



The Effectiveness of Story Mapping on Reading Comprehension Skills of Children with ADHD

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Abstract

The purpose of the current study was to explore the effectiveness of story mapping on reading comprehension skills of children with ADHD. 10 students in grades five who had been identified as having ADHD were chosen. The sample was randomly divided into two groups; experimental (n=5 boys) and control (n=5 boys). Attention-Deficit Hyperactivity Disorder Test (ADHDT), and Reading Comprehension Test were used. Mann Whitney and Wilcoxon tests were employed for data analysis. Results from this study indicated the effectiveness of story mapping on reading comprehension skills of the students in the experimental group.

Keywords: *Story mapping, reading comprehension skills ,children with ADHD,*

Introduction

Reading comprehension is a critical academic skill all students are expected to master. Research has shown deficits associated with ADHD, such as inattention, poor working memory and organizational skills, significantly decrease students' ability to derive meaning from text (Flory, Hayden, Milich, Lorch, Strange, & Welsh, 2006). During early elementary school, students are taught how to read. As students advance, reading instruction focuses on comprehension or reading to learn (Gardill & Jitendra, 1999). If students experience difficulty comprehending text, it is likely they will struggle in many other academic areas.

Story maps are visual-spatial displays that can be used during instruction to guide attention to important components of narratives using a specific structure (Boulineau, Fore, Hagan- Burke, & Burke, 2004). The map provides readers with a space to record important story grammar categories including: Setting, characters, problem, goals, actions, outcome, and conclusion of the story. The purpose of instruction with a story map is to improve narrative comprehension by helping students to understand the structure of a coherent story representation, with emphasis on the causal connections between characters' goals, their attempts to achieve goals, and the outcomes of those attempts (Boulineau et al., 2004).

In two studies that examined the effect of interventions focusing on story mapping, Idol and Croll (1987) and Boulineau et al. (2004) explicitly instructed struggling readers on story grammar categories and story structure using story maps. Students in both studies received extensive feedback from teachers on correct identification of story grammar elements through story map completion. Participants in Idol and Croll (1987) showed improved comprehension, and most maintained comprehension gains when story maps were removed. Students in Boulineau et al. (2004) improved in the identification of story grammar elements from pre-test to post-test, and accuracy of identification was maintained after removal of instruction. These studies suggest that interventions that focus on story-mapping as a technique may effectively improve comprehension. DuPaul and colleagues (2006) and Jitendra and colleagues (2007) utilized a story mapping technique as one available component among multiple components of a reading intervention package in large scale, long-term, academic intervention studies for children with ADHD. Both studies found evidence of improved comprehension for these struggling readers, although the unique contribution of story mapping instruction cannot be determined. As a whole, these studies suggest that instruction in the use of story maps is a promising technique for improving knowledge of story structure and potentially of narrative comprehension and production.

Story Comprehension in Students with ADHD

Previous research has found story mapping can help students with learning disabilities improve in these areas.

Stagliano and Boon (2009) used a multiple probe design to examine the effects of story mapping on three fourth grade students' reading comprehension skills for expository text. In this study, participants received daily story map intervention for 15 to 20 minutes over

a two month period. Participants' comprehension skills were monitored by reading comprehension questions. On average, the participants increased their percentage of correctly answered reading comprehension questions from 14.9% at baseline to 88.4% at the conclusion of the intervention phase. A maintenance phase was incorporated in which participants' reading comprehension skills were assessed two weeks after the intervention was discontinued.

Jamie(2010) examined whether the effects of story mapping will be maintained after the intervention is discontinued. The participants' comprehension levels were evaluated using DIBELS Oral Reading Fluency and Story Retell measures and the AIMSweb Maze measure. An analysis of the data is expected to reveal that story mapping increases comprehension skills for students with ADHD and that this effect is maintained after the intervention is discontinued.

Karen et al.(2014) examined the effects of an 8-week Story Mapping Intervention (SMI) to improve narrative comprehension in adolescents with ADHD. Thirty 12 – 16 year-old adolescents with ADHD who were participating in a summer treatment program for adolescents with ADHD received the SMI instruction ten times and completed SMI homework ten times in a structured environment with teacher feedback. Recall of fables and story creation were assessed before and after the SMI. At post-test, fable recalls included more of the most important events, were more coherent, and included a greater number of plausible inferences than pre-test fable recalls. SMI homework scores accounted for increases in recall of important events and plausible inferences

Jaime et al.(2015) examined the effects of story mapping on the reading comprehension scores, on-task behaviors, and attitudes of third- -grade students (N = 6) with ADHD. Students' reading grade equivalencies were assessed before and after the study. The teacher-researcher compared two other achievement measures before and during story mapping to assess growth. The practical difference in scores as calculated with Cohen's d revealed that story mapping was successful in improving students' comprehension. On tests from the reading basal, students' scores improved an average of 16.00%, while tests from a computerized reading program improved 20.00%. Students exhibited on-task behavior 79.33% of the time and positive attitudes 82.33% of the time during the intervention.

This study investigated the effects of story mapping on reading comprehension skills of elementary students with ADHD. It was hypothesized that story mapping will increase reading comprehension skills of students with ADHD.

Method

Participants

10 students in grades five who had been identified as having ADHD were chosen .The sample was randomly divided into two groups; experimental (n= 5 boys) and control (n= 5 boys). Parental informed consent forms were sent home by the school director and school psychologist to parents of potential participants telling them about the study and requesting them to give permission for their children to participate. Through a previous comprehensive psychological evaluation each targeted child had received a primary diagnosis of ADHD.

Measures

Attention-Deficit Hyperactivity Disorder Test (ADHDT) (Jeong, 2005): To support evidence of criterion validity related to the questionnaire developed based on DSM-IV-TR criteria, the Attention-Deficit Hyperactivity Disorder Test (ADHDT) was employed. ADHDT is based on the DSM-IV. This instrument consists of three categories: Hyperactivity (13 items); Impulsivity (10 items); and Inattention (13 items). The items use a 3-point Likert scale with 0 representing no problem, 1 representing a mild problem, and 2 representing a severe

problem. The author reported reliability with Cronbach's alpha coefficient. Cronbach alphas for hyperactivity, impulsivity and inattention were .98, .95, and .98 respectively for teacher ratings.

Reading Comprehension Test: The test was developed to assess reading disabled children's skills in reading comprehension. It was based on the features of comprehension skills recognized by Mourad Ali (2015). The test consists of (60) items assessing word recognition, and comprehension, 30 items each, with score ranging from 0-1 on each item and a total score of 60. The test has demonstrated high internal consistency with Cronbach's α ranging from 0.86 to 0.89.

Procedure

Screening : Through a previous comprehensive psychological evaluation each targeted child had received a primary diagnosis of ADHD.

Pre-intervention testing: All the ten students in grade five completed the reading comprehension test. Thus data was reported for the students who completed the study.

General Instructional Procedures: Participants were recruited voluntarily through teacher referrals. Prior to the start of the study, student-informed assent and parental consent were obtained for all the participants. The story map used during the intervention phase was developed by Boulineau and colleagues (2004) (Appendix A). The map provides seven areas for recording key elements of a story: setting/time, characters, problem, solution, outcome, reaction and theme. The story mapping intervention was implemented three times a week for seven weeks. Prior to each reading, the instructor provided explicit instruction about story elements and how to use the story map. Participants met in pairs and took turns reading portions of the story orally, while the other participant followed along. When participants read a portion of the passage corresponding to the story map, the investigator directed the participants' attention to the story map and provided instruction on how to complete the map.

Post-intervention testing: Having practiced twenty-one sessions of reading, the participants in both groups took the Reading Comprehension Test as post-test.

Design and Analysis

The effects of implementing story mapping on students' reading comprehension were assessed using pre- post testing.

Results

Story Mapping and reading comprehension

The first objective of the study was to determine if use of story mapping would be more effective for the treatment group compared to the control group. For this purpose, the post intervention scores of both treatment and control groups were analyzed. Table 1 shows Z Value results for the differences in post- test mean rank scores between experimental and control groups in Reading Comprehension Test.

Table 1. Z Values results for the differences in post- test mean rank scores between experimental and control groups in Reading Comprehension Test

Variables	Groups	N	Mean Ranks	Sum Ranks	Mann-Whitney	Z Value	Sig.
Comprehension	Ex	5	8	40	Zero	-2.335	0.01
	Cont.	5	3	15			
Word Recognition	Ex	5	8	40	Zero	-2.431	0.01
	Cont.	5	3	15			
Composite	Ex	5	8	40	Zero	-2.588	0.01
	Cont.	5	3	15			

The table shows that (Z) values were (-2.335)for comprehension, (-2.431) for word recognition, and (-2.588)for the composite score. These values are significant at the level (0.01) in the favor of experimental group.

The second objective of the study was to determine the effect of story mapping on improving reading comprehension skills of children with ADHD. The children’s reading comprehension was measured pre and post intervention. Table 2 shows Z Value result for the differences in pre and post test mean rank scores for the experimental group in Reading Comprehension Test. The table shows that (Z) values were (-2.512) for Comprehension, (-2.423) for Word Recognition,(-2.532)for the composite score. These values are significant at the level (0.01) .This indicates that use of story mapping had a positive effect on improving reading comprehension skills in children with ADHD.

Table 2. Z Values results for the comparison of mean rank scores of experimental group at pre- and post intervention in Reading Comprehension Test

Variables	Negative Ranks		Positive Ranks		Z Value	Sig.
	Mean	Sum	Mean	Sum		
Comprehension	3	15	Zero	Zero	-2.512	0.01
Word Recognition	3	15	Zero	Zero	-2.423	0.01
Composite	3	15	Zero	Zero	-2.555	0.01

Discussion

This study investigated the effects of story mapping on reading comprehension skills of elementary students with ADHD. It was hypothesized that story mapping will increase reading comprehension of students with ADHD.

Previous research suggests students with ADHD have difficulty making causal connections in a story, which adversely affects their overall comprehension (Lorch et al., 2004; Flory et al., 2006; Renz et al., 2003; Lorch, Milich, Astrin, & Berthiaume, 2006). Also, research from Renz and colleagues (2003) and Flory and colleagues (2006) indicate students with ADHD have deficits in working memory which impedes on their ability to develop a cohesive story representation. Data from these studies suggest story mapping may be an effective intervention for students with ADHD, because the visual support may lower the demand on working memory and assist students with organizing and linking key events.

Practical Implications

Teaching children to effectively extract meaning from a text is certainly one of the most important tasks that schools have to face. Without this ability, students will inevitably fail in their academic endeavors. In addition, they will miss out on a whole array of activities that make life enjoyable (like reading a book or communicating through social networking tools) and will struggle immensely in many of their daily routine activities (like understanding an instruction book, a letter from an agency, or the latest news).

Limitations and Further Study

One limitation of the current study stems from the fact that the scope of the study is limited to the data collected from children with ADHD. Hence, further research with larger and more demographically diverse populations with random selection would strengthen the findings of the study.

Second, it may be that the length of the intervention was not sufficient to see change large enough to be measured. Sheridan et al. (1996) suggested that the training used in that

study (10 weeks long) possibly was too short to produce long-range effects. The present study also used brief training (7 weeks), as is often the case with interventions in the school setting.

Despite these limitations, the present study contributes useful knowledge about the influence of story mapping on ADHD children's reading comprehension skills .

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APPENDIX A

STORY MAP

Setting/Time:
Main Character :

Problem	Episode(s) Solution	Outcome
Theme:		
Reaction:		