Using Simultaneous Prompting and Computer Assisted Instruction with Pictures to Teach Narrative Writing Skills to Students with Significant Cognitive Disabilities

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USING SIMULTANEOUS PROMPTING AND COMPUTER ASSISTED INSTRUCTION WITH PICTURES TO TEACH NARRATIVE WRITING SKILLS TO STUDENTS WITH SIGNIFICANT COGNITIVE DISABILITIES

by

Bonnie J. Larson

A creative project submitted in partial fulfillment of the requirements for the degree of

MASTER OF EDUCATION in

Special Education

Approved:

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2016
Abstract

Students with significant cognitive disabilities often struggle to express themselves with written language. This project examined the effects of combining simultaneous prompting and computer assisted instruction, including picture icons, to teach students with significant cognitive disabilities to create narrative stories. Participants included seven students with significant disabilities currently being taught in a self-contained special education classroom located in a public elementary school. Participants had educational classifications of autism spectrum disorder, intellectual disability, or multiple disabilities. A multiple probe across behaviors design was used and instructors measured the number of sentences written by participants in each computer session. Sentences were defined as a group of words that contain at least a subject and a verb and were linked in a logical way. First, a simultaneous prompting intervention was used to teach participants to copy simple three-sentence stories using the Pixwriter™ assisted writing program on a preferred topic. When the participants could do this, they were given a two-sentence story to copy and then asked to generate a final sentence that would be cohesive with the story. This process was to be repeated across three preferred topics. Participants in this study had varying results with this intervention. Six of the participants with significant cognitive skills got to practice their own narrative story writing skills. Only one participant completed the full intervention. One participant did not get past copying the prepared stories. All of the participants enjoyed listening to the computer as it read the stories that they copied or helped to create.
INTRODUCTION

Writing is an important tool that uses written words to communicate, problem-solve, and learn (Koppenhaver & Williams, 2010). Staples and Edmister (2012) stated that writing has become an integral part of everyday life as people email, text, instant message, and share information at school and work in more formal ways. The Utah State Office of Education (USOE) adopted the Utah Core Standards for English Language Arts (2010) which established ten standards for writing instruction of elementary students. These standards covered four main areas (a) writing a variety of texts, (b) producing and distributing writing, (c) researching and using that research to support writing, and (d) writing regularly for a variety of purposes. It was organized so that the complexity of these standards increased with each grade level (USOE, 2013).

The Individuals with Disabilities Education Act (IDEA, 2004) required that all children with disabilities have access to an appropriate education. In this act, a free and appropriate education (FAPE) was defined as “special educational and related services provided at public expense that meet the standards of approximate grade levels of the State education agency provided in conformity with individualized education programs” (p. 118, STAT. 2654). Therefore, all Utah children must have access to writing instruction based on the Utah core standards. This includes students with significant cognitive disabilities (SCD). The USOE (2013) defines SCD as a disability or multiple disabilities that significantly impact intellectual functioning and adaptive behavior. These students with SCD should be provided the means to learn how to express themselves in writing (Taft & Mason, 2011). This is a challenge because there are characteristics generally associated with intellectual disabilities that make written communication a problem. For example, children with intellectual disabilities tend to acquire skills at a
slower rate and have difficulty with strategies needed to organize and plan for writing (Joseph & Konrad, 2009). Also many of these students have complex communication needs that require the use of assistive technology or sign language.

Both IDEA and No Child Left Behind (NCLB) require that all students with disabilities be included in the year-end testing to determine adequate yearly progress (USA Dept. of Education, 2005). To plan for these needs, the USOE participated along with 11 other states in a consortium that developed the Dynamic Learning Maps (DLM) Essential Elements (EE) for Language Arts (DLM Consortium, 2013). These EE were specific statements of knowledge and skills linked to the grade-level expectations identified in the Common Core Standards. Their purpose was to build a bridge from the content in the Common Core to expectations for students with SCD. A group of educators and content specialists from the 12 member states developed the initial version. Meanwhile, other experts worked on developing a highly connected representation of how language arts skills are acquired and interconnected called DLM. Then a team of content experts refined the DLM and EE to ensure horizontal alignment between the EE and Common Core Standards and vertical alignment across the grades according to the DLM (DLM Consortium, 2013).

In the DLM materials (2013), the EE require students with SCD to produce writing for a variety of purposes. They specify the following skills: (a) write to share opinions about topics or text, (b) write to share information supported by details, (c) write about events or personal experiences, (d) express more than one idea in writing, (e) revise writing with assistance, (f) use technology to produce writing, (g) gather information and conduct research projects, (h) recall or gather information on a writing topic, (i) find and
use information from informational text to support writing, and (j) write regularly for a variety of purposes (USOE, 2014). Special educators are required to use evidence-based writing instruction (IDEA, 2004) to teach these writing skills. Since Utah’s yearly alternative assessment (DLM) will test these writing EE for my third to sixth grade students with SCD, I need to find out which teaching strategies are evidence-based for teaching these skills to this population, and then implement them with my students.

**Literature Review**

I searched four databases in EBSCOHost (Academic Search Premier, Education Source, ERIC, and PsycINFO) for articles on evidence-based writing instruction practices for students with SCD. I used the terms, “intellectual disability, developmental disabilities, autism, or mental retardation” and “writing instruction” as my search terms. I came up with 185 listings. As I looked through the abstracts for these studies, my criteria for inclusion was (a) participants with SCD like autism, developmental disabilities, intellectual disabilities, or multiple impairments, (b) participants in preschool to twelfth grade, and (c) the dependent variable was the construction of written text and not just spelling words or handwriting. This narrowed down the listings to 21 articles. A preliminary review of these articles revealed that five of the articles used participants with mild disabilities like Asperger Syndrome. Five contained discussions of teaching strategies but were not research based. This review also yielded references to an additional five articles that fit the criteria. As I considered these 16 articles, I gave preference to articles that included multiple participants or gave information about computer assisted learning. I have had good success teaching students with limited verbal skills to read with computer assisted programs. I was hoping to find a computer strategy
for teaching writing to some of these same students. I selected three meta-analyses and two single subject design studies to provide direction for my own research.

Koppenhaver and Williams (2010) conducted a review of writing research to see how well components of cognitive processes of writing were applied to people with complex communication needs using augmentative and alternative communication (AAC). They used the components as defined by Flower and Hayes (1981), i.e., planning (generating, organizing, goal setting), translating (putting thoughts into written words), reviewing (evaluating, revising), and monitoring (making decisions about what to do next). They investigated how well the studies included all of these cognitive processes of writing. They searched seven electronic databases and ended up with eight original, empirical studies that focused on the cognitive processes of writing, and twelve descriptive studies that focused on spelling skills. The writing studies included 40 participants from age 8 to adult. All of these participants had complex communication needs requiring AAC and a range of other disabling conditions (anarthria, autism, cerebral palsy, dyspraxia, intellectual disability, and visual impairment). The settings were not all listed, but included home and school.

The results showed that two studies included planning strategies (organizing and generating ideas). All of the studies included modeling and translating strategies (putting ideas into linear, visible language). One focused on reviewing strategies (evaluating and revising). The authors noted a lack of research in this area. They also commented on the failure of research to “explore how planning, reviewing and monitoring can be an important part of the writing process for people who use AAC” (p. 165). They called for more current data to be generated on technologies and their potential impact on all of the
writing processes of planning, translating, reviewing, and monitoring. Finally, they noted that individuals with complex communication needs improved writing skills when they received systematic writing instruction using a variety of cognitive processes. Rather than arguing about which one program was best, they suggested that limited resources be used to (a) learn from each other’s models, (b) implement programs that are consistent with their own world views, and (c) document the effects of the models on composing meaningful written texts independently. They suggested that any claims of evidence-based practice are premature. Practitioners were encouraged to choose materials for writing instruction that addressed one or more of the cognitive processes described by the Flower and Hayes (1981) model, and to examine the improvements that this brings to general writing quality.

Although not a writing study, Schlosser, Bischak, Belfiore, Bartley, and Barnett (1998) used AAC to evaluate the effects of different feedback conditions on learning to spell. They selected a 10-year-old boy with ASD and a severe communication disorder as their participant. He was attending summer school in an elementary self-contained classroom. Sessions were carried out in a library or quiet corner of his classroom.

Schlosser et al. used an alternating treatments design to study three feedback conditions: (a) visual, (b) auditory, and (c) auditory-visual. They used a pre-assessment to select 12 words that the participant comprehended, but could not spell correctly. They used a LightWRITER device that could be manipulated so that it could either give auditory feedback, visual feedback or both. During each training session, the experimenter presented four words two times each. During the visual feedback sessions the participant would compare the words he wrote with a card containing the word.
During the auditory feedback sessions, he would hear the device say each letter as he typed it and then hear the whole word when he pressed a button. The auditory-visual sessions combined both strategies.

The authors defined efficiency of learning as the number of training sessions to criterion. They found that the efficiency of conditions was ranked in the following order: (a) auditory, (b) auditory–visual, and (c) visual. They acknowledged that this study only included one participant and therefore would need to be replicated with other students with ASD. Auditory feedback may be an effective strategy to employ with other students with SCD.

Taft and Mason (2011) reviewed other strategies for teaching writing to students with SCD. The studies they selected used a variety of cognitive planning strategies for students with primary disabilities other than learning disabilities. Studies included in their review met four criteria: (a) targeted or disaggregated data on individuals diagnosed with a primary disability other than a learning disability, (b) an empirical study for explicitly taught sequences of instruction in written expression, (c) studies published in peer-refereed journals or a doctoral dissertation, and (d) writing performance as a dependent variable. Percentage of nonoverlapping data (PND) was used to describe results of single-participant design studies. After searching multiple data bases, 15 studies were found that met these criteria. They involved a total of 57 participants ranging in age from 7-17 years. Students with attention-deficit/hyperactivity disorder, speech or language impairment, Asperger syndrome, autism spectrum disorder (ASD), mild intellectual disability (ID), orthopedic impairment, and emotional or behavior disorders were included in these studies. All of the studies took place in a school setting. They all used
self-regulated strategy development (SRSD, a strategy based on the cognitive processes of writing) instruction or blended components of SRSD within other interventions. This included SRSD for POW+WWW, POW+TREE, STOP and DARE, SRSD for PLAN, SRSD combined with video modeling, and a modified cognitive strategy instruction in writing (CSIW) strategy. The acronyms stand for different steps or questions that the students were to ask themselves and answer in the writing. SRSD was adapted to the individual needs of the students. Six instructional stages were used (a) develop preskills and background knowledge, (b) discuss the strategy, (c) model the strategy, (d) memorize the strategy, (e) practice with teacher guidance, and (f) practice independently. Criterion instruction was used with students moving on when they mastered a phase.

All of the studies examined in this review reported improvement in writing across different genres for a variety of students with diverse needs. This mirrors success reported in over 40 studies using SRSD strategies with other students reported to be poor writers or to have LD. Prior to instruction, all students showed an inability to effectively self-regulate their writing behavior which is a critical component of SRSD. The authors stated in summary that “writing instruction that includes components of evidence-based practices can be adapted to meet the needs of a diverse group of students with disabilities” (p. 367). They also stated that there is a need to replicate these results with all disability classifications, and under the direction of teachers and not just researchers like most of the studies in this review.

A literature review done by Pennington and Delano (2012) summarized research on interventions used to teach writing to students with ASD. They looked at four questions (a) What writing skills had been targeted for investigation?, (b) What
interventions have been investigated and are they consistent with practices for teaching writing to a population of students without ASD?, (c) Have the interventions been effective?, and (d) What is the quality of the available research? After a search of multiple databases they identified 15 articles that met their inclusion criteria. The studies had to be (a) published in a peer-reviewed journal between the years 1994 and 2011, (b) used experimental, quasi-experimental, or single-case research, (c) identified participants as having an ASD, and (d) addressed the instruction of writing skills. There were 2 female and 27 male participants in these studies ranging in age from 4 to 21 years of age. Seven studies were in school based special education settings. One was in an alternative school. Three used university settings and two used home settings. The last two studies did not specify the settings. The studies evaluated a variety of procedures to teach writing skills. Eight of the research teams used electronic technology to teach writing skills. Three of the teams conducted five of the studies using SRSD strategies. Nine of the teams used single-case designs. Five used pre-/posttest procedures and one implemented intervention as a case study in multiple stages.

Pennington and Delano (2012) concluded that all of the students in this review improved their performance on a variety of writing tasks. Ten of the research teams also showed that these writing skills generalized to other response topographies (i.e. handwritten, spoken) or to the acquisition of other literacy skills (i.e., sight word reading, phonological awareness). However, the review did not identify any evidence-based interventions because no single intervention was evaluated across enough participants to meet their criteria. Pennington and Delano identified trends in practice that have emerged for students with ASD. The first is that SRSD strategies were effective for
teaching writing. Second, researchers in the majority of the studies used computer technology to present learning materials or to check learner knowledge. Third, students with ASD benefited from various forms of modeling. Fourth, seven of the interventions described using a visual array of possible responses to reduce cognitive load. Finally, a variety of reinforcement strategies were used to engage student participation. They suggested that these successful components should be included in future research for students with ASD.

Pennington, Collins, Stenhoff, Turner, and Guncelman (2014) took some of these components and combined them for their study. They taught narrative writing skills to five males with autism between 6-10 years of age. All of the participants had moderate to severe language delays, and received the majority of their instruction in a self-contained classroom. They all demonstrated the following pre-requisite skills (a) visual and auditory acuity, (b) echoic vocal responses, (c) computer mouse skills, (d) sight word reading vocabulary, (e) handwritten copying skills, and (f) ability to stay in an instructional area for 10 min. The instructors were a special education teacher with 12 years of experience and a paraprofessional with 13 years of teaching experience. They were trained using a combination of script review, role-play, and practice.

The 1:1 instructional sessions took place at a computer in a self-contained special education classroom or a separate speech therapy room. PixWriter™ software (Slater & Slater, 1994) was used to create story templates. Words were displayed in a 3 x 6 cell grid at the bottom left side of the screen. Each cell contained one word. Three templates were created for each student based on the interests of the students as determined by the results of a modified multiple stimulus without replacement (MSWO) preference
assessment. Ten stories were created for each template that consisted of three sentences each.

Pennington et al. (2014) used a multiple probe across behaviors design to evaluate the effects of a simultaneous prompting procedure on story writing. Before starting the intervention, the instructors conducted three full probe sessions. During these sessions, three templates on different preferred topics were presented. After receiving an attention cue, the participants were given the direction to “Write a story.” The instructors waited 10 s for the student to respond. If he did not respond, the template was closed and a “0” was scored for the number of sentences written. If the student responded within the 10 s, he was allowed to continue until 10 s had elapsed between word selections. At the end, general praise was given for on task behaviors. Three variables were scored for each session. First, the number of sentences was recorded. To be considered a sentence, it had to contain at least a subject and a verb, and make sense. Second, in order to meet criterion, stories needed to show cohesion (all sentences were related to the same subject and described a cause and effect relation). In order to meet criterion, the story had to show cohesion Third, the number of story elements was scored as present or not present. These elements included (a) main character, (b) locale, (c) character action, (d) result of the character’s action, and (e) character’s emotion. Researchers also conducted a variety of other probes- a comprehension assessment at the end of each story construction, a sight reading probe after meeting criterion on a story for three sessions, maintenance probes, generalization probes with a novel template, handwriting probes, and storytelling probes.
During the intervention, the instructor randomly selected three of the ten previously created stories for the current PixWriter™ template. Then the instructor delivered an attention cue. When the participant was oriented to the computer screen the direction was given to “Write a story.” The instructor then pointed to each word of the selected story and waited for 5 s for the student to select the word. During training sessions, the instructor delivered general verbal praise for on-task behaviors and, upon completion of the story, selected a button that played a digitized reading of the story. After discovering a delay in responding, the researchers made the decision to rearrange the templates in the order of subject, choices of verb, choices of article, and a 3 x 3 array of nouns and adjectives.

All five participants acquired story construction responses. Four of them constructed multiple stories, including their own variations of the stories. On average they met criterion in 13 sessions. All participants maintained responses at two and four weeks after instruction. They all showed increased generalized responses to other topographies. The greatest change was from the pre-test to the post-test for the verbal storytelling responses. Three of the participants made gains in other written tasks. Only three of them constructed sentences using the untrained template. All of the participants increased the number of sight words that they could read.

Across these reviews there is a common thread of needing more research in writing instruction. They have shown that students with SCD can make progress in writing skills when they are taught using strategies that involve cognitive processes such as modeling, putting text on paper or screen, evaluating, and revising text. They have also
shown that using computer technology, a visual word array, and a variety of reinforcement strategies generally improve writing results with these students.

The simultaneous prompting strategy combined with the PixWriter™ computer program implemented by Pennington et al. (2014) employed many of these components. This strategy also gave auditory feedback that has been found to be more efficient than visual feedback alone for children with ASD (Schlosser et al., 1998) and should be considered for students with other significant disabilities. The purpose of this research was to replicate strategies that were used in the Pennington et al. (2014) study with some adaptations to see if they increased the number of sentences generated by students with SCD in a cohesive story. The adaptations was to utilize preferred reinforcers with each participant, add images to each word cell in the array, and allow the participant to make any revisions they wanted to make after hearing their story read by the audio feedback. I chose not to include sight word reading, handwriting, comprehension checks, and storytelling probes because I wanted to focus on the story writing skills. This research sought to answer three questions, (a) “Will adding word cell images, preferred reinforcers, modeling, simultaneous prompting, and sentence revision to the PixWriter™ computer-assisted instruction program increase sentences written in cohesive stories by elementary students with SCD across a variety of topics?” (b) Will adding word cell images, preferred reinforcers, modeling, simultaneous prompting, and sentence revision to the PixWriter™ computer-assisted instruction program increase the number of independently generated sentences that complete a story written across a variety of topics by four elementary students with SCD?” (c) “Will students maintain their increases in
sentences written two weeks after criterion is met on each topic and the intervention components are removed?"

**Method**

**Participants**

Seven elementary students with SCD participated in this study. Participants ranged between 9-12 years old and were selected according to the following criteria: (a) full-scale intelligence quotient (IQ) score in the 40-75 range, (b) able to use a computer with either a touch screen or a standard computer mouse, (c) able to see and hear the computer, (d) capable of sitting and working at the computer for 10-15 min with teacher supervision, (e) unable to write at least a three word sentence on paper without teacher assistance, and (f) current student in my life skills classroom. Four participants had educational classifications of ID and three participants had educational classifications of ASD. Three participants were female and four participants were male. Two participants were Hispanic and five were Anglo-American. Three participants could speak independently in full sentences. Three participants could be prompted to speak in full sentences. One participant was non-verbal and used an assistive device and gestures to communicate with others. When given three word choices, participants could identify basic sight words at a variety of levels (See figure 1).

Participants were not selected by gender, ethnicity, or socioeconomic status. Participants would have been excluded from the study if they had excessive absences or if parents did not give informed consent for their participation in this study, but this was not the case. I made the final decision about which students would participate in this study.
Two of my paraprofessionals and I delivered the intervention and collected data on each session. The speech therapist that worked with my class, and I collected data on interobserver agreement and treatment integrity from videos and saved stories.

**Setting.** The setting for the study was a self-contained special education classroom in a public elementary school located in the western region of the U.S. The classroom was about 9 m by 9 m (29 ft. by 29 ft.). Four group tables were located around the room separated by bookcases. The intervention took place at one of two participant desktop computers located on a table against the wall of this classroom. There is a cardboard divider that separates the two computers. There were about 13 other students and staff in the room at the time of the intervention. The classroom teacher or a paraprofessional worked one on one with the participants during each 10-15 min session.

**Dependent Variables and Response Measurement**

I measured two dependent variables. First, instructors recorded the number of sentences written by the students using the PixWriter™ computer-assisted instruction strategy in each session. During the simultaneous prompting phase these sentences were heard and seen before the participant was asked to copy them. At this phase, they were counted as complete if the participant copied the sentence without physical or pointing prompts. During the sentence addition and revision phase, the criteria for the first two sentences was the same as the previous phase. The criteria for the third sentence was that it had to be a group of words that contained at least a subject and a verb and were linked in a logical way. If the instructor gave any prompts for the participant to complete the third sentence, it was not counted. Instructors allowed for errors in punctuation and single article omissions/additions.
Second, in the final phase instructors scored each story for cohesion. This meant that the final sentence added by the participant was linked in a logical and patterned way to the original two sentences provided by the instructor. The sentences had to be “related to the same main character and the events must have occurred in a sequence that described a cause and effect relation between character actions” (p. 400, Pennington et al., 2014). The instructor scored each story with a “yes” if the student’s sentence demonstrated this cohesion and “no” if the last sentence was not related to the main character or to the other sentences. Instructors recorded this information on a data sheet (see Appendix B). Maintenance data was collected two weeks after criterion was met on the third story for one participant.

**Independent Variables**

**PixWriter™ images.** I utilized images in the PixWriter™ word cells. The word cells were individual squares within a larger grid that contained a word and a corresponding picture. When clicked the program would put that word and picture onto the screen. Some of the images came with the software (Slater & Slater, 1994) and others were internet clip art images added to the word cells. These images were used to create story templates (see Figure 2). A story template is a grid of word cells that contain the words (and corresponding pictures) necessary to form sentences about a given topic (e.g., Elsa, robot, dinosaurs, etc). Each template included a word cell for the main character (i.e., the topic word), and multiple verbs, articles, propositions, and nouns that were related to the main character. I created templates that corresponded with topics that participants selected in the MSWO preference assessment (DeLeon & Iwata, 1996): they were Boy (own name), Cinderella, Curious George, dog/Spot, Elsa, Fairy Rosetta, Girl
(own name), horse, Luke Skywalker/Star Wars, Pinkie Pie Pony, Robot, Spiderman, and SpongeBob. I organized them in order of main character (i.e., the topic word), verbs, articles and prepositions, and nouns and adjectives (see Figure 1).

**Simultaneous prompting.** After reading the story to the participant, the participant was asked to write the story as the instructor pointed to each word. If the participant did nothing for 10 s the instructor would use full or partial physical prompting or a pointing prompt to get the participant to click on the appropriate word cell. If the participant needed this prompting, the sentence was not counted in the number of sentences completed for this session. This also included modeling and prompting support for the sentence addition/revision phase for the independent sentence.

**Reinforcers.** I used a MSWO preference assessment to select preferred reinforcers. I presented eight items recommended by parents and staff in an array to the participant. I allowed the participant to examine the objects. Next, I said “Pick one that you would like to work for.” I allowed the participant to eat the item or interact with the item for 30 s and recorded the participant’s choice on the recording sheet (Appendix A). Then, I removed that object from the array and repeated this procedure until only one item remained or the participant made no selection within 30 s of the request. This process was repeated three times. The top three items were selected to use as reinforcers during instruction. The participant was asked to select one of the three preferred reinforcers from their own personalized choice board before each work session. These reinforcers were presented to the participant when they completed a simultaneous prompting or sentence addition and revision session.
**Auditory Feedback.** After the participant wrote her/his own sentence in the sentence addition/revision phase, they listened to the computer voice reading the story. After hearing the story, the participant could revise the sentence to have it make more sense if she/he chose to.

**Instructional sequence.** I used a two-phase instructional sequence to teach students to write sentences. Prior to instruction, the instructor selected a story made up of words from the prepared template of choice that also included images for the words. The same story was not used in 3 consecutive work sessions. The participant was asked to choose a reinforcer to work for. The instructional sequence began with simultaneous prompting. The teacher read the three-sentence story to the participant. The participant was asked to write the story by clicking on each word cell as the instructor pointed to each word in the story. If needed, the teacher used full physical, partial physical, or verbal prompting to help the participant find the word cells in order to write the story. At the end of the session, the instructors had the student click on the button that had the computer read the story to the student. The participant then received the reinforcer. The second instructional phase was sentence addition and revision. During this phase, the participant copied the first two sentences and then was asked to complete the story with a sentence of his/her own. He/She received simultaneous prompting, as needed, to click on the word cells to create his/her own sentence. After he/she had written the final sentence, he/she received auditory feedback as the computer read the story to him/her. The instructor asked him/her if the story was how he/she wanted it. If the participant replied “no” then he/she was allowed to adjust the story and listen to the auditory feedback again until he/she was satisfied with the writing. When he/she was finished, he/she received
their reinforcer. This sequence of story selection, simultaneous prompting, and sentence addition/revision was repeated for multiple stories.

**Interobserver Agreement (IOA)**

An independent observer reviewed 20% of the saved participant stories and completed the scoring sheet on the dependent variables. This was compared with the scoring sheet filled out by the instructor working with each participant. IOA was calculated by dividing the total number of agreements by the total of agreements plus disagreements and multiplying that score by 100% to generate a percentage score. IOA was calculated to be 83% during this study.

**Treatment Integrity**

Instructors received training in the implementation and scoring procedures during a training session. They received verbal instruction, written procedures, and had an opportunity to practice the procedures the next day with other staff acting as students. They were required to show fidelity of implementation with 100% accuracy across three sessions before beginning the intervention with the students.

Treatment integrity was measured by videotaping 11% of the baseline and intervention sessions and having another observer use a checklist to determine if all of the treatment components were present. The components of the baseline sessions were (a) give attention getting prompt, (b) orient student to computer, (c) deliver prompt, “Write a story about ________.”, (d) use correct wait times, and (e) verbal praise for on task behavior. The components for the simultaneous prompting phase were (a) have student select reinforcer, (b) give attention getting prompt, (c) orient student to story, (d) read the story, (e) orient student to computer, (f) deliver prompt, “Write the story.”, (g)
simultaneous prompting, (h) use correct wait times, (i) give verbal praise for on task behavior, (j) play back sentences to participant, and (k) give the preferred reinforcer. The components for the sentence addition and revision phase were (a) have student select reinforcer, (b) give attention getting prompt, (c) orient student to story, (d) read the first two sentences of the story, (e) orient student to the computer, (f) deliver prompt, “Write the first part of the story.”, (g) simultaneous prompting, (g) deliver prompt, “Write a sentence to finish the story.”, (h) use correct wait times, (i) give verbal praise for on task behavior, (j) play back sentences to participant, (k) ask participant if their story is done, (l) if the participant says that the story is not done, allow them to edit their story and then go back to step “k”, and (m) give preferred reinforcer when the participant is done. See Appendix D. A percentage score was calculated by dividing the number of components present in the intervention by the total number of components possible and multiplying the total by 100%. The treatment integrity for this study was calculated to be 97%.

**Experimental Design**

I used a multiple probe across behaviors (multiple story topics, i.e., templates) design repeated across seven participants to evaluate the effects of the story writing intervention (Pennington et al., 2014). This design allowed all participants to begin the intervention at the same time, but also showed treatment effects across three different story topics (i.e. Yoda, Arthur, and Spider Man), for each participant. The simultaneous prompting sessions included the first three components of the independent variable—images on the Pixwriter™ cells, simultaneous prompting, and a preferred reinforcer. The criterion for moving to the next phase was three consecutive sessions in which the participant wrote three sentences of the story with only verbal prompts. When criterion
was met in the simultaneous prompting phase, the instructor moved on to the sentence addition and revision phase. During these sessions all four components of the independent variable were in place — images, simultaneous prompting for the third sentence, preferred reinforcer, and auditory feedback. When the criterion was met across three consecutive sessions, the instructors conducted a baseline session on the two remaining preferred topics. The next step introduced simultaneous prompting with the second topic template. When criterion was met during the sentence addition and revision phase of the second topic, the instructors began the entire sequence again with a new topic. This pattern was repeated for three topics. Two weeks after one student reached criterion on the third topic, he was asked to complete a Sentence Addition and Revision session on the third topic with two previously unused stories as a maintenance check.

**Procedures**

**Prior to the study.** I talked to parents and staff that worked with the participants and identified preferred topics and located representational pictures of them. I gave the participants a chance to look at eight pictures, and then conducted a MSWO preference assessment using the pictures. I said “Point to the one you want to write about.” After the participant selected a picture, I removed that picture, rearranged the order of pictures in the array, and repeated the request. I repeated this until all of the pictures were selected or until the student did not make a selection. I repeated this process two more times and selected the three highest preferred items as instructional targets.

Using these preferred topics, I created 13 stories that were three sentences long and 13 stories that contained two sentences for each topic and wrote them on 10.2 cm x 15.2 cm (4 x 6 in) cards. These cards were placed in a plastic cardholders 11.5 cm x 16
cm. I also created PixWriter™ templates for each preferred topic containing words for the stories that I generated.

I also conducted a MSWO preference assessment to select reinforcers to use during the intervention with each participant. I started with eight reinforcers recommended by staff members that worked with each participant and my own experience with each child. I said “Point to the one you want.” If an edible was selected, the participant was allowed to consume the edible. If a non-edible was selected, the participant was allowed to play with the item for 30 s. That item was then removed, and the instruction repeated until only one item remained. I repeated this process two more times and selected the three highest preferred items as reinforcers. I created a choice board for each participant to select the reinforcer for each session.

**Baseline sessions.** For each topic, a baseline session was conducted using the PixWriter™ computer assisted writing program. On each trial, the instructor put up the templates and give an attention cue to the participant (i.e. “Look”), waited for her/him to look at the PixWriter™ computer screen, pointed at the template and said, “Write a story.” The instructor waited 10 s for the participant to respond. If the participant did not respond within 10 s, the instructor closed the template, and scored a “0” for the number of sentences constructed. Then the instructor repeated this procedure for the next template. If the participant responded within the 10 s, he/she was allowed to continue until 10 s had elapsed between word choices. At the end of each trial, if any sentences have been written, the instructor pushed the audio feedback button. The instructor also delivered general praise for on task behaviors. Each story was saved in a folder with the participant’s name using the date as the file name. The instructor also recorded the
number of sentences completed on the data form. This process was repeated at the end of
the first and second simultaneous prompting with sentence addition and revision sessions
for the untaught topics.

**Simultaneous prompting.** The instructor used a simultaneous prompting (SP)
procedure with the PixWriter™ computer assisted writing program during the
intervention phase. The instructor selected one of the 13 stories (three sentences long) on
the current topic for that participant from the cardholder. The same story was not selected
on three consecutive days to prevent simple memorization of the text. The instructor had
the participant select which of the three preferred reinforcers she/he wanted to work for.
Then the instructor delivered an attention cue (i.e. “Look at the story.”). The instructor
read the story pointing to each word as she read. The instructor then delivered the
prompt, “Write the story.” Without a pause, the instructor prompted by pointing to each
computer cell showing the words from the selected story and waiting 10 s for the
participant to select each word in order. If the participant did not select the word after 10
s, the instructor used a full or partial physical prompt to assist the student in selecting the
word, but did not count that sentence in the number of sentences completed for that
session. During these sessions, the instructors delivered general verbal praise for on-task
behaviors following the completion of each sentence. When the story was complete, the
instructor provided praise and selected the audio feedback button to play a digitized
reading of the story. The instructor then delivered the selected reinforcer if the participant
willingly participated in copying the sentences. The instructor saved each story in the
participant’s digital folder using the date as the file name and recorded the number of
sentences correctly completed on the data form (Appendix B and C). In order to meet
criterion, the participant had to copy all three sentences of the story with only pointing prompts at the words of the original story and verbal prompts to stay on task over three consecutive sessions. If the instructor has to use any physical prompts or point to the word cells, the sentences were not counted in the total for the story.

**Simultaneous Prompting with Sentence Addition and Revision.** The instructor selected one of the 13 stories (two sentences long) created for the current topic for that participant from the cardholder. The instructor had the participant select which of the three preferred reinforcers she wanted to work for. Then the instructor delivered an attention cue (i.e. “Look at the story.”). The instructor then read the story pointing to each word as she read. The instructor delivered the prompt, “Write the story.” The instructor pointed to each word as the participant selected the corresponding word cell from the template. The instructor delivered general verbal praise for on-task behaviors following the completion of each sentence. After the two sentences were copied with only verbal prompts, the instructor delivered the prompt, “Write a sentence to complete the story.” If the participant did not select the word after 10 s the instructor used a partial physical prompt to assist the student in selecting words, but did not count that sentence in the number of sentences completed for the session. When the story was complete, the instructor provided praise and selected the audio feedback button to play a digitized reading of the story. After the participant listened to the story, he/she was asked if the story was how he/she wanted it. If the participant replied “no,” then he/she was allowed to adjust the story and asked again if the story was complete. If he/she replied “yes,” then the instructor gave the participant the reinforcer that he/she selected, saved each story in the participant’s digital folder using the date as the file name, and recorded the
number of sentences correctly completed on the data form (Appendix B and C). Three consecutive days of three sentence cohesive stories were required in order to meet the criterion to move to introduce the next story topic. Cohesion was achieved when the final sentence related to the story topic and the events occurred in a reasonable sequence.

**Maintenance and Generalization.** The baseline sessions conducted before the second and third topic provided generalization data. In addition to this, two weeks after one participant reached criterion on the final topic, the participant was asked to complete a Simultaneous Prompting with Sentence Addition and Revision session with two untaught stories on the third topic to check for maintenance of story completion skills.

**Results**

All of the participants started out with zero sentences written in the baseline probes before the intervention began. All of the participants made progress in writing narrative text in the Simultaneous Prompting phase. Six of the participants met criterion on this phase and progressed to the second phase of adding their own sentences to at least one story. Four of these six participants met the criterion of adding their own cohesive sentences to the stories with only verbal prompting to stay on task over three consecutive sessions, and were able to move on to other topics. One participant was not able to move past the simultaneous prompting phase for the first topic.

Participant A completed no sentences during the first two baseline probes of the first two topics, but he correctly completed one sentence in the third baseline probe on the third topic (See Figure 3). He progressed through all three preferred topics completing three sentences in all except two sessions. Then he completed a successful maintenance
probe two weeks after the last topic was completed. He quickly learned the placement of
the word cells for each topic during the simultaneous prompting (SP) phase. During the
sentence addition and revision (SAR) phase, he had no problem forming a sentence to
complete the story, but he did not consistently create sentences that were cohesive with
the first two story sentences. By the third topic (Spiderman), he created cohesive
sentences with no prompting. Procedural errors were made during each of the topics.
During the SP phase of the first topic (robot), five stories were completed at criterion
before advancing to the SAR phase. During the SP phase of the second topic (dinosaur),
four stories were completed at criterion before advancing to the SAR phase. During both
phases of the third topic (Spiderman), six stories were completed at criterion before
ending each phase.

Participant B was not able to complete sentences during any of the baseline
sessions (See Figure 4). He took longer to learn where each of the word cells were
located in the first topic (Star Wars) SP phase. When he advanced to the SAR phase of
this topic, he did not consistently form sentences and make them cohesive with the story.
At story 25, the stories completed per session were increased to two. At story 29, color
was added to the borders of the word cells. It was at this point that he was able to
construct his own cohesive sentences. After adding the colored borders, he completed
cohesive stories for his next four consecutive stories. He made much quicker progress
during the SP phase of the second topic (his own name). He still was inconsistent in
forming his own cohesive sentences in the SAR phase of the second topic, even with
color on the borders of the word cells. He did not reach criterion on this skill by the end
of the study. Three times procedural errors were made as four stories were completed at criterion before moving on to the next phase.

Participant C did not form any sentences during his baseline sessions for either of his story topics (See Figure 5). He took ten sessions to reach criterion during the first topic (robot) SP phase. In the second phase, he was not initially successful forming sentences independently. After 10 stories, color was added to the borders and prompting was delivered on using words from the different colors, but he was still not creating sentences. After 17 stories, he changed to completing two stories per day. With this change, he started creating his own sentences and met criterion after 21 stories in this phase. Even with these changes it still took him twelve sessions to reach criterion on the second topic (Star Wars) SP phase. This is more stories than he required in the first topic. He did not begin the SAR phase for the second topic during the study. Procedural errors were made three times as four stories were completed at criterion before moving on to the next phase.

Participant D did not form any sentences during her baseline sessions for either of her topics (See Figure 6). She made slow gradual progress in the SP phase for her first topic (Elsa). She required many sessions and stories to learn where the word cells were located in that phase. It took her 19 sessions in this phase before she was able to reach criterion. She was inconsistent in forming sentences in the SAR phase. Twice during the first three stories, she used sentences that came from previous stories. Then as she progressed she chose words that did not make sense in the order that they were chosen. She did not see anything wrong with the order of her words. She received prompting to pick words in the correct order. Even after adding in color borders after story 34 and
increasing the number of stories per day after story 36, it took her five more sessions to reach criterion. The instructor reported that the colors seemed to help her organize her ideas for her sentence. She had just started second topic (fairy) at the end of this study.

As shown in Figure 7, participant E did not form sentences in the initial baseline probes, but did form one sentence in the second baseline probe on the second topic (her own name). At first her sessions were separated by many intervening days because of scheduling conflicts. After 8 stories in the first topic (Elsa) SP phase, the number of stories per session increased to two. Her performance immediately improved and she reached criterion four stories later. At this point colored borders were added to her template and her sessions were moved to a more consistent morning time. After this, she quickly completed the SAR phase for the first topic. A procedural error was made, when the instructor had her complete three sessions of cohesive stories (six stories) instead of three cohesive stories as intended. She moved quickly through the second topic (own name) SP phase and has met criterion on two stories in the second topic SAR phase at the end of the study. Her success appeared to be a result of more frequent opportunities to work on the stories.

Participant F engaged with only one topic. She did not form any sentences in the baseline probe (See Figure 8). At first her sessions were also spread across time because of scheduling conflicts and absences. She required 20 stories to move through the first topic simultaneous prompting phase. She often failed to find the word cells. After nine stories, she began to complete two stories per day, and color was added to the borders of the word cells. The colored borders helped her find the words faster. Also her sessions were scheduled at a more consistent time in the morning after story thirteen. After this,
she completed six consecutive stories without prompting. This was also a procedural error. She should have moved on after 3 consecutive stories. Once she got to the sentence addition and revision phase, she reached criterion in the minimum possible number of stories. Unfortunately, the study ended before she could progress to a second topic.

Participant G, the only participant who was non-verbal, worked on only one topic during the study. He did not complete any sentences in the baseline session (See Figure 9). He never completed a simultaneous prompting phase. At first when orally prompted with the word, he was able to use a mouse to click on the pictures that he recognized—himself, his parents, and the rides at Lagoon. He was quick to randomly click on other word cells without looking carefully for the word cell in the template that matched the prompted word. Eventually he was able to click on the rest of the nouns and verbs when orally prompted with the word. As time progressed, he continued to click randomly on the small words (the, to, and, his, in, on, up, down, and with). By the end of this study he had was able to consistently click on three of these words (the, up, down) when verbally prompted. Instead of looking at the words carefully, he was clicking any of the cells he did not recognize. He thought it was funny to have the computer read the wrong word. These smaller words are part of the 203 basic sight words he can select from a three-word array in the Edmark computer program with 86% accuracy. These smaller words are often harder for my students with SCD to remember. Participant G’s progress was measured in the reduced number of prompts needed to complete stories. During the first two stories, Participant G needed prompting on 73% of the words. On two of the last stories, Participant G needed prompting 18% of the time.
Participants A, E, and F (Figures 2, 6, and 7) had higher oral language skills and could independently speak in complete sentences. They made faster progress through Phase 2, the Sentence Addition and Revision phase, of each topic that they completed. When they listened to the story being read back to them, they were more likely to revise a sentence if it did not make sense. Participants B, C, and D (Figures 3, 4, and 5) could produce oral sentences with prompting. They needed more time to complete Phase 2 of each topic.

We employed two strategies to help participants that were making slow progress. The first strategy was to add color to the borders of the word cells. A different color was used for main character, verbs, articles and prepositions, and nouns and adjectives. The colors helped some participants in the first phase remember where the word cells were located. The colors also helped some participants in the sentence addition/revision phase organize their sentence writing. Participants were prompted to pick a word from a certain color as they learned to write their own sentence. These sentences were not counted as independent sentences, but eventually participants could do this on their own. At first, because of time constraints, participants completed only one story during each work session. The second strategy was to increase the number of stories completed each day from one to two. We were able to do this because participants were quicker to complete a story and because we changed the schedules for some participants.

Some corrections had to be made to the original study materials. Four story words had been inadvertently left off of the story templates. These words were easily added into the templates, but the delay this caused could have been avoided. I should have asked someone else to go through the document with the word lists and stories, and check it for
accuracy. The data collection sheets were adjusted several times before the study began, but had to be adjusted again during the study. I had failed to include a space for recording baseline data. Also, the printed criteria for passing off each phase on the data sheets were not complete. I neglected to include how many stories the participants had to complete, with only verbal prompts to look at the story or the screen, to meet this criteria. Therefore, the first participant to reach criteria in the simultaneous prompting phase did so over five stories instead of the intended three stories. Also one participant reached criteria in the sentence addition/revision phase for six stories. This information was in the training materials, but not on the data sheet.

In addition to the increased narrative writing skills, this study had other positive results. Upon completion of the reinforcer preference assessment, we discovered some new reinforcers to use with students in other settings. Participants seemed to enjoy listening to the stories that they made. They were quick to click on the audio feedback button that read their story back to them. Some participants would click on this button multiple times after adding their own sentence and invite others to listen to their story. Participants reported sharing their stories with parents and siblings at home. Two participants said that the pictures made this easier to share stories with their younger siblings. Two participants asked if I could add in other words to their templates so that they could create more personalized sentences.

**Discussion**

Given these results, this study demonstrated that adding images in word cells, utilizing preferred reinforcers, and giving an opportunity to revise sentences paired with the simultaneous prompting and computer-assisted instruction strategy used by
Pennington et al. (2014) increased the number of sentences written by some participants with SCD in cohesive stories on preferred topics. Six participants were able to finish stories across one topic adding sentences that made sense and were cohesive with the story. One of those participants was also able to do this across all three preferred topics.

The most successful participants were those who were able to verbally express themselves in complete sentences prior to the study. I recommend that one of the participation criteria for using this intervention should be the ability to communicate verbally in sentences. It is harder to create a written sentence that makes sense if one is not able to form one in oral language. In the future, these oral sentence skills should be developed first through collaboration with the speech therapist. The speech therapist at our school is currently using a strategy to develop this skill. She has a folder with action pictures and a choice of icon in an array on the opposite side. She has students choose icons from the array, place them onto a strip, and then verbalize the words to tell about the picture. She begins with one word and then keeps increasing the words required to tell about the story. I could use a strategy similar to this to help students learn the pre-requisite skills needed for narrative writing.

The results showed that four participants benefited from the addition of colored borders to the word cells. Five participants benefited from increasing the number of stories per session and two benefited from completing the study at a more consistent time in the morning. I would suggest that these should be included from the beginning in future studies of this strategy. The results also showed that the PixWriter™ templates gave participants an opportunity to play around with words and experiment with putting words in different orders. Three participants did this before they understood how to
organize words into sentences in the SAR phase. These were the same participants who relied on prompting to form complete verbal sentences. It seemed to be a necessary part of the process of learning how to organize words into sentences. All students were eager to participate with the computer assisted writing. They would ask when it would be their turn to get on the computers to write stories.

The training for the instructors and reference materials could have been improved. There was some confusion about what constituted a sentence. I could have used more examples and non-examples in the training. It would have been helpful to put an example of the format used to save the stories on display in the computer area. It would have also saved time and paper to make sure that all instructors knew that they could do both stories on the same paper for each day. We also found that some students would try to close out of the sessions before the stories had been saved. We had to make sure that the instructors saved the story before sending it to the printer.

There is a need for continued research to replicate and extend the results of this study. Researchers should consider what precursor skills are needed to benefit from using this intervention. Maybe there is a screener that could be used to determine if participants have the necessary language skills to put together a sentence. Also, maybe the picture icons with the words on the PixWriter™ templates are not needed for all students. It would be good to figure out at what level they do not need this support.

Researchers may want to study how much writing instructional time is optimal to get maximum benefits for teaching writing to SCD students with teacher support. Students with SCD often have a shorter attention span than higher functioning peers. My experience has taught me that these students can learn many skills if the tasks are broken
down into their basic components, and then presented repetitively over time. Additional studies will be needed to identify evidence-based writing instruction strategies that accomplish this for our students with SCD.

As these strategies for writing instruction are identified, they need to be shared, and instructional materials developed to facilitate writing instruction. The strategies need to be easy to implement on a regular basis in a busy self-contained classroom for students with SCD. As they are implemented on a regular basis students will learn skills that allow them to communicate their ideas through email, text, instant message, and to share information at school and work in more formal settings.
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<th>Participant</th>
<th>Verbal Skills</th>
<th>Writing Skills</th>
<th>Reading Skills-ID Sight Words</th>
<th>Cognitive Skills (IQ)</th>
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</thead>
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<tr>
<td>A</td>
<td>Forms independent sentences</td>
<td>Copy sentences &amp; spell some CVC words</td>
<td>150</td>
<td>40-60</td>
</tr>
<tr>
<td>B</td>
<td>Forms prompted sentences</td>
<td>Copy sentences &amp; spell some CVC words</td>
<td>205</td>
<td>40-60</td>
</tr>
<tr>
<td>C</td>
<td>Forms prompted sentences</td>
<td>Copy sentences</td>
<td>64</td>
<td>40-60</td>
</tr>
<tr>
<td>D</td>
<td>Forms prompted sentences</td>
<td>Copy sentences &amp; spell some CVC words</td>
<td>108</td>
<td>40-60</td>
</tr>
<tr>
<td>E</td>
<td>Forms independent sentences</td>
<td>Copy sentences &amp; spell CVC words</td>
<td>43</td>
<td>60-75</td>
</tr>
<tr>
<td>F</td>
<td>Forms independent sentences</td>
<td>Copy sentences &amp; spell CVC words</td>
<td>40</td>
<td>60-75</td>
</tr>
<tr>
<td>G</td>
<td>Non-verbal-gestures &amp; assistive device</td>
<td>Trace words</td>
<td>203</td>
<td>40-60</td>
</tr>
</tbody>
</table>

*Figure 1.* – Participant skill levels.
Figure 2. – Examples of templates used for story construction.
Figure 3. Participant A’s Story Construction Responses Across Three Story Topics
Figure 4. Participant B’s Story Construction Responses Across Two Story Topics
Figure 5. Participant C’s Story Construction Responses Across Two Story Topics
Figure 6. Participant D’s Story Construction Responses Across Two Story Topics

Key  BL- baseline  SP- simultaneous prompting
     SAR- sentence addition and revision  ● - no cohesion
Figure 7. Participant E’s Story Construction Responses Across Two Story Topics
Figure 8. Participant F’s Story Construction Responses Across One Story Topic

Key
BL - baseline
SP - simultaneous prompting
SAR - sentence addition and revision
- no cohesion

Figure 9. Participant G’s Story Construction Responses Across One Story Topic

Key
BL - baseline
SP - simultaneous prompting
Appendix A

Data Collection Sheet for MSWO Preference Assessment

Name __________________ Date ______________________

Write the items used in the first column and list the order that the items were selected in the Session columns.

<table>
<thead>
<tr>
<th>Items</th>
<th>Session 1</th>
<th>Session 2</th>
<th>Session 3</th>
<th>Total</th>
</tr>
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<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

Add the numbers across sessions in the total column. Rank the items from the lowest number to the highest in the list below.

1*. ___________________________

2*. ___________________________

3*. ___________________________

4. ___________________________

5. ___________________________

6. ___________________________

7. ___________________________

8. ___________________________

* These items are the preferred items to be used with the intervention.
Appendix B

Original PixWriter™ Strategy Recording Sheet

Student Name ___________________   Dates ______________
Template _______________________   Stage ______________

Number of sentences completed

First phase ends when the student can make the three sentences without physical prompting. Draw a bold line when 2nd phase begins.

The second phase ends when the student can copy the first two sentences with prompting and add a sentence of their own that is cohesive with the story without prompting.

<table>
<thead>
<tr>
<th>Day of the week</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date/# of sentences</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date/# of sentences</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Date/# of sentences</td>
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<tr>
<td>Date/# of sentences</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Date/# of sentences</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Criteria for a sentence- Minimum of a subject and verb linked in a logical way. Errors in punctuation and single article omissions/additions will be allowed.

Cohesion of the story during second phase

Date 2nd phase begun ______________

<table>
<thead>
<tr>
<th>Day of the week</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes or No?</td>
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<tr>
<td>Yes or No?</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Yes or No?</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
</tbody>
</table>

Criteria- Each sentence related to the same main character - Events occurred in a reasonable sequence
Appendix C

Final Phase 1 Simultaneous Prompting Recording Sheet

Student Name ____________________  Template ____________________

Dates___________ to _____________

<table>
<thead>
<tr>
<th>Key</th>
<th>IV= independent or verbal prompt</th>
<th>P= pointing prompt</th>
<th>PP= partial physical prompt</th>
<th>FP= full physical prompt</th>
<th>R= refuse to work</th>
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</table>

Baseline Data

<table>
<thead>
<tr>
<th>Topic 1</th>
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<th>Topic 3</th>
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</thead>
</table>

<table>
<thead>
<tr>
<th>Date/Story #</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sentence 1</td>
<td>IV P PP FP R</td>
<td>IV P PP FP R</td>
<td>IV P PP FP R</td>
<td>IV P PP FP R</td>
<td>IV P PP FP R</td>
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<tr>
<td>Sentence 2</td>
<td>IV P PP FP R</td>
<td>IV P PP FP R</td>
<td>IV P PP FP R</td>
<td>IV P PP FP R</td>
<td>IV P PP FP R</td>
</tr>
<tr>
<td>Sentence 3</td>
<td>IV P PP FP R</td>
<td>IV P PP FP R</td>
<td>IV P PP FP R</td>
<td>IV P PP FP R</td>
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</tr>
</tbody>
</table>

<table>
<thead>
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<th>Tuesday</th>
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<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sentence 1</td>
<td>IV P PP FP R</td>
<td>IV P PP FP R</td>
<td>IV P PP FP R</td>
<td>IV P PP FP R</td>
<td>IV P PP FP R</td>
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<tr>
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<td>IV P PP FP R</td>
<td>IV P PP FP R</td>
<td>IV P PP FP R</td>
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<td>IV P PP FP R</td>
<td>IV P PP FP R</td>
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<table>
<thead>
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<tbody>
<tr>
<td>Sentence 1</td>
<td>IV P PP FP R</td>
<td>IV P PP FP R</td>
<td>IV P PP FP R</td>
<td>IV P PP FP R</td>
<td>IV P PP FP R</td>
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<td>Sentence 2</td>
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<td>IV P PP FP R</td>
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<th>Tuesday</th>
<th>Wednesday</th>
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</table>

First phase ends when the student can make the three sentences without pointing or physical prompting over 3 consecutive stories.
Final Phase 2 Sentence Addition and Revision Recording Sheet

Student Name ___________________ Template ____________________
Dates_________ to _____________

Criteria for a sentence- Minimum of a subject and verb linked in a logical way. Errors in punctuation and single article omissions/additions will be allowed

Criteria for cohesion- Each sentence is related to the same main character. Events occurred in a reasonable sequence.

<table>
<thead>
<tr>
<th>Key</th>
<th>IV= independent or verbal prompt</th>
<th>P= pointing prompt</th>
<th>PP= partial physical prompt</th>
<th>FP= full physical prompt</th>
<th>R= refuse to work</th>
<th>Y= yes</th>
<th>N= no</th>
</tr>
</thead>
<tbody>
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<tr>
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<td>N</td>
<td>Y</td>
<td>Y</td>
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</table>

The second phase ends when the student can copy the first two sentences with prompting and add a sentence of their own that is cohesive with the story without prompting over 3 consecutive stories.
### Appendix D

#### Simultaneous Prompting Checklist

<table>
<thead>
<tr>
<th>Instructor</th>
<th>Date</th>
<th>___ Student pick reinforcer</th>
<th>___ Attention getting prompt</th>
<th>___ Student oriented to story</th>
<th>___ Read the story</th>
<th>___ Orient student to computer</th>
<th>___ Prompt “Write the story.”</th>
<th>___ Simultaneous prompting</th>
<th>___ Correct wait times</th>
<th>___ Verbal praise for on task beh.</th>
<th>___ Play back story to student</th>
<th>___ Ask if the story is done</th>
<th>___ Give reinforcer to student</th>
</tr>
</thead>
</table>

#### Sentence Add, and Rev. Checklist

| Instructor          | Date   | ___ Student pick reinforcer | ___ Attention getting prompt | ___ Student oriented to story start | ___ Read the 1st 2 sentences | ___ Orient student to computer | ___ Prompt “Write the 1st part of the story.” | ___ Simultaneous prompting | ___ Correct wait times | ___ Say “Write a sentence to finish the story.” | ___ Verbal praise for on task beh. | ___ Play back story to student | ___ Ask student if story is done | ___ Allow revision if desired | ___ Give reinforcer to student |

#### Baseline Integrity Checklist

| Instructor          | Date   | ___ Attention getting prompt | ___ Student oriented to computer | ___ Prompt “Write a story.” | ___ Verbal praise for on task beh. |