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EDITORS

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A MESSAGE FROM THE EDITORS

Welcome from the The OHIO Journal of Teacher Education Editorial Team. At present, Xavier University, Cincinnati, Ohio, is the institutional home of The OHIO Journal of Teacher Education under the new editorship of co-editors Dr. Leslie Ann Prosak-Beres, Xavier University (prosak-b@xavier.edu) and Dr. Suzanne Mac Donald, University of Akron (smacdonald@uakron.edu).

The OHIO Journal of Teacher Education (OJTE) is now officially online! After some initial challenges in the fall, our second journal, Spring 2015 has gone to cyber-print. To those new to our journal, and OATE, we welcome you and hope that in the future you will consider submitting a manuscript for publication. To those with continuing membership, welcome to the spring edition of the OJTE journal.

The OHIO Journal of Teacher Education (OJTE) provides a forum for the exchange of information and ideas concerning the improvement of teaching and teacher education. Articles submitted should reflect this mission. Their focus should concern concepts, practices and/or results of research that have practical dimensions, implications, or applicability for practitioners involved with teacher education. OJTE's journal articles cover topics such as research to classroom practice and using strategies to help all learners succeed. The journal is regional in scope and is online to reach more readership and as a benefit of membership in the Ohio Association of Teacher Education. Points of view are those of the individual authors and are not necessarily those of either OATE or OCTEO Association.

As co-editors, we aim to achieve a strategic balance among the areas of preservice and inservice teacher education practice, policy, and research, bringing those areas to bear on one another in challenging and productive ways. We offer a forum for diverse work of teacher education researchers (university and non-university based), teacher education practitioners (e.g., university, state, district, community college), and policy makers at all levels. Linking research and practice is paramount to our vision for the OJTE.

We are pleased that this issue of the Spring OJTE journal includes important topical research offerings: Memory Strategies, Development of a Dyslexia Certificate Program, Understanding the Common Core in Mathematics and Global Competence, Developing Partnerships in Teacher Education Mentoring, as well as Reflection Co-Teaching as Transformative Practice in Early Childhood Education.

If you are interested in submitting a manuscript for The OHIO Journal of Teacher Education, please reference our Publication Guidelines at the end of the journal.

Best,

Dr. Leslie Ann Prosak-Beres
Dr. Suzanne Mac Donald

Note: The editors of this journal wish to thank Ms. Sarah Dulle, (dulle.sarah@gmail.com, 513-746-0920) graphic designer, for her creativity, time and professional design for our online edition of The OHIO Journal of Teacher Education.

EDITORIAL BOARD

A CALL FOR EDITORIAL BOARD MEMBERSHIP

The Ohio Journal of Teacher Education (OJTE) is looking for interested individuals to join the Editorial Board of the journal. We are looking to establish a board that represents the Colleges and Universities of Ohio as well as offers a broad spectrum of content expertise.

If interested, please submit a one page letter of intent that includes your College or University, your educational background, and your content area of interest to the co-editors.

Dr. Leslie Ann Prosak-Beres: prosak-b@xavier.edu
Dr. Suzanne Mac Donald: scm@uakron.edu

We look forward to hearing from you. We would like to hear from you by July 1, 2015, so that we can better plan for our Fall 2015 and Spring 2016 editions of the OJTE Journal.

Leslie and Suzanne

Memory Strategies Used By Teachers

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Indiana University Southeast

Abstract

The current study examines how teachers use memory strategies to present their lessons. Two research questions are asked. First, what memory strategies do teachers use to teach their lessons? Second, how do teachers use memory strategies in their instruction? Eleven teachers complete an open-ended questionnaire to identify the memory strategies they use and give examples how they use these strategies to teach. Rehearsal is found to be the most frequently used strategy, followed by mental imagery, elaboration, mnemonics, and organization. Representative examples and activities of these memory strategies are given to show how teachers use these strategies in their classrooms.

Keywords: memory strategies, teachers, instruction

Memory Strategies Used By Teachers

School learning involves memorizing a variety of information. Whether used by teachers or students, memory strategies, such as elaboration, mental imagery, mnemonics, organization, and rehearsal, are helpful in remembering information. Most studies on memory strategies in classrooms focus on how students use these strategies, e.g., elaboration (Willoughby, Porter, Belsito, & Yearsley, 1999), mental imagery (Bozorgmanesh & Mohmmad, 2012), mnemonics (Scruggs, Mastropieri, Berkeley, & Marshak, 2010), organization (Pang, 1991), and rehearsal (Tam, Jarrold, Baddeley, & Sabatos-DeVito, 2010).

Only a few studies on memory strategies in classrooms focus on how teachers use these strategies. Pressley, Allington, Wharton-McDonald, Block, and Morrow (2001) noted that teachers' instruction of memory strategy is lacking in the intensity necessary for students to learn how to use memory strategies effectively. In addition, Ornstein, Coffman, and Grammer (2009) found that teachers vary considerably in how much they use memory-relevant language, such as strategies and metacognitive questions (questions related to students' knowledge of how memory works) that encourage students to remember information.

Memory Strategies

The memory strategies recommended

to teachers and students include elaboration, mental imagery, mnemonics, organization, and rehearsal (Santrock, 2011; Schunk, 2012; Woolfolk, 2013). Discussion of each of these strategies is given as follows for teachers and students to adopt.

Elaboration.

Adding distinctiveness to new information exemplifies the strategy of elaboration. Woolfolk (2013) explained that elaboration assists encoding and retrieval of new information because it links new information to older information. Ways to elaborate include generating self-reference examples and constructing meaningful sentences. For example, to remember how to spell the word, rendezvous, students can use elaboration to make a meaningful sentence (e.g., the restaurant will be our rendezvous). Another way to elaborate is to answer questions about new content. For example, to remember the fact that the Western Spotted Skunk lives in a hole in the ground, students can ask, "Why would that fact be true?" When students generate answers to why questions, they relate what they already know to the new information. After examining elaboration strategy use as a function of prior knowledge with students in elementary schools, Willoughby, Porter, Belsito and Yearsley (1999) got positive findings for elaboration for all grade levels when learners have access to an extensive network of information. In fact, elaboration is an effective memory strategy for both children and adults across a variety of learning tasks (Pressley, Wood, Woloshyn, Mmartin, King, & Menke, 1992).

Mental imagery.

Visualizing images of verbal information lead to the construction of mental imagery. The dual coding theory (Paivio, 1971) states that memory for linguistic information is enhanced if relevant imaginal information is activated, and such activation of both verbal and nonverbal systems results in the dual coding of information. Schunk (2012) suggested different ways to elicit students' mental imagery, such as having students close their eyes and think about a story scene, steps of an experiment, or dance movement, etc. For example, to remember a historic incident, students can use mental imagery to visualize a battlefield with eyes closed. After reviewing the use of mental imagery in classrooms, Douville (2004) concluded that mental imagery is best used in facilitating deep-level engagement in reading, generating descriptive words in writing, and concretizing abstract mathematical concepts.

Mnemonics.

Imagery and words can be combined as mnemonics to aid memorization. There are various types of mnemonic strategies: rhymes (e.g., "righty tighty, lefty loosey"), spelling rules (e.g., "i before e except after c"), song lyrics (e.g., "head and shoulders, knees and toes"), phrases (e.g., use "never eat soggy waffles" to remember the compass directions "north, east, south, and west"), acronyms (e.g., use "HOMES" to remember the five Great Lakes – Huron, Ontario, Michigan,

Erie, and Superior), method of loci (e.g., use the logical movement after supper to remember "a tiger" on the countertop, "a monkey" in the sink, "a hippo" in the dishwasher, and "a bald eagle" on the sofa), keyword method (e.g., connect vivid images of two apples getting married to remember "Annapolis is the capital of Maryland"). After reviewing educationally-relevant mnemonic strategy research, Levin (1994) stated that mnemonic strategies equip students with skills to acquire straightforward factual information, but fail to promote students' independent transfer and application of information.

Organization.

Connecting items to one another can organize information in such a way that recalling one item also recalls other items linked to it. Santrock (2011) explained that organization makes large amounts of information more manageable and more meaningful. Woolfolk (2013) recommended the use of hierarchy to integrate pieces of information, the use of chunking to group information into higher-order units to be remembered as single units, or the use of outline to organize information. For example, to remember the 50 states, students can organize states by region (West, South, Midwest, Northeast, East, etc). To remember vocabulary, students can group semantically related words by meanings (categories, instances, associates, synonyms, etc.). Banerjee and White (2015) found that organizational strategy is highly specific to the demands and goals of individual tasks even when tasks share commonalities such as involving the same cognitive domain. It means that organizing words on the basis of semantic category enhances memory of a word-list learning task, but organizing words on the basis of nonsemantic, phonemic characteristics enhances language fluency of a word-generation task. Therefore, organization strategy is one of the most efficient means of improving free recall in the absence of cognitive support.

Rehearsal.

Consciously rehearsing information over and over can somewhat slightly extend the length of time it stays in memory. Santrock (2011) stated that rehearsal works best when encoding and remembering of a list of items for a brief period of time, but it does not work well when for retaining information over the long term. Woolfolk (2013) also mentioned that rehearsal works well with highly overlearned material, such as multiplication facts, spelling words, or a play script, but it does not work well for remembering more complex and meaningful information. For example, to remember multiplication facts, students can repeat them over and over verbally or in written form. However, Harris and Qualls (2000) stated that rehearsal is primarily used for disposable memory traces, such as a single-use telephone number that would be forgotten immediately after its use.

Memory Strategies in the Classroom

There are only a few studies on memory strategies in classrooms which focus on the types of memory strategy teachers teach their students and the types of memory-relevant language teachers use in the class. To observe the memory strategies teachers taught to support children's learning, Moely, Hart, Leal, Santulli, Rao, Johnson, and Hamilton (1992) conducted a cross-sectional study of classrooms from kindergarten through sixth

grade. They observed how teachers structured classroom learning activities in a range of subjects and how they monitored and directed children's study. To do so, they developed a coding system to record many aspects of the teaching process, and used factor analyses to identify four factors: teachers' responses to error; positive interactive teaching; communicating task-related information; and cognitive processes and strategies. Among these factors, cognitive processes and strategies included instances in which teachers gave suggestions about studying or learning, such as offering rationales for strategy use, providing information about appropriate cognitive processes for task performance; advising of the need for memory activity, telling children not to engage in certain study strategies, and requesting children's questions or problems.

The authors found that the most commonly coded teacher behaviors included requests for answers to questions. Instruction that called for children to engage in cognitive processing and strategy use occurred rather infrequently. Teachers of grade 4 and above provided rationales for the use of strategies more often than teachers of younger children. Teachers of lessons involving mathematics activity and language arts suggested students use such strategies more than those teaching lessons involving other activities. Teachers instructing language arts suggested deduction strategies most often whereas teachers instructing mixed subject matter (including math) most often promoted the use of specific aids for problem solving. Rehearsal was the memory strategy taught most often by all teachers, followed by elaboration, and mental imagery. Subsequent training in the use of the memory strategy of organization was also given to children. Among average and low achievers of the group, those whose teachers were relatively high in strategy suggestions showed improved memory performance and more deliberate use of the organization strategy than did children whose teachers rarely made strategy suggestions.

In contrast to the study of Moely, et al. (1992), Ornstein and his colleagues (Coffman et. al., 2008; Ornstein, Coffman, & Grammer, 2009; Ornstein, Coffman, Grammer, San Souci, & McCall 2010) undertook a longitudinal study to examine the memory-relevant language teachers use during the course of instruction and the mnemonic goals expressed in their lessons. Based on Moely, et al.'s cognitive processes and strategies factor, Ornstein et. al. developed a coding instrument, the Taxonomy of Teacher Behaviors. The four categories of teacher memory-relevant language in the Taxonomy concerned the nature and extent of various instructional memory-related strategies: instructional activities (providing information about an upcoming activity), cognitive structuring activities (encouraging children to engage with the materials in ways that facilitate the encoding and retrieval of information), memory requests (asking students to retrieve information or to prepare for future activities), and metacognitive information (providing or soliciting metacognitive information with the goal of facilitating children's performance). The authors then followed students throughout their elementary school years and made several visits to

observe them in their classrooms. During each visit, one observer employed the Taxon- omy and another observer prepared a detailed contextual narrative of each lesson.

The authors found that instructional activity was the most frequent activity and memory request was the second-most frequent activity. The narratives showed that most of these memory-related requests were implied deliberate, in which the demand for the use of memory was implicit without an expressed prompt to remember or not to forget, and a small percentage of these requests were expressed deliberate, in which memory demands were explicitly stated. In addition, they also found that the achievement of low-achieving students increased when they were placed in classrooms in which teachers were categorized as "high-mnemonic teachers" who frequently embedded memory-relevant information in their teaching.

Purpose of the Present Study

Previous studies on how teachers use memory strategies focused on the types of memory strategy teachers teach their students and the types of memory-relevant language they use in the class. Moely, Hart, Leal, Santulli, Rao, Johnson, and Hamilton (1992) investigated how and when teachers ask students to use study and memory strategies in the elementary school classroom. Ornstein and his colleagues (Coffman et. al., 2008; Ornstein, Coffman, & Grammer, 2009; Ornstein, Coffman, Grammer, San Souci, & McCall 2010) examined the memory-relevant language teachers use to encourage students to use memory strategies during the course of instruction in elementary school classrooms. The current study further examines how teachers use memory strategies but the focus is on the types of memory strategies teachers use to present their lessons. Two research questions are asked. First, what memory strategies do teachers use to teach their lessons? Second, how do teachers use memory strategies in their instruction? Getting to know the memory strategies other teachers use help teachers make informed decisions how and when to use these strategies in their own instruction.

Method

Participants

The participants in this study were 11 mathematics teachers enrolled in a graduate program in education at a Midwestern state university. There were 3 males and 8 females with a mean age of 29.6 years, ranging from 22 to 44 years old. The average length of teaching experience was 6.15 years, ranging from 1 to 21 years. One participant taught first grade, two taught second-grade, four taught fourth-grade, and four taught fifth-grade.

Procedure

Participants completed an open-ended questionnaire as part of the requirement for a graduate course in education. They were asked to write responses to two questions: "What information did your students need to remember in the subject you teach?" and "What strategies did you use to help your students to remember this information?" The first question served as a lead-in to help participants answer the second question. The responses shared by participants in the second question were coded if they fitted as rehearsal, mental imagery, elaboration, mnemonics or

organization strategies according to Schunk (2012).

Results

Table 1 (See Appendix page 12) presents the memory strategies teachers use to teach their lessons. Out of the 238 examples of memory strategies used, 111 (46.64%) were rehearsal, 54 (22.69%) were mental imagery, 46 (19.33%) were elaboration, 17 (7.14%) were mnemonic, and 10 (4.2%) were organization.

Representative examples and activities of these memory strategies explain how teachers use these strategies in their classrooms. For example, teachers use drill and practice, and a variety of games to help students rehearse what they have learned (see Table 2 in Appendix on page 13). One teacher wrote, "We created flashcards to practice memorizing common conversions that were the building blocks for more complex conversion." Rehearsal was used widely from first to fifth grade no matter how much teach experience the teachers had.

To generate mental imagery, teachers use realia and visual aids, or engage students in mental math or visualization (see Table 3 in Appendix on page 14). One teacher wrote, "As I described unit to unit conversion, students imagined what this looked like in both units." Mental imagery was used widely in different elementary grade levels by teachers with less than five years of teaching experiences.

Not only can teachers elaborate the information by using analogy and making meaningful connections to real life, they may also ask students to generate their own personalized examples, complete their own projects, and teach their peers (see Table 4 in Appendix page 15). One teacher wrote, "I used what the kids already knew and built on it." Elaboration was used mainly by fourth and fifth-grade teachers no matter how much teaching experience they had.

Acronyms, phrases, and songs are mnemonics teachers use in different subjects (see Table 5 in Appendix on page 16). One teacher wrote, "Tablespoon and teaspoon both start with the letter T, T rhymes with 3, so there are 3 teaspoons in a tablespoon." Mnemonics were used mainly by fourth and fifth-grade teachers with less than five years of teaching experiences.

Teachers also use anchor charts, concept maps, check sheets, and bookmarks, or engage in chunking to organize the information for students to remember (see Table 6 in Appendix on page 83). One teacher wrote, "We made a web of words that often gave clues as to whether a person should add or deduct." Organization was used mainly in fourth and fifth grades by teachers with less than five years of teaching experiences.

General Discussion

The current study examines the types of memory strategies teachers use to present their lessons. Rehearsal and mental imagery were used widely by first to fifth-grade teachers whereas elaboration, mnemonics and organization were used mainly by fourth and

fifth-grade teachers. Rehearsal and elaboration were used by teachers regardless of their teaching experiences whereas mental imagery, mnemonics and organization were used by teachers with less than five years of teaching experiences.

Rehearsal is found to be the most frequently used strategy, followed by mental imagery, elaboration, mnemonics, and organization. Previous study also found that rehearsal is the memory strategy taught most often by teachers to their students (Moely et al., 1992). The high percentage of teachers using rehearsal in the classroom (46.64%) indicates that teachers frequently use drill and practice, as well as games, to repeat foundational information for students to remember. As reviewed, rehearsal works well in remembering a list of items, arithmetic facts, spelling words, and scripts but is less effective for remembering more complex and meaningful information and/or information over the long term (Santrock, 2011; Woolfolk, 2013). From the examples given by teachers, rehearsal is used appropriately for students to remember foundational matter that is continuously revisited and built upon. In fact, rehearsal is the strategy to encode information to working memory where information is stored long enough to be processed to complete a task.

When the information is deemed important, other memory strategies are needed to move it to long-term memory. Memory strategies which move information from working memory to long-term memory are elaboration, mental imagery, mnemonics and organization. However, the percentage of teachers using rehearsal (46.64%) to encode information in working memory is much higher than the percentage of teachers using any of those strategies which move information to long-term memory. To move information to long-term memory, teachers should adopt these strategies more often and more widely. In planning lessons individually or as a team, these memory strategies can be incorporated into instructional activities of a variety of topics.

The memory strategies discussed in the current study may benefit other teachers or educators who would like to apply memory strategies in their own educational settings. With exposure to how other teachers use memory strategies, teachers or educators can equip themselves with a number of strategies before developing their own versions. However, caution has to be taken when reading these strategies because they are ascertained from teachers' self-reported responses to an open-ended question. In the real classroom, teachers who participated in this study may not use these memory strategies or may not implement these strategies in the ways they describe. Nevertheless, exposure to a teacher who teaches memory strategies would lead students toward more effective learning (Moely, et al., 1992). Further studies might compare students' academic performance under teachers who use more memory strategies and those who use fewer memory strategies in presenting the lessons, or examine memory strategies by content matter and grade level.

Conclusions

Memory strategies are critical in promoting learning at schools. The types of memory strategies teachers use to present their lessons determine how students would remember the information. Rehearsal is helpful in remembering foundational information

in working memory, whereas elaboration, mental imagery, mnemonics and organization are helpful in moving information from working memory to long-term memory. Therefore, teachers are encouraged to learn from other teachers how to incorporate these memory strategies in presenting lessons to their students.

Appendix

Table 1

The Number and Percentage of Memory Strategies Used By Teachers

Memory Strategies	Number of Examples	Percentage of Examples
Rehearsal	111	46.64%
Mental Imagery	54	22.69%
Elaboration	46	19.33%
mnemonic	17	7.14%
organization	10	4.2%
Total	238	100%

Table 2

The Examples and Activities of the Memory Strategy of Rehearsal Used by Teachers

Memory Strategies	Examples	Activities
Rehearsal	Drill	1. Tracing letters. 2. Unscrambling a sentence. 3. Repeating the letter sound. 4. Reciting the specific rule and formula. 5. Listening to a script and reciting it.
	Practice	1. Using flashcards. 2. Completing worksheets. 3. Doing homework. 4. Reviewing at regular intervals. 5. Performing the movements, 6. Giving self-test. 7. Asking peers questions, 8. Looking for the concepts in daily life, 9. Solving real world situations.
	Games	1. *Jeopardy!* for common conversions. 2. *Go-fish* for letter cards and corresponding pictures. 3. *Bingo* for single and two-digit multiplication problems. 4. *Tic-Tac-Toe* for 3 levels of multiplication. 5. *Multiplication Wheel* for multiplication. 6. Velcro cards for matching element's name, symbol, atomic number, and numbers of neutrons, protons and electrons. 7. Computer games for multiplication facts, identification of A.M. & P. M., review of the periodic table, and classification of living organisms and cell types.

Table 3

The Examples and Activities of the Memory Strategy of Mental Imagery Used by Teachers

Memory Strategies	Examples	Activities
Mental imagery	Mental math	1. Using base ten notations 2. Adding up the number of dots.
	Realia	1. A circuit board. 2. A "D"cell battery. 3. Two or three wires. 4. Different types of conductors and insulators. 5. A light bulb. 6. A motor. 7. A small demonstration clock.
	Visual aids.	1. Flashcards with pictures. 2. Vocabulary cards with pictures and letters. 3. Pictures on bulletin boards, whiteboard, or posters. 4. Illustrations within story books. 5. Video or Smartboard demonstrations. 6. Songs with physical motion, 7. Scripts with physical motion but without voice.
	Visualization.	1. The equal sign of an algebraic expression as a scale holding the same weight at both sides. 2. A compass rose as a favorite uncut pie with 360 small cuts. .

Table 4

The Examples and Activities of the Memory Strategy of Elaboration Used by Teachers

Memory Strategies	Examples	Activities
Elaboration	Analogy	1. Multiplication is analogous to repeated addition. 2. Division is analogous to repeated subtraction. 3. Mowing the yard is analogous to area because you mow the whole yard, 4. Setting up a fence is analogous to its parameter because you go around the edges.
	Meaningfulness	1. Calculating area when one wants to buy carpet for houses, order tiles for a kitchen, or build a house. 2. The letter *A* comes before the letter *P* in the alphabet, so A.M. comes before P.M. just as morning comes before night. 3. Since "tablespoon" and "teaspoon" both start with the letter *T*, and *T* rhymes with "three", remember that there are 3 teaspoons in a tablespoon.
	Peer teaching	1. After finishing their work, students can help others determine examples and non-examples, identify the type of speech in sentences, and apply the parts of speech to compose sentences. 2. Working together to discuss the question, figure out the answer, and share the strategies of how to get the answers. 3. After summarizing their sections, each student teaches that section to the class and other students may ask questions about that section.
	Personalized examples	1. Connecting a script to an emotion students identify with and relating it to a previous event from their life. 2. Using the new words to write personalized sentences relevant to their life and making meaningful connections to the words. 3. Deriving the formulas themselves. 4. Writing a song, rap, or poem about a state and its capital. 5. Creating a sentence for each common interjection. 6. Writing down definitions, making observations, drawing pictures, making hypotheses and predictions, discussing the steps and strategies, and explaining the successes and failures of one's project. 7. Creating flashcards with the material and other visuals. 8. Rewriting and explaining the concepts in one's own words.
	Projects	1. Creating a poster of a topic and presenting the poster to the class. 2. Choosing an experiment for science fair based on what students have learned and presenting their results to the whole class. 3. Constructing 3-D prisms with grid paper and discovering the standard algorithm for finding volume. 4. Creating one test question for teachers to put into a test. 5. Making a cake to show the type and parts of cells.

Table 5

The Examples and Activities of the Memory Strategy of Mnemonics Used by Teachers

Memory Strategies	Examples	Activities
Mnemonics	Acronyms	1. Using "KFC" as a cue for remembering the fraction operation: keep, flip, and change. 2. Using "FANBOYS" as a cue for remembering conjunctions: for, an, nor, but, or, yet, and so. 3. Using "SOH CAH TOA" as a cue for remembering geometry equation: Sine = opposite/hypotenuse, cosine = adjacent/hypotenuse, tangent = opposite/adjacent.
	Phrases	1. Using "King Henry doesn't make Disney channel music" as a cue for remembering the conversion of measurements in the metric system: kilo, hecto, deka, meter, deci, centi, milli. 2. Using "Please excuse my dear Aunt Sally" to remember the order of operations in math: parenthesis, exponents, multiplication, division, addition, and subtraction. 3. Using "Never eat soggy waffles" to remember cardinal directions: north, east, south, and west.
	Songs	1. Using songs on perimeter and area, states and capitals, living organisms classifications, cell types and their parts, and the periodic table and its elements.,

Table 6

The Examples and Activities of the Memory Strategy of Organization Used by Teachers

Memory Strategies	Examples	Activities
Organization	Anchor chart	1. Writing the similarity and difference between insulators and conductors in two columns.
	Bookmark	1. Figuring out an unknown word in a variety of ways, such as sounding out words, breaking words apart, and looking for context clues and text features.
	Check sheet	1. Identifying main ideas and supporting details, such as reading the entire passage first, deciding whether the passage is fiction or non-fiction, listing the important parts of the passage, looking for the sentence telling the main idea, and summarizing the passage with the main idea and supporting details.
	Concept map	1. Writing key words to identify the operation of addition (sum, total, more, sum) and subtraction (reduce, decrease, less than, difference) in boxes and connecting them to the respective operation.
	Chunking	1. Parts of speech as four smaller units: nouns, verbs, connections, and interjections. 2. Adjectives, nouns, and pronouns as a descriptive unit. 3. Adverbs and verbs as a motion unit. 4. Prepositions and conjunctions as a connecting-word unit.

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For more information about
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The OHIO Journal of Teacher Educators (OJTE),
see page 95.

Prospective Teachers' Understandings of Common Core Mathematical Practice: Making Sense of Mathematics

Carla Gerberry, Xavier University
Lindsay Keazer, Michigan State University

Abstract

The Standards for Mathematical Practice that accompany the Common Core necessitate a shift in mathematics teaching to emphasize conceptual understanding and reasoning. Thus, many prospective teachers must learn to teach in ways distinct from how they learned. This study examines prospective early childhood teachers' understandings of CCSS.MP.1, which emphasizes making sense of mathematics. Approximately one third of students demonstrated an understanding of the emphasis on students' thinking strategies, while another third interpreted the process as one that could be minimized to a procedure. This holds implications for teacher educators to explore ways to develop prospective teachers' understandings of this important distinction.

Keywords: Sense making, Common Core Standards of Mathematical Practice, prospective teachers

Introduction

The National Council of Teachers of Mathematics (NCTM) (2000) and the National Research Council (2001) have made recommendations that teaching for conceptual understanding should be a major goal for mathematics teacher education. They suggest that traditional ways of teaching have reduced mathematics to a focus on skills and procedures, and failed to help prospective teachers make sense of mathematics. The Common Core State Standards (CCSS) (National Governors Association Center & Council of Chief State School Officers, 2010), adopted by the majority of U.S. states and territories, built upon the work of these groups with the establishment of the Standards for Mathematical Practice. The eight Standards for Mathematical Practice (SMP) describe the expertise that teachers should develop in their students, and require that mathematics learning have a conceptual basis.

A challenge currently facing many prospective teachers is that the new SMP require them to learn to teach mathematics in ways distinct from how they learned mathematics. Prior to entering a teacher education program, prospective teachers have spent many years as students in mathematics classrooms, often learning mathematics in ways that do not align with current standards. Lortie's (1975) theory of "apprenticeship of observation" suggests that a teacher's past experiences observing and engaging in learning as a student are a major contributor to how they learn to teach. Prospective teachers' understandings of mathematics and teaching are strongly influenced by their past experiences as students of mathematics. If they did not develop a conceptual understanding of mathematics, they may have difficulty interpreting the SMP, and struggle to support their future

students in developing them.

Several of the SMP emphasize that students need to be able to reason conceptually about mathematics. In order to teach in this manner, research has recognized that teachers themselves need a conceptual understanding of mathematics (e.g., Ball, Hill, & Bass, 2005). Research suggests, however, that prospective teachers in the U.S. are not adequately prepared to teach the demanding mathematics curriculum required by the CCSS (Education Policy Center, 2011). Therefore, teacher education programs must consider how to support prospective teachers' development of understandings of the SMP.

Purpose

This study sought to contribute to this need by exploring prospective teachers' understandings of the first SMP (CCSS.MP.1) through the lens of their past experiences. This standard requires students to "make sense of problems and persevere in solving them." More specifically, we investigated the following question: What are prospective teachers' interpretations of the CCSS.MP.1 based on their past experiences? Examinations of prospective teachers' interpretations of the SMP are informative to teacher educators interested in supporting prospective teachers in learning to foster these important practices in their future classrooms. In this study we focus specifically on CCSS.MP.1 as it is a core practice with broad application to all levels of mathematics. In addition, this practice represents a key shift from traditional mathematics teaching practices with its focus on student thinking and persistence through solving non-routine problems. Inquiry-based learning requires teachers to pose mathematics problems that are open-ended and allow several different paths to a solution. With this comes the need for students to develop perseverance and deduction.

We surveyed 41 prospective teachers enrolled in early childhood and middle childhood teacher preparation programs, in order to glean information about how they interpret and understand this standard in light of their past experiences. We asked them to consider the description of CCSS.MP.1 and describe any past experiences as a mathematics student where they had developed expertise in the standard. Through analysis of their responses we answer the following question: How do prospective teachers make sense of the standard by drawing on their past experiences with mathematics? This question is important because little is known about how prospective teachers interpret the meaning of CCSS.MP.1 in light of their own mathematical experiences. For example, do prospective teachers recognize that a conceptual understanding of mathematics would be necessary in order for prospective teachers to "make sense" of mathematics? Or do they interpret the standard as requiring prospective teachers' proficiency in solving problems through a series of prescribed steps? These findings have significance to assist mathematics teacher educators in identifying important ideas underlying this practice that deserve emphasis in teacher education programs in order to prepare prospective teachers for teaching according to the SMP.

In the following sections, we review the literature on teacher preparation for the SMP, and specifically related to "making sense," the emphasis of CCSS.MP.1 that we focused on in this study.

Preparation for Teaching for the SMP

As of yet, little research has assessed teachers' understandings of or implementation of the SMP. A database search of "mathematical practice", "Common Core", and "sense making" yielded no entries that were directly related to prospective teachers learning about the CCSS. There were two practitioner articles found: one article (i.e., Thomas & Edson, 2014) discusses similarities and differences between the CCSS and the NCTM standards, and the second article (i.e., Stephan, 2014) discusses a teacher's implementation of all eight SMP in her classroom. We found no research that addresses prospective teachers' learning about the SMP.

Newton, Wood, Spangler, Wilson, Drake, and Kasten (2013) conducted a survey of mathematics teacher educators (MTEs) to understand what changes are being made to teacher education programs in light of the CCSS. They found that many MTE's acknowledged that more changes should be made to teacher education programs in order to prepare prospective teachers for teaching according to the CCSS. MTEs cited the need for change most prominently in the field experience component, and also in other areas: assessment, content preparation, and pedagogical preparation. When surveyed about changes that had been made to the curriculum thus far, Newton et al. found that 91% reported at least minor changes, and 24% reported major changes to their own courses. The most common changes specified were attention to specific mathematics content or practices (73%) and linking already existing course activities to the CCSS (62%). In many cases, however, changes being made were instructor-dependent rather than formal programmatic changes. These findings suggest that while some changes have been made, more are needed, as well as a common understanding of what those changes should look like as MTEs learn more about how prospective teachers make sense of the SMP.

Making Sense of Mathematics

In this study we focus on prospective teachers' understandings of the first SMP: "make sense of problems and persevere in solving them." This practice emphasizes the need for prospective teachers to develop thinking strategies and persist to solve non-routine problems. This SMP aligns closely with the reasoning and sense making practice emphasized by the National Council of Teachers of Mathematics (2009). This practice describes a way of thinking, or making sense, that is necessary for all mathematical activity. It is closely related to the idea of reasoning conceptualized broadly as "the way of thinking, adopted to produce assertions and reach conclusions" (Bergqvist, Lithner, & Sumpter, 2008, p. 2).

Literature across the field of mathematics education supports the proposal that an emphasis on reasoning and sense making should be inherent in all mathematical activity in order for prospective teachers to learn with a conceptual understanding (e.g., NCTM, 2009; Schoenfeld, 2009). This practice stands in sharp contrast to traditional ways of learning mathematics through rote

memorization and an emphasis on skill over understanding. New efforts are being made to help prospective teachers come to see mathematics as a "discipline of reasoned sense making" (Schoenfeld, 2009, p. 171), as indicated by the creation of CCSS.MP.1. Moreover, this practice is essential to all areas of mathematics.

Examining how prospective early childhood teachers interpret and understand CCSS.MP.1 is of particular importance, because research has indicated that early childhood teachers have limited mathematical knowledge related to this practice (see Stylianides, Stylianides, & Shilling-Traina, 2013). In this study we examine prospective teachers' early understandings so that future research can address ways of developing their understanding of this practice.

Methods

Population

This study was conducted in two sections of a Number Theory content course designed for prospective teachers of early childhood education and middle childhood education at a private university in the Midwest. Prospective teachers were in their freshman or sophomore year and this was their first mathematics course at the university. The population consisted of 41 prospective teachers: 38 females and 3 males. Eleven of the students were enrolled in a middle childhood education program, and 30 were enrolled in an early childhood education program. The courses utilized the same textbook, although certain topics were covered more in-depth for middle childhood students.

Data

The data for this study were collected from an online survey given prior to the first day of class. We asked demographic questions as well as items pertaining to attitudes and beliefs. The focus of this study was on pre-service teachers' knowledge of CCSS.MP.1 and how they make sense of it through the lens of their past experiences as students. More specifically, the survey asked prospective teachers to read the description of CCSS.MP.1 and think about what it meant to them. "Describe any past experience you have had as a student of math, in which you feel like you participated in a way that met this standard." The description of CCSS.MP.1 that was provided to the prospective teachers matched what was provided in the SMP descriptions (National Governors Association Center & Council of Chief State School Officers, 2010).

Analysis

Qualitative data was imported into an Excel spreadsheet and identifying information was removed. The two co-authors began the grounded theory process (Glaser & Strauss, 1967) by reading and rereading all prospective teachers' responses, and engaging in constant comparison to search for possible themes. We met to discuss initial observations and concluded that an observable variation between responses was whether or not the individual described the "making sense" process as one that involved problem solving with non-routine thinking, or as a process of

following prescriptive steps. After discussing this variation, we separately returned to the data and categorized responses according to these two categories. This categorization was done by reading and rereading responses and underlining words or phrases that indicated an understanding of problem solving as either a thinking process, or a process of relying on prescriptive steps. After we each separately conducted this analysis, we met to compare our categorizations and to discuss the responses that were particularly difficult to classify. This process of categorizing, sharing, and discussing helped us to further clarify our understanding of the criteria that differentiated responses in each category.

The prospective teachers' responses that we categorized as demonstrating an understanding of the practice were those which indicated that thinking and reasoning was an integral part in coming to a mathematical solution. Some examples of phrases used by prospective teachers that indicated the importance of reasoning to support solutions were: "thinking about the problem critically and from different angles", "support our answers", "problem solve and explain our reasoning to how we got our answers". Responses that we did not categorize as demonstrating an understanding of the practice fell into one of two cases: a) they indicated a reliance on rules, steps, or procedures rather than their own thinking, or b) they were vague and lacked enough detail to make a determination. When responses emphasized prescriptive steps and did not indicate the use of their own thought processes in arriving at a solution, we concluded that it did not offer substantial evidence to indicate understanding of CCSS.MP.1. Once all responses were categorized according to whether or not they indicated an understanding of the practice, we conducted further analysis by reading and rereading the responses within each category, and noting themes that emerged within each group. In the following sections, we describe the findings.

Findings

A distinguishing feature that divided prospective teachers' responses was whether or not they recognized "making sense" as a thinking process in which students developed their own processes to solve a problem. While some responses did describe a thinking process used to find a solution, others described solving problems in ways that attempted to rely on a procedure or steps, similar to traditional methods.

Evidence of Making Sense as a Thinking Process

Of the 41 responses, 13 demonstrated an understanding of CCSS.MP.1 as representing a thinking process. Here we present 3 illustrative examples in Table 1 (see Appendix on page 30). In each example, we added our own underlining of their discourse, to emphasize the particular phrases that justified the prospective teacher's understanding of the standard as a student-centered thinking process. Here, we present three illustrative responses that vary in length and level of detail, to illustrate the different ways students articulated an understanding of the standard.

Each of the 13 responses that we categorized as "understanding" CCSSS.MP.1 indicated that the prospective teacher understood this standard as being about a thinking process in which the ideas and strategies come from the student (i.e., "I had to figure

out…"). In the three responses above, student-centered thinking is indicated through verbs and phrases such as: plan, questioning, pondering, discovering, think out, thoroughly considers the question, determine the best way to solve.

As we looked further across the 13 prospective teachers who demonstrated an understanding of CCSS.MP.1, we noticed other common ideas expressed. In 9 of the 13 responses, prospective teachers mentioned the existence of "different methods" to solve. Four of those responses also mention a goal of trying to come up with the best solution or determine the best way to solve the problem. Additionally, some responses indicated common contexts for using this standard. Three of the 13 responses included a reference to a geometry course as a context in which they had practiced CCSS.MP.1, and four responses referenced "word problems," as a context. Below is an example of a prospective teacher's response that includes reference to both contexts, which we highlighted in bold text. Our underlining is also included to indicate the phrases that we saw as evidence of understanding the standard.

> When I took Geometry, in order to complete a proof you must analyze the problem and think thoroughly. Word problems have always been involved in every math course I have taken especially Algebra. I took Physics last semester and we had to problem solve and explain our reasoning to how we got our answers. We had to support our answers. In high school, during Trigonometry our teacher had us explain lessons to one another to make sure we truly understood the material.

Evidence of Procedural Knowledge

Of the 41 prospective teachers who completed the survey, 28 did not show ample evidence to demonstrate an understanding of CCSS.MP.1 as a thinking process. In 15 of these 28 cases, the prospective teacher restated jargon or phrases directly from the standard or gave a vague response and did not provide any elaboration on what the standard meant to them or how they had experienced it. Thus, we felt there was not enough evidence to justify that they understood the meaning of the standard. We recognized that they could have chosen to use words directly from the standard in order to try to give us the desirable answer, and thus we looked for evidence of understanding that went beyond directly restating what had been provided in the description of the standard. These 15 responses we categorized as "not enough information," meaning they could have an understanding of this standard but they were unable to demonstrate it within their response to the survey question.

In 13 of the 28 cases that did not provide enough information to indicate understanding, we categorized the response as "procedural" because they described the problem solving process as one that attempted to minimize it to a procedure. Prospective teachers' procedural approaches to problem solving emphasized following steps, such as underlining key ideas, following steps previously learned, and double-checking the answer. For example, one prospective teacher's response included, "most of the time I circled, highlighted, or underlined the given

important information in the word problems and ignored other information that I didn't need." Some other responses referenced a general need to follow steps, such as a prospective teacher who described their future students' needs by saying, "I believe as a teacher this means students will need to learn certain steps to solve a mathematical problem."

Further analysis revealed addition- al themes among the 28 responses that did not indicate understanding. Seven of the 28 respondents described general strategies that have been found to be help scaffold the problem solving process (i.e. draw a picture, use manipulatives, guess and check) but did not reference a need to use their own thinking. These responses seemed similar to attempts to follow Polya's (1957) approach of solving a problem by relying on a recommended strategy, but they did not indicate the important thinking process that would also be required. For example, in the following response we underline the phrases suggesting the use of general problem solving strategies:

> I think the idea of relying on objects or pictures to help solve a problem is very important in early childhood education. Many times works include erasers, beads, or pictures to help prospective teachers visually see the math they are doing. It also helps children apply math to the real world. I am a visual learner so I do believe strongly in drawing pictures, graphs, and diagrams to promote hands on learning of math that can be an abstract concept to learn.

This response indicated reliance on pictures and manipulatives to help prospective teachers, but did not express understanding to the level of emphasizing the need for prospective teachers' own thinking.

Another theme that surfaced from our analysis was that 7 of the 28 responses emphasized the importance of checking and rechecking their work using multiple methods. These responses also did not contain any mention of student thinking or demonstrate an understanding of CCSS.MP.1. Some sample responses include: "I would often use a variety of methods to check my answer. Among these different ways, my favorite was guess and check," and "When taught multiple ways to solve a problem, I use the process that makes the most sense to me and then use one or two of the other methods to check my work." Each of these responses emphasize the importance of using multiple methods to solve a problem or check their answer, but they do not distinguish that these methods of solving should be generated by the students' thinking, rather than prescribed or explicitly taught by the teacher.

As another level of analysis, we investigated whether there were any patterns related to the teacher education program area that prospective teachers were enrolled in, and their understanding of CCSS.MP.1. Of the 11 prospective teachers who were enrolled in a middle childhood education program, only 2 provided responses which were categorized as understanding CCSS.MP.1. Meanwhile, 11 of the 30 prospective teachers enrolled in an early childhood education program provided responses which indicated an understanding of the math practice. Because of the small sample size of this study, and small number of students indicating understanding from each group, further research would be needed to explore these trends in understanding before generalizations could be made.

Discussion

Just under a third of the prospec- tive teachers were able to show evidence of understanding that CCSS.MP.1 was about a student-centered thinking process, by giving examples or drawing on their past experiences. Of those prospective teachers who showed evidence of understanding CCSS.MP.1, about half of them referenced geometry or word problems as contexts in which they had had opportunities to participate in this standard in the past. These findings suggest that prospective teachers' past experiences may have offered them little opportunities outside of those two contexts to engage in the practice promoted by CCSS.MP.1.

The high school geometry course and the context of "word problems" have traditionally been known as the sites where problem solving and reasoning activities took place. The geometry course was a place where reasoning and proving activities were traditionally introduced (NCTM, 2009), and "word problems" have been broadly interpreted as sites where problem solving takes place, despite the fact that traditional textbook word problems often do not include the criteria necessary to foster non-routine problem solving (Kabiri & Smith, 2003; Stein, Remillard, & Smith, 2007).

Mathematics education reform since the 1980's has emphasized "problem solving," fueled by An Agenda for Action (NCTM, 1980) and subsequent policy documents (NCTM, 1989; NRC, 1989). The ambiguity of "problem solving" as a focus proved problematic, as the phrase has been broadly interpreted to include solving almost any problem (Schoenfeld, 2009) instead of shifting mathematics teaching towards student-centered inquiry. Now, however, the emphasis on problem solving is being replaced by an emphasis on "reasoning and sense making" (NCTM, 2009) and "make sense of problems and persevere in solving them." These ideas clearly delineate the need for prospective teachers to develop their own thinking strategies for working through non-routine problem solving, and necessitate that these practices become a part of "every mathematics classroom every day" (NCTM, 2009, p. 5) instead of limited to narrow contexts such as geometry and word problems.

There is risk that prospective teachers who do not understand that reasoning and sense making is about developing students' thinking strategies may attempt to reduce the ideas to procedural steps. Just under one third of the prospective teachers we surveyed interpreted CCSS.MP.1 as describing a problem solving process that could be done with minimal thinking and minimized to a procedure. They emphasized activities such as circling, highlighting, underlining, and double-checking, rather than activities that develop students' own thinking strategies.

Conclusions

This is a time of transition for teacher educators as we develop our programs to prepare teachers for new expectations established by the SMP. Prospective early and middle childhood teachers are now

responsible for promoting and developing students' understanding of the mathematical practices in their future classrooms. The findings from this study are significant as they illuminate prospective teachers' early understandings of the SMP, and identify a need for teacher educators to support further development of their understandings.

Without extra support, teachers (both prospective and practicing) are limited to the examples provided within the CCSS documents. Their past experiences may not have provided them with the relevant skills needed to enable them to generalize the meanings of each of the SMPs. Thus, mathematics teacher educators should explore ways to help prospective teachers unpack and understand these ideas through engagement in mathematical inquiry and subsequent reflection, aimed to help them understand the thinking processes that should be an inherent part of doing mathematics.

Further research is needed to ex- plore ways of supporting the development of prospective teachers understandings of these ideas, and to examine the conditions that help prospective teachers come to see mathematics as a sense making process.

Appendix

Table 1: Examples of responses indicating evidence of sense making

Student 1	These Common Core Mathematical Practice standards are important I think to successful learning of mathematical concepts. The standards include actions and processes that allow prospective teachers to gain a deeper understanding of the information they are learning because they are very active in their learning. In elementary school and high school, some teachers did encourage and push us to use these skills in our math lessons, such as showing our work to plan a solution and pathway to get there, questioning different arguments, and pondering if an answer makes sense or is possible for the solution. I think in my high school math classes, more teachers pushed us into discovering the solutions by our own efforts rather than telling us exactly how to get an answer from a certain process.
Student 2	In previous math classes I remember having to think out different ways that I could solve a problem then pick which one I thought would work best for me to solve the problem presented to me.
Student 3	To me, these standards mean that a student doesn't simply use memorized steps in order to find a solution, but rather she thoroughly considers the question being asked, uses her knowledge to determine the best way to solve the problem, understands the steps she is taking, and can justify her answer. When studying for exams for past math classes, I like to talk through the practice problems to makes sure I understand why I need to do something rather than just going through the motions. This helps me understand how to apply the concept to real world examples.

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Building Collaborative Partnerships in Teacher Education based on Perceptions, Experiences, and Insights from Mentoring Teachers

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Abstract

Student teaching and pre-clinical field experiences are an instrumental component of teacher education programs within most universities nationwide. A successful program must have two essential parts: effective clinical placement settings and highly qualified mentoring teachers. With the new CAEP (Council for the Accreditation of Educator Preparation) standards surrounding the education field for building effective partnerships and creating high-quality clinical programs, many are taking notice that there is a gap in the literature surrounding the perspectives of mentoring teachers in partnering school districts where our teacher candidates spend vast amounts of time to complete the requirements to receive teacher licensure (Torrez & Krebs, 2012; Clift & Brady, 2005; Veal & Rikard, 1998; Graham, 2006). To better develop coherence across clinical and academic components of preparation of teacher candidates, all voices must be heard; all perspectives need to be outlined in current literature to form a shared responsibility and accountability.

For this article, the perspectives of mentoring teachers and teacher candidates from early childhood placements were collected and analyzed to determine the current state of collaborative partnerships pertaining to student learning and development, implementation, assessment, and continuous improvement of a teacher education program. The overarching research question, "How do universities and partners begin to form a collaborative partnership to develop and establish mutually agreeable expectations to create student success within teacher educator programs?" guided this research to examine the perceptions, experiences, and insights of mentoring teachers in early childhood classrooms to strengthen current teacher education programs. The ultimate goal of this research was to gain an understanding of the current thinking of more stakeholders and to use the information to begin the process of mutually designing the programs to en- sure sufficient depth and breadth, reflection, pedagogical skills, and increased vigor for our teacher education programs.

Review of Related Literature:

The extant literature surrounding effective field experiences addressed that a

strong, mutual relationship is imperative between the faculty of universities and the mentoring teachers within the local school districts (American Association of Colleges for Teacher Education, 2010). Field experiences need to be designed mutually by all invested partners to provide teacher candidates with opportunities to grow as educators. Teacher candidates need to be able to try new strategies, receive positive and constructive feedback, and develop an understanding of grade-level appropriate content and best practices without added stress of inappropriate placements and unwilling mentoring teachers. In general, the design of the specific field experiences are decided by individual universities; decisions ranging from choosing placement sites to selecting mentoring teachers are controlled by the universities without collaborative input from various partners such as local school districts and the mentor teachers.

In the Unites States, field experiences, in general, characterize two different models; earlier field experiences in degree programs are integrated with course work and students take the role of observer or assistant inside the classroom. Most teacher education programs are completed with a student teaching experience, where the students are in the field every day and assume more of the responsibilities of an actual teacher while being mentored by an experienced teacher (Ronfeldt and Reininger, 2012). Both types of field experiences are traditional designs that have occurred for numerous years within universities to help pre-service teachers become familiar with the field of teaching. It enables them to learn real-life authentic experiences from highly qualified teachers who are willing to pass their expertise to neophytes. According the National Council for Accreditation of Teacher Education, Blue Ribbon Report, (2010), there is no other experience in teacher education programs that has a more monumental impact on the effectiveness of future teachers. Many other various research articles concurred with the notion that field experiences are the most beneficial experience in the development and effectiveness of future teachers (Borko and Mayfield, 1995; Grimmett and Ratzlaff, 1986). It is the intent of teacher education programs, that students exit the programs feeling more prepared and confident while exuding the passion and knowledge needed for exceling in the field of education.

In order for teacher candidates to gain the confidence and knowledge, it must be modeled to them by experienced and highly-qualified mentoring teachers. An effective mentor must be able to effectively model appropriate teaching techniques, know the scope and sequence of curricula, understand the importance of co-teaching, provide frequent positive and constructive feedback, and allow opportunities for practice and reflection to occur, in order to be able to effectively coach a teacher candidate (Goodnough, et al., 2009; Glenn, 2006). Many of these skills do not come naturally to a first-time mentor, especially when their own previous training centered around content-specific areas. Unfortunately, less than half of all state universities that offer teacher education programs

with field experiences provide training for their mentors to help them with the process (National Council for Accreditation of Teacher Education, 2010). Research conducted by Ronfeldt and Reininger (2012) indicated the quality of the mentoring teacher is the strongest predictor of the effectiveness of teacher candidates in regards to preparedness and efficiency. Many other research studies concur with the statement, ranging from current to several decades old research (Cook, 2007; Karmos and Jacko, 1977; Manning, 1977; Smagorisnsky et al., 2006; Torrez and Krebs, 2012). With this in mind, it is imperative for universities to provide training to mentor teachers to ensure they are aware of expectations and prepared to handle the role of being a mentor. By collaboratively working together, teacher education programs must partner with the mentoring teachers to ensure that prospective teachers acquire the knowledge, beliefs, and skills necessary to succeed in the field of teaching.

The task at hand of providing training for mentoring teachers may seem like a simple solution, but there are many other challenges, according to research, to add to the conundrum. Several research studies reported insufficient communication skills between the university supervisor, teacher candidate, and mentoring teacher as creating the largest struggle for producing an effective experience (Veal and Rikard, 1998; Bain, 1991; Kauffman, 1992; Koehler, 1998; Ryan, 1982). Mentoring teachers may feel as if they have a strained relationship with the university supervisor, possibly because of the infrequent visits from university supervisors to the placements or a result of the power struggle as to which individual is known as the knowledge/content expert among the two groups (Veal and Rikard, 1998). Some mentoring teachers reported unclear procedures and lack of support from university supervisors, while some mentoring teachers reported they felt uncomfortable and intimidated by sharing ideas and methods with the university supervisors (Koehler, 1998; Valencia, et al., 2009; Veal and Rikard, 1998). Another challenge that occurs is mentoring teachers accepting teacher candidates in their classroom because they are dependent on the extra set of hands rather than wanting to help a future teacher to develop. These mentoring teachers may be less likely to take an active role in the preparation process of the teacher candidate. Teacher candidates have reported feeling unwelcomed, which as a result minimizes opportunities for taking risks and trying out new strategies inside the classrooms (Borko and Mayfield, 1995)

Unfortunately, when teacher candidates lack the comfort level and have a decreased level of understanding, oftentimes this results in a relationship of tension between the mentoring teacher and teacher candidate. A variety of belief systems, past experiences, and future expectations all play a vital role in developing a safe and conducive learning environment between the mentoring teacher and teacher candidate (Valencia, et al., 2009). Understanding the personalities, belief systems, and qualities of professionalism of each party is needed to ensure an appropriate connection between the mentoring teacher and teacher candidate to allow the student teacher to feel a sense of comfort in which they are empowered to take risks and try new strategies without the fear of failure.

With the current challenges noted, and the understanding that several decades of unapplied research pertained to the voices

of uncorroborated efforts between mentoring teachers and universities, it was the current goal to highlight the voices of the mentoring teachers in a way that would utilize the perspectives to strengthen our teacher education program.

Method

To begin the study, the overarching research question was generated to help improve our teacher education program: "How do universities and partners begin to form a collaborative partnership to develop and establish mutually agreeable expectations to create student success within teacher educator programs?" To begin to address this question, the perspectives of all individuals needed be taken into account. The perspectives of the individuals involved at the university level have been well documented, but the perspectives of the mentoring teachers were exponentially overlooked. A survey was developed based on current research and guiding questions to begin to collect information from mentoring teachers on their thoughts and perspectives of our early childhood education field program. Questions addressed basic demographics, obtaining opinions surrounding the current structure of the placements, provid- ing suggestions for increased involvement, documenting challenges and benefits of the current program, and detailing recommendations to create a more vigorous and effective field placement during future semesters.

At the conclusion of the spring 2014 semester, mentoring teachers and teacher candidates were invited to participate in the online survey. The researcher surveyed the teacher candidates and their mentoring teachers from an early childhood field education program at a four-year, public university in the Midwest. The grade levels of the placements ranged from kindergarten to third grade, with the majority of the placements being first grade. The expertise of the mentoring teachers ranged from three years of experience to more than 15 years of experience, with the majority having three to eight years of experience. There was an equal distribution between the percentage of teachers teaching in rural versus urban school districts. The survey was sent to the individuals the week after final grades were posted; teacher candidates and mentoring teachers were aware that their perspectives were anonymous and confidential. Twenty mentoring teachers participated in this study, which was 71% of the surveyed population. Concerning the teacher candidates, a similar survey was sent with the same parameters; 50% of the 28 teacher candidates responded to the survey.

The students and mentoring teachers spent 35 days together during the spring semester in which the students were required to develop 20 lessons and co-teach on a regular basis with their mentoring teachers. The mentoring teachers were required to formally observe two lessons, continuously provide positive and constructive feedback, instill the teacher candidates with effective strategies through modeling, and offer guidance as needed during the 16-week placements. During the placements, the supervisors

observed two lessons, and the field coordinator additionally visited on two separate occasions to offer assistance and guidance. The supervisors and the teacher candidates met periodically for content classes on campus where the students were asked about the current continual status of the placements. Beyond those encounters, additional contact between the schools and university were not formed.

Results and Findings

Several different questions were asked to mentoring teachers and teacher candidates to determine a clear picture of the current state of the early childhood field experience program in comparison to the current literature. The findings are presented as they relate to the perspectives of mentoring teachers and teacher candidates to determine the current state of collaborative partnerships pertaining to student learning and development, implementation, assessment, and continuous improvement of a teacher education program.

Intentions of Participation and Emotional Involvement

To best understand the current thinking of the mentoring teachers and to begin the survey, the question of "Why do you participate in the teacher education program as a resource teacher?" was asked to the mentoring teachers. This question was asked to determine how many of our mentoring teachers were involved in the program with the goal of helping the teacher candidates succeed. An overwhelming response of 90% replied: "To positively contribute to the field of education." Not a single teacher reported that either the administration required them to accept a teacher candidate or that of they simply needed an extra set of hands in the classroom. A few mentoring teachers reported that they accepted a teacher candidate to learn new information or to be reinvigorated with fresh ideas. The results of this discovery were insightful and uplifting to know that the mentoring teachers were accepting neophyte teacher candidates into their classrooms along the premises of helping future generations rather than focusing on the demands of the current moment.

Concerning emotional involvement, the question: "Did you enjoy being a resource teacher and the experience that came along with it?" was asked to the mentoring teachers. This question was based on the research by Borko and Mayfield (1995) as to the notion that the lack of empathy and emotional involvement could hinder the outcome of potential success within the teacher candidates. Eighty-five percent of the mentoring teachers reported that they enjoyed the experience; in addition 25% of mentoring teachers claimed that they might consider hosting a teacher candidate again in the future, while 75% claimed they would volunteer to be a mentoring teaching again. Several teachers stated open-ended responses, which illuminated the positive experience that they had during the 16-week placements. Several comments further showcased these results, such as: "I had a wonderful experience with my TEC student. She was excited and motivated to learn. I feel the amount of time we spent together, along with her positive attitude had a significant impact on her learning experience" and "I truly enjoyed having a university student and would welcome any at any time!"

A similar question was asked to the teacher candidates: "Did you enjoy being a

teacher candidate and the experience that came along with it?" The results were once again overwhelming with a percentage of 100% reporting either "mostly" or "very much" as to enjoying the experience. Individual comments were generated to further showcase this positive comparison, including: "The mentoring teacher was awesome! She created a classroom where it was clear that her students felt safe, comfortable, and cared for" and "I was truly blessed to be in this placement this semester."

An additional question was asked to the teacher candidates on if they would recommend their mentoring teacher for future placements; seventy-nine percent documented that they would most definitely recommend their mentoring teacher to host a future teacher candidate again in the future. The remaining 11% claimed that they would recommend their resource teacher if they received additional help and assistance in the classroom to know the expectations and requirements of a mentoring teacher.

Mentor Effectiveness and Preparedness

According to current literature (Cook, 2007; Karmos and Jacko, 1977; Manning, 1977; Smagorisnsky et al., 2006; Torrez and Krebs, 2012), a large challenge of creating and ensuring effective placements is the quality and preparedness within the mentors. During the survey, several questions were aligned with finding out information pertaining to the mentors' and teacher candidates' perspectives on the effectiveness and preparedness of the mentoring teachers within the teacher education program.

First, the mentoring teachers were asked of how many previous times they had mentored a teacher candidate; this information was used to gauge the preparedness of the mentoring teachers. It was reported that 55% were mentoring teachers for the first time, with only 25% stating that they were seasoned mentor teachers with having three or more teacher candidates in previous semesters.

The mentoring teachers were further asked "How prepared did you feel as a mentoring teacher to provide the teacher candidate with support and expertise to help them grow as future educators?" Fifty percent of mentoring teachers reported that they felt sufficiently prepared to mentor a teacher candidate. Forty-five percent reported that they felt sufficiently prepared. The same question was asked of the teacher candidates, 14% stated that their mentoring teachers were slightly prepared and 86% documented that their mentoring teachers were significantly prepared.

The mentoring teachers and teacher candidates were then asked to report and comment on how the university helped to assist and prepare the mentoring teachers and teacher candidates for this experience. Fifty percent of the mentoring teachers reported that the university sufficiently helped to prepare them for this experience while only 20% reported that the university significantly prepared them. Comments ranged from "The university provided me with the information I needed to complete the field experience program" and "I wish that our ideas would

be heard to help change the program for the better."

In comparison, 36% of teacher candidates felt the university played a small part in assisting and preparing the mentoring teachers and teacher candidates for the experience. Several students felt that more could have been done to form a partnership between the university and mentoring teachers to make the program more effective. Comments from the teacher candidates emerged, such as: "The university did not really communicate with the resource teacher. There was no evidence of a partnership" and "A lot of mentoring teachers were confused as to everything expected" and "There wasn't much collaboration between the mentoring teachers and professors that prepared me as a teacher candidate." This information was extremely beneficial to hear from the mentoring teachers and teacher candidates, as it would not have been relayed without the use of the survey.

University Supervisor Visits

The design of the specific field experiences are, in general, decided by individual universities; decisions ranging from choosing placement sites to what assignment the teacher candidates must complete is mainly decided by university professors. In recent years, there has been more of a concerted effort to include the school districts and mentoring teachers into the decisions surrounding placements, assignments, observations, and final evaluations. Concerning visits from the university supervisors, the mentoring teachers were asked how many times they wished to have on-sight visits from the supervising professors for conferences, observations, and/or discussions to help assist the teacher candidates. Eighty percent reported that two to three times per semester was sufficient, whereas 20% felt four to six was a sufficient amount of visits. The teacher candidates reported: 29% felt two to three visits would be sufficient, 64% felt four to six times would be sufficient, and seven percent deemed more than 10 visits as proficient.

According to research by Veal and Rikard (1998), mentoring teachers may feel as if they have a strained relationship with the university supervisor, possibly because of the infrequent visits from university supervisors. On average, the university professors visit the school districts two to three times per semester as long as no issues occur that need further assistance. Most professors had additional university expectations including teaching other classes, research, and service projects. This is an area that could be further researched to better understand why the mentoring teachers and teacher candidates would like to see professors in the field more. The possibilities could range from developing more of a partnership to providing more guidance and structure.

Challenges and Benefits of Effective Placements

To further gain information on how to create effective placements with effective mentors, the mentoring teachers were asked to report on the three uppermost challenges of having a teacher candidate inside their elementary classrooms. The top three challenges reported by mentoring teachers were: a lack of content knowledge from the teacher candidates, the time frame of the placements (teachers felt more time was needed for the placement to be effective), and a lack of understanding of the program requirements from either the mentoring teacher and/or

teacher candidate. The teacher candidates were asked the same question; two of the top challenges were the same as the mentoring teachers (that of a lack of understanding of the program requirements from either the mentoring teacher and/or teacher candidate and the time frame of the placements). The third top challenge included personal challenges of the teacher candidates ranging from a need to still work a full-time job and/or limited family time due to the time demands of the teacher education program.

The benefits of effective programs were also taken into consideration. The mentoring teachers' and teacher candidates' perspectives of beneficial attributes of an effective placement were defined; each group reported that a successful and effective place- ment allowed the teacher candidates to inter- act in positive relationships with the students, to observe modeling and best practices, to gain knowledge of content, to have discus- sions which allowed positive and constructive feedback, and to try new strategies in a risk-free environment.

Professional Development Opportunities

At the conclusion of the survey the mentoring teachers were asked of the likelihood of them participating in future professional developments where the university planned sessions to help the mentoring teachers to gain experience and knowledge pertaining to the early childhood field experience and the mentoring responsibilities. It was reported by the mentoring teachers that 65% would consider attending the professional development sessions offered by the university and 20% reported that they would most likely attend the sessions.

A follow-up question was asked to generate possible ideas for the potential future professional development sessions. The teachers were asked to supply sugges- tions for possible topics at the sessions; ideas ranged from how to write an effective observation to how to offer constructive feedback to the teacher candidates. Other teachers mentioned the topics of: how to provide positive support to your teacher candidate, how to provide guidance with classroom management, and how to encourage your teacher candidate to step outside their comfort zone.

The teacher candidates were asked a similar question pertaining to their mentoring teachers; the teacher candidates were asked to identify possible topics of sessions that would have effectively benefited their mentoring teacher. The majority of students commented on ideas pertaining to the topic of helping their mentoring teachers to help their teacher candidates to take risks and to step out of their comfort zones.

With the understanding that few universities and colleges offer professional development sessions and the importance of having knowledgeable and trained mentors to assist teacher candidates (National Council for Accreditation of Teacher Education, 2010), this would be an area to further develop and research. Future data would need to be collected to verify actual participation rates to professional development sessions in comparison to potential participation

percentages. Mentoring teachers need to have their voices heard and universities can learn from them; however, mentoring teachers can also learn new information from the universities. It is a process of two-way communication that can be further developed and strengthened.

Conclusion

In conclusion, valuable information was ascertained from conducting this research for one semester from the mentoring teachers and teacher candidates. By investigating the perceptions concerning areas of: Intentions of Participation and Emotional Involvement, Mentor Effectiveness and Preparedness, University Supervisor Visits, Challenges and Benefits of Effective Placements, and Professional Development Opportunities, information was gained that can be utilized to build strong and effective partnerships between the University and stakeholders while reshaping the individual program to better meet the needs of our early childhood field experience students.

Each question that was asked to the mentoring teachers and teacher candidates helped to define a response to the overarching research question: "How do universities and partners begin to form a collaborative partnership to develop and establish mutually agreeable expectations to create student success within teacher educator programs?" The responses to the survey questions helped to establish that the teachers want to be involved more in the process and have valuable insights that will have a positive and effective change on the structure of the early childhood field experience programs. Although many of the findings in this research were to be expected, the new research adds depth to decades old research to further support that teacher educators are valuable resources and their voices should be heard and utilized.

As we move forward with creating solid partnerships with our mentoring teachers and school districts, attention will be applied to maintaining relationships with teachers who positively want to impact the field of education. The challenges and benefits documented by the extant literature and our mentoring teachers will be reflected upon and adaptations will be implemented as needed. Beyond offering professional development sessions, the next step in creating a more solid union with our partnering districts is to continually seek their opinions; we need to regularly ask for their advice and suggestions as we move forward. In addition, we need to have more of a presence within the school districts and to offer our assistance and guidance with their initiatives and projects. By working together, both the school districts and universities will be able to attain benefits from the collaboration. It is the desired goal of this research to continue to survey the mentoring teachers and teacher candidates in future semesters and to use the information to continue to change and reshape the program of early childhood field experience to better meet the needs of our students in the ever-changing field of education.

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Global Competence and the Common Core: Designing Engaging Units That Incorporate Both

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Abstract

This article explores the notion of integrating global competence into student learning. An analysis of the relationship between the Common Core State Standards (CCSS) and the tenets of global competence is presented. Not only is there a correspondence between CCSS and the underpinning elements of global competence, but global competence enhances the fundamental aspects of the CCSS. The constituent parts of a global lesson, four domains and four quality components are defined. The process of creating a unit, that originates with the CCSS and incorporates global competence is delineated. The process of creating global units that are grounded with the CCSS is applicable to all content and grade levels.

Introduction

It has never been more evident that we live and work in a global society. The students that teachers are preparing in the classroom today are likely to be working with people from other countries and cultures (Friedman, 2005; Stewart, 2007). As the use of technology increases the possibility of today's student eventually working on international teams conducting scientific research or voting on relevant global issues escalates (Stewart, 2007). Students must be familiar with and have a disposition and understanding of the many issues and nuances of other cultures (Friedman, 2005; Mansilla & Jackson, 2011; Reimers, 2006). Using more than a million data points, Mapping the Nation (2014), a live infographic database funded by the Longview Foundation tracks the globalization of America. This source estimates that, "Ninety five percent of consumers live outside of our borders; nationally jobs tied to international trade have grown on average, more than 100% over the past twenty years; and one in five jobs is tied to international trade. Cultural and linguistic diversity is evident in cities, suburbs, and most rural communities."

Schools are not meeting the challenge of preparing students to understand and act upon global challenges (Reimers, 2006) though students must become globally competent in our schools if they are to become culturally competent employees (Friedman, 2005). In a Framework for State Action on Global Education, the Partnership for 21st Century Skills, a coalition that includes the U.S. Department of Education, has broadened

its definition of the essential elements for 21st century readiness to include global competence, noting that, "In today's economy and world, global knowledge and international understanding needs to move from optional to foundational for our students" (2014, p.4). This emphasizes what the data has made obvious; that globalization has transformed the way Americans must prepare to work, learn and think in the immediate future (Stewart, 2007). Schools must adapt their program offerings and instructional methods so that students graduate with the competencies they need to successfully participate in a globally connected world (Reimers, 2009).

Global Competence

The Council of Chief State School Officers (CCSSO) and the Asia Society Partnership for Global Learning have constructed a definition for global competence that serves to guide educators in developing pedagogical tasks that build students' global capacities, detailing it as "the capacity and disposition to understand and act on issues of global significance" (Mansilla & Jackson, 2011, p.xiii). The methods that teachers can implement to realize these qualities in students have been developed in the field through the work of Asia Society. Asia Society's Partnership for Global Learning initiative has resulted in the development of International Studies Schools Network (ISSN) across America where educators deliberately teach students to become globally competent by aligning many of their classroom activities to four basic elements, or "domains," investigate the world, recognize perspectives, communicate ideas and take action. Students must become globally competent to adequately comprehend, participate and respond to global events (Reimers, 2009).

Driving the development of creating global competence in students is the research process involved in investigating the world with a focus on a topic of global or local significance. Each subsequent layer of the "four domains" is dependent upon the exploration of this global topic. It is through the analysis of a global issues that students begin the academic and personal journey of an understanding of the interconnectedness of the world. (see figure 1 in Appendix on page 52)

Investigate the World

Globally competent students investigate the world beyond their current environment. They are engaged in generating global knowledge through investigating other cultures, developing questions, analyzing, synthesizing and drawing conclusions about global issues. For example, the student identifies that data shows access to clean water is not equal to all people and articulates how the wealthy and poor are impacted differently (Council of Chief State School Officers' EdSteps Initiative & Asia Society Partnership for Global Learning [CCSSO, EI & AS], 2011).

Recognize Perspectives

According to CCSSO, EI & AS (2011), the notion of recognizing perspectives includes students identifying and articulating their own perspective and demonstrating an understanding of different perspectives

with an understanding that situations, events and phenomena influence perspectives. This domain involves students understanding that human interaction is influenced by perspectives. The notion of recognizing perspectives requires students to think critically about influences concerning perspectives and analyze information and resources. Students recognize that factors such as poverty, gender, age and ethnicity impact one's perspective.

Communicate Ideas

Students who are globally competent have the capacity to differentiate to their audience and adjust their disposition to communicate effectively. They understand that audiences may perceive the same information differently. With this in mind they deliberately employ the skillful use of language to allow the information to be clearly communicated and understood by people from varying perspectives. For example, when presenting information about the differing access to clean water between the wealthy and poor, the student shares the information without bias for either population. A final key element of communicating ideas is to select the most appropriate media for communication. Students choose from various mediums such as debates, speeches, documentaries and written narratives to ensure they provide an effective structure for sharing a particular topic with a diverse audience (CCSSO, EI & AS, 2011).

Take Action

Lastly, students that are globally competent identify opportunities to take action and advocate for improving conditions locally and globally. Students transcribe their findings and options as they discover creative approaches to take action individually or collaboratively. Students that take action are striving to contribute to or improve a situation or phenomena (CCSSO, EI & AS, 2011). For example, students may create a documentary detailing an important finding from their investigation about the global water crisis and share it with the community or other appropriate audience.

The Role of the Teacher

Schools are faced with the challenge to make the philosophical and pedagogical changes needed to prepare students for the ever changing global environment that currently exists. The charge to prepare students for the future will largely fall upon the classroom teacher. Asia Society's Partnership for Global Learning (n.d.) explains that if educators are to prepare their students to succeed in the global marketplace, students must emerge from high school prepared for work and civic roles in a globalized environment, where students will need the ability to compete, connect, and cooperate on an international scale. Teachers then, must be able to create classroom environments where they integrate strategies that engage students in global learning. A deliberate effort must be made to integrate global content into the curriculum. To accomplish this, teachers must understand the components of globalizing classroom instruction that will help them develop appropriate learning experiences for students, integrated with the CCSS they are required by their school systems to teach. This work begins with understanding the four domains of competence and how teaching students to be globally competent supports the anchor standards of the CCSS.

How Global Enhances Common Core State Standards (CCSS)

The creation of the CCSS was an effort grounded in the notion that the purpose of academic content standards, particularly in Language Arts and Math, is to prepare students for college or a career in the global marketplace. The CCSS attempt to internationalize math and Language Arts benchmarks, that is, to make them comparable to the standards of nations leading in the global marketplace, with the goal that American students will graduate with skills that will allow them not only to compete with their American peers, but in the global marketplace as well.

Students are citizens not only of our county, but of the world. Global issues like poverty, access to clean water, contagious disease, nuclear energy, and conserving natural resources impact all citizens and require that students work together as such to solve these complex and interconnected problems. These real-world issues present in the classroom as engaging topics that teachers can use as entry points in teaching students about the world of the 21st Century through the demands of the CCSS.

Embedded in the CCSS is the basic teaching of 21st century skills such as critical thinking, collaboration, communication and even creativity. These skills are an essential ingredient for solving real world problems. The components of global competence sup- port the skill development and rigorous core content that underpins the CCSS. It is appropriate and urgent for teachers to create classroom level experiences that will help students develop global competence as part of teaching the CCSS. An Educational Policy Improvement Center study indicated that students who "master global competencies in English Language Arts would be expected to significantly increase mastery of the Common Core State Standards" (2013, para. 4). This study also found that the alignment of the CCSS with the International Study Schools Network's (ISSN) recommended components of global competence was significant. In Language Arts, all areas of the CCSS are related to global competence. In Math, all CCSS are related to at least 3 domains of global competence. Together with the shift of implementing the CCSS, Asia Society's protocol for creating global lessons provides a purposeful pathway for teachers to accomplish the important work of globalizing the curriculum for students.

Creating Units that Integrate Global and CCSS

Similar to the backward design model, the task of creating units that integrate global and CCSS is a process that involves several essential steps. These steps are implemented systematically and involve collaboration through brainstorming, a fine tuning protocol, graphing and recording the framework of the unit.

Identify CCSS

The first step in creating a global unit involves the teacher identifying the CCSS

that will underpin the lesson. For example, a fifth grade teacher may select the following CCSS, "compare and contrast stories in the same genre (e.g., mysteries and adventure stories) on their approaches to similar themes and topics (NGA Center & CCSSO, 2010, pg. 44)." After choosing the CCSS the teacher would then create a summative assessment. Most units are designed for several weeks and include a handful of CCSS often across disciplines.

Brainstorming

Next the teacher participates in a process that involves brainstorming elements of the unit including summative assessment, essential questions, enduring understanding, activities and formative assessments. In pairs teachers take turns, as one teacher verbally describes aspects of the module the other teacher scribes. This allows the teacher to focus on the module without using cognitive effort toward writing or typing. After the teachers take turns they exchange notes and work individually to develop a framework for their unit.

Fine Tuning Protocol

After identifying the CCSS and brainstorming, teachers engage in a fine tuning protocol. The fine tuning protocol assists teachers through providing insight in developing elements of a unit as they collaborate in triads. Each teacher in the triad takes a turn explaining each preliminary idea for the unit. While one teacher explains the unit, the other two teachers must listen without interruption. After that teacher has concluded the explanation, the other two ask clarifying questions and then provide rounds of cool (suggestions for improvement) and warm (positive) feedback. When the teachers provide cool and warm feedback the teacher that presented may not speak. Finally, the teacher that presented has a few minutes to reflect and jot down notes. Each phase of the fine tuning protocol has a specific time limit and must be followed with fidelity.

Graphic Organizer

Next, the teacher reviews the unit and makes adjustments. To gain a clear picture of the unit, the teachers create a graphic organizer charting aspects of the unit such as the activities, days needed, materials, formative assessments and the summative assessment. Each graphic organizer is designed based the unique needs of the teacher. For example, a graphic organizer may be created using a laptop including columns for days needed, activities, materials, formative assessments and summative assessment. In contrast, another graphic organizer may be created using large chart paper and sticky notes to indicate days needed, activities, formative assessments and summative assessment.

One-pager

The last phase in creating a unit is the one-pager. The one-pager is a summary or overview of the unit containing information including the author, grade level, subject, description, essential questions, enduring understandings, CCSS, formative assessments and summative assessment. In addition the one-pager includes a description of how the summative assessment includes student choice, authentic activities, global significance and opportunities for exhibition to a real-world audience (SAGE). The format of the one-pager is designed to assist teachers in quickly previewing a unit and is conducive to

creating collections that can be shared between colleagues.

The 4 Quality Components of a Global Lesson

After creating a global unit the teacher should review the unit to identify the four quality components, this includes student centered activities, authentic learning experiences, clear expectations and the opportunity for mastery. These quality components are characteristics of each lesson as they are integrated throughout a global unit.

Student Centered

First, a quality global lesson is student centered. This means that the instructor differentiates the activities and teaching strategies to meet the individual needs of the students. An element of student centered learning is choice, provided several options to reach the desired outcome. In addition to providing choice, the instructor utilizes multiple teaching strategies to accommodate diverse learning styles.

Authentic Tasks

In addition to including the element of student centered, quality global lessons are authentic, providing students to engage in meaningful work that real professionals do. An authentic task is not abstract or disconnected from reality, but rather purposeful and situated in real-world context resulting in authentic products. An authentic learning experience for students in the content area of math could include designing graphic representations of data in the form of tables, charts, or graphs that inform people about the global water crisis.Perhaps in the content area of English language arts students write a research based position paper taking a stance on access to clean water as a basic human right.

Clear Expectations

Providing students with clear expectations is the third quality component of a global lesson. Unless the instructor communicates the expectations clearly, it is difficult for students to become motivated and put forth their best effort. Clear expectations allow students an opportunity to self assess and have ownership of their learning. If students know what they are working toward and how their efforts regarding the task at-hand will contribute to the culminating product they will be more invested in their work. For example, providing students with tools such as checklists, rubrics and models of the task, support clear expectations.

Multiple Opportunities

Lastly a quality global lesson provides students the opportunity for mastery. It takes time and deliberate practice to master specific skills. Often students need more than one opportunity to master the content that is presented in a lesson. When teachers provide students appropriate feedback and multiple instances to grapple with content, they facilitate the opportunity for mastery.

Practical Application

The process for creating global lessons that incorporate CCSS is similar for both pre-service and practicing teachers. The following are suggestions for getting started.

1. Examine a unit of study and explore how it could be transformed with a world view. For example, a language arts unit that explores story elements may be transformed to represent diverse cultures and multiple points of view.
2. Explore the Council of Chief State School Officers web-site (www.edsteps.org/ccsso/SampleWorks?Matrices420.pdf) where you will find sample lessons and matrices that outline performance outcomes in each content area for developing global competence.
3. Consult the Asia Society website (www.asiasociety.org/education) for resources including lesson plans, how-to-guides and publications. The Asia Society website includes information concerning the International Studies Schools Network (ISSN)

Conclusion

Today's students live in an interconnected world and as a result must develop global competence. Students who are globally competent have developed essential skills such as the ability to investigate other cultures, recognize the perspectives of others, communicate their ideas and take action to promote positive change in the world. These skills prepare students to participate and compete in the global marketplace. However, many classrooms are not prepared to facilitate instruction that fosters the tenets of global competence. Through utilizing the process of creating lessons that incorporates both the CCSS and global competence, teachers can gradually be prepared to provide instruction that support students in becoming globally competent citizens.

Appendix

Figure 1. The

Source: Asia Society, 2013

Classroom Ideas

Position Paper

Task Time: 6-12 hours

Description:

Students will create and share a paper that uses evidence-based arguments to take a strong position on an issue of global significance.

Grade Level Adaptations:

Elementary

Student learning might focus on identifying evidence to support their positions and on finding ways to organize their evidence in writing.

Middle School

Students will potentially be able to engage in distinguishing their position from others and identify evidence that enhances their position.

Secondary School

Students might focus their learning on arguing for their position by acknowledging and countering other popular opposing points of view. Students will also potentially learn to adjust their arguments or language different audiences.

Learning Tasks:

1. Students will decide on a topic and gather information for a one-page description.
2. Students will determine the audience they intend to reach with their position paper.
3. Students will outline a draft through organizing their organizing their thoughts about the issue with the supporting evidence you have collected.
4. Using feedback from a peer and/or teacher, students will strengthen their drafts by improving their presentation of a position.
5. Students will develop a one page executive summary and present to their intended audience.

SAGE Alignment:

Student Choice

Students can demonstrate independence through this task in a number of ways. Students can choose the issue and/or they can choose their position. They can also choose the resources they review and/or the audience for their paper.

Authentic Task

Position papers are written in many professions: the closing argument in a court of law, a briefing for a politician or member of Congress, a presentation at a local city council meeting, a blog post, and a letter to the editor or editorial. They require that students use non-fiction informational texts and develop skills to comprehend as well as critique.

Global Significance

Global issues, by their very nature, are complex and allow students explore a range of possible positions. Position papers provide students with an opportunity to explore an issue, come to understand other perspectives and cultures, and express their views about that issue while demonstrating their capacity to construct viable arguments and critique the reasoning of others.

Exhibition to Real World Audience
Position papers require students to respond to the varying demands of audiences and purpose. There are many possible audiences for position papers. If students are working on a school issue it might be an assembly. If it's a community issue, they might present at a City Council Meeting or Town Hall. Students might submit letters to the editor of a newspaper, or see if they can create a guest blog post. Students can create their own class wiki, or put their papers together into a publishable book on a self-publishing site.

Common Core State Standards:
CCRA. Reading
R7: Quantitatively integrate and evaluate content presented in diverse media and formats through
visuals and text
R.8: Delineate and evaluate argument/claims
R.9: Analyze how texts address themes/topics to build knowledge or compare authors' approaches

CCRA. Writing
W1: Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence
W.7: Conduct short as well as more sustained research projects
W.8: Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism
W.9: Draw evidence from literary or informational texts to support analysis, reflection, and research

CCRA. Language
L.1: Demonstrate command of the conventions of standard English grammar and usage
L.2: Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

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Revising, Renewing, and Reimagining: The Development of a Dyslexia Certificate Program

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Abstract

Dyslexia is a complex learning disability that ranges in both its severity and presentation. Dyslexia affects a 1:5 students, yet for many, the issue goes unidentified and unaddressed. In order to better serve our students, it is imperative that teachers be educated in the presentation and remediation of dyslexia. This article discusses our departmental process of creating and planning for the implementation of a dyslexia certificate program for undergraduates by bring into line our coursework with the International Dyslexia Association's Knowledge and Practice Standards for Teachers of Reading.

Introduction

Reading is a complex act requiring the integration of multiple skills and strategies to be successful. In addition, reading is a skill that is required across disciplines. A struggle with reading, therefore, will have far-reaching consequences. The statistics pointing to the prevalence of reading difficulties as a cause of academic failure and underachievement are consequently not surprising (International Dyslexia Association, 2010). "Between 15 and 20% of young students demonstrate significant weakness with language processes, including but not limited to phonological processing, that are the root cause of dyslexia and related learning difficulties" (p. 1). Dyslexia is defined by the International Dyslexia Association (IDA) as a "language based disorder of learning to read and write originating from a core or basic problem with phonological processing intrinsic to the individual" (International Dyslexia Association, 2002). Research by the National Institute of Health (NIH) has identified that 20% of the population or 1:5 people have dyslexia. Despite this statistic, only 1 out of 10 cases will be eligible under special education laws for an Individualized Education Program (IEP) (Simon & Kule-Korgood, 2011). Thus, it is imperative that teachers possess the knowledge and skills necessary to meet the needs of students with dyslexia within the context of the regular classroom environment.

The importance of a prepared, high-quality, committed teacher is clear, given high-stakes testing, grade retention mandates, such as Ohio's Third Grade Reading Guarantee (ODE, 2014), increased accountability, and emphasis on the use of data to inform instructional practices. "The abbreviated answer to 'What works?' is: a caring teacher who knows a lot about current research and theory in education and psychology and, as a result, is an expert at such tasks as managing

a classroom, teaching students explicitly how to accomplish school tasks, and scaffolding instruction to support students where they are" (Gaskins, 2005, p. 3). However, research has shown that teachers with advanced training in teaching students with disabilities, such as special education or reading specialist licenses, can articulate no more knowledge of research-based, effective practices for working with students with dyslexia than teachers with a general education license (International Dyslexia Association, 2010). The National Association for Educational Progress (NAEP) report results that 46% of fourth grade students achieved proficiency in reading in 2013. The preparation of teachers who are able to provide instruction informed by data, and targeted to student needs is clearly an advancing imperative for teacher education.

In this article, the process followed in our department to develop a dyslexia certificate program for our undergraduate teacher candidates will be described. Our university-issued certificate program is an elective program for our teacher candidates, and is grounded in the 12-hour reading core, as well as additional coursework specific to dyslexia. Prompted by the Ohio Board of Regents' call for teacher education programs to align coursework with the International Dyslexia Association's Knowledge and Practice Standards for Teachers of Reading (Moats, et al, 2010), we began a journey to identify areas in need of revision, renewal, and reimagining to develop a robust dyslexia certificate program for our candidates.

Review of Literature

Within the field of learning disabilities, there is great debate over the definition, identification, and treatment of dyslexia. Dyslexia has been described as operating on a continuum of severity, with those with mild forms of dyslexia often never receiving a diagnosis (International Dyslexia Association, 2010). As Stanovich (1996) has identified, however, the existence of dyslexia along a continuum does not lessen the impact it has at whatever point the student operates. Adding to the complexity of identifying dyslexia in students is the variation in its definition across states and even school contexts. When students move from classroom to classroom, school to school, or district to district, their ability to qualify for individualized services may shift based on the way in which dyslexia is being identified and defined within the particular context.

This conflict in the literature surrounding how to define, identify and instruct students with dyslexia has been swirling for decades (Gunning, 2002; Lipson & Wixson, 2003; Snow, Burns, & Griffin, 1998). At present, the debate continues, as states work to identify consistent definitions, processes of diagnosis, and components to remediation and instruction. Defining dyslexia according to a dimensional model, rather than a categorical model, "has been embraced by most researchers, although not yet a majority of educators" (Snow, Burns, & Griffin, 1998, p. 91). According to the dimensional model, dyslexia is one component of reading disability, and is included at the lower end of a bell-shaped

curve of reading ability (Shaywitz et al, 1992). Viewing reading difficulties in this way illustrates why identifying and diagnosing dyslexia is challenging. Using a categorical model, students are placed in categories based on the specific characteristics they present regarding their reading difficulties. The downside to this model is the inability to address the complex and layered needs students bring to classrooms. Each person with dyslexia will exhibit different characteristics than another, thus a nuanced and in-depth look at reading difficulty is required of classroom teachers to provide appropriate instruction for all of the students in their classrooms (International Dyslexia Association, 2010).

Regardless of the decisions made regarding the process of identifying and diagnosing dyslexia on a broad level, students remain in classrooms, struggling to learn to read in the traditional context and with existing programs. "Effective instruction includes artful teaching that transcends - and often makes up for – the constraints and limitations of specific instructional programs" (Snow, Burns, & Griffin, 1998, p. 314). Teachers who make decisions regarding their instruction based on individual student needs are the "difference makers" in classrooms (Pressley, 2002; Snow, Burns, & Griffin, 1998). Teachers of reading need to understand the conceptual foundations of the reading process, develop deep knowledge of the structure of language, and have supervised practice in teaching reading (Brady & Moats, 1997; Santa, et al, 2000; Snow, Burns, & Griffin, 1998). Preparing teachers to take ownership of the decisions regarding the students who struggle with reading in their classrooms is a critical component to meeting the educational needs of all students, and is the driving force behind the development of the dyslexia certificate program at our university.

Context

In Ohio, there has been a recent push, based on a number of state mandates for successful reading instruction including the Third Grade Reading Guarantee, to integrate the International Dyslexia Association's (IDA) Knowledge and Practice Standards for Teachers of Reading into teacher education coursework. In addition, an initiative in our department to increase the number of university-based certificate offerings to candidates was proposed within the same time period. Given this context, a committee was formed within our department to examine the reading-related coursework in light of the IDA standards, and to determine how a certificate in dyslexia studies could be offered to interested candidates.

Our department includes both undergraduate and graduate programs, as well as several endorsement and certificate programs for teacher candidates and practicing teachers. In the undergraduate program, which is the focus of this article, candidates in the Early Childhood, Middle Childhood, and Intervention Specialist licensure areas take the "reading core" of courses to meet state requirements and to provide a solid foundation in reading instruction to all teachers. The reading core includes a sequence of four courses, including reading methods, content area reading, phonics, and children's literature. This core of reading courses is also required by our post-baccalaureate initial licensure candidates and as pre-requisites for the Master of Science in Education degree in Literacy. Finally, our undergraduate and

initial license candidates also take a course in diversity, special education, and inclusion, which already included information about dyslexia and other learning disabilities. This sequence of five courses, including the four core reading courses and one course in diversity was the focus of our revision process surrounding the IDA Standards.

Aligning our programs with the IDA Standards, involved a close look at textbook selections, syllabi, course activities, and curriculum mapping. In addition, this process involved explicit partnership with community stakeholders to mutually benefit both our teacher education program and the community. Our team has made multiple site visits to K-8 schools that are practicing exemplary methods for instructing students with dyslexia, community-based centers providing tutoring to students with dyslexia, and elementary schools seeking support for students with dyslexia. Through these collaborative interactions, lines of dialogue have been opened, allowing the dyslexia certificate program to provide a resource to schools and the community seeking support and intervention for the students they serve. This process of creating a dyslexia certificate program engaged faculty in reflective conversations regarding curriculum and program goals. We have addressed the "why" of our goals for preparing our teacher candidates to work with students with dyslexia.

Revising and Renewing our Courses

In the spring of 2012, a committee met with members of the Ohio Board of Regents and the Dyslexia Task Force, a group formed to promote the integration of research on dyslexia into teacher preparation programs across the state, to discuss the implementation of the IDA Knowledge and Practice Standards as a new component to the university review and accreditation process at the state level. In looking at these standards, faculty in our department saw an opportunity to revise our coursework to reflect in greater depth the specific components of instruction for students with dyslexia.

In reviewing the existing alignment of our courses with the IDA standards, we found that many of the standards were already covered effectively in our courses. These sections included Section A, Foundation Concepts about Oral and Written Language and Section D, Interpretation and Administration of Assessments, and sub-sections of Section E, Structured Language Teaching. This process of identifying standards already present in our courses, while also updating the existing content, served as an effective "renewal" process for our existing coursework in reading. Table 1 (See Appendix on page 65) describes the articulation of the standards across the diversity course as an example of the integration of the standards in our courses.

The section of the standards that led to the most discussion, and subsequent revision, included Section E, on structured language teaching, specifically in the area of handwriting, spelling, and written expression. Though our coursework includes a specific course in phonics, the opportunity

to look closely at the content and identify places where information on handwriting could be incorporated on a more explicit basis provided an additional foundational element to this touchstone course in the reading core, taken by candidates in three of the four licensure areas. In addition, looking closely at the standards on phonology, phonics, fluency, and vocabulary identified critical areas that were not being adequately articulated across courses. Thus, this conversation led to curriculum mapping and identification of redundancy and gaps in the sequence of courses.

Comprehension of text is an area we predicted our courses would be in full alignment, as we emphasize the use of authentic literature, strategy instruction, and authentic purposes for reading across our reading courses. However, the IDA Standards include discrete elements of comprehension within Section E that target the technical side of comprehending a text. Looking closely at the ways in which our courses reflected the surface code, text base, and mental model of comprehension, for example, pushed our courses in new ways, inviting additional perspectives on comprehension for our candidates. Ultimately, this will give our candidates multiple tools to use in classrooms in which students' needs and learning styles are wide and varied (Brophy, 2013; McCarthey, 2013).

The process of reviewing our reading courses to align with the IDA Standards was one of revision and reimagining as we looked for ways to document current content and incorporate new content to prepare our candidates for working effectively with students with dyslexia. Our courses emerged as well-articulated, thorough representations of the essential components we believe our candidates should understand about effective reading instruction

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Designing the Certificate Program

Once our coursework was aligned with the IDA Standards, we began to imagine the possibilities for our candidates based on this work on a broader scale. Knowledge of dyslexia as a learning disability with specific instructional recommendations is one important component for classroom teachers, but the ability to apply and demonstrate competency using this knowledge in a practicum setting is essential for successful application of the methods in a classroom with students who struggle. The undergraduate Dyslexia Certificate builds on content in the 12-hour Reading Core, and seeks to provide pre-service teachers with knowledge and skills for supporting students with dyslexia within the regular classroom environment. This program does not qualify a candidate as an intervention specialist, reading specialist, or Orton-Gillingham tutor. Candidates who earn the certificate leave our program with additional, in-depth knowledge and skills about dyslexia to support their regular classroom instruction.

Our planning for the certificate program involved interviews with candidates, visits to schools, and building partnerships with local resources, each of which will be discussed in the following sections.

Candidate Interviews.

As previously mentioned, one of the courses that was a focus of revisions for the IDA Standards was our diversity course. In this course, approximately one class session was devoted to information on dyslexia as a language-based learning disability to be

accounted for in classrooms. Through these discussions of learning differences and the ways in which they could be supported, four candidates self-identified as having experienced dyslexia, either themselves or through the experiences of siblings. To understand the experiences of these four candidates, and as a way to inform our program development, we interviewed each of them to talk over their experiences, their perspectives, and their visions for effective teachers of students with dyslexia. We designed questions, based in the IDA Standards, to focus the conversation, and took notes and transcriptions of the interviews to identify themes and patterns in the candidates' experiences.

The interviews revealed multiple themes and nuances that will be the topic of future work, but the themes that directly informed our "reimagining" process as we sought to develop the dyslexia certificate program included the critical role of a teacher knowledgeable about dyslexia, identification of the disability as early as possible in the educational career, and specific, structured teaching targeted at the individual needs of the student. By describing their own experiences or that of their siblings, the candidates identified positive and negative experiences in school at the hands of either a knowledgeable (in the case of the positive experiences), or an ill-equipped teacher (in the case of the negative experiences). Two of the four candidates interviewed identified the specific instructional programs in which they enrolled as having a direct, positive impact on their success and confidence. For one of the candidates, a lack of identification of her disability caused frustration, low self-esteem, and little support for dealing with it successfully.

These themes assisted us in identifying the essential components of the dyslexia certificate program we imagined. These themes also assisted us in defining the goal of our dyslexia certificate program, as one to prepare knowledgeable teachers who understand the complexities of teaching the students who will be a part of their classrooms. Site visits.

The next step in our process was for our team to arrange for site visits to schools and centers targeted for students with dyslexia and other learning disabilities. Site visits were made to two schools and one tutoring center. Schools in Cincinnati and Louisville were visited, as well as one tutoring center in Dayton. During these site visits, we were able to observe classrooms, talk with administrators, and ask questions about curriculum, assessment, and professional development to inform our work. As was the case in the candidate interviews, multiple themes and nuances emerged from these visits, and several of these themes informed our program development. In specific, these site visits helped us to begin to answer the questions, "What are these schools doing to make a difference for students with dyslexia? How can we help all teachers to make this same impact on student success?" The schools and center we visited had unwavering commitments to student learning, were willing to think "outside the box" to help students be successful, and provided teachers with extensive training and professional

development in their areas of expertise. The site visits were invaluable to us as we continued to imagine the possibilities for our teacher candidates and our dyslexia certificate program.

Community partnerships.

One result from these site visits was the building of community partnerships to support the certificate program. Our visit to the Dayton Learning Center, a tutoring center for students with dyslexia, revealed an opportunity for collaboration with an established, recognized center. The IDA Standards require that a practicum experience be supervised by instructors certified and knowledgeable in multi-sensory instructional techniques, and though we had university faculty who were engaged in this training, we were interested in partnering with an existing center with an established reputation of providing quality instruction to individuals with dyslexia. The development of this partnership is still on-going at the time of this article, but it has already helped us to reimagine the possibilities for our candidates and this program. In collaboration with the director of the center, we designed a pilot experience for interested candidates, and the response has been enthusiastic, as over 40 candidates registered for the pilot experience. The pilot experience is on-going, thus data on its effectiveness is not available as of yet; however, the pilot is the positive result of collaboration, collegiality, and communication with a community partner interested in making a difference for students with dyslexia.

Discussion

In numerous states, including our own, advocacy groups have formed, com- prised mainly of parents of children with dys- lexia, to advocate for the inclusion of dyslexia under IDEA as a specific learning disability, eligible for Individualized Education Program (IEP) services. As with the "reading wars" of the past, differing opinions exist regarding the most effective method to teach children, particularly those who are struggling to read. The development of this certificate program is relevant to this current dialogue, particularly in its aim to utilize research to inform instruction. When the struggle to read is viewed as a one-size-fits-all dilemma, the extremely varied needs of students will not be met. In this way, this work has relevance to both influencing policy and exemplary practices.

The implications of this initiative are far-reaching, as the statistics regarding the pervasive nature of dyslexia in schools indicates. The major goal of this work is to provide teachers with the resources, experiences, and knowledge critical for instructing students with dyslexia within the regular classroom context. The research is clear that no one method will be the right match for all students (Gaskins, 2005), so preparing teachers who can effectively assess, evaluate, plan, and teach to meet the varied needs of the students in their classrooms is responsible practice. This work has the potential to provide teachers with requisite knowledge and skills for working with students with dyslexia in their classrooms, increase awareness of the complexity of dyslexia as a language-based learning disability and the continuum on which it exists, and to become a resource to the community seeking information and support for students with dyslexia.

Finally, though it is clear we value and

endorse the integration of the IDA Standards into teacher education programs, we also believe that teacher candidates need to understand multiple approaches to reading instruction in order to reach all of the students in their classrooms. Multi-sensory structured language teaching, as it is articulated in the IDA Standards, is one model of how to teach students who are specifically identified with dyslexia, but it is not the only tool teachers need as part of their literacy instruction. Holding to this essential belief, our process of revising and renewing our coursework did not "throw the baby out with the bathwater", as we continue to be committed to the research on of balanced literacy (Bingham & Hall-Kenyon, 2013; Pressley, Roehrig, Bogner, Raphael, & Dolezal, 2002), literature-based instruction (Morrow & Gambrell, 2001), guided reading, and authentic reading and writing workshops.

In any form of teaching, it is always important to remain current and innovative in our methods and practices. The integration of the IDA Knowledge and Practice Standards has been a process of revision of coursework, renewal of programs, and re-imagining of the possibilities for our teacher candidates that has helped our department to remain current and innovative, while also providing well-prepared, knowledgeable teachers who will impact student learning in their future classrooms.

Appendix

Course	IDA Standards Addressed	Sample Assignment
Educating Students of Diverse Populations	C.2) Recognize the tenets of the NICHD/IDA definition of dyslexia. C.3) Recognize that dyslexia and other reading difficulties exist on a continuum of severity. C.4) Identify the distinguishing characteristics of dyslexia and related reading and learning disabilities (including developmental language comprehension disorder, attention deficit hyperactivity disorder, disorders of written expression or dysgraphia, mathematics learning disorder, nonverbal learning disorders, etc.). C.6) Discuss federal and state laws that pertain to learning disabilities, especially reading disabilities and dyslexia.	Read an article about dyslexia and respond in small groups to a video case study of a student with dyslexia.

Table 1. Example of Alignment of Existing Coursework to IDA Standards.

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Co-Teaching as Transformative Practice in Early Childhood Clinical Settings: Teacher Mentor Responses and Perspectives

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Abstract

In 2010, the Blue Ribbon Panel Report recommended clinical practice as the focus of teacher preparation. Co-teaching emerged as an intentional practice that encompasses a cycle of co-planning, co-assessment, and co-instruction to advance students' learning in all classrooms. An emphasis on co-teach- ing shows promise for clinical settings as sites for transformative learning experiences for both in-service teachers, or teacher mentors, and pre-service teachers, or teacher candi- dates. Researchers at eight university cam- puses in Ohio involved 82 mentor teachers as participants in a mixed-method investigation of co-teaching as transformative practice in early childhood (P-3) clinical settings. Mentor teachers from rural, suburban, and urban school districts and programs provided their insights about co-teaching and related strategies used to engage pre-service teachers, transform pre-service and in-service participants' knowledge base and skills, and provide benefits for their prekindergarten to third-grade students. Of the various co-teaching strategies used, participating mentor teachers deemed "Center/Station Teaching," "Alternative Teaching," and "Team Teaching" to be most transformational, followed by "One Teach, One Observe," and "One Teach, One Assist." Mentor teachers reported gaining transformative knowledge and insights through co-teaching in clinical settings and also reported instances in which they felt the pre-service teachers did, as well.

Keywords: co-teaching, transformative practice, clinical setting, early childhood

Introduction

The Blue Ribbon Panel on Clinical

Preparation and Partnerships for improved Student Learning from the National Council of Accreditation in Teacher Education (NCATE) issued Transforming Teacher Education through Clinical Practice: A National Strategy to prepare Effective Teachers in 2010, which recommended clinical practice as the focus of teacher preparation. In response to the report, co-teaching emerged as a trend during clinical field experiences in teacher preparation (Diana, 2014). Further, the traditional model of student teaching, also called the professional internship, is being intentionally enhanced by co-teaching in many teacher preparation programs (Bacharach, Heck, & Dahlberg, 2010). In these programs, co-teaching encompasses a cycle of co-planning, co-assessment, and co-instruction to advance students' learning (Strieker, Shaheen, Hubbard, Digiovanni, & Lim, 2014). Although co-teaching is not a new phenomenon and is an established practice in inclusive classrooms (Austin, 2001), this study proposes that embracing it as a strategy for the preparation of pre-service teachers, beyond special education programs, transforms how mentors engage with candidates in early childhood prekindergarten to grade three (P-3) settings. Moreover, embracing co-teaching as transformative practice in P-3 early childhood teacher preparation aligns with initiatives and principles outlined by the Blue Ribbon Panel to transform teacher preparation (NCATE, 2010).

In a review of the literature on the benefits of co-teaching during a student teaching experience, Diana (2014) reports that it is a way "to strengthen connections between universities and school partners" (p. 76). Mentor teachers are supportive of co-teaching when they recognize its benefits to children in the classroom (Austin, 2001; Diana, 2014). In order for this to occur, teacher educators must work to create an awareness of co-teaching strategies that already exist in the field; and provide support for implementing additional co-teaching strategies and encourage emerging models that include co-planning, co-assessment, and co-instruction.

The teacher educator's role in promoting greater understanding of what is meant by the term "co-teaching," as well as communicating the benefits of co-teaching when mentoring pre-service teachers at the individual classroom level, is the key to increasing buy-in by educators in early childhood settings. Communication and collaboration with mentor teachers (also referred to as cooperating and participating teachers, and in-service teachers) are essential ingredients for a successful outcome of the co-teaching initiative. Further, researchers of this study have anecdotal evidence that placement opportunities for teacher candidates are expanded as teachers recognize that understanding of, and positive experiences with, co-teaching strategies promote the teacher candidates' higher levels of engagement and their optimum development, as well as higher levels of P–3 student achievement. The study reported in this paper supports the premise that co-teaching strategies represent transformative practice for pre-service and in-service teachers.

Problem Statement

Researchers in this study, as teacher educators themselves, recognize the importance of co-teaching as a strategy to move the clinical model in teacher preparation forward. They also recognize that co-teaching includes traditional and established practices in many developmentally appropriate classrooms, as teachers enlist the involvement of paraprofessionals, service providers, or classroom volunteers in planning for, delivering, and assessing teaching and learning. Further, the researchers acknowledge that mentor teachers may not recognize their own practices as being one of several "co-teaching" models, there- fore, university teacher educators need to create an awareness of the use of co-teaching as an initiative in implementing the clinical model. Therefore, the survey developed and used for the study was designed to be instruc- tive as well as a vehicle for gathering descrip- tive data. The survey questions incorporated descriptors of major co-teaching models. In completing the survey, early childhood educators enhanced, or at least confirmed, their knowledge about co-teaching practices in P-3 classrooms with pre-service teachers.

Purpose of the Study

The purposes of this mixed-method descriptive study of co-teaching strategies used in P-3 classrooms by mentor teachers and pre-service teachers from rural, suburban, and urban school districts in Ohio are as follows:

- Gain insight about cooperating/mentoring teachers' utilization of a variety of co-teaching and related strategies in diverse P-3 settings.
- Identify co-teaching strategies cooperating/mentoring teachers know, engage in, or would like to learn more about in order to work effectively with early childhood students in P-3 settings;
- Compile qualitative data highlighting specific examples of co-teaching interpreted as transformative by mentor teachers, as evidence of capacity-building (knowledge, skills, dispositions, sense-of-self) in teacher candidates and cooperating/mentoring teachers who intentionally engage in co-teaching strategies in P-3 settings.

This report presents a brief review of the literature on co-teaching, the methodology followed in the study, results of the investigation, discussion, and recommendations for further research. The review of the literature reveals a scarcity of studies on co-teaching in P-3 classrooms that specifically target early childhood teacher candidates/pre-service teachers placed in both P-3 classrooms for typically developing students and inclusive classrooms.

Definition of Terms

Clinical model.

"Clinical model" refers to recommendations by NCATE's Blue Ribbon Panel to restructure teacher education to include rigorous accountability; stronger candidate selection and placement; revamped curricula; incentives and staffing; supportive partnerships; and an expanded knowledge base for continuous improvement (NCATE, 2010, pp. iii-iv).

Co-teaching.

"Co-teaching" in the context of this study refers to two or more educators working together in an early education and care setting to plan, instruct, or assess students' development in all domains of learning (cognitive, physical, social-emotional).

Co-teaching strategies.

"Co-teaching strategies" refers to a variety of models for co-teaching described in the literature by Bacharach, Heck, and Dahlberg (2010), Friend and Cook (2003), and Villa, Thousand, & Nevin (2008). The models cast co-teachers in various roles, from relatively disparate, in regard to instruction, as in the One Teach, One Observe model, to equal instructional responsibility as in the Parallel Teaching model.

Mentor teacher.

The term "mentor teacher" in this study refers to the mentor, cooperating, participating, or in-service teacher in the P – 3 setting, who co-teaches and mentors the university or college student during his or her clinical experience, including professional internship.

Pre-service teacher.

The term "pre-service" refers to the university or college student during his or her clinical experience, including his or her professional internship or student teaching experience. Pre-service teachers are also referred to as "teacher candidates" in this study.

Transformative practice.

"Transformative practice" in the context of this study refers to achievement the NCATE's Blue Ribbon Panel (2010) design principles for clinically based preparation, such as P-3 student learning as the focus; teacher candidates' integration of a base of knowledge and effective teaching practices to solve problems; development of a collaborative culture necessary for successful co-teaching; technology applications for collaboration and on-going professional learning; the systematic gathering and use of data to inform practice; and strategic partnerships for shared responsibility, authority, and accountability in P-3 teacher preparation (NCATE, 2010, pp. 5-6).

Literature Review

This brief literature review focuses on co-teaching and transformative practice. Co-teaching is defined and elaborated upon to provide a basic understanding of a co-teaching classroom environment and aspects of the relationship between the mentor teacher and pre-service teacher. Transformative practice is defined and elaborated upon to provide an understanding of it as a core concept aligning with investigators' views that co-teaching results in transformation as outlined in the literature.

Co-Teaching

The Teacher Quality Enhancement Center (Bacharach, Heck, & Dahlberg, 2010) defines co-teaching as "two or more teachers working together with groups of students, sharing the planning, organization, delivery, and assessment of instruction as well as the physical classroom space" (p. 3). Team teaching and collaborative models of shared planning for instruction, implementation and delivery of instruction and assessment of learning are viewed as the most efficient model in inclusive classrooms (Friend,

Reising, & Cook, 1993; Ostrosky & Sandall, 2001). The collaborative model of co-teaching, as presented by Scruggs, Mastropieri, and McDuffie (2007), refers to a general education teacher paired with a special education teacher, intervention specialist, or inclusion teacher, working together in the same setting to deliver instruction to students in inclusive or special education classrooms. In an investigation to reveal special education cooperating teachers' perceptions of collaborative teaching, teacher preparation, and school-based supports in inclusion, Austin (2001) identified co-teaching as a valuable and beneficial experience for each. Regarding teacher preparation for collaborative teaching, special education co-teachers in Austin's study considered the co-teaching placement of student teachers to be useful or very useful. Semi-structured interviews conducted with 12 of the 92 co-teachers revealed that co-teaching "contributed positively to their professional development" (Austin, 2001, p. 250). In addition, co-teachers cited the reduced student-teacher ratio as the principal benefit of co-teaching with student teachers. Co-teachers in the study also stated that they "believed co-teaching contributed positively to the academic development of all their students" in inclusive classrooms (Austin, 2001, p. 253). Further, Mahoney (1997) noted that co-teaching is effective with other populations, namely English-language learners (ELL). In addition, Pugach and Winn (2011) identified benefits of individualizing for students as a result of collaboration and coordination by co-teachers. Many other qualitative researchers report benefits of co-teaching, among them are Beninghof (2012); Gargiulo and Metcalf (2010); Potts and Howa (2011); and Scruggs, Mastropieri, and McDuffie (2007).

Friend, et al. (2009, p. 12) identified and defined six models of co-teaching:

1. One teach, one observe, in which one teacher leads large-group instruction while the other gathers academic, behavioral, or social data on specific students or the class group;
2. Station teaching, in which instruction is divided into three nonsequential parts and students, likewise divide into three groups, rotate from station to station, being taught by the teachers at two stations and working independently at the third;
3. Parallel teaching, in which the two teachers, each with half the class group, present the same material for the primary purpose of fostering instructional differentiation and increasing student participation;
4. Alternative teaching, in which one teach- er works with most students while the other works with a small group for remediation, enrichment, assessment, preteaching, or another purpose;
5. Teaming, in which both teachers lead large-group instruction by both lecturing, representing opposing views in a debate, illustrating two ways to solve a problem, and so on; and
6. One teach, one assist, in which one teacher leads instruction while the other circulates among the students offering individual assistance.

Such research studies indicate the transformative potential of a co-teaching model in which teacher candidates work with a mentor teacher to plan for instruction, organize the classroom environment, gather and prepare materials for the delivery and

implementation of instruction, and engage in formative and summative assessment of instruction.

Transformative Practice

The literature on transformative practice suggests that using co-teaching models in moving from traditional classroom practice where planning, instructing, and assessing for student learning are led by the mentor teacher to an environment of co-planning, co-instructing, and co-assessing can result in transformation to the clinical model. Of particular relevance to this study, Villa, Thousand, and Nevin (2008), in A Guide to Co-Teaching: Practical Tips for Facilitating Student Learning, highlight the importance of collaboration between the in-service and pre-service teachers that result in establishing trust, developing communication, sharing responsibilities, and problem-solving strategies. As teacher candidates are part of a co-teaching environment, opportunities for reflective practice are heightened in relationships formed and based on mutual goals for student success and trust. This mutual goal setting is demonstrated as co-teachers do the following (Villa et al, 2009, p. 5):

- Coordinate their work to achieve at least one common, publicly agreed-on goal.
- Share a belief system that supports the idea that each of the co-teaching team members has unique and needed expertise.
- Demonstrate parity by alternatively engaging in the dual roles of teacher and learner, expert and novice, giver and recipient of knowledge or skills.
- Use a distributed functions theory of leadership in which the task and relationship functions of the traditional one teacher are distributed among all co-teaching team members.
- Use a cooperative process that includes face-to-face interaction, positive interdependence, interpersonal skills, monitoring co-teacher progress, and individual accountability.

Transformative practice is based on the notion that a defining condition of being human is that we strive to understand the meaning of our experiences. Most adults have acquired a coherent body of experience—associations, concepts, values, feelings, and conditioned responses—frames of reference that define their perceptions. Frames of reference are the structures of assumptions through which adults understand experiences. They selectively shape and delimit expectations, perceptions, cognition, and feelings. They set our "line of action." Once set, adults may automatically move from one specific activity (mental or behavioral) to another, with a strong tendency to reject ideas that fail to fit preconceptions. In enormously complex contemporary societies, however, to be effective in their endeavors, individuals must learn to interpret, rather than merely act on the purposes, beliefs, judgments, and feelings of others. Facilitating such understanding is the cardinal goal of adult education. Transformative learning is an important element in this goal.

Transformative learning is the process of effecting change in a frame of reference (Cranton, 2006; Mezirow, 1978).

Cranton (2006) defines transformative learning as "the development of revised assumptions, premises, ways of interpreting experience, or perspectives on the world by means of critical self-reflection" (p. xii). When circumstances permit, transformative learners move toward a frame of reference that is more inclusive, discriminating, self-reflective, and integrative of experience. A theory of transformative learning, developed by Mezirow (1978) characterizes transformation as "a structural change in the way we see ourselves and our relationships" (p. 100). Further, transformation is most likely to occur when practices are engaging, inclusive, motivational, participatory, and interactive (Burns, 2012; Cranton, 2006). Co-teaching in clinical settings, such as the ones used in this study, offer the potential for changes in perspective and practice suggested by these earlier research studies on transformative learning. When co-teaching relationships between mentor teachers and pre-service teachers are based on a shared vision of student success, established in mutual respect and trust, and engaged in collaboration, transformation occurs through interactive engagement (Burns, 2012), and is sustained by critical self-reflection (Cranton, 2006).

Methodology

Participants

The eight teacher educators, who were investigators in this study and who represented eight campuses (four universities and four regional campuses) located in rural, suburban, and urban areas in Ohio, contacted a total of 160 mentor teachers via e-mail, inviting their participation in the study. Fifty-one and one-fourth percent (51.25%) of the mentor teachers contacted participated in the online survey. The eight university teacher educators were aware that, to a degree, co-teaching strategies were an ongoing part of P-3 pre-service teachers' experiences; however, the teacher educators were also aware that some mentor teachers might not recognize that they were engaged in co-teaching strategies. The 82 participants included lead teachers in grades prekindergarten through grade three, from rural (31%), suburban (34%), and urban (34%) schools or programs. Most participants (79%) taught in public schools; a small proportion (6%) taught in private schools; some (9%) taught in federal programs, and a few (6%) taught in early education and care settings for children with developmental delays and those developing typically. Sixty-three participants (77%) had attained a master's degree or higher. All participants had licensure in the areas within which they were teaching. As shown in Table 1 (see Appendix on page 89), most participants (94%) in this study had been teaching more than four years. Over half (66%) had been at their current grade level for six or more years.

As shown in Table Two (see Appendix on page 89), of the 82 participants surveyed, 14 (17%) teach children in prekindergarten; 16 (20%) teach children in kindergarten; 23 (28%) teach children in grade one; nine (11%) teach children in grade two; 15 (18%) teach children in grade three; and five (6%) teach children in special education or English as a Second Language mixed-grade level classrooms.

Seventy-five of the 82 participants indicated the number of years they had spent supervising or mentoring teacher candidates. As shown in Table Three (see Appendix

on page 89), 15 (20%) mentored early field candidates; 21 (28%) mentored clinical-field candidates; 10 (13%) mentored pre-primary professional interns; and 29 (39%) mentored primary professional interns.

Instrument

The first version of the survey for this study was created following a review of the literature on co-teaching. The initial 31-item survey was evaluated by eight researchers, and underwent revision to include three additional items deemed beneficial for teacher educators at eight different university campuses (e.g., "Indicate the name(s) of the university/ universities attended by the teacher candidate(s) you mentor."). The survey included prompts to gather demographic data (e.g., rural, suburban, urban setting; highest level of education attained; years as a mentor teacher), nine statements about co-teaching (e.g. One Teach, One Assist), nine open-ended prompts about co-teaching (e.g., "An example of One Teach, One Observe from my mentoring a teacher candidate as a co-teacher is…"), and four prompts related to transformative practices (e.g., "After reading the definition of 'transformational teaching,' please identify an individual strategy or list of co-teaching strategies you describe as transformational for the candidate.") .

Recognizing that mentor teachers may not recognize their own practices as being one of several "co-teaching" models, the survey was designed to be instructive by suggesting models of co-teaching found in the literature (e. g., Bacharach, Heck, & Dahlberg, 2010; Friend, Cook, Hurley-Chamberlain, & Shamberger, 2010;) or recognized in practice by investigators' observations when mentors and teacher candidates were engaged in teaching and learning. The survey served as a vehicle for gathering descriptive data about the practices of mentors while mentoring pre-service teachers. For each co-teaching strategy, mentor teachers were given an example to read and reflect upon. It was the intention of investigators that as a result of the act of completing the survey, pre-kindergarten through grade three (P-3) educators would enhance their knowledge about co-teaching in practice in P-3 classrooms with pre-service teachers.

Data Analysis.

Descriptive quantitative data were reported by Qualtrics for the forced-choice items. Descriptive qualitative data were collected from participants who chose to elaborate on co-teaching strategies. A phenomenological approach, as defined by Lichtman (2010), who suggests that "the essence of lived experiences of individuals who have experienced a particular phenomenon" are best described using the phenomenological approach (p. 75), informed the qualitative aspect of this research: the mentor teachers' narratives about co-teaching strategies and their perceptions of transformations in teacher candidates and themselves as a result of engaging in co-teaching. According to Creswell (2013), this approach represents an effort to get at the essential element of the experiences narrated by participants. It typically involves abstracting themes that

emerge from those narratives, and is particularly applicable to this study in that teachers' narratives gave anecdotal examples. Through their anecdotes and descriptions, mentor teachers shared the experience of being involved in co-teaching. The researchers identified and coded themes to gain a deeper understanding of the common experiences of the participants. Individual researchers in this study arrived at major themes and based on comparison of themes, agreed on those that were most salient and relevant to the study.

Findings

The survey results for prompts on different co-teaching models indicate the prevalence of various models in clinical settings in the P-3 classrooms in which the participants taught. The models on which data were collected are as follows: One Teach, One Observe; One Teach, One Assist; One Teach, One Demonstrate; Center/Station Teaching; Parallel Teaching; Supplemental Teaching; Alternative (Differentiated) Teaching; and Team Teaching. A question relating to transformational learning indicated which model the participants regarded as most likely to have led to transformational learning in the clinical setting.

One Teach, One Observe

Seventy-three participants responded to the following prompt: "One teacher has primary responsibility while the other gathers specific observational information on children or the teacher who instructs the children. The key to 'One Teach, One Observe' is observing, with one teacher doing the instructing and the other is gathering data through observation." As Table Four (see Appendix on page 90) indicates, of the respondents, 50 (68.5%) responded "yes," indicating that they had used this method in mentoring the teacher candidate(s) and 23 (31.5%) responded "no," indicating that they had not used this method in mentoring the teacher candidate(s).

The following quotes from participants are representative of open-ended statements about One Teach, One Observe:

- Intervention specialist documenting behaviors while classroom teacher teaches. Teacher candidate recording data for behavior plan.
- As my student teacher is teaching I write up an observation for her as well as take anecdotal records on the students in the areas of behaviors and understanding of skills presented.
- Formative assessment can be used; one teacher teaches and the other goes around and makes a checklist of the students who understand the concept.
- In a typical developing preschool classroom, paraprofessionals and teachers are very similar to co-teaching. The two staff members do not hold teaching degrees but they must work together to have a successful classroom. It's nice when the teacher candidate takes over circle time so that I can observe from the outside a different point of view opens new horizons!

One Teach, One Assist

Seventy-two participants responded to the following prompt: "'One Teach, One Assist' is an extension of 'One Teach, One Observe'. One teacher has primary instruc- tional responsibility while the other assists children with their work, monitors behaviors,

or corrects assignments." As Table Five (see Appendix on page 90) indicates, of the respondents, 56 (78%) responded "yes" and 16 (22%) responded "no."

The following quotes from participants were representative of open-ended statements about One Teach, One Assist:

- During reading groups she is helping with word study, clarifying and differentiating.
- We do group sessions on the Smart Board where one teacher leads and the others assist with behavior and also input information to the lesson.
- While I was teaching math at the beginning, my student teacher took a small group that needed more support in the lesson.
- Partnership students often help during whole group activities. For example, they provide support for lower students during whole group exercises by sitting close, checking for understanding, and using reminders to keep focus on the exercise. Partnership students also do things like write directions on the board while I give them, and make lists for the students while I facilitate the conversation.

One Teach, One Demonstrate

Thirty-two participants responded to the following prompt: "Learning is facilitated when children are able to hear and see activities demonstrated. By using 'One Teach, One Demonstrate,' the mentor teacher is able to maintain children in his/her field of vision while giving directions about a skill to be practiced and learned. The teacher candidate or intern is able to perform the skill at the same time the mentor teacher is giving directions." As Table Six (see Appendix on page 90) indicates, of the respondents, 10 (31%) responded "yes" and 22 (69%) responded "no."

The following quotes from participants were representative of open-ended statements about One Teach, One Demonstrate:

- We used this in Science for a lab.
- When one taught the lesson and the other instructor did the writing on the dry erase board during Foundations.
- An example of One Teach, One Demonstrate might be when one teaches students the proper way to hold a pair of scissors and the other teacher shows the students how to cut by placing the point of the scissors on the line and open and closing.
- I often use my partnership students to help me model different things in the room. Sometimes I have them model procedures, or we work together to model a game or an activity.

Center/Station Teaching

Seventy-one participants responded to the following prompt: "In 'Center/Station Teaching,' the co-teaching pair divides the instructional content into parts. Each teacher instructs one of the groups; groups then rotate or spend a designated amount of time

at each center/station—often an independent station will be used along with the teacher-led stations." As Table 7 (see Appendix on page 90) indicates, respondents, 52 participants (73%) responded "yes," and 19 (27%) responded "no."

The following quotes from participants were representative of open-ended statements about Center/Station Teaching:

- Even on the first day of their experience in the room the partnership students are in charge of running centers. Once the partnership students have been in the room for a few weeks they will begin to plan and implement their own center ideas. For example, my students this semester are in charge of running a game center and a review center for math on Tuesdays and Thursdays. They plan, model, and facilitate the center in the afternoon.
- We use this every day during our literacy block. One leads reading small groups, one leads work on writing and one leads work with words. We rotate throughout the semester.
- I worked with a small, guided reading group and the candidate reads with students in the silent reading station. She listened to them read and asked comprehension questions. She also helped at the computer station with any technology problems.
- This is our primary format for math instruction to get more hands-on and small instructional sizes.

Parallel Teaching

Seventy participants responded to the following prompt: "Each teacher instructs half the children. The two teachers are addressing the same instructional material and presenting the material using the same teaching strategy. The greatest benefit to 'Parallel Teaching' is the reduction of child-to-teacher ratio." As Table 8 (see Appendix on page 91) indicates, of the respondents, 25 (36%) responded "yes" and 45 (64%) responded "no."

The following quotes from participants were representative of open-ended statements about Parallel Teaching:

- Dividing up a class when teaching a difficult concept, such as "fewer," works well.
- During reading, I teach the ELL students concentrating on front-loading vocabulary for better comprehension, while the student teacher reads with the other students concentrating on character, setting, and plot.
- Parallel Teaching can be used when students are learning to read. When the students are broken up into smaller groups, it is beneficial for the students because when the group is smaller you can hear each child read.
- This is great when brainstorming a topic or vocal to get ideas flowing. With smaller groups, more voices can be heard.
- We often do this during math time. Each teacher works with one group of students on the same material.

Supplemental Teaching

Forty-five participants responded to the following prompt: "This strategy [Supplemental Teaching] allows one teacher to work with children at their expected grade level, while the other teacher works with those

children who need the information and/or materials re-taught, extended, or remediated." As Table 9 (see Appendix on page 91) indicates, of the respondents, 29 (36%) responded "yes" and 16 (64%) responded "no."

The following quotes from participants were representative of open-ended statements about Supplemental Teaching:

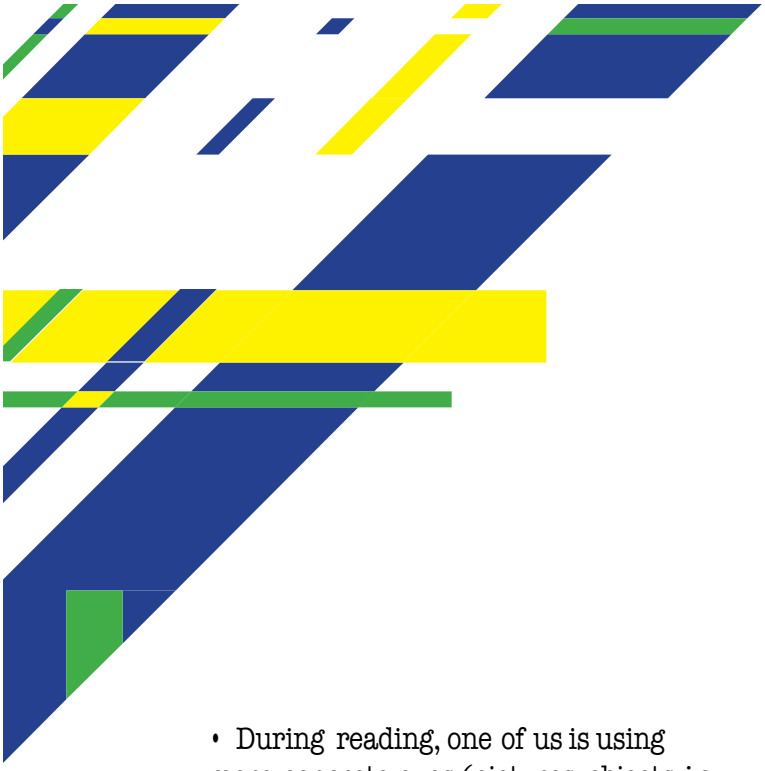
- During math stations, one of us will teach an enrichment extension of the day's lesson to students who already have the day's concepts down. The other teacher will work on readiness activities in regards to the day's lesson.
- A form of supplemental teaching would be to allow one teacher to re-teach numbers 0-10 while the other teacher goes on with numbers 11-20. This keeps students engaged and focused on what they need to learn. This helps with boredom and behavior issues.
- The partnership students plan a review center to provide supplemental teaching for the students in a center.
- Teacher candidate takes a lesson that the teacher does and creates a learning lesson from that. Taking a lesson and breaking it into segments so students can be successful on their own level. For example, children and their names, [candidates help by] breaking it down into segments. What stage is the child at? Are they at a matching, identifying or naming level? Can the student teacher identify this and build a lesson for each individual child?
- During math stations, one of us will teach an enrichment extension of the day's lesson to students who already have the day's concepts down. The other teacher will work on readiness activities in regards to the day's lesson.

Alternative (Differentiated) Teaching

Seventy participants responded to the following prompt: "'Alternative Teaching' strategies provide two different approach- es to teaching the same information. The learning outcome is the same for all children; however, the avenue for getting there is different." As Table 10 (see Appendix on page 91) indicates, 30 participants (43%) responded "yes" and 40 (57%) responded "no."

The following quotes from participants were representative of open-ended statements about Alternative Teaching:

- This is especially useful in math, where one group may need more time with manipulatives to grasp the math concept, but others have the foundation and can apply.
- When the partnership students are planning, modeling, and facilitating their math center in the afternoon, it is required of them to plan differentiations for lower- and higher-level learners.
- Recently my student teacher worked with students who already understood addition to enrich them, while I worked with students who needed remediation.



- During reading, one of us is using more concrete cues (pictures, objects in room) for ELL students, while the other is teaching the same concept by asking probing questions
- An Alternative Teaching example might be that students are taught to blend phonemes together through letter vests and another group might learn to blend phonemes by using letter cards and putting them together.

Team Teaching

Seventy-two participants respond- ed to the following prompt: "Well planned, team taught lessons, exhibit an invisible flow of instruction with no prescribed division of authority. Using a team teaching strategy, both mentor teacher and teacher candidate or intern is actively involved in the lesson. From the children's perspectives, there is no clearly defined leader - as both individuals share instruction, are free to interject information, and available to assist children and answer questions." As Table 11 (see Appendix on page 91) indicates, of the respondents, 36 (50%) responded "yes" and 36 (50%) responded "no"

The following quotes from participants were representative of open-ended statements about Team Teaching:

- During a problem-based learning lesson where students designed their own products to sell to another class, my co-teacher and I both presented material and monitored and assisted with groups. We guided them in coming up with posters, a commercial, and making their products.
- During read-to-self times, both of us are monitoring children, giving strategy ideas for readers who are "stuck," listening to children read and reinforcing good reading behavior.
- During a Math lesson on place value, students feel free to ask either of us questions as we present the lesson together one of us explaining, while one models using the whiteboard or manipulatives.
- Team Teaching is valuable when both teachers share in calendar time. Each shares in the instruction of days of the week and the colors by singing together or saying the colors together. One teacher may add questions, such as "what day is it today?"
- I am more apt to use this with professional interns, rather than teacher candidates.

Transformational Practices

A central issue in this study is the identification of co-teaching practices that have the potential to bring about transformational learning. In collecting data in regard to this issue, both quantitative and qualitative data were collected. Participants were asked to respond to the following prompt about transformational practices in teaching: "This prompt addresses transformative practices. After reading the definition of 'transformational teaching,' please identify an individual strategy you describe as transformational. In the next prompt, you will be asked to give an example for the teacher candidate or intern. In the following prompt, you will be asked to give an example for yourself. Transformational practices in teaching involve much more than the transmission of content and skills.

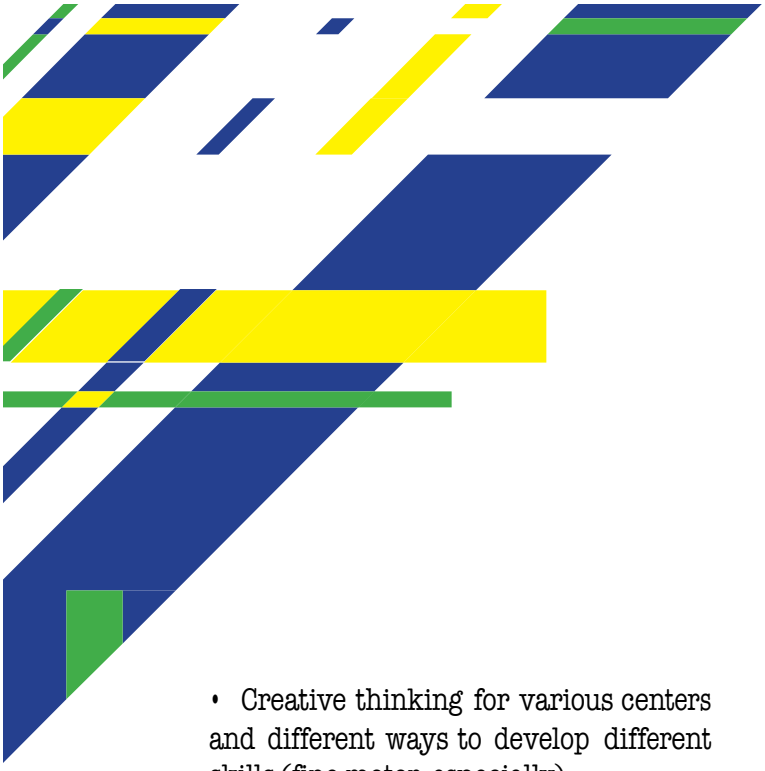
Transformational practices create independent, self-directed, self-motivated learners who are capable of critiquing and directing their own work; who are open to alternative viewpoints; and who have strongly developed higher-order thinking skills."

As Table 12 (see Appendix on page 92) indicates, of the 47 respondents to this prompt about co-teaching model that was most likely to represent transformational practice, four (8.5%) responded "One Teach, One Observe," four (8.5%) responded "One Teach, One Assist," 15 (32%) responded "Center/Station Teaching," two (4.3%) responded "Parallel Teaching," one (2.1%) responded "Supplemental Teaching," nine (19.1%) responded "Alternative Teaching," nine (19.1%) responded "Team Teaching," and three (6.4%) responded "Other." The three participants indicating "Other" in response to this prompt reported either a need to make more than once choice among the models or identified a model not listed, such as "Daily 5 with CAFÉ."

Transformation in Teacher Candidates or Professional Interns.

A total of twenty-three participants provided narrative examples of transformation they perceived as having occurred in a teacher candidate or intern he/she was supervising and mentoring. The following responses are representative of attributions of transformative practice related to co-teaching. As some responses illustrate, not all attributions align with the characteristics usually associated with transformational learning:

- [Co-teaching transforms by] providing more opportunities [for students] to work in smaller groups on skill levels in reading (reading groups). When we do this together, we are able to meet the needs of more students on a regular basis. Students that need more practice on a daily basis will receive it every day, and the typical and higher reading skilled students will not miss out on their time as well.
- If a teacher candidate is given the responsibility of supervising literacy centers, they will gain confidence in coming up with their own centers and in literature instruction.
- We co-planned the lesson and developed what we would do. This allowed reflection as we planned, and the candidate could experience what I did as a mentor when planning the lesson. We then reflected afterwards together.
- During math while using the alternative teaching approach, student teacher was able to focus on struggling learners, pinpoint the error and help correct students. Post-tests indicated growth and understanding of number sense. Student teacher did an excellent job of getting students to direct their own work and check it for errors and completion.
- Through team teaching, the teacher candidate in my room is confident in planning and carrying out lessons she plans on her own with just a little guidance from me.



- Creative thinking for various centers and different ways to develop different skills (fine motor especially).
- I have had a few teacher candidates that began teaching students all at the same level—after they met the students—assessed where they were at in their learning and where they needed to be—they quickly learned the importance of differentiating instruction to meet their needs.
- One student teacher I had found research on the Internet and incorporated it into her teaching to help her with discipline since she felt this could be an area of improvement. This demonstrated to me that she was a self-motivated learner.
- Center/Station was used with a teacher candidate. The class was broken into stations for sorting with different attributes. One table sorted by shape, one sorted by color, and one by size.

Transformation in Himself/Herself.

Twenty-one participants indicated they experienced transformation as a result of working with teacher candidates or professional interns in a co-teaching arrangement. The following responses are representative:

- By observing and teaching alongside teacher candidates, I have found other techniques and a lot of useful activities to do with children. I was able to get fresh new ideas and information as we planned and reflected on the lesson.
- "One teach, one observe" has really helped me look at my classroom on both a larger and smaller scale. I can brainstorm and relate with the students who needs more practice paying attention, and what that child needs to do, or how they can more readily involved in their own learning. By stepping back from the "front line" I am able to really look, listen, and get to know my students on a deeper level which in turn enables my relationships to grow.
- I have realized and begun to be able to give up some power in the classroom. By doing this with the student teacher, I think I may be better able to let my students make more of their own decisions, too.
- While hosting teacher candidates in my room, I have embraced new ideas and learned how to use technology as I work with students and curriculum.
- I try to create a way for students to explore and write on their own. [Gaining] new ideas from student teachers is one reason I like to have them in my room. I also have learned to make them accountable to themselves. When they have to share their work or it is going into a class book, the students take more pride in what they do. Then I can talk to them individually on how to improve their own writing and see what they think they should work on.
- Team teaching—seeing how other people approach instruction. I believe mentoring students helps me to reflect on my own teaching.
- We have smart boards in our classroom. From observing my student teacher I learned a lot about using this technology.
- Last year in my student teaching experience my cooperating teacher was extremely skilled at questioning to make

me reflect. This experience made me grow as a reflective teacher in a huge way. She constantly asked me about my teaching, and questioned me until I was led to a conclusion and a way to change my teaching for the better the next time

Discussion

A total of 82 early childhood (P-3) in-service teachers who mentor pre-service teachers (teacher candidates and professional interns) participated in this study investigating co-teaching as transformative practice. Researchers from four universities (public and private) and four regional campuses invited mentor/cooperative teachers to participate in a mixed-method survey. Mentor teachers from rural, suburban, and urban school districts provided their insights about co-teaching and related strategies used to engage pre-service teachers (early childhood teacher candidates and interns) and transform their practice.

Participant responses on the forced-choice (yes/no) survey items showed the most commonly used co-teaching models in these clinical settings were One Teach, One Assist (79%); Center/Station Teaching (73%); One Teach, One Observe (68.5%); and Supplemental Teaching (64.5%). Of these commonly used models, only one, Center/Station Teaching, was reported as representing transformational learning by a significant proportion (32%) of the teacher mentors. Team Teaching and Alternative/Differentiated Teaching were used by 50% and 43%, respectively and received the second highest proportion of responses (19.1% each) as representing transformational learning. These findings suggest that there may be grounds for developing a continuum of co-teaching models based on their effects on a variety of outcomes for teacher candidates, including transformative learning.

As indicated in Table 13 (see Appendix on page 92), qualitative data analysis suggested three major categories of co-teaching: (1) One teacher leads as one supports (One Teach, One Prepare; One Teach, One Tutor; One Teach One Observe; One Teach, One Assist); (2) co-teachers each engage in similar teaching roles simultaneously (Center/Station Teaching; Parallel Teaching; Supplemental Teaching; Alternative Teaching; Team Teaching); and (3) co-teachers each lead in different roles (One Teach, One Demonstrate; One Teach, One Transition; One Engage, One Facilitate). Table 13 (see Appendix on page 94) indicates co-teaching used for each of the categories that emerged from the data.

According to participant respons- es, the most frequently used models were One Teach, One Observe (68.5%); One Teach, One Assist (78%); and Center/Sta- tion Teaching (73%). Of those participants who responded (n = 47) to the prompt asking participants to identify an individual co-teaching he/she believes to be transformational for their teacher candidate or professional intern, strategies deemed to be transformational were Center/Station Teaching (32%), Alternative (Differentiated) Teaching (19.1%) and Team Teaching (19.1%).

According to the data, mentor teachers indicated that the co-teaching experiences transformed their own practice or perspective and the practice or perspective of their professional interns. Mentor teachers gained new ideas and teaching techniques from their interns. Particularly noted was the use of technology, as illustrated in this quote from a participant, *"While hosting teacher candidates in my room, I have embraced new ideas and learned how to use technology as I work with students and curriculum."*

Also, some mentor teachers learned how to give up some of their control in the classroom, giving the intern the opportunity to lead and giving students more ownership of their learning. The notion of distributed leadership and the negotiation of roles (e.g. who takes the lead, who supports) transforms both in-service and preserves teachers. Mentor teachers noted that interns realized how reflection on teaching can lead to positive changes in the classroom, including the incorporation of differentiated instruction. One participant elaborated on the importance of reflection by stating, *"We co-planned the lesson and developed what we would do. This allowed reflection as we planned, and the candidate could experience what I did as a mentor when planning the lesson. We then reflected afterwards together."*

More importantly, participants stated that co-teaching is transformational for P-3 students' learning. One participant summed this up by stating, *"Shared classroom = better learning for all students."* Mentor teachers were able to conduct more small-group lessons when co-teaching with an intern than when they were alone in the classroom, thus providing these P-3 students with more individualized instruction.

Mentor teachers suggest that with co-teaching, teacher candidates are no longer just dropping in to complete their college assignments. Rather, they stay longer in the classroom and they form closer relationships with their mentor teachers. This leads to pre-service teachers being involved in various areas of teaching from taking attendance, grading assignments, making instructional materials, listening to and working with individual students, participating in discussions about student learning, attending parent-teacher conferences, and planning/co-planning, teaching/co-teaching relevant lessons, and assessing/co-assessing that support mentor teachers' goals for student learning objectives or student learning outcomes. When mentor teachers and teacher candidates develop a close relationship, the nature of teaching and learning for all involved transforms into one of mutual support, collaboration, and trust. Mentor teachers are more at ease and accept the teacher candidates into a teaching team. Mentor teachers perceive the pre-service teachers, too, as more at ease and receptive to taking initiative, accepting responsibility and responding to feedback. Our qualitative data suggest that when relationships are reciprocal, teacher candidates develop some ownership of the classroom practice and are empowered to take criticism and suggestions from mentor teachers as a way of improving student learning.

Creating a survey that would be instructive as well as a vehicle for gathering descriptive data was one important element of this study. The survey revealed that participants, who were new to hosting teacher candidates, intended to use many of the

co-teaching strategies introduced as they continued to develop in the role of mentor. Several participants expressed interest in attending professional development or reading more about co-teaching strategies. Several shared e-mail addresses and phone numbers in order that researchers provide follow-up and distribute copies of the findings of the survey. The following comment is representative, *"With the new ELA [English Language Arts] assessment we have to administer in preschool, this is a strategy I will be using to record information for the social emotional section of the assessment in particular."*

Limitations

The quantitative data collection for this study are subject to limitations in that participants were not randomly selected, but were, in effect, a sample of convenience, in that they were mentor teachers at schools served by the teacher-educators who designed and implemented the study. While having about one-half of invited respondents complete the survey is an average proportion, which may raise issues of whether some bias informs the responses.

The sample size in regard to the number of items responded to is another limitation of the study. Not all 82 participants responded to all items on the survey. However, the findings are based on a mean of 54 participants' responding to items and a mode of 70 participants' responding.

Only the content, or face, validity of the survey was established. Whether the survey is a reliable measure, and one that offers a strong theoretical grounding have yet to be determined. A problem noted by some participants is that they were not able to select more than one strategy as representing transformative practice.

These minor limitations notwithstanding, the findings, quantitative in combination with qualitative, in this study, offer sufficient evidence to warrant further development of the use of co-teaching in the clinical setting as a potential means of transforming the practice and perspectives of teacher candidates as well as those of mentor teachers in the classroom.

Recommendations

To provide context for the significance of the study and for the recommendations in this section, the following reflection by one of the eight teacher-educator researchers is offered:

"*It was around the year 2000 when I realized in my own practice, as a long-time kindergarten teacher, that the days of the single teacher with a classroom full of children and the closed door had undergone a significant change. We had shifted from a state of individualized, autonomous teaching function into one whereby the teacher was to assume more of a collaborative/coordinating role with other teaching adults moving in and out of the classroom throughout each day. Mainstreaming and inclusion were part of the influence. Administrative structures that encouraged teaching teams were another. . . . Moving into more collaborative practices in the final five years of my 30-plus years as a practitioner required a new way of thinking. With my*

instructional assistant I devised times for what this study identifies as "Parallel Teaching." In these instances, I would take the students who were struggling to master the content, and she worked with the students who were close to or beyond mastery. With helping parents and the instructional assistant I developed different roles at different learning centers for the "Station Teaching." With the range of interventionists (Speech and Language Teachers, Cognitive Disability Instructors, Learning Disability Teachers, Physical and Occupational Therapists) I learned to be a collaborative partner in "Alternative (Differentiated) Instruction." . . . Arriving as a faculty member at the university level in 2005, gave me the perspective of what could be an even more expanded range of collaborative behaviors than I had experienced as a practitioner in the field. This co-teaching perspective provided an even better model for the in-service and preserves instructors.

When the request for mentors went out to our partner schools for the 2012-2013 year, as faculty, we were distressed to hear that teachers, principals, and superintendents were reluctant to maintain the long-term partnership with the university. Regretfully, we did not have classroom teachers echoing the views of the survey participant in this study who said, "As a classroom teacher, I enjoy having an extra set of eyes, ears and hands. I like watching the student teachers bring in new and fresh ideas, their planning process as well as becoming independent and self-reliant in their abilities." One school district closed its door to all practicum students and student teachers . . . and it was not just our university; they were closing the doors to all institutions of higher learning. What was the source of such a dramatic turnabout? The State Report Card over the years had moved from a district report of student performance, to the school report; and the latest targets of the assessment tools were all focused upon the teacher. Student performance was more closely linked with teacher competencies, and we were informed that a teacher could not yield her classroom to the novice for any length of time. The progress of the students could be jeopardized. It needs to be noted, however, that, by comparison, mentors who were engaged in our full-year apprenticeship model often clamored to be sure I was assigning them a student. In working with our students over the course of a school year, they maintained strong feelings about the benefits of the university-district partnerships.

To help navigate these types of situations in the future, all of the researchers in this study are pleased to move forward with a clearer understanding of how co-teaching is used in clinical settings and, consequently, with clearer expectations as to what we, as university faculty, expect for all participants in the field experience. One possibility, for example, is that a range of co-teaching behaviors can be designated for certain times of the year in a progressive manner in order to allow pre-service teachers to grow from supportive, to equally engaged, to confidently sharing in leadership."

As this personal, but representative history of one teacher educator's transformational learning suggests, the co-teaching model, in all of its various permutations can provide a continuum of instructional strategies that foster collaboration and promote learning for P-3 students and pre-service teachers. This flexible model fosters a synergy robust enough to respond to any instructional challenge, proving that two heads are really better than one!

Co-teaching in its many forms has the potential to transform learning opportunities

for children. As one educator teaches, the other can focus more fully on the children's responses, their struggles, and their readiness for greater challenges. Through careful observation, both educators can collaborate to plan for and design next steps in learning that are aligned to the needs of individual children. The teaching and learning environment can be transformed to better address children's unique learning needs.

Co-teaching has the potential for transformational practice when a true collaboration between the university and school partnership occurs. A successful co-teaching experience includes a reciprocal relationship that moves into an individualized, democratic practice for each pair of mentor teacher/pre-service teacher, one that goes beyond meeting simple university requirements and expectations. This type of relationship empowers the mentor teacher to have an active role in the partnership through personal decision making, guiding the pre-service teacher through practices that are meaningful to the specific pair and beneficial for P-3 students.

Pursuant to development of professional development and clinical-setting models that construe co-teaching as a means of transformational learning, the researchers in this study note that the concept of distributed leadership and negation of who leads and who follows was not explored in this study. Distributed leadership in various forms and its effects on teachers, teacher candidates, and students is substantially related to the issues explored in this research and, therefore, represents a rich area for further study in co-teaching contexts.

It is the collective belief of researchers in this study that teacher educators must continue to foster co-teaching as transformational practice by strengthening professional partnerships and networks with various early childhood settings. Co-teaching experiences support the NCATE design principles for clinically-based preparation, such as P-3 student learning as the focus; teacher candidates' integration of a base of knowledge and effective teaching practices to solve problems; development of a collaborative culture necessary for successful co-teaching; technology applications for collaboration and on-going professional learning; the systematic gathering and use of data to inform practice; and strategic partnerships for shared responsibility, authority, and accountability in P-3 teacher preparation (NCATE, 2010, pp. 5-6). Our study shows that co-teaching is currently in use in a number of ways in P-3 classrooms and that mentor teachers recognize its potential for transformative learning. Early childhood teacher educators are in a unique position to engage with practitioners and leaders in the field, coordinate professional development for in-service teachers, and enhance opportunities for pre-service teachers. We recommend efforts such as these, which can lead to transformation of the clinical model of teacher preparation, with benefits to educators and students at every level of schooling.

Table 1
Participants' Teaching Experience.

#	Answer	Response	%
1	1 - 3 years	5	6%
2	4 - 7 years	21	26%
3	8 - 12 years	19	23%
4	12 - 20 years	19	23%
5	21+ years	18	22%

Table 2
Participants' Classroom Grade Levels

#	Answer	Response	%
1	Grade PK	14	17%
2	Grade K	16	20%
3	Grade 1	23	28%
4	Grade 2	9	11%
5	Grade 3	15	18%
6	Other	5	6%

Table Three
Participants' Mentoring Experiences

#	Answer	Response	%
1	Early Field (freshman-sophomores)	15	20%
2	Clinical Field (methods courses for juniors)	21	28%
3	Pre-Primary Professional Internship	10	13%
4	Primary Professional Internship	29	39%

Table 4
Use of One Teach, One Observe

#	Answer		Response	%
1	Yes		10	31%
2	No		22	69%
	Total		32	100%

Table 5
Use of One Teach, One Assist

#	Answer		Response	%
1	Yes		56	78%
2	No		16	22%
	Total		72	100%

Table 6
Use of One Teach, One Demonstrate

#	Answer		Response	%
1	Yes		10	31%
2	No		22	69%
	Total		32	100%

Table 7
Use of Center/Station Teaching

#	Answer		Response	%
1	Yes		52	73%
2	No		19	27%
	Total		71	100%

Table 8

Use of Parallel Teaching

#	Answer		Response	%
1	Yes		25	36%
2	No		45	64%
	Total		70	100%

Table 9

Use of Supplemental Teaching

#	Answer		Response	%
1	Yes		29	64.5%
2	No		16	35.5%
	Total		45	100%

Table 10

Use of Alternative (Differentiated) Teaching

#	Answer		Response	%
1	Yes		30	43%
2	No		40	57%
	Total		70	100%

Table 11

Use of Team Teaching

#	Answer		Response	%
1	Yes		36	50%
2	No		36	50%
	Total		72	100%

Table 12

Model Most Representative of Transformative Practice

#	Answer	Response	%
1	One Teach, One Observe	4	8.5%
2	One Teach, One Assist	4	8.5%
3	Center/Station Teaching	15	32%
4	Parallel Teaching	2	4.3%
5	Supplemental Teaching	1	2.1%
6	Alternative (Differentiated) Teaching	9	19.1%
7	Team Teaching	9	19.1%
8	One Teach, One Demonstrate	0	0%
9	Other	3	6.4%
	Total	47	100%

Table 13

Categories of Co-Teaching

AA	AB	A	B	C	D	E	F	G	H	I	J
One Teach	One Teach	One Teach	One Teach	Center/ Station Teach	Para- llel Teach	Supple- mental Teach	Alterna- tive Teach	Team Teach	One Teach	One Teach	One Engage
One Prepare	One Tutor or Assess	One Observe	One Assist						One Demo	One Transi -tion	One Facili- tate
ONE TEACHER LEADS AS ONE SUPPORTS				TEACHERS EACH ENGAGED IN SIMILAR ROLES SIMULTANEOUSLY					TEACHERS EACH LEAD IN DIFFERENT ROLES		

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