

METACOGNITIVE STRATEGY USE IN SECOND
GRADE STUDENTS WITH LEARNING DISABILITIES
DURING WRITTEN SPELLING TASKS

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Abstract

General education and special education teachers are expected to provide evidence-based instruction to all students in the classroom. Meeting the needs of all students in the classroom is a difficult task especially with 10-20% of those students having special learning needs that require a different approach to assessment and instruction.

The purpose of this study was to investigate the role that metacognitive strategies have in second grade students with learning disabilities while they are performing written spelling lists and story generation tasks. One-on-one interviews over the course of an academic year were conducted where students were asked to reflect and report their thinking processes before, during and after the writing process.

The results indicated that although their metacognitive strategies were emerging, they had difficulty reporting consistently and accurately what spelling strategies they used. Additionally, they had difficulty reporting whether a word was correct or incorrect and if incorrect, how to correct it. Each student used a different approach to spelling words and neither of those approaches worked effectively for these students.

The overall findings indicated that these two second grade students with learning disabilities used limited metacognitive strategies of monitoring,

regulating, and reflecting. The strategies they did employ were not consistent or effective to help them achieve a level of spelling competency needed to be successful in second grade.

Background and Purpose

Serving students with special needs has been on the national agenda since the inception of P.L. 94-142 in 1975 that gave the right to all students with disabilities to receive a free and appropriate public education. The current status of special education in the United States reveals that the majority of children with high incidence disabilities, such as those with learning disabilities, are increasingly being educated in general education classrooms (Smith, 2007). Since the Individuals with Disabilities Improvement Act (IDEA) of 2004 and the No Child Left Behind Act (NCLB) of 2001 have merged their priorities, the major outcome of this shift has been in terms of accountability for all students regardless of disability. These accountability measures include state-mandated testing, the use of scientifically-based instruction as well as the mandate for highly qualified teachers for all students (Skrtic, Harris & Shriner, 2005).

It is also known that children with learning disabilities need more intensive, systematic and explicit instruction in order to perform the academic activities of typical learners (Darch & Simpson, 1990). As the need increases to serve children with special learning needs in the general education classroom as a result of the inclusion movement, teachers will need to be aware of the thinking processes of their students with special needs in order to design appropriate instruction for their learning styles. There must also be a way for children with learning disabilities to use and monitor strategy use for learning, retaining, and expressing their thoughts through writing.

Metacognitive Development

Metacognition refers to “the knowledge about the nature of people as cognizers, about the nature of different cognitive tasks, and about possible strategies that can be applied to the solution of different tasks” (Flavell, 1999, p.22). In other words, “thinking about thinking” (Flavell, 1979). Developmentally, metacognition can appear as early as three or four years of age and continues to develop as the learner gains literacy skills. Metacognition “becomes more explicit, more powerful, and more effective as it operates more under the individual’s control. It is developmental in nature” (Kuhn, 2000, p. 178).

Strategy use and development help children young and old to make connections for recalling and delving deeper into more difficult material. Wong (1986) advocated that teachers instruct students to use “self-monitoring, planfulness, self-checking and self-evaluation” (p. 10). Self-regulation is a strategy that students develop to help them size up a task and determine how to approach the learning situation and complete it. These types of skills are developed and refined over time (Borowski, 1992).

Metacognition and Learning Disabilities

Many students with learning disabilities have difficulty with cognitive information and then transferring that information into a metacognitive format. These students have difficulty with organizing, listening, recalling information, and attending to instruction. There are several possible causes for students with limited metacognition abilities among them, memory and the possibility that students with learning disabilities lack an array of strategies to employ when needed. Students with learning disabilities most often are deficient in strategy knowledge and use and must be taught strategies

explicitly. They are often “overwhelmed, disorganized and frustrated in learning situations” (Vaidya, 1999, p. 187). The difficulty students with learning disabilities have cognitively, affects their ability to reflect, monitor, and regulate their learning. The results of the Darch et al., (2000) study confirmed that students with learning disabilities have difficulty using strategies and when used they were not effective.

Spelling and Learning Disabilities

Most children with learning difficulties, approximately 80%, have difficulty with reading (Lerner, 1989). Along with the challenge in reading, spelling problems for students with learning disabilities are common and appear to be very difficult to remediate, especially if left untreated (Gerber & Hall, 1987). Writing and reading development are closely related to spelling development and often works in harmony together to achieve a completed product while using the same cognitive processes. Reading and writing depend on the same relationship between letters and sounds, however writing is more complicated because it is a combination of thinking about what to say, how to say it and how to spell it (Moats, 2005).

It is at this point, that spelling becomes a difficult process. Spelling is a skill that is interrelated with orthographic knowledge, phonological processes, morphological as well as semantic abilities (Kami & Hinton, 2000). Students with learning disabilities have challenges integrating these specialized skills. Poor spellers tend to use visual processes more than phonological processes compared to average spellers which results in the use of different processes, which takes them longer to reach the same spelling level as good spellers. Spelling judgments must be a part of the sequence. Students must

conceptualize a word, write that word, and then determine if that word is either correct or incorrect.

Alley and Deshler (1979) found that students with learning disabilities have difficulty spelling words without errors as well as recognizing that they have spelled their words incorrectly. The recognition of those errors relates to the presence or absence of the speller's metacognitive abilities. The metacognitive strategy, self-regulation which includes the processes of knowing when a word is in error, is more delayed in poor writers than it is in skilled writers (Graham & Harris, 2000). It appears from the research that students with learning disabilities are less effective in the use of spelling strategies while attempting spelling tasks than their typical peers either due to processing difficulties or ineffective rule application (Bailet & Lyon, 1985; Darch et al., 2006).

The purpose of this study was to investigate the early primary grade population namely second graders with learning disabilities, and attempt to determine if they use metacognitive strategies and if so, just what metacognitive strategies as well as spelling strategies they employ during written spelling tasks, namely, spelling lists and self-generated stories.

The following research questions were generated in order to investigate strategy use in students with learning disabilities:

Research Question 1: Are second grade students with learning disabilities able to reflect and report the strategies they use during written spelling tasks?

Research Question 2: What types of strategies do second grade students with learning disabilities use when spelling words while writing a story?

Research Question 3: What types of strategies do second grade students with

learning disabilities use when writing a spelling list?

Method

Participants

The subjects for this qualitative study were chosen by the principal of the school. The special education director was given specific criteria for the selection who in turn identified which schools may have students who fit the criteria. Two students with learning disabilities in reading, both in second grade, both having the same general education classroom teacher as well as the same special education teacher for program services.

Two second grade students, a boy and a girl from the same classroom for general education and special education with an urban school population were identified, permission was received from parents, teacher, principal and school superintendent for the academic year long study to proceed.

Description of Materials

Data collection for this study included student interviews that were audio-recorded and transcribed, the use of the Test of Written Spelling-4 (TWS-4), and observations with anecdotal notes. Prior to the beginning of the study, a protocol for the interview questions was developed. Two sets of interview questions were adapted and modified from the Darch et al., (2000) study (see Appendix A-Pre-activity and B-Activity). These questions were used during a pilot study for this study and found to be valid for assessing the metacognitive information processes sought after in this study. The words used as research prompts for the spelling activity were taken from the second

grade classroom spelling list. Photos of children involved in activities were used as writing prompts to help the students compose a story for the story generation task portion of the study.

Description of Procedures

The two students in the study were assessed while they were in the special education classroom during their regular pull-out session to help reduce distractions that might occur from general education classroom routines. Each student was seen individually over two visits per week during the course of the school year. Multiple visits were necessary until a pattern of spelling strategies was identified for each student. The *Test of Written Spelling-4 (TWS-4)* was administered as a baseline measure of spelling ability after the two-week classroom observations had concluded.

After the TWS-4 and the administration of the Pre-Spelling Interview (Appendix A), the students worked directly with the author to begin this part of the study. One day each week, the students were given a ten-word spelling list orally by the researcher. One word was said orally at a time along with a sentence containing that word and then the word was repeated. The student was asked to spell that word on a piece of paper. Once the ten words were completed, the students were asked Activity Based Spelling Interview Questions (Appendix B). The second day of the same week, the students were asked to choose a photograph from a group of five action photographs and write a story about the picture. Once the student finished the story, each student was asked the Activity Based Spelling Interview Questions (Appendix). This pattern continued throughout the school year for two times each week, excluding holiday breaks and spring vacation. These interviews were audio-recorded and then transcribed for

arrangement in grids for coding by the author as well as a university colleague to help insure intercoder agreement while categorizing the responses to the interviews. At the conclusion of the study, each student was again administered the *Test of Written Spelling-4 (TWS-4)*.

Results

This study addressed metacognitive strategy use in children with learning disabilities in second grade while performing written spelling tasks. The data collection occurred over a nine-month school calendar excluding school breaks and holidays and is included in a summary as well as tables below.

The Pre-Spelling Interview (Appendix A) was given to each student individually prior to the start of the spelling assessment and was intended to determine the students' perceptions of their spelling ability. The results of that interview for Student A and Student B are listed below.

Table 1

Pre-Spelling Interview Questions and Responses

Questions	Student A	Student B
1. When you are writing and come to a word you don't know, what do you do? What else do you do?	Go back and try to sound it out. Sound it out.	I sound it out? (prompt: "Anything else?") No.
2. If you knew that one of your friends was having problems with his/her spelling, what could you tell your friend that would help?	I would come help. I would tell her how to do something.	Tell them the word.
3. How do you think you learned to spell?	My friend helped me.	My teacher.
4. Are you a good speller?	Yes.	No. (shook his head)
5. What would you like to be able to do better as a speller?	I don't know.	Math.
6. When did you first learn	When I was like four. The	When I was four – dog.

how to spell words?	first word was five.	
7. Do you think some kids have trouble spelling?	Yes.	Yes. (shook head)
8. How do you feel if you can't spell words when you are writing?	Sad.	Okay.
9. Tell me how your teachers teach you to spell.	They teach me good. They pull us out and have us spell words.	Nice.

The *Test of Written Spelling-4 (TWS-4)* (Pro-Ed, 1999) was administered individually to each student pre-study and post-study. Table 2 below shows the standardized scores that the students received for both sessions. It is noted that both baseline scores fell below the average range of standard scores which is 85-115 and improved to the low-average range for their age post-study.

Table 2

Test of Written Spelling-4 Standardized Scores

Types of Scores	Student A 9/09	Student A 3/10	Student B 9/09	Student B 3/10
Standard Score	80	93	79	87
Percentile	9	32	8	19
Spelling Age	6-6	8-0	6-9	7-9
Grade Equivalent	1.4	3.0	1.7	2.7

Interview Data

The interviews were conducted over a six-month span of an academic year to develop a general theory about if and how Students A and B use their metacognitive abilities to spell words during a written spelling list and a story generation task. Table 3

indicates the most frequently occurring answers to the interview questions by Student A for a written spelling list task.

Table 3 – Student A

Overall frequencies to Interview Questions for Student A after a Written Spelling List

Interview Questions	Student A's most frequently occurring response	Percentage of total possible responses
1. Were there any words you had trouble spelling?	No.	14/20 = 70%
2. How did you decide if that word was spelled correctly or not?	I don't know	10/22 = 45%
3. If a teacher asks you to correct a misspelled word, what do you do to spell it correctly?	Erase it.	13/20 = 65%
4. What is the first thing you think about when you are ready to spell a word for a spelling list?	How to spell words.	10/20 = 50%

Student A's answers to the questions indicates that she was not using the metacognitive strategy, self-monitoring, to determine if she had spelled words correctly or not. However, during the last two months of the study, it was noted that she did indicate a word or words she had trouble spelling.

Table 4 indicates the most frequently occurring responses to the four questions asked after Student A completed a story generation task based upon an action photograph that she chose out of five possible choices.

Table 4 – Student A

Overall frequencies to Interview Questions for Student A after a Story Generation Task

Interview Questions	Student A's most frequently occurring response	Percentage of total possible responses
1. Were there any words you had trouble spelling?	No.	9/20 = 45%

2. How did you decide if that word was spelled correctly or not?	I don't know	6/19 = 32%
3. If a teacher asks you to correct a misspelled word, what do you do to spell it correctly?	Erase it. Write it.	5/21 = 24%
	Rule-based letter discussion	4/21 = 19%
	Write it at the end of the paper	4/21 = 19%
4. What is the first thing you think about when you are ready to spell a word for a spelling list?	What word can I spell?	10/20 = 50%
	What was I gonna write?	6/20 = 30%

Student A had more varied responses to the interview questions. It is possible that because she generated the words herself, rather than a spelling list the author gave to her, that she was able to choose words that she knew how to spell. However, there was never an instance where she spelled all words correctly in any of the 20 stories she created.

Table 5 shows the responses to the interview questions that Student B had after a written spelling list was given orally by the author. His answers are indicated in the Table below.

Table 5 – Student B

Overall frequencies to Interview Questions for Student B after a Written Spelling List

Interview Questions	Student B's most frequently occurring response	Percentage of total possible responses
1. Were there any words you had trouble spelling?	No.	12/20 = 60%
2. How did you decide if that word was spelled correctly or not?	Sounded it out.	13/20 = 65%
3. If a teacher asks you to correct a misspelled word, what do you do to spell it correctly?	Sound it out.	8/20 = 40%
	Ask a friend	2/20 = 10%
	Add a letter.	2/20 = 10%
4. What is the first thing you think about when you are ready to spell a word for a spelling list?	Happy because....	7/20 = 35%
	Smarter than anyone.	4/20 = 20%
	Nothing.	4/20 = 20%

Student B's responses to the Interview also showed lack of self-monitoring during this spelling task. Student B however, did indicate the reporting of the strategy "sound it out" which indicates he was using a rule-based strategy. During the course of the study it was noted that he used this strategy for every instance for planning his spelling and correcting his mistakes. He reported this strategy for more than half of the school year. Student B's answers to the interview question after a story generation task are listed below.

Table 6 – Student B

Overall frequencies to Interview Questions for Student B after a Story Generation Task

Interview Questions	Student B's most frequently occurring response	Percentage of total possible responses
1. Were there any words you had trouble spelling?	No.	10/18 = 56%
2. How did you decide if that word was spelled correctly or not?	Sounded it out.	11/18 = 61%
3. If a teacher asks you to correct a misspelled word, what do you do to spell it correctly?	No oral response, just starts writing a word Take something away?	8/20 = 40% 4/20 = 20%
4. What is the first thing you think about when you are ready to spell a word for a spelling list?	Nothing. Smart. Happy.	4/19 = 21% 4/19 = 20% 3/19 = 16%

Student B's responses to Question #3 indicated a lack of being able to report what strategy he used when asked what he does to actually correct a misspelled word. He did use a strategy by rewriting the word rather than reporting it orally. Once again, it is thought that Student B put more strategies into use when he was able to pick the words he wanted to spell for his story, rather than from a spelling list task. Often, the "sound it out" strategy was not a correct strategy for him to use when he was working to spell sight

words that were not “sound out” friendly. He was able to spell the words correctly about 5% of the time with no assistance from the author.

Coding of Strategies

The number and types of strategies based on Student A and B’s responses were divided into categories based upon the work of Darch et al. (2000). They included four categories in their study of second grade students’ spelling strategy use after gathering data on metacognitive responses (Kraai, 2010).

Table 7

Spelling Strategy Categories (Darch, Kim, Johnson & James, 2000)

Strategies	Examples of Student’s Comments
<i>Rule based</i> – comments made that referenced appropriate rule-based strategies	“I thought of the letter in the word and spell it.” “If you don’t know the word, you sound it out.”
<i>Multiple</i> – comments made indicating the use of more than one strategy during spelling.	“I tried to look for other words like the one I thought hard.”
<i>Resource-based</i> – Indications of the use of prior learning experience.	“I would get a piece of paper, and ask teacher to write down the word I didn’t know.”
<i>Brute Force</i> – Reports of less sophisticated procedures and recall information. These methods indicate tenacity rather than the use of systematic strategies.	“I keep on trying. I keep thinking about the word. Sometimes I guess if I don’t know.” I just spelled it and did the best I could.”

Tables 8 and 9 will present the different spelling strategy categories that Student A and Student B used during the course of the study by listing the frequency count for each of Darch, Kim, Johnson & Jame (2000) categories (Kraai, 2010).

Table 8 – Student A

Overall frequency counts for the use of Spelling Strategies

Strategy	Spelling List	Story	Totals
Rule-Based	10	5	15

Multiple	2	3	5
Resource-Based	1	4	5
Brute Force	22	26	48

Student A overwhelmingly used Brute Force to solve her spelling issues when trying to decide how to spell a word. She did not use a consistent strategy, (Sound it out) but responded to the questions with answers such as: “Because I write it everyday,” or “I don’t know, Looked at it and it didn’t look right” which indicated no clear, consistent use of a spelling strategy for either a spelling list or a story generation task.

Table 9 – Student B

Overall frequency counts for the use of Spelling Strategies

Strategy	Spelling List	Story	Totals
Rule-Based	31	16	47
Multiple	3	4	7
Resource-Based	4	3	7
Brute Force	0	14	14

Student B’s dominant responses fell into the Rule-based category. The overwhelming strategy use was “Sound it Out.” Sometimes this strategy worked for him , however, it was often inappropriate for the spelling of a word that did not lend itself to the process of sounding it out. His use of different strategies was not flexible enough or varied for each situation to work effectively to spell the variety of words (Kraai, 2010).

Conclusion

The results of this study provide insight into the metacognitive functions of monitoring and regulating of two students in second grade who have learning disabilities. Student A and Student B used different strategies to spell words during written spelling tasks. Both students received the same general education classroom instruction as well as special education services however, one used a “Brute Force” strategy and the other a “Rule-based” strategy. The commonalities observed were that both Student A and Student B showed that self-reflection was an emerging concept for each of them because for most of their responses, they did not perceive they had a difficulty spelling or had spelled any words incorrectly. Their answers to questions and checking of their work indicated they did not spend too much time on reflection. Students with learning disabilities are “often not aware of what they do not know” and tend to be more passive in their ownership of engaging in the learning activity (Wery & Nietfeld, 2010, p.70).

Student A and B were asked to report what strategy they used to check if a word was misspelled. Both students were exposed to a phonetic approach to reading and writing. For Student A, the response, “Sound it Out” was only reported seven times, however, while observing her writing, it was noted that she sounded out each letter silently while she wrote it, even though she did not report it consistently. Student B reported that he used this strategy for 24/39 responses, unfortunately it was the only strategy he employed and was often not effective for accomplishing the correct spelling of a word. His use of this strategy was inflexible and not accurate for what the situation needed.

To assess the level of reflection, Student A and B were asked what they thought about when they were ready to spell words. Neither student was observed in deep reflection over their writing. If they did, they did not report it. They would quickly work at the task and take little time for checking their work or asking questions about that work. Children may be thinking one thing and report another. Paris and Flukes (2005) stated that children's reporting of their cognitive processes are not always accurate. Reports may also appear more sophisticated than they actually use because they want to please the examiner.

Metacognitive strategy use is an important factor in helping students become independent readers and writers. Knowing where a student is in their metacognitive strategy development would inform teachers about how to take students to the next level in learning how to "think about thinking" and do it correctly and efficiently.

Limitations

The data collected for this study were intended to add to the body of knowledge about what students with learning disabilities do when performing written spelling tasks. Since there were only two subjects, this information is not intended to be generalized to the population at large.

Future Considerations

The findings of this study point to the need to assess the level of metacognition of students with learning disabilities in order to determine what metacognitive aspects are developed and which aspects are not at certain ages. There is also a need to look at developmental levels of metacognition so that it can be known what stages typical children pass through so that information for children with learning disabilities can be

derived from that data. Additionally, the same type of research should be constructed for students with learning disabilities so that explicit and systematic instruction can be implemented based upon those metacognitive deficits.

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APPENDIX A

Pre-Spelling Interview

1. When you are writing and come to a word you don't know, what do you do? What else can you do?
2. If you knew that one of your friends was having problems with his/her spelling, what could you tell your friend that could help?
3. How do you think you learned to spell?
4. Are you a good speller?
5. What would you like to be able to do better as a speller?
6. When did you first learn how to spell words?
7. Do you think some kids have trouble spelling?
8. How do you feel if you can't spell words when you are writing?
9. Tell me how your teachers teach you to spell.

Kraai, 2010

APPENDIX B

Activity Based Interview

1. Were there any words you had trouble spelling?
2. How did you decide if that word was spelled correctly or not?
3. If a teacher asks you to correct a misspelled word, what do you do to spell it correctly?
4. What is the first thing you think about when you are ready to spell a word for a spelling test? For a story?

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