The Effect of the SIM Inference Strategy on Reading Scores of Special Education and At-Risk Students

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Abstract

The research for this study was taken from a doctoral dissertation where archival data was reviewed to determine the effect of the Strategic Instruction Model (SIM) Inference Strategy on standardized reading test scores of special education and at-risk students educated exclusively in a school-within-a-school setting. The school-within-a school setting is a classroom designed to provide additional academic support for students whose Florida Comprehensive Assessment Test (FCAT) reading scores indicated the need for additional support by the school district. Florida Comprehensive Assessment Test reading scale scores, including archival data, were compared for four groups of eighth-grade students attending a Central Florida Title I public middle school during the 2008–09 and 2009–10 school years. Groups 1 (2008–09) and 3 (2009–10) received SIM treatment in a school-within-a-school setting, instructed by the same team of teachers, general educators trained in the SIM Inference Strategy. Groups 2 (2008–09) and 4 (2009–10) neither participated in the school-within-a-school model nor received SIM instruction. Although results indicated improved high-stakes standardized reading test scores for the school-within-a-school students, the study revealed no statistically significant difference between the groups that received SIM instruction and those that did not.

Keywords: SIM Inference Strategy, FCAT, School-within-a-school,Special Education Students, At-Risk Students, Middle School

"The ability to infer information from academic reading material may be somewhat elusive for middle school students, particularly for those students considered at-risk or identified as having learning disabilities" (Fritschmann et al., 2007). Many students with learning disabilities entering seventh-grade reading classes read only at the fourth-grade reading level and evidence little progress as they continue through school (Fritschmann, Schumaker, & Deshler, 2007). The ability to infer the meaning of a test question may be the difference between passing and failing in high-stakes standardized testing. Students who have difficulty in reading test questions, understanding what the questions mean, and using prior knowledge and skills to answer questions can become frustrated; and their resulting test scores may be misrepresentations of the students' actual ability levels (Hughes, Schumaker, Deshler, & Mercer, 1988).

The University of Kansas Center for Learning Research (KU-CLR), strategic instruction model (SIM) is a research-based, validated instructional method designed to improve the academic success of at-risk students through the implementation of specific interventions (Ehren, Deshler, & Graner, 2010). This model consists of two major, highly structured components: the learning strategies curriculum and content enhancement routines. The student-focused learning strategies curriculum consists of interventions for learning. Content teachers in general education classrooms design the teacher-focused content enhancement routines for implementation. By incorporating both components of SIM, learners can become both strategic and independent learners. This study focused on the learning strategies component of SIM.

SIM is designed to promote the development of individuals who can learn and perform independently, exhibit appropriate personal skills, earn standard high school diplomas, and successfully transition to post-high school settings (Orange County Public Schools, 2008). The strategic curriculum is focused on the tasks or demands students must meet to be successful in the SIM setting. The learning strategies curriculum consists of three separate strands: (a) acquisition, (b) storage, and (c) expression. To implement the strands, the SIM facilitator/teacher must create a strategic environment to facilitate a learning partnership with the students. Active student participation is central to gaining a strategic instruction level.

The instructional process consists of eight stages (Lenz, 2003). In the first stage, students take a pretest to determine the knowledge they bring to the lesson. In the second stage, the facilitator describes the topic of strategic instruction. In the third stage, arguably the most important step of strategy implementation, the teacher models what the students must do, thinking aloud to demonstrate the thought processes necessary to complete the task. Think aloud modeling is the heart of all SIM strategies (Lenz, 2003). In the fourth and fifth stages, students practice the skills modeled by the facilitator through mnemonic devices, first by engaging in verbal practice, and then by engaging in controlled practice. Students receive feedback during each kind of practice. In the sixth stage, students engage in advanced practice, working independently on the strategy. In the seventh stage, students take a posttest to assess their acquisition of the new skills. Results from this posttest indicate whether review is necessary. The eighth and final stage involves generalization in which the student implements the strategy independent of teacher support or instruction.

The goal of this study was to determine if the SIM Inference Strategy is an effective treatment to improve high-stakes standardized reading test scores for special education and at-risk students in a school-within-a-school classroom setting. For the purpose of this study at-risk students are defined as “students who are likely to fail at school… school failure is typically seen as dropping out of school before high school graduation” (U. S. Department of Education National Center for Educational Statistics, 1992). High-stakes standardized reading test scores are a focal point in many districts throughout the country. Reading skills, in particular, have gained nationwide attention as essential skills to improve one’s quality of life, both professionally and personally. Providing special education and at-risk students with the skills necessary to infer information from written materials is in alignment not only with the short-term goal of academic success, but also with the long-term lifetime goal of reading with understanding in daily life.

KU-CRL has completed extensive research focused on learning strategies for special education students. In its 30-year existence, the KU-CRL has developed research-based, validated strategies that, when taught with fidelity, result in improved academic skills of students ranging from elementary school through college. SIM has been implemented in public schools throughout Florida since the 1980s. With current trends focused on the results of high-stakes standardized testing, the need for student success has become a part of the school culture (Fritschmann, 2006). In many cases, students have not developed the academic skills or strategies they need to pass such tests. Some students do not have the ability to infer information from a text or test. Prior to the doctoral work completed by Fritschmann in 2006, students with disabilities were not specifically identified in any research studies related to the ability to infer information successfully and generalize its use on standardized tests. Davoudi (2005) stated that, “without explicit training, it is more difficult for children to answer inferential questions about a text than literal questions” (p. 115). Davoudi (2005) further stated, “The process of inference-making is a key component of fluent readers” (p. 106). Explicit instruction is an integral component of reading. It is also essential that learning not be shallow; students require a deep understanding of the content area they are learning to make connections and successfully utilize inference skills.

Fritschmann (2007) implemented a multiple-probe-across-subjects design based on the research of Horner and Baer (1978) and reading probes to find the students' benchmark levels and baselines in reading comprehension. The researchers used the SIM Inference Strategy for 5 hours and implemented supervised practice during generalization for 10 hours of a period of over several weeks. The students received feedback on their progress. A student satisfaction questionnaire was administered following the generalization level of the Inference Strategy. The participants indicated that they were more satisfied with their abilities to answer reading comprehension questions after learning the Inference Strategy than they were prior to learning the strategy. Additionally, Skiba and Paterson cited the work of Slavin (2000) that indicated, without naming SIM specifically, the need for the implementation of "effective instructional strategies such as advanced organizers, direct instruction, or feedback and corrections that have been shown to improve academic outcomes cannot also be used to instruct students in the social expectations of the classroom and schools" (p. 18).

Background

Prior to this study, several middle schools in Florida began implementing both the SIM learning strategies curriculum and the content enhancement routines (Ehren et al., 2010). In one group of nine schools, researchers followed an initial group of students who commenced instruction in SIM upon entering sixth grade. The students received SIM instruction throughout their 3 years in middle school. At the end of the grant period, five of the nine schools continued to implement SIM and to report their students' progress. Researchers found that students who incorporated the SIM strategies demonstrated success; those encouraged to participate showed steady improvement. Students who participated in SIM from the start of their middle school careers increased their high-stakes test scores from Levels 1 and 2 to Levels 2 and 3; some students increased to Level 4 (Orange County Public Schools, 2008). In addition, SIM instructors reported fewer incidents of in-class disruption from SIM student participants in the seventh and eighth grades.

Participating schools reported success in changing not only the ways in which their low performing students learned but also the way their teachers taught students (Orange County Public Schools, 2008). Four of the five schools that continued the program scored A's on state standardized tests. One school that earned a C the first year of SIM implementation reported an B the following school year. These results revealed that implementing SIM had a positive effect on the statewide standings of these schools. This study reviews the use of the SIM Inference Strategy in the only school in the district practicing the school-within- a-school program, as well as the only school, at that time, to implement the SIM Inference Strategy.

The Problem

The effect of the SIM Inference Strategy on eighth-grade Florida Comprehensive Assessment Test (FCAT) reading scores of special education and at-risk students was unknown. Research conducted through KU-CRL showed support for SIM in general (Deshler, Palincsar, Biancarosa & Nair, 2007; Deshler & Tollefson, 2006; Schumaker & Deshler, 2006); but research concerning the use of the Inference Strategy by special education and at-risk students was limited (Deshler et al., 2007), as was research concerning these students' comprehension of high-stakes standardized test questions (Thurlow, 2000). Comprehending such questions can be challenging for any learner; but for special education and at-risk students, clear comprehension of such questions can be the difference between promotion and retention (Deshler & Tollefson, 2006).

Method

A quantitative descriptive and casual-comparative (ex post facto) research design was used to explore the relationship between the reading scores of the students who received the SIM Inference Strategy treatment and the reading scores of those students who did not. This research design was implemented because the research took place after the fact, without interference from the researcher. The independent variable was the SIM Inference Strategy. The SIM Inference Strategy was implemented before the standardized testing took place, and before the data was collected in an archival format by the researcher. The dependent variable was the FCAT reading scores for the four groups of eighth-grade students, which also were collected in an archival format by the researcher.

Research Questions

The following research questions were used to guide this study:

RQ1: Is there a significant difference between the eighth-grade FCAT reading developmental scale scores of special education and at-risk students who received the SIM Inference Strategy (Group 1) and the scores of special education and at-risk students who did not (Group 2) during the 2009 standardized testing year?

RQ2: Is there a significant difference between the eighth-grade FCAT reading developmental scale scores of special education and at-risk students who received the SIM Inference Strategy (Group 3) and special education and at-risk students who did not (Group 4) during the 2010 standardized testing year?

RQ3: Is there a significant difference between the 2008 and 2009 FCAT reading developmental scale scores of special education and at risk students (Group 1) pre- and post implementation of the SIM Inference Strategy treatment?

RQ4: Is there a significant difference between the 2009 and 2010 FCAT reading developmental scale scores special education and at-risk students (Group 3) pre- and post implementation of the SIM Inference Strategy treatment?

Setting

The target school was a Title 1 public middle school in Central Florida. The school had a fluid population of 1,188 students: 470 in sixth grade, 418 in seventh grade, and 330 in eighth grade. The school population was 72% Hispanic, 16% Caucasian, 10% Black, and 4% Asian or Other ethnicity (Florida Department of Education, 2008-2009). The percentage of special education students in the school was 21%. The population of English language learners was 20%. The average ratio of students to teacher varied; but in 2009, at the time of this study, it was reported to be 20 to 1. The student mobility rate for the school was 45%; 81% of the students were eligible for free or reduced-price lunch (Florida Department of Education, 2008–2009).

A school-within-a-school model was implemented within the target school to meet the academic needs of special education and at-risk students with below average scores in two or more areas on the FCAT. During the 2008–09 school year, 33 students attended classes in this setting. The 33 students were divided into two groups and worked with two teachers. A common door connected the two classrooms, with students moving from one teacher to the other as required. The teachers frequently combined the students into one classroom for special lessons, such as the SIM Inference Strategy. Both teachers were in the process of becoming SIM professional developers and had learned the Inference Strategy within one month of presenting it to their students. The same team of teachers worked with the groups in 2009–10.

During the 2009–10 school year, 34 students attended classes in the school-within-a-school setting. They were also divided into two groups. However, the two student groups were combined, with both teachers working with all students in all subjects, not merely in reading.

Participants

Participants consisted of a convenience sample of students in the school-within-a-school model in both school years and a matching sample of special education and at-risk students in the same grade levels who did not receive SIM instruction. Matching the students was based solely on the school identification of the students as special education and at-risk. A total of 134 special education students participated in the study: 67 received SIM instruction in the school-within-a-school model; 67 did not. These students comprised four groups, all of which were formed prior to the study without any input from the researcher. Groups 1 and 2 were matched for purposes of comparison, as were Groups 3 and 4. Group 1 consisted of 33 students, 20 boys and 13 girls, all of whom received SIM instruction during the 2008–09 school year. Group 2 consisted of 33 students, 21 boys and 12 girls, none of whom received SIM instruction. Group 3 consisted of 34 students, 16 boys and 18 girls, all of whom received SIM instruction during the 2009–10 school year. Group 4 consisted of 34 students, 16 boys and 18 girls, none of who received SIM instruction.

Instrumentation

The FCAT, a statewide assessment given each spring, served as the instrument for data collection. This high-stakes standardized test was developed to ensure that students were achieving at the proper academic levels and was first initiated in 1976. The FCAT evidences three types of validity: content-related, criterion-related, and construct-related. Reliability coefficients indicated the FCAT has "(a) internal consistency, (b) test–retest reliability, (c) inter-rater reliability, and (d) reliability of classifications" (Florida Department of Education, 2004, p. 24). The reliability of the internal consistency of the FCAT was reported using both "Cronbach's Alpha and the Item Response Theory (IRT) marginal reliabilities" (Florida Department of Education, 2004, p. 24). The standard for interpretation of the FCAT is the Sunshine State Standards.

Data Collection and Analysis

The goal of the statistical analysis was to evaluate the pre- and post-treatment achievement of Groups 1 and 3. Archival FCAT reading data from the 2008–09 and the 2009–10 school years were collected from the eighth-grade guidance counselor in the target school. Data included the seventh- and eighth-grade FCAT reading scale scores for both Groups 1 and 3 and the eighth-grade FCAT reading scale scores for Groups 2 and 4. Data were retrieved from both the district Web site and guidance department files. The school-within-a-school teacher team also provided data on student academic growth in reading as determined by the FCAT for the 2008–09 school year. To ensure confidentiality, each student involved in the study was assigned a number.

Data were entered into a Microsoft Excel spreadsheet created for statistical analysis using SSPS 20.0. Independent sample t-tests were computed to compare the FCAT reading scale scores of the students not receiving the SIM treatment with those who did receive the treatment. An alpha of .05 served to determine statistical significance.

Results

As shown in Table 4, the dependent samples t-tests indicated the posttest mean scale score for Group 1 was statistically significantly higher than the pretest mean scale score, $t(32) = 4.91$, $p < .001$. The t-test results for Group 3 also indicated the posttest mean scale score was statistically

Table 1. *FCAT Reading Developmental Scale Score Descriptive Statistics*

School year	Group	*n*	Minimum	Maximum	*M*	*SD*
2008–09	1	33	886	1895	1656.79	214.76
	2	33	886	2172	1634.42	278.19
2009–10	3	34	1119	1962	1694.65	171.75
	4	34	886	1905	1630.85	205.35

Table 2. *Independent Samples T-Test Results*

							95% CI	
Groups	Source	*MD*	*SE*	*t*	*df*	*p*	Lower	Upper
1 & 2	FCAT reading assessment	22.37	61.18	0.37	64	0.716	-99.85	144.58
3 & 4	FCAT reading assessment	63.79	45.91	1.39	66	0.169	63.79	45.91

significantly higher than that of the pretest, $t(33) = 8.80$, $p < .001$. Therefore, students who received instruction in the SIM Inference Strategy evidenced statistically significant increases in their reading scores compared with their performance prior to instruction.

RQ1 and RQ2 required comparisons of the 2009 FCAT reading scores for Groups 1 and 2 and the 2010 FCAT reading scores for Groups 3 and 4, respectively. As shown in Table 1, Group 1 had a slightly higher mean FCAT reading developmental scale score than did Group 2 (1656.79 and 1634.42, respectively). Group 3 had a higher mean FCAT reading developmental scale score than did Group 4 (1694.65 and 1630.85, respectively). Group 2 had more variability in their scale scores than did Group 1 (278.19 and 214.76, respectively) and a larger range of scale scores. This was also the case for Groups 3 and 4 (205.35 and 171.75, respectively).

Table 2 shows that the mean scale scores were not statistically significant for either Groups 1 and 2 or Groups 3 and 4. Therefore, no significant difference existed between the FCAT scores of

Table 3. *Pretest and Posttest FCAT Reading Developmental Scale Scores for Groups 1 & 3*

Group	Source	*n*	Minimum	Maximum	*M*	*SD*
1	Pretest	33	886	1895	1656.79	214.76
	Posttest	33	886	2172	1634.42	278.19
3	Pretest	34	1119	1962	1694.65	171.75
	Posttest	34	886	1905	1630.85	205.35

Table 4. *Dependent Samples T-Test Results for Groups 1 & 3*

							95% CI	
Group	Source	*MD*	*SE*	*t*	*df*	*p*	Lower	Upper
1	FCAT reading assessment	178.49	36.33	4.91	32	< .001	104.49	252.48
3	FCAT reading assessment	244.00	161.65	8.80	33	< .001	187.60	300.40

special education and at-risk students who received SIM instruction and those who did not for either the 2008–09 or the 2009–10 school year.

RQ3 and RQ4 required comparisons of the 2008 and the 2009 FCAT reading scale scores for Group 1 and the 2009 and 2010 FCAT reading scale scores for Group 3, respectively. Table 3 shows that the mean scores for Group 1 increased from 1478.30 to 1656.79, although the variability in the students' scores remained relatively the same (pretest = 208.96; posttest = 214.76). Similarly, the mean FCAT reading developmental scale score for Group 3 increased from 1450.65 to 1694.65. However, the variability in the students' scores for Group 3 also increased (pretest = 145.75 and posttest = 171.75).

Discussion

The ability to infer information from academic reading material may be somewhat elusive for middle school students, particularly for those students considered at-risk or identified as having learning disabilities (Fritschmann et al., 2007). Special education and at-risk students enter the classroom at a disadvantage, often beginning their academic experience reading below grade level and making minimal progress throughout their school careers (Fritschmann et al., 2007). The ability of students to generalize what they have learned to other areas of study, including improving their performance on standardized tests, is a primary goal of the SIM learning strategies curriculum (KU-CRL, 2009). However, prior to this study, researchers had not focused on the implementation of SIM strategies among special education and at-risk students placed exclusively in school-within-a-school middle school settings. The results of this study clearly show that such students can improve their reading scale scores significantly when they are taught the SIM Inference Strategy and, thus, support the goal of KU-CRL.

However, the study results also indicate the need for ongoing pedagogical research focused on special education and at-risk students in specialized academic settings. The data show that special education and at-risk students in the school-within-a-school program did increase their FCAT reading scale scores from pretest to posttest after receiving the SIM Inference Strategy treatment. However, their increase was smaller than that of their peers not enrolled in the school-within-a-school setting. Therefore, more research should be conducted into the effects of the SIM Inference Strategy treatment in similar school-within-a school settings.

The data also suggest the need for further investigation concerning high-stakes testing. Specifically, researchers should determine whether students in typical middle school general education programs experience results similar to those of the school-within-a-school students after learning to use the SIM Inference Strategy. Students in Florida are very aware of the importance of FCAT testing as it is referenced quite liberally in both print and electronic media throughout the state. Learning strategies and techniques, such as SIM, that become second nature through practice can be the difference between students' success and failure. With high-stakes standardized testing often representing financial gains or losses for school districts, improving scores holds the potential for districts to expand academic opportunities for all students. Such opportunities may improve students' continued academic growth, potentially decreasing dropout rates and increasing the number of high school graduates seeking higher education.

As high-stakes standardized testing in the state of Florida continues to evolve from the FCAT to the FCAT 2.0 to the Florida Standardized Assessments (FSA), the need to successfully infer information remains essential for Florida's students. The Florida Department of Education continues to strive to provide the students of Florida with a more rigorous and robust education. As a result more rigorous and robust assessments must be introduced. The Florida Department of Education (2005-2013) states that the "Reading (component) includes a greater number of test items that require reasonable inferences and reasonable prior knowledge." This indicates that there is

still a need for students to be provided with the opportunity to learn the SIM Inference Strategy in order to continue to practice and develop their skills in making appropriate and logical inferences.

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