pic of what it's about because it's from your perspective. Repeat what you write!</td>
<td>You could try it too - You can write word instead of full sentence and then say that</td>
<td></td>
</tr>
<tr>
<td>What did you learn in this study?</td>
<td>Writing - learned more about bulleted notes that we have to write something big, just something that makes us remember. Cuz I didn't really use bulleted notes. I learned a lot of stuff kinda. It's helped my writing - writing stuff helped me. Stuff that interested me or that I didn't know about. A little scared, but I feel good. Kind of like elem to jhs. I feel good, but scared because it's high school. Might need help, but could do some stuff by myself.</td>
<td>Volleyball, MJ, Jim Thorpe, other athletes - soccer; word one</td>
<td></td>
</tr>
<tr>
<td>What was your favorite part of this study?</td>
<td>All of it was fun and interesting! I don't know what my favorite part was I guess.</td>
<td>When I had to do something before this pictography thing -</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>To see and unearth the people and stuff? - reading new articles</td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>的回答</td>
<td>bulleted notes; independent notes</td>
<td>that I didn't know were out</td>
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<tr>
<td>-------------------------------------------------------------------------</td>
<td>------</td>
<td>----------------------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>Did you get what you wanted out of the study?</td>
<td>I feel like it helped - I don't think I said anything in the beginning that I remember - I think I might have did if I did say something. It's fun - got to learn some stuff and do some work.</td>
<td>Yeah - because I learned a bunch of strategies of reading</td>
<td>Yeah</td>
</tr>
<tr>
<td>How did you feel about telepractice?</td>
<td>It was good, we had some tech difficulties, but it was good I think. A weird experience writing on a tablet! Write on this...</td>
<td>It feels good, can just be at home</td>
<td>Good</td>
</tr>
<tr>
<td>What would you tell others about telepractice?</td>
<td>Different experience I guess - I feel like most of us would know what it's like on Zoom because of last year - different experience I guess</td>
<td>Just get on</td>
<td>You're one of the best teachers - liked it on Zoom</td>
</tr>
<tr>
<td>Anything else you'd like to share</td>
<td>I had a lot of fun! Thank you for just helping.</td>
<td>Nope</td>
<td>I had a really fun summer</td>
</tr>
</tbody>
</table>
### Appendix U. Parent Social Validity Responses by Participant

<table>
<thead>
<tr>
<th></th>
<th>Thomas</th>
<th>Garcia</th>
<th>Cat</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-study</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child’s overall learning ability</td>
<td>4 – Fine.</td>
<td>2 - Needs support on staying focused, might not ask for help when needed.</td>
<td>4 - She is really good at doing school work on her own</td>
</tr>
<tr>
<td>Reading and writing ability</td>
<td>4 – Fine.</td>
<td>2 - Garcia struggles with being able to put his thoughts on paper.</td>
<td>2 - She still struggles with words and sentences</td>
</tr>
<tr>
<td>Anything else to share?</td>
<td>Thank you for allowing Thomas to participate. He got himself on the video chats himself &amp; he was always positive.</td>
<td>He is some kind of wonderful.</td>
<td>No.</td>
</tr>
<tr>
<td><strong>Post-study</strong></td>
<td></td>
<td></td>
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<tr>
<td>After the video, what are your perceptions of your child’s use of S&amp;S?</td>
<td>5 - Thomas had a lot of confidence with the material</td>
<td>4 - I listened to his voice/speech. He started out not being sure of his sketch, to refining his sketch and delivering a very confident oral report video.</td>
<td>4 - I have watched her put it into place</td>
</tr>
<tr>
<td>General impressions of the treatment and video</td>
<td>I enjoyed watching the activity. I am impressed with the amount of facts Thomas remembered. I definitely see the benefits in this activity.</td>
<td>Well done. This treatment will provide Garcia with another tool for learning.</td>
<td>I like this alternative way for her it reached her</td>
</tr>
<tr>
<td>Will your child continue to use S&amp;S in high school?</td>
<td>Yes, independently.</td>
<td>Yes, with support.</td>
<td>Yes, independently.</td>
</tr>
<tr>
<td>Would you like your child to continue using S&amp;S?</td>
<td>Yes. I think Thomas did well with this type of organization to help speak &amp; I think Thomas will succeed in public speaking if he continues to use this tool.</td>
<td>Yes, this will provide Garcia with a solution to improving his studies</td>
<td>Yes, she learns like this better</td>
</tr>
<tr>
<td>Did your child share information with you during the study?</td>
<td>Thomas did let me know he enjoyed the class.</td>
<td>Garcia started out as a Debbie Downer. I reminded him that the program was to help him if he wanted. His commitment to finish</td>
<td>She what she did in class easier</td>
</tr>
<tr>
<td>Question</td>
<td>Response</td>
<td></td>
<td></td>
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<tr>
<td>------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
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<tr>
<td>Did you watch your child in live sessions?</td>
<td>No, unfortunately not.</td>
<td></td>
<td></td>
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<tr>
<td>Impressions of treatment</td>
<td>No response.</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>She was getting more information than usually did</td>
<td></td>
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<tr>
<td></td>
<td>Garcia is computer literate so it was easy for him to access his materials.</td>
<td></td>
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<tr>
<td></td>
<td>Very easy to use</td>
<td></td>
<td></td>
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<tr>
<td>Anything else to share</td>
<td>Thomas learned from the material. He got himself to the class &amp; had a great attitude about attending this class.</td>
<td></td>
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<tr>
<td></td>
<td>Thank you for the invite to this program.</td>
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<tr>
<td></td>
<td>I truly appreciate the time and effort the instructor put in with my child. My child came away with a great deal of tool to help her.</td>
<td></td>
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</tbody>
</table>
Amy K. Peterson

Curriculum Vitae

April 2022

Utah State University
1000 Old Main Hill
Logan, Utah 84322

POSITION TITLE: Ph.D. Candidate

Education

<table>
<thead>
<tr>
<th>Institution</th>
<th>Degree</th>
<th>Year</th>
<th>Field</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utah State University (in pursuit)</td>
<td>Ph.D.</td>
<td>05/2022</td>
<td>Disability Disciplines</td>
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<tr>
<td>University of Wyoming</td>
<td>M.S.</td>
<td>08/2010</td>
<td>Speech-Language Pathology</td>
</tr>
<tr>
<td>University of Wyoming</td>
<td>B.S.</td>
<td>05/2008</td>
<td>Communication Disorders</td>
</tr>
</tbody>
</table>

Professional Positions

Temporary Lecturer, Division of Communication Disorders, University of Wyoming
Teaching Assistant and Graduate Instructor, Division of Communication Disorders, Utah State University
Adjunct Instructor, Speech-Language Pathology Assistant Program, Laramie County Community College, Cheyenne, Wyoming (2019-2021)
Speech-Language Pathologist, Laramie County School District Number 1, Cheyenne, Wyoming (2012-2018)
  ▪ Lead Speech-Language Pathologist (Fall 2013-Spring 2017)
  ▪ LCSD#1 New Staff Mentor (Fall 2015-Spring 2018)
Speech-Language Pathologist, STRIDE Learning Center, Cheyenne, Wyoming (2010-2012)

Grants and Awards

Nonfunded Grants

Peterson, A. K. (Submitted May 2021). A single-case experimental investigation of Sketch and Speak expository intervention for adolescents with language-related learning disabilities via telepractice. Wing Institute Graduate Research Funding Program ($5,000).

Peterson, A. K. (Submitted June 2021). A single-case experimental investigation of Sketch and Speak expository intervention for adolescents with language-related learning disabilities via telepractice. Utah State University Graduate Research and Creative Opportunities ($1,000).
**Awards**
American Speech-Language and Hearing Association (ASHA, 2022) Pathways Program Awardee
NIH Student Travel Award (2022). Symposium on Research in Child Language Disorders ($700)
Graduate Student Travel Award (2021). Utah State University Graduate School ($300)
Graduate Student Travel Award (2019). Utah State University Graduate School ($300)

**Research and Scholarship**

**Publications**

**Refereed Publications**


**Invited Publications**


**Presentations**

**National and International Research Presentations**

**Peterson, A. K.** & Ukrainetz, T. A. (2022, June). *A single-case experimental investigation of Sketch and Speak expository intervention for adolescents with language-related learning disabilities via telepractice*. Poster presentation at the Symposium on Research in Child Language Disorders, Madison, WI.


Clinical Consultation, Workshops, and Presentations

Peterson, A. K. (2022, March). Expository intervention across the grades: Background, research, and practice. 3-hour professional development workshop, Laramie County School District #1, Cheyenne, Wyoming.

Peterson, A. K. (2020, August). Sketch and Speak Treatment: Background, Research, and Practice. 3-hour professional development workshop, Upton, WY.

Peterson, A. K. (2020, April). Sketch and Speak Treatment: Background, Research, and Practice. Invited lecture and Q&A for SLPA program at Laramie County Community College, Cheyenne, WY.

Regional and Local Presentations


**Works in Progress**


**Teaching Experience**

**University of Wyoming, Laramie, WY**

Speech and Language Disorders; 3 CR undergraduate, Spring 2022 (hybrid)

Evidence-based Practice and Assessment; 4 CR graduate, Fall 2021 (in-person)

Phonetics, 3 CR undergraduate, Fall 2021 (in-person)

Language Disorders Across the Lifespan; 3 CR undergraduate, Fall 2020 (online, async)

**Utah State University, Logan, UT**

Child Language Development; 3 CR undergraduate

Spring 2022 instructor (online, synchronous)

Spring 2021 co-instructor (online, async)

Spring 2020 primary instructor (in-person)

Spring 2019 co-instructor and TA (in-person)
Laramie County Community College, Cheyenne, WY (SLPA associate’s degree)
Introduction to Phonetics; 3 CR, Spring 2021, Spring 2020 (online, sync)
Introduction to Communication Disorders and Treatment; 3 CR, Fall 2019 (online, sync)

Service
Wyoming Speech-Language Hearing Association Publicity Chairperson (2016-2018)

Ad Hoc Reviewer
Communication Disorders Quarterly (2022, 2021, 2020, 2018)
Public Library of Science, One (2018)

University
Disability Disciplines Doctoral Student Faculty Liaison, 2021-22 academic year

Grant Reviewer
Graduate Enhancement Award, Utah State University (May 2019)

Research Judge
Student Research Symposium Judge, Utah State University, April 2021 (online)
Fall Student Research Symposium Judge, Utah State University, December 2020 (online)
Student Research Symposium Judge, Utah State University, April 2020 (online)
Fall Student Research Symposium Judge, Utah State University, December 2019 (in-person)

References
Teresa A. Ukrainetz – Assistant Department Head and SLP Division Chair – Professor, Utah State U.  teresa.ukrainetz@usu.edu  (435) 797-1384
Tim Slocum – Professor, Utah State University  tim.slocum@usu.edu  (435) 797-3212
Erin Bush – Associate Professor, University of Wyoming  ebush1@uwyo.edu  (307) 766-5795
Kelly Farquharson – Associate Professor, Florida State Univ  kfarquharson@fsu.edu  (850) 644-8465
Kaitlin Bundock – Assistant Professor, Utah State University  kaitlin.bundock@usu.edu  (435) 797-3911
Sarah Pinkelman – Assistant Professor, Utah State University  sarah.pinkelman@usu.edu  (435) 797-6371