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Abstract

This paper showcases how one teacher preparation program embedded action research within the Response to Intervention (RtI) model. This integration helped preservice teachers gain a deeper knowledge of RtI key concepts and pedagogical decision making for meeting diverse students' needs. Examples from a course assignment are provided to demonstrate how an action research framework helped cultivate the professional knowledge and skills needed to understand and successfully implement the RtI decision-making process. A brief discussion and implications for teacher preparation programs are also shared.

Introduction

The No Child Left Behind Act (NCLB, 2002) charges schools with the responsibility of ensuring that "all children have a fair, equal, and significant opportunity to obtain a high-quality education". This means that schools and teachers must make every effort to meet the needs of all students including those who are not achieving at an acceptable level of proficiency. In this spirit, the reauthorized Individuals with Disabilities Education Act (IDEA, 2004), shifted focus of the identification of students with learning disabilities from a discrepancy model (e.g., difference between an IQ score and academic achievement) toward examining students' response to evidence based instruction and intervention (Fuchs & Fuchs, 2006; Stecker, Fuchs, & Fuchs, 2008). This approach, known as *Response to Intervention* (RtI) focuses on early intervention efforts to identify and address the needs of all students using a tiered instructional model.

As states and districts begin to require that schools implement RtI, teachers must understand and know how to weave the process into their instruction. This change requires teachers to examine how their students are learning through the process of employing evidence-based instructional approaches, continually collecting data for the purposes of monitoring students' responses to instruction, and making instructional decisions based on these data. These steps all occur within the context of the specific school and classroom, and with respect to each individual child's background and unique needs. The cycle shifts through multiple tiers, distinguished by different levels of targeted intervention. This conception of RtI naturally aligns and fits within an inquiry or action research framework that provides teachers with opportunities to closely examine, reflect upon, and learn about their own practice through systematically studying students' learning.

Given that teachers need to develop this conceptual and pedagogical decision making capacity associated with RtI, teacher education programs across the country must reconsider their approach to course content, tasks, and clinical experiences to provide pre-service teachers opportunities to develop this

important professional knowledge. Embedding action research activities within initial teacher education programs is a vehicle for developing these RtI related instructional expectations in pre-service teachers. The inclusion of action research or teacher research within the field experiences is consonant with the key recommendation from the NCATE Blue Ribbon report (2010) which calls for schools, districts, and teacher preparation institutions to create authentic learning experiences and opportunities for pre-service teachers to become data literate, as well as knowledgeable about evidence based instructional practices that develop an understanding of how to use data based decisions to guide instruction. Teacher education programs interested in responding to the demands of the NCATE Blue Ribbon Report can work with their school partners to authentically design RtI focused inquiry/action research tasks that create space for pre-service teachers to conduct inquiry around how their struggling students are responding to evidence based instruction. Coupling together RtI under the action research umbrella offers pre-service teachers an ongoing opportunity to engage in reflective practice and become responsive teachers.

In this paper, an overview of RtI is provided first, followed by a description of how action research and RtI can be explicitly linked. Next, we present an overview of the action research strategy implementation project with embedded student examples. Lastly, we provide a brief discussion focusing on implications for including this type of work with pre-service teacher education programs.

Response to Intervention Overview

RtI is a multi-tiered intervention model that is currently in various stages of implementation across the nation. RtI, as outlined in federal legislation (NCLB, 2002; IDEA, 2004), highlights the role of teachers in providing high quality instruction that is not only tied to achieving high academic standards but also is differentiated to meet the individual needs of all students. Essential to the success of implementing the RtI process effectively are five components that all pre-service teachers need to understand: (1) Tiered instructional models; (2) Implementing evidence based instruction; (3) Ongoing assessment including universal screening and progress monitoring; (4) Teaming and collaboration, and (5) Data-based decision making (Fuchs & Fuchs, 2006; Palenchar and Boyer, 2008).

Most RtI models across the nation currently employ three tiers. Tier I instruction occurs in the general education classrooms with all students receiving core instruction that often involves using a common instructional program that is evidence based (Kovaleski & Glew, 2006). Effective lessons include a range of evidence based practices including whole group instruction, small group skill-focused lessons that provide explicit, direct instruction, and work stations or centers to provide multiple practice opportunities and promote high levels of student engagement. Thus, during core instruction students are exposed to differentiated evidence-based practices that are tailored to the different learning needs of students in any given classroom (Deshler, Mellard, Tollefson, & Byrd, 2005; Fuchs & Fuchs, 2006). Furthermore, ongoing assessment is tightly coupled to instruction as teachers monitor student achievement. For example, universal screening is one key element of core instruction and includes benchmark screening, diagnostic assessments, and curriculum-based measures (Deno et. al, 2009). The purpose of universal screening is two fold: (1) to formally assess students to measure student progress at chosen intervals throughout the school year, and (2) to subsequently identify students who are at-risk and in need of intervention services (Deno et al., 2009; Fuchs, D. & Fuchs, 2006).

Tier II interventions take place when students demonstrate deficits in key skill areas on universal screening instruments and curriculum based classroom data within the core reading or math program. In addition to core instruction, these students participate in small group supplemental instruction

targeting specific skills in their areas of need. These lessons are designed to be student centered and regularly monitor progress. Progress monitoring is defined as frequent, on-going assessment of targeted skills using curriculum-based measurements to determine the effectiveness of the supplemental intervention (Deno et al. 2009, Fuchs, & Fuchs, 2006). Consequently, determining student progress requires "data-based decision making derived from observable and measurable outcomes" (Hale, Kauffman, Naglieri, & Kavale, 2006, p. 754). This occurs as teachers use results from universal screening and progress monitoring assessments to determine the effectiveness of instruction at each tier of the RtI model (Roehrig, Guidry, Bodur, Guan, Guo, & Pop 2008; Stecker, Fuchs, & Fuchs, 2008).

Tier III instruction occurs when the student continues to display deficits in academic performance despite core instruction offered in Tier I and additional learning opportunities delivered in Tier II. Theoretically, only small numbers of students are in need of Tier III interventions. Tier III instruction is inherently more individualized, intensive, and prescriptive in nature than the other tiers in order to address each individual student's failure to respond to intervention. In addition, referral and identification for special education services may occur as students enter this tier but only if all other intervention services have been deemed unsuccessful (Bradley, Danielson, & Doolittle, 2007; Reschley, 2005).

To address the complexities of RtI outlined above, teacher educators benefit from understanding in-service teachers' perceptions of how prepared they are to effectively use data to support struggling students. For instance, research suggests that while many teachers are skilled at gathering data regarding student achievement, many teachers grapple with how to efficiently and effectively interpret data to inform their instruction (Mokhtari, Rosemary, and Edwards, 2007). In addition, research indicates that a teacher's ability to make instructional decisions is dependent upon his or her professional knowledge and skill of using data (Jacobs, Gregory, Hoppey, & Yendol-Hoppey, 2009) as well as their ability to analyze student work including informal assessments and student work samples (Jacobs et al., 2009; Mokhtari et al., 2007). Since RtI is a data-driven instructional model, teachers must perceive themselves as both "data users" and "data collectors". The action research cycle develops the capacities of developing questions about student learning, developing and implementing data collection efforts, analyzing data, and using that data to make instructional decisions. Given these demands RtI is placing on teachers across the nation, the infusion of action research into RtI shows promise as a pedagogical tool for helping pre-service teachers develop RtI professional knowledge.

Linking Action Research to RtI: The Strategy Implementation Project

Action research was the tool used to help pre-service teachers become familiar with the RtI framework and begin systematically addressing students' learning needs to improve student achievement. During a special education methods course taken in conjunction with their final internship, teacher candidates completed an action research project referred to as the Strategy Implementation Project. This project focused on the implementation of an evidence based practice tailored to meet the needs of struggling students. This project simulated the Tier II RtI intervention process from start to finish by focusing on a research question related to a specific group of students' needs, developing data collection and analysis skills, and cultivating teacher candidates' knowledge and skills as they developed and implemented an intervention to meet targeted students' needs. In particularly, since Tier II interventions typically occurred in small groups, pre-service teachers provided high-quality, evidence-based strategies to address the targeted needs of struggling students. Throughout, action research served as a tool for helping teacher candidates explore

essential components of the RtI problem solving process and construct important professional knowledge related to RtI needed to enter the profession.

The following illustration of the Strategy Implementation Project is drawn from a pre-service special education teacher named Tricia. The illustration demonstrates how the action research process was infused within the RtI strategy implementation project and how the process helped cultivate the important professional knowledge and skills needed to understand and successfully implement the RtI decision-making process.

Step 1: Student Selection and Description of the Problem

Identifying the problem or question of study is the first component of the RtI process. To begin this process, the teacher candidate gathers data from universal screening tools, benchmark assessments, diagnostic testing, and/or curriculum based formative assessments to identify target students and areas in need of intervention. Once a small group or an individual student has been identified, pre-service teachers write a thorough description of the targeted students. This rich description includes a description of the areas of strengths, weakness, and interests that the student(s) exhibits, and a description of the academic area(s) that will be addressed during the project. This process assures that the teacher candidate identifies an important question targeting student performance by reviewing data.

In illustrating this first step, Tricia reviewed data that indicated her students' inability to name letters and determine initial letter sounds as indicated by classroom performance and the district kindergarten inventory which included the *Dynamic Indicators of Basic Early Literacy Skills* (DIBELS) assessments. As a result, she asked, "How can I help this group of kindergarten students who are labeled as "high risk for failure" improve their letter and sound recognition? In this example, Tricia uses data to identify a question related to a specific student learning need.

Step 2: Action Planning

While analyzing pre-intervention data,

identifying students in need of intervention, developing the description, and identifying a question, pre-service teachers and their mentors collaboratively reviewed evidenced based practices. The goal was to identify the best practice(s) to serve as an intervention, and construct a plan of action to meet targeted student needs. To complete this step, students used the Tier II – Design Worksheet (see Figure 1) to prepare a plan of action. This figure illustrates how Tricia completed this step.

To begin this process, Tricia provided data that indicated how her students were in need of an intervention in a particular area, early literacy skills. Critical to this step was the development of a goal for the academic intervention related to the action research question. In this example, Tricia's goal for one of the students in her small group, was, "by December 6 James will increase his letter identification rate from 11% accuracy to 85% accuracy during weekly trials." This process kept the focus on on-going data collection and analysis. Next, Tricia and her mentor collaboratively reviewed the early literacy literature to identify evidence-based practices that matched the small groups' needs and collaboratively designed when and what intervention(s) were necessary to change student performance for the targeted skills. The more specific and concrete the plan, the more likely the plan would be implemented with fidelity and this subsequently increases the likelihood of the students' experiencing success. Lastly, a specific timeline for implementation of the action plan was designed. This included the frequency, time, and schedule for the intervention sessions as well as developing a systemic progress monitoring plan which is often referred to as on-going analysis. This plan also specified how often progress monitoring data was collected and analyzed throughout the intervention. Once the RtI design worksheet was completed and collaboratively approved by both the mentor teacher and university

Figure 1. RtI Project Design Worksheet

Tier 2 - Small Group Intervention Form

Student(s): _____ DOB: _____

School: _____ Teacher(s): _____

Meeting Date: _____ Target Skill:_____

DIRECTIONS: This form is to be completed and approved before starting your strategy implementation project

Additional Data Indicating Need for Intervention (Benchmark and progress monitoring data must be attached.):
Benchmark assessments

- *DIBELS indicated that this group of students are considered high risk for failure. They also scored low to high risk on the Initial Sound Fluency (ISF) measure. Student could identify 4 of 26 uppercase letters and 0 of 26 lowercase letters (10th percentile) and identifying from 0-11 initial sounds (ranged from the 6th and 44th percentile).*
- *As indicated on the kindergarten inventory students weaknesses include naming the days of the week, recognizing basic shapes, and recognizing letters.*

Instructional Procedures:
Orton Gillingham strategies including:

- Hands on activities (sand writing Manipulative Letter Work/ Elkonin Boxes)
- Phonemic Awareness (oral Sound) work included using multi sensory strategies, (choral responding) and music based activities (*Alphabet Boogie, Who Let the Letters Out*).

Times per week: 3 (Tues.-Thurs.)

Length of sessions: 30 minutes

Tier 2 Initiation Date: October 4

Progress Monitoring Plan:
Weekly using flash cards and a coding sheet for initial letter sounds as well as letter identification. Assessment will be determined based on the number of letters and sounds correctly identified.

DIBELS ISF subtests assessment every two weeks.

Daily observations notes on what is proving to work or not work during each session will be taken. Intervention will be change accordingly.

Goal Statement (This is one Example as each student had multiple goals for letter recognition and initial sound fluency.)
By December 6, James will increase his letter identification rate from 11% accuracy (3 of 26) to 85% accuracy (22 of 26) during weekly trials.

professor, prospective teachers like Tricia started to implement their intervention.

Step 3: Plan Implementation

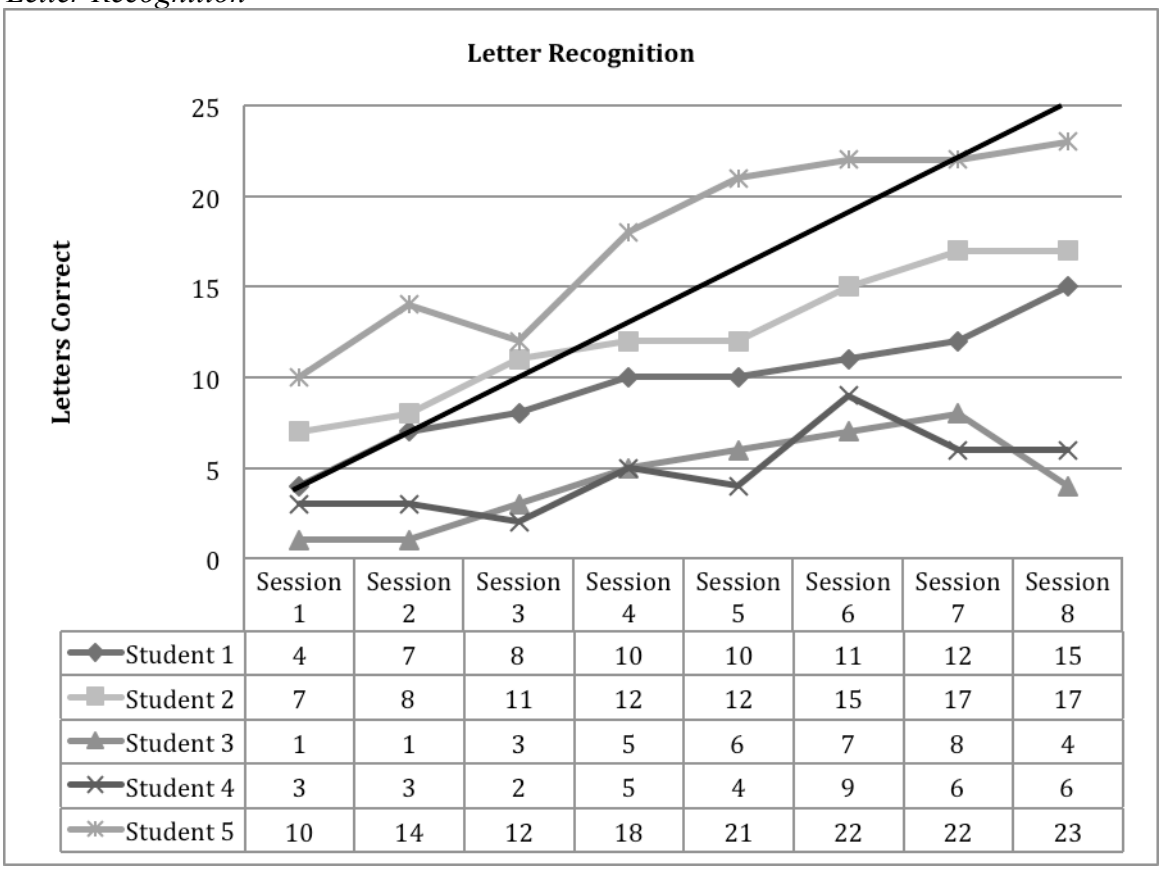
Once the action plan was developed and approved, pre-service teachers began the intervention. Throughout the semester, teacher candidates maintained a regular schedule of progress monitoring. By regularly scoring weekly or bi-weekly monitoring probes and recording the results, teacher candidates developed data collection and analysis skills. Graphing templates were used and assisted in monitoring student progress. These templates proved helpful to pre-service teachers in identifying learning trends during the intervention period. The collection of valid and reliable data, as displayed in Tricia's graph, allowed her to easily track progress, determine how a student was responding to the intervention, and adjust the intervention accordingly. Figures 2 and 3 present Tricia's representation of her students' learning gains across intervention sessions.

As evident in the figures, Tricia carefully included enough progress monitoring points to accurately create a trend-line (e.g., typically 6-8) as well as a goal-line or aim-line (indicated by the dark black line in Figures 2 & 3). She also indicated that her targeted goals were consistent with the intervention plan by having the graph monitor the same need that was prioritized and addressed in the intervention plan. She also assured that there was adequate data for each student.

Step 4: Outcome Assessment

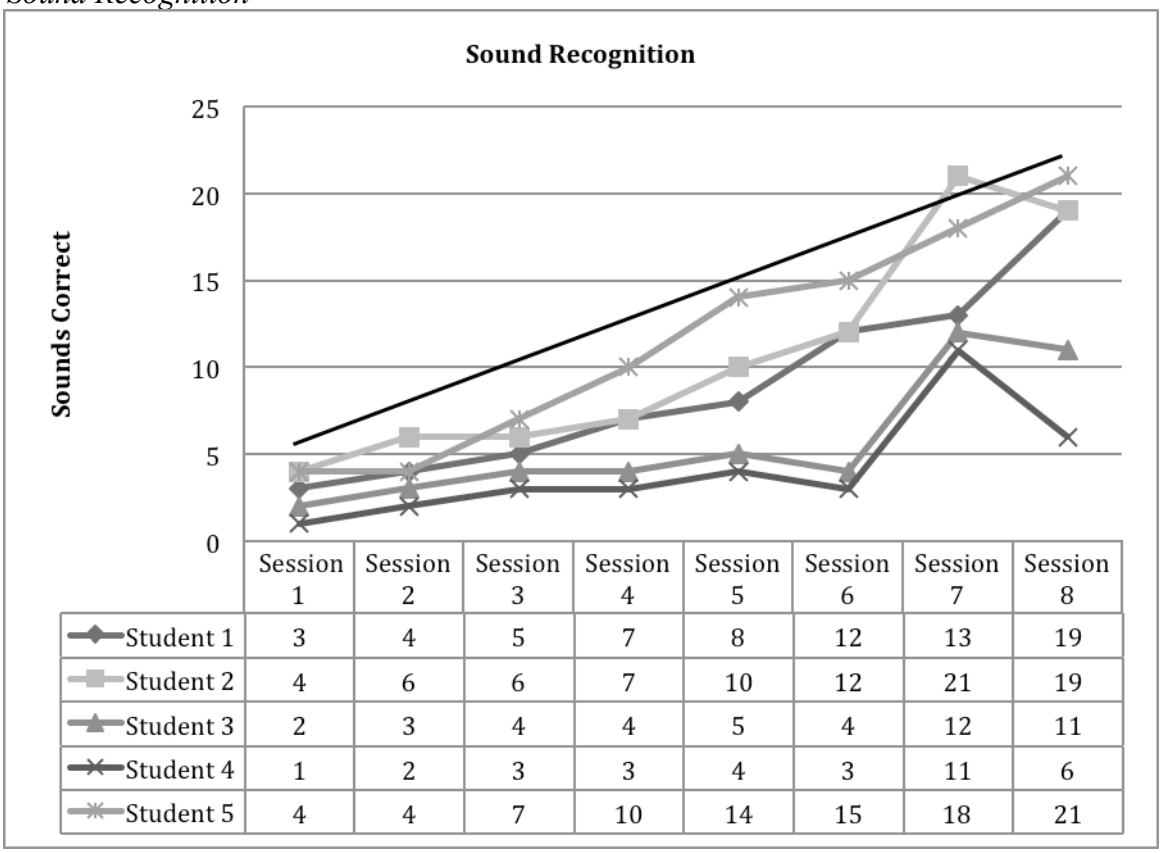
The outcome of the RtI action research project was to summarize and analyze student achievement progress based on intervention data to determine the effectiveness of the RtI

Figure 2. Letter Recognition



	Session 1	Session 2	Session 3	Session 4	Session 5	Session 6	Session 7	Session 8
Student 1	4	7	8	10	10	11	12	15
Student 2	7	8	11	12	12	15	17	17
Student 3	1	1	3	5	6	7	8	4
Student 4	3	3	2	5	4	9	6	6
Student 5	10	14	12	18	21	22	22	23

Figure 3. Sound Recognition



	Session 1	Session 2	Session 3	Session 4	Session 5	Session 6	Session 7	Session 8
Student 1	3	4	5	7	8	12	13	19
Student 2	4	6	6	7	10	12	21	19
Student 3	2	3	4	4	5	4	12	11
Student 4	1	2	3	3	4	3	11	6
Student 5	4	4	7	10	14	15	18	21

intervention plan. This process was done collaboratively with a small group of peers. Presenting data in a visual format, as displayed in Figures 2 and 3, to peers was central to this part of the assessment. In making their findings public to their peers, students also shared patterns or themes gathered from anecdotal notes in their research journal that help to explain inconsistencies in the student outcome data. Further, peers raised questions and made suggestions related to the findings. Any changes or modifications of the intervention were also discussed. Lastly, recommendations for continued intervention and generalization necessary to assist the student in improving skill deficits were discussed. In sum, this step assisted pre-service teachers in deciding to continue the current intervention, tweak or revise the intervention, discontinue the intervention and begin another, or refer students for further evaluation based on the outcomes of this project. In the final report, preservice teachers reflected on their work to decide whether the intervention was implemented with fidelity, the progress monitoring plan was appropriate, the data was valid, the relative success of the intervention, as well as provided future recommendations. These reflections showcased the pre-service teacher's professional growth related to using RtI to meet the needs of struggling students.

Tricia's outcome assessment indicated that she was pleased with the progress of her students. Her visual representation of her data and writing summary suggests that students overall have improved their letter and sound recognition, though two students in particular struggled more than the others. She believed that implementing the intervention consistently and with fidelity played a major role in achieving the gains. Tricia also identified increasing student engagement on the targeted skills as an important factor and that the students' confidence had grown when identifying letters and their sounds. This was confirmed on the last DIBELS assessment probe when one student successfully had "closed the gap and reached benchmark on the letter identification subtest". Tricia also thought that progress monitoring was simple and in no way overwhelming. However, her reflection also highlighted how she thought some students were guessing when assessed using the bi-weekly DIBELS probes. In her opinion, this occurred because "DIBELS is a timed test and students are asked to think quickly, while during weekly progress monitoring assessments students were allowed to take as much time as they needed." Her final recommendation was to continue with the intervention for all students for another four weeks, even for the student who just met the benchmark on letter identification as she believed he could benefit from the added instruction before being transitioned out of Tier II instruction.

Discussion and Implications for Teacher Preparation

Research suggests that pre-service teachers' preparedness to teach has been drawn into question because they do not demonstrate the basic knowledge needed to teach struggling students (Bos, Mather, Dickson, Podhajski, & Chard, 2001). To combat this dilemma, the Strategy Implementation Project was designed to simulate and scaffold pre-service teachers through the RtI problem-solving process. In this paper, we described how this project incorporated action research methods within an authentic assignment that cultivated pre-service teacher candidates' development of the knowledge and skills needed to meet their students' learning needs. This approach suggests that teacher education programs are positioned to help preservice teacher candidates recognize that problem solving and action research are a part of effective teachers' daily routines and that having a deep understanding of theory to practice connections are necessary to successfully implement RtI.

During the Strategy Implementation Project pre-service teachers engaged in action research nested within the RtI model and as a result of this process these pre-service teachers were able to explain their

instructional decisions as well as student outcomes using data. Action research and systematic inquiry become embedded into their daily practice. A related outcome was that prospective teachers also gained a deeper understanding of the connections between theory and practice by exploring evidence based best practices and implementing instruction within the RtI framework in a practical step-by-step fashion with peer support. This process cultivated pre-service teacher candidates' ability to engage in data based decision-making including the intricacies of moving between different instructional tiers, the multiple uses of universal screening and progress monitoring data, as well as how to effectively deliver differentiated evidence based instruction and interventions to meet the needs of diverse learners.

However, challenges also exist related to the Strategy Implementation Project. The challenge of developing effective collaborative partnerships with local schools and districts to design action research efforts in authentic ways that aligned with actual practice of in-service educators was difficult. For example, mentor teachers with whom the pre-service teachers work need to understand both RtI as well as possess action research skills in order to support pre-service teacher learning. Additionally, school administrators and faculty need to facilitate pre-service teacher access to student data in order for pre-service teachers to develop data analysis skills and the ability to form important learning questions that can target struggling student learning needs. Further, university faculty need to be prepared to rethink the role of the practicum, associated seminars, and links between the practicum and other coursework as called for in the NCATE Blue Ribbon Report. Lastly, school faculty, including mentor teachers and school administrators, need to be involved in the planning and implementation of action research such as the Strategy Implementation Project. Although challenging, the successes noted in Tricia's illustration as well as many of her peers indicate that overcoming these challenges will lead to the development of promising and important professional skills.

Using action research methods with the RtI framework exemplified effective practice (Dozier, Johnston, & Rogers 2006) and supported the idea of an orientation toward using action research being a mindset or stance. If designed and implemented effectively this work has the potential to not only deepen teacher candidates' content knowledge and refine their instructional practice, but also to learn the data skills required of teacher researchers and develop of an inquiry stance (Cochran-Smith & Lytle, 1999; Dana & Yendol-Hoppey, 2009). Acquiring and fostering an inquiry stance is especially important today as teachers' roles have evolved significantly to require more problem solving skills and data based instructional decision making.

In sum, teacher preparation programs interested in cultivating an inquiry stance (Cochran-Smith & Lytle, 1999; Dana & Yendol-Hoppey, 2009) into teaching and student learning should consider embedding similar action research assignments within the RtI model. Action research provides a process that if routinized and habitualized helps to create a professional lens and responsibility for meeting the needs of all students. When embedded throughout a program, these action research assignments provide multiple opportunities for pre-service teachers to wrestle with the many nuances of the RtI model while simultaneously assisting pre-service teachers in developing the knowledge, skills, and dispositions to pose questions related to student learning, collect data, use evidence based instructional strategies and interventions with the goal of improving students' learning.

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