

ELEMENTARY PRE-SERVICE TEACHERS' PERCEPTIONS AND EXPERIENCES OF  
MATHEMATICS INTERVENTION AND RESPONSE

TO INTERVENTION PRACTICES

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Response to Intervention has become a widely implemented early intervention and pre-referral program in many schools due to the reauthorization of the 2004 Individuals with Disabilities Education Act. Limited studies exist that validate how teacher preparation programs are preparing the next generation of teachers to assess students, apply early academic interventions, monitor progress, and make educational decisions for students with learning difficulties as part of an RTI program. The purpose of this study was to examine elementary pre-service teachers' perceptions and experiences in a mathematics intervention project (MIP), as part of a university mathematics methods course as related to RTI practices.

Data were collected from multiple sources, including: Seidman's three-step interview series with pre-service participants and course instructors, document analysis of the Mathematics Interactions Project (MIP) students' responses, mathematics methods course syllabi, and observations of the mathematics methods course instruction. Haskell's transfer theory was used as the framework from which to analyze the data. It was assumed that if a majority of the 11 principles of meaningful transfer were addressed, higher levels of transfer from university instruction to intervention instruction would be observed during the MIP. Findings indicate differences in RTI understanding according to elementary education degree plan. Candidates in the English as a Second Language (ESL) program did not demonstrate a strong foundational understanding of RTI, evidenced by a lower level of transfer about RTI. Alternately, pre-service teachers in the special education degree plan had a stronger foundational knowledge of RTI, discussed how RTI learning was supported, and had more experiences to implement RTI

(principles 1, 7, and 9). Pre-service teachers in the Special Education (SPED) certification degree plan demonstrated a higher level of transfer since more of the principles were met; this was foundational in Haskell's transfer theory. Implications are that elementary education programs, and particularly projects such as the MIP, should focus explicitly on RTI practices, as these are increasingly necessary in the field of elementary education practice.

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By

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# ELEMENTARY PRE-SERVICE TEACHERS' PERCEPTIONS AND EXPERIENCES OF MATHEMATICS INTERVENTION AND RESPONSE TO INTERVENTION PRACTICES

## Introduction

In today's public schools, general education teachers must be adequately prepared to teach students with multiple learning needs, including students who do not speak English, who have identified or suspected disabilities, and students who have diverse cultural and racial backgrounds. The enactment of No Child Left Behind in 2001 and the reauthorization of the Individuals with Disabilities Education Improvement Act of 2004 (IDEA 2004) placed an emphasis on providing research based instructional practices in the general education classroom before an at-risk student can be considered for placement in special education. It is vital that general education teachers are prepared to work with this diversity in classrooms, including strategies to work with students who are at-risk for developing learning difficulties or who may already have a disability.

Response to intervention (RTI) is a general education intervention system used by classroom teachers to assist struggling learners and provide individualized, academic support to help all students succeed academically (Fuchs & Fuchs, 2006a). This process is also vital as a pre-referral process as a prerequisite to special education referrals and eligibility determination (Fletcher & Vaughn, 2009). There are important legal ramifications that schools must follow in regard to special education identification and eligibility. Identification and pre-referral processes are the responsibility of the general education teacher as the first point of contact with a student who struggles academically or behaviorally (Fletcher & Vaughn, 2009; Mastropieri & Scruggs, 2005).



### *RTI in Practice*

RTI has been widely studied as an evidence-based intervention process used to assist struggling learners in the classroom or to identify students as having a learning disability either in reading or math (Baker, Gersten, & Dae-Sik, 2002; Fuchs et al., 2005; Gersten, Chard, et al., 2009; Scammacca et al., 2007; Wanzek & Vaughn, 2007). Recently, studies have also focused on campus and teacher RTI implementation in individual districts and schools, including many of the teacher concerns related to their development and practices of RTI in classroom settings (Greenfield, Rinaldi, Proctor, & Cardarelli, 2010; Orosco & Klingner, 2010; Rinaldi, Averill, & Stuart, 2011; Stuart, Rinaldi, & Higgins-Averill, 2011; Wilcox, Murakami-Ramvalho, & Urick, 2013).

The National Mathematics Advisory Panel (2008) recommends that early mathematics instruction entail concepts such as whole number arithmetic, number sense, fractions, geometry, and measurement in preparation for algebra as a foundation of mathematics proficiency. Specifically, the Panel (2008) reported that explicit, systematic, and direct instruction in math is the most significant intervention within the realm of research-based strategies for low-achieving learners. Additionally, research in mathematics instruction and intervention purports that explicit instruction in mathematics should include effective teacher modeling, opportunities for guided practice, teacher checks for understanding, feedback to learners, and independent practice by the learner (Doabler et al., 2012; Doabler & Fien, 2013). Fuchs and Fuchs (2001) established further components of explicit math instruction including a quick pace with varied instructional activities and high levels of student engagement, challenging instructional standards, opportunities for students to verbalize their learning, and physical and visual representations or models of number concepts or problem solving situations. According the RTI principles, a core

math curriculum should have a clearly identified research-base, explicit instructional techniques, and consistent instructional routines to guide teachers as intervention specialists (Gersten, Beckmann, et al., 2009; Gersten, Chard, et al., 2009).

Pre-service general education preparation is significant in predicting teachers' perceptions of working with students who have disabilities. Research has demonstrated that general education practitioners do not feel adequately prepared to work with students who have disabilities or students in inclusion settings (Goodlad & Field, 1993; Rojewski & Pollard, 1990). Special education pre-service coursework is connected with more positive attitudes among general educators toward teaching students who have learning disabilities (Bender, Vail, & Scott, 1995; deBettencourt, 1999). Studies linking pre-service preparation to teachers' attitudes in working with students who have disabilities are an important predictor of positive instructional approaches related to mainstreaming and inclusion (Ajuwon et al., 2012; Hadadian & Chiang, 2007; Rademacher, Wilhelm, Hildreth, Bridges, & Cowart, 1998; Van Laarhoven, Munk, Lynch, Bosma, & Rouse, 2007; Voss & Bufkin, 2011). Research also connected teacher confidence and self-efficacy with pre-service coursework and field experiences in special education issues (Atiles, 2012; Brownell & Pajares, 1999; Gao & Mager, 2011; Lancaster & Bain, 2010). Related to the context of RTI, these studies are vital for consideration since RTI and special education are inextricably linked through general education support strategies for struggling learners.

Successful RTI implementation is dependent upon a teacher's preparation and development to implement the dynamic relationship of student assessment, intervention, monitoring, and decision-making. RTI practices, similar to the nature of other school reform concerns, require significant change on many levels, including changes in teaching practices (Nunn & Jantz, 2009). The RTI model proposes a fundamental "paradigm shift" in the way in

which schools identify and serve students who struggle with the general education curriculum. The level of specialized, hierarchical academic support provided to students requires a set of knowledge and skills from the general education practitioner that was not previously required. This paradigm shift has important implications for pre-service teacher preparation programs (Richards, Pavri, Golez, Canges, & Murphy, 2007).

### *RTI and Pre-Service Teacher Preparation*

The challenges of RTI implementation are present in teacher preparation programs (Fuchs & Fuchs, 2006b; Nunn & Jantz, 2009; Richards et al., 2007). RTI is based on the premise that general educators will deliver evidence-based practices in the classroom setting (Danielson, Doolittle, & Bradley, 2007), and the training of pre-service teachers helps build capacity for future implementation in the schools. Danielson et al. stated, “at this point, there has not been sufficient attention paid to the implications of RTI for the pre-service preparation of personnel who will play critical roles in implementation (i.e. principals, general education teachers, [school] psychologists, and special educators)” (p. 633). If teachers receive preparation in RTI implementation at the pre-service level, there is some evidence that they may implement interventions in the classroom with more integrity and less coaching (Begeny & Martens, 2006).

Researchers cite a growing need for embedded RTI practices within teacher preparation programs. According to a 2010 survey by the Florida Problem Solving/RTI Statewide Implementation Project, recent graduates indicated that teacher preparation programs needed to do more to expand the competencies and skills needed to work with struggling students in a problem solving or RTI model (Prasse et al., 2012). Other studies have indicated similar reports,

with teachers citing a lack of basic knowledge needed to teach struggling students (Hoppey, 2013; Mather, Bos, & Babur, 2001). While researchers often discuss the importance of pre-service training, there are only a few studies that specifically investigate pre-service teacher training and RTI practices.

Hawkins, Kroeger, Musti-Rao, Barnett, and Ward (2008) explored the outcomes of training pre-service special educators in RTI through targeted university coursework and field-based experiences. The researchers found that effective RTI training models included several important components such as interdisciplinary training in specific RTI prevention or tier one practices, using assessment and progress monitoring data to make decisions, participation in team problem-solving, and selecting effective research-based interventions appropriate for specific student needs. This study emphasized the significance and challenges of placing pre-service professionals in field experiences that provide experiences in implementing an RTI program. Finding adequate settings and mentor teachers is a significant barrier for preparation programs wanting to simulate effective RTI experiences for their pre-service teachers.

Grogg (2009) studied the relationship between training in pre-referral intervention teams and pre-service teachers' knowledge and perceptions of these practices. Pre-service teachers who participated in pre-referral training reported significant changes in knowledge about instructional interventions, including positive changes in perceptions of the assessment process, making decisions based on the data, and responding to individual student needs. These increases in knowledge about the pre-referral process only serve to build future capacity for responding to student instructional needs as part of an RTI process. Grogg attributed focused training in pre-referral activities to the pre-service teachers' ability to generalize this knowledge to future instructional settings.

McCombes-Tolis and Spear-Swerling (2011) conducted a review of elementary education coursework syllabi to determine the extent of training in RTI practices for early reading intervention. The researchers discovered that elementary pre-service teachers were not routinely receiving explicit instruction regarding key RTI terminology, theoretical models and best practices of RTI, and research-based reading interventions. This finding echoed sentiments expressed earlier by the National Reading Panel (2000) and Bos, Mather, Dickson, Podhajski, and Chard (2001). Furthermore, inadequacies in preparing pre-service teachers to implement early reading interventions continue to be a concern (Otaiba, Lake, Greulich, Folsom, & Guidry, 2012).

Pre-service special education teachers who participated in an online RTI training system known as the IDEA '04 and research for inclusive settings (IRIS) model were found to have significant positive changes in their reported knowledge about RTI as compared to pre- and post-participation in the modules (Kuo, 2013). Furthermore, the modules were shown to increase background knowledge about RTI although the sustainability of this knowledge in classroom settings remains unknown.

A study by Neal (2013) set out to discover general and special education pre-service teachers' perceptions of RTI and their perceived ability to implement an RTI program in future settings. While most pre-service participants perceived RTI as a necessary and crucial part of assisting struggling students, there was a significant difference among participants in the reported ability to implement RTI. Special education pre-service teachers reported much higher levels of self-efficacy in implementing RTI, mainly due to differences in coursework and fieldwork experiences compared to the general education program. A common theme seen among all participants in the study was the need for more training and hands-on experiences with

implementing RTI in a school setting, suggesting that teacher preparation is a vital component of implementing an effective RTI program in future classroom settings.

In many of these studies, participants primarily included psychology students and special educators rather than general education pre-service practitioners (Hawkins et al., 2008; Kuo, 2013; Neal, 2013). The encompassing RTI literature typically situates RTI as a general rather than special education intervention (Fletcher & Vaughn, 2009; Mastropieri & Scruggs, 2005). Overall, more information is needed about how university teaching programs prepare general educators to diagnose, intervene, and monitor struggling students specific to the RTI framework established formally in NCLB 2001 and IDEA 2004. This raised concerns in the extent that general education teachers use assessments, monitor progress, and make sound educational decisions regarding struggling students. When considering the prominent role general educators play in the implementation of RTI, this is cause for concern (Neal, 2013).

### *Purpose and Research Questions*

While the perceptions and experiences of pre-service teachers are critical to the future success of RTI implementation, limited studies in teacher preparation evaluate how pre-service programs are preparing general education teachers to implement RTI as both a prevention model and an identification model in their future classrooms (Hoppey, 2013; Prasse et al., 2012). Hawkins et al. (2008) stated, “a specific literature review revealed no specific studies related to RTI pre-service training and outcomes” (p. 747). Since this statement, few studies have emerged that specifically examine RTI implementation within pre-service teacher preparation programs (Grogg, 2009; Kuo, 2013; McCombes-Tolis & Spear-Swerling, 2011; Neal, 2013).

Recent emphasis on pre-service teacher preparation methods and a focus on meeting the

academic needs of a diverse student population in the general education classroom has revealed a need for more research in the practices of these programs (National Mathematics Advisory Panel [NMAP, 2008; National Research Council [NRC], 2010; National Council on the Accreditation of Teacher Education [NCATE], 2010; National Council on Teacher Quality [NCTQ], 2013). Of particular interest is the need to understand how elementary education (EC-6) pre-service teachers are prepared to include RTI practices in their classrooms, and how these pre-service teachers transfer their university preparation by applying the principles of RTI in their fieldwork experiences.

Research documents that there is an existing transfer problem in the realm of pre-service teacher education (Korthagen & Kessels, 1999; Wubbels, Korthagen, & Brekelmans, 1997). A synthesis of the literature reveals several documented areas of concern regarding pre-service teacher education and the transfer of knowledge and experience to actual teaching settings (Bransford & Schwartz, 1999; Stofflet & Stoddart, 1994; Wubbels, 1992). Research in teaching and learning reveals that existing or prior knowledge has a major impact on comprehension and learning (Scardamalia & Bereiter, 1989).

The purpose of the study was to examine pre-service teachers' understanding, practice, and generalization of RTI practices in a university mathematics methods course assignment that applies RTI methodology. The following research question guided this study:

- What are general education elementary pre-service teachers' understanding and practice of RTI in a university mathematics methods course assignment (mathematics interactions project) that transfers RTI methodology to mathematics teaching practice?

### *Theoretical Framework*

Educational experts have cited transfer of learning as one of the most problematic issues

with learning in a classroom environment (Bevevino, Dengel, & Adams, 1999; Borich & Tombari, 1997; Rossett, 1997). Robert Haskell (2001) developed a theory of learning transfer by synthesizing years of research on transfer within learning contexts applicable to an educational framework. Haskell believed that the transfer of learning refers to application and acclimatization of previous learning to new contexts. Constructivist learning theory idealizes the notion that prior knowledge and experiences are essential for new learning to occur; the issue with transfer arises when new learning is applied to vastly different contexts.

Haskell posited that significant transfer could only occur when new learning transpired in order to produce the transfer. He suggested that near, far, and displacement or creative transfer were the highest levels to strive for and insisted that unless new learning occurred, the only thing that resulted was the application of the same learning, rather than the transfer of new learning. Studies in transfer and generalization have corroborated this theory for meaningful transfer (Calais, 2006; Clark & Voogel, 1985; Comier & Hagman, 1987).

Haskell summarized 11 widely accepted educational principles that support transfer processes. These principles were the primary lens through which the data from this study were collected and analyzed to determine level of transfer that occurred regarding RTI practices among the pre-service participants. Transfer is a vital consideration as pre-service teachers apply learning in coursework and field based experiences to the teaching profession. This is a complex process and requires careful, explicit educational opportunities designed to specifically facilitate transfer (Benander & Lightner, 2005). Additionally, Calais (2006) stated that educational learning must consider Haskell's levels to design opportunities for higher, more significant levels of transfer to occur. This study sought to identify the RTI knowledge that was gained through a teacher education preparation program, in particular, a mathematics interaction project (MIP) as



part of the mathematics methods course, through the lens of Haskell's principles of transfer in order to deduce how pre-service teachers transfer this learning to a field-based teaching context.

These 11 principles include:

1. Learners need to acquire a large knowledge base in the areas in which transfer is to occur (Clark & Lampert, 1986; Korthagen & Kessels, 1999; Scardamalia & Bereiter, 1989; Tom, 1997).
2. Acquiring knowledge outside of the transfer area is useful for future, relational thinking in regard to transfer (Lasley, Williams, & Hart, 1991; Overing & Travers, 1967; Tennyson, 1973).
3. A historical and theoretical foundation of the transfer process is needed (Wubbels, 1992).
4. The learner must have adequate motivation for transfer to occur (Korthagen & Kessels, 1999; Skemp, 1979).
5. Learners need to understand what transfer is and how it works (Haskell, 1987).
6. An understanding of how to encode information for transfer is needed (Epps & Lane, 1987; Scruggs & Mastropieri, 1994; Stokes & Osnes, 1989).
7. Support systems and cultures of transfer must be present (Huibregtse, Korthagen, & Wubbels, 1994; Stofflet & Stoddart, 1994), including meaningful feedback to promote growth (Noelle, Duhon, Gatti, & Connell, 2002; Scheeler, Ruhl, & McAfee, 2004).
8. An understanding of the theory underlying the transfer is crucial for successful transfer (Wubbels, 1992; Wubbels, Korthagen, & Brekelmans, 1997).
9. Practice and drill are necessary for transfer (Engelmann, 1988; Rose & Church, 1998).
10. Significant transfer needs time to develop and does not occur immediately (Huibregtse et al., 1994; Stofflet & Stoddart, 1994).
11. Learners need to observe and read written works of persons who are masters at transfer.

### Research Design

The research design followed a case study methodology. This study sought to explain pre-service teachers' (PSTs) perceptions of RTI and gauge ability to transfer this knowledge to

classroom use through interviewing and extensive analysis of a course assignment given in the mathematics methods course known as the Mathematics Interactions Project (MIP).

Undergraduate students working toward elementary teaching certification at a north Texas university were recruited as participants. PSTs choose from one of several routes to obtain certification from the university, including: early childhood-6th grade (EC-6) generalist, or EC-6 with a specialization. The specialization areas include English as a second language (ESL), bilingual, or special education (SPED). PSTs also participated in field-based experiences known as professional development schools (PDS) while taking methods classes at the university. During this phase, courses taught at the university are designed to interface theory to practice in the field. Assignments from courses align theories presented in class with field experience opportunities to test the theories with young learners. Approximately 85 PSTs were enrolled in PDS coursework in the spring 2015 semester, from which 22 candidates consented to participate in the study. The participants included one bilingual candidate, six SPED candidates, and 15 ESL candidates across four sections of the mathematics methods courses.

### *Data Sources*

The study employed two main data sources to determine the case for PSTs' perceptions of university mathematics methods coursework in relation to RTI and their transfer of learned RTI practices during their PDS experience. Data were derived from document analysis of the PSTs' field based assignment and focus group interviews during the first PDS semester.

The MIP was a required assignment as part of the mathematics methods course. In the project, PSTs work with a supervising or mentor teacher in the field to select and implement an appropriate assessment and intervention protocol, and to interact with a small group of students

in the classroom, with mathematics as the center of the interactions across a four to six week timeframe. PSTs mimicked an RTI process by diagnosing students' mathematical knowledge and skills by giving a pre-assessment, analyzing student data, selecting appropriate materials and creating lessons specifically to address the instructional needs of students, as noted in the diagnostic, resulting in four intervention lessons. Following each lesson, PSTs informally monitored student progress through each lesson, and completed a post-assessment to determine progress at the end of the six-week interaction. The PSTs were also expected to continually reflect on this process of assessment, intervention, and monitoring as a simulation of a campus based RTI procedure, while receiving feedback from the course instructor.

Focus group interviews were conducted with small groups of PSTs during concurrent enrollment in the mathematics methods course. The structure for the interview sequence followed Seidman's (2006) three-interview series. Questions were open-ended so as to allow participants to reconstruct experiences within the confines of the topic of study. The purpose of these interviews was to identify PSTs' perceptions and experiences with RTI through university coursework and field experiences and to identify how the PSTs are able to transfer their learning to their active fieldwork experiences.

### *Data Analysis*

A document analysis approach was used to examine data gathered from the MIP. The analysis focused on pre- and post- assessment data and formative assessments as a decision-making tool, specific reflections on lesson planning and applicability to the teaching practice, and on mathematical understandings of how to intervene with students explicitly connected to an RTI practice. PSTs' MIP documents were uploaded into NVIVO 10 software and initially coded

using Haskell's transfer principles, aligned with accepted RTI practices. NVIVO 10 is a qualitative data analysis software package that facilitates the organization of unstructured data by classifying, sorting, and arranging information to determine relationships, patterns, and/or trends in the data (QSR International, 2014).

The interview portion of the data analysis involved digitally recording, transcribing, and uploading the digitally written material into NVIVO 10. The interviews served as a method to probe deeper into the experiences that PST participants had with RTI in prior pre-service courses, thus establishing an extensive knowledge base about RTI based on the first principle of Haskell's transfer theory. Secondly, the interviews provided a way to further examine PSTs' experiences with RTI through the mathematics methods course and field-based experiences, specifically in regard to transferring their knowledge through the mathematics interactions project. Data gleaned from the focus group interviews were analyzed using coding categories from the principles in Haskell's transfer theory.

## Findings

The data for this study will be reported within the context of the relevant corresponding principles of Haskell's theory. Principles 1, 7, and 9 were revealed as applied to the transfer of RTI principles in practice in the MIP; the remaining principles were not seen in the results.

### *Principle 1 – Knowledge in Area that Transfer is to Occur (RTI)*

Haskell (2001) maintained that for significant transfer to occur there must be a depth of knowledge in the area of transfer. This has been supported in research on transfer and learning (Bransford & Schwartz, 1999; Lee, 1998; Lee & Pennington, 1993). In this study, the main

transfer area studied was PSTs' knowledge and skills, understanding, and practice of RTI. An analysis of the focus group interviews and MIPs revealed several themes related to RTI understanding as part of the university program.

### Coursework

PST participants were asked about knowledge and understanding of RTI within the context of prior coursework and experiences as part of the teacher preparation program at the university. Responses varied greatly according to degree plans; discrepancies in course coverage and experiences related to RTI emerged. ESL and bilingual degree plans are nearly identical, with the exception of a single language-oriented course; for the purposes of this report, the Bilingual candidate will be grouped with the fellow ESL participants.

### *ESL participants*

PSTs on the ESL plan frequently cited class lectures, PowerPoint presentations, online learning modules, and the course textbook as the main sources of RTI learning from coursework at the university. When asked what courses covered RTI, students had some trouble isolating the individual courses; however, further investigation led to identification based on common instructors and/or topics mentioned. These included the ESL instructional strategies course, an Assessment of Reading Course, and a single Special Education (SPED) course that all non-SPED candidates are required to take. The attention to RTI in these courses was reported as scarce in depth and breadth of coverage. Students frequently stated that courses with RTI coverage only introduced basic definitions, referenced the tier triangle of instruction, and gave quizzes that checked for understanding as methods for teaching and assessing understanding of RTI.

Comments from ESL student participants regarding exposure to RTI in university coursework provide insight [participant quotes follow]:

It seems like in almost every class we might've talked about it very briefly, like what it is. And I remember, I think it may have been last semester in some class, there was a module we did online over it that was sort of interactive, but it still wasn't very real to us.

I remember seeing a slide [PowerPoint] on it and I remember there was a part of the book that we read that had it in there.

I'm [on the] ESL [plan] and we probably looked at it on a PowerPoint. We probably had to memorize it for a quick quiz, but didn't go into depth about it.

None of the responses about RTI learning was answered in relation to the mathematics or other methods courses, but only about prior coursework.

ESL PSTs frequently stated the lack of concrete or hands-on experiences with RTI and also indicated the desire to have more practical application of RTI within coursework experiences. This was the case within three of the four focus groups. Students with ESL degree plans offered these thoughts about the lack of practical experiences in the ESL degree plans:

I just feel like we didn't really get much practical experience or hands-on stuff with RTI.

As far as like hands-on working with students that kind of stuff, I mean I don't think we've really ever done too much of that.

It's just different and I would like more practice on how to do interventions and how to work with kids who are struggling.

### *SPED*

Students on the SPED degree plan gave very different responses when asked about coursework and RTI learning experiences. These students did not reference textbook definitions, lectures, or presentations as ways that they learned about RTI, but rather gave specific examples and projects from their SPED courses. These students cited several courses and projects in

which they had to assess students in the classroom, create interventions, and monitor progress and make decisions based on student data. There were five SPED courses that were commonly referenced and are only courses that SPED majors are required to take.

Furthermore, candidates in the SPED degree plans frequently cited learning and experiences in these courses that mirrored RTI experiences. For example:

I have extensively studied RTI for our classes. EDSP 4330 and 4320 are our assessment and evaluation classes and the strategies for special education. We actually had to do an RTI project.

In the Special Ed program we get to – many of our classes have practicum hours we're working with – like in my transitions class, we go and work with adults with disabilities... And last semester I was in a fourth grade class, inclusion. So I got to experience come test time all the different accommodations and modifications.

Most of the special education classes that we take in some aspect have RTI within them, whether it's creating a lesson plan or going into the classrooms and seeing their RTI tiers and what those teachers are doing. I can remember the family and community class that we had to take here at [university]. I guess it integrated a lot of RTI, most of them, if not all of them have RTI. And you learned about it each time at the very beginning of the semester, you reiterate it over and over again.

Two main projects surfaced from conversations with the SPED students about RTI coursework.

The first was cited more frequently, known as the RTI project in which PSTs had to work with an individual struggling student in the classroom for ten weeks. In this project, the teacher candidate was required to give an initial assessment to determine the student's educational need, provide academic interventions to the child at a certain level of frequency, monitor progress of the student by taking data points, and make educational decisions based upon the data collected. The other project was less cited and was known as the Communities in Schools project where teacher candidates had to spend 10 to 15 hours working with a student. However, this project appeared to be more open ended as only one pre-service candidate referenced tutoring a student in an academic area related to RTI intervention implementation.

## Tier Model

When asked foundational questions about RTI and what it was, PSTs almost always referred to a tiered model of instruction and referenced the RTI tier triangle including tiers one, two, and three. Differences in understanding about RTI became apparent when discussing the tiered model as the question was answered at a more basic level from students participating in the ESL certification program than from students participating in a SPED plan. The following details narratives given by ESL teaching candidates on the definition of RTI during the first round of focus group interviews:

It is progressively more intervention for students, like the higher the level, the more support they need.

I know it's like in a triangle and I always get the tiers mixed up, like two – I can't ever remember if the first triangle is the first tier or the base of it, and then I can't ever remember if the bottom is the one that needs to help the most because it's the biggest or the top one needs help the most because it's like the smallest. So RTI, that's pretty much all I know.

It's just building on what the students know, putting them into the different levels. And just small group instruction to help each group progress as quickly and as efficiently as possible, I guess.

Additionally, responses about the definition of RTI from the ESL participants indicated a high degree of uncertainty and hesitation about their understanding of RTI. Responses from the participants were frequently followed with phrases such as, “I guess...I'm not sure...I'll let someone else elaborate...I don't know...Is that correct?” Phrases such as these were used in at least eight of the individual responses from the ESL participants across all four of the focus group interviews. Responses such as these were not seen among the SPED candidates. In three of the four focus group sessions, at least one SPED participant was in attendance. The fourth focus group was comprised of only ESL degree plan participants. In this focus group session, none of the PSTs was able to give a working definition or foundational understanding of



RTI related to a tiered model of intervention other than to point at what they were seeing in their field based experiences [focus group quotes follow].

I don't really know much about it.

I don't really know much about RTI either... I feel like it's something I haven't really been as prepared for as I could've been through this program.

Thoughts and definitions about the RTI triangle from the few SPED participants were more detailed and hinted at a depth of understanding from previous coursework that involved RTI projects and principles. For example:

Being in the Special Ed program I have extensively studied RTI. EDSP 4330 and 4320 are our assessment and evaluation classes and the strategies for special education. We actually had to do an RTI project. So let me explain to you RTI...

This response goes on to give an elaborate definition of RTI including giving a pre-assessment, monitoring progress for at least three or more points of reference, providing and modifying an appropriate intervention according to a child's individual progress and then adjusting the intervention frequency or intensity as necessary. Other narratives by SPED participants in other groups indicate similar responses in the detailed understanding of RTI:

There are three tiers, and I've actually had to do a response to intervention project in one of my classes where I worked with a student for 10 individual sessions and did a report on that. So in tier one, I just know that that's where the majority of the children are, and then tier two is a little bit more one-on-one instruction, and then of course tier three is the most intense instruction.

References to the RTI tier triangle were indicated as part of previous coursework rather than current coursework in the mathematics or other methods courses.

#### Intervention

PSTs in the ESL and SPED programs alike referred to RTI and the purpose of the MIP within the context of a system to provide assistance in the form of interventions to struggling

students. Terms frequently used to identify this component of RTI include providing differentiated instruction, giving modifications and accommodations, using strategies for helping struggling or ESL learners, providing individualized instruction, and scaffolding. Teachers in both degree plans also stated the extent of strategies gained in their coursework to help struggling learners, although the specific strategies were aimed at either helping students with learning, behavioral or other exceptionalities as in a SPED program or ESL students acquiring a second language as in the ESL program. This became a concern among some of the ESL participants in applying or generalizing the strategies to learners other than what their coursework prepared them for. In the example of ESL teaching candidates:

I feel like having the ESL certification puts emphasis on learning how to teach ESL students, which is great, but we still have other students that I feel lost sort of the emphasis because it's always well, "How do you make language modifications? ... In my field placement I have kids with behavior issues, this one child can't sit down long enough to do the work. I'm like, "I don't know how to help him. How do I make him sit here and do his work or how do I make sure he's learning?" It's like if it was an ESL student I could tell you how to modify, but I don't feel like our classes have really put an emphasis on things like this.

Alternately, SPED candidates indicated a more willingness to generalize strategies for providing intervention to all students, regardless of the academic need. For example:

As Special Ed majors, we had an entire class on intervention, like behavioral intervention as well as educational intervention and how to accommodate for different types of learners. Even the experiences that the learners we might come in contact with might be having how to support them in those situation.

### Assessment and Progress Monitoring

PST candidates in the ESL and SPED degree plans frequently referred to the concept of assessment and monitoring progress of a student when discussing RTI and the purpose of the MIP. Assessment was seen as a way to identify a student's instructional level or areas of

weakness in an academic area, either before or after introducing a concept. Assessments were also seen as a way to monitor progress of a student throughout the instructional sequence. When ESL majors discussed the concept of assessment, frequently it was in isolation and did not reference giving a specific strategy or intervention; several of these participants talked about how they gave assessments in their prior coursework (reading classes, ESL classes) to determine what level a particular student was on. However, these conversations did not insinuate further action through decision making and planning to provide an intervention to assist a child. For example:

There's a few of the assessment classes that we've taken, which are helpful in figuring out what students are struggling and at what level they're struggling, or specifically what they're struggling with.

Responses from the SPED participants regarding assessment and progressing monitoring indicated a complementary balance of assessment as a way to make decisions for future intervention implementation through coursework experiences and the purposes of the MIP.

But in one of our courses we specifically chose an area that needed work with a student, and one on one did the assessments. And then built lessons on that, either progressively getting more difficult or broken up like scaffolding and things like that as needed.

Only one ESL pre-service participant cited the MIP as an authentic and novel way to implement both the assessment and intervention strategies that had been learned in prior coursework rather than creating generic lesson plans based on TEKS. She stated:

I think it [MIP] also helps – it's [like] a real teacher, you know, we're assessing our students, figuring out what their needs are and then teaching and interacting with them based on that...So it's kind of like a way to see how that whole process works. Instead of like, oh, as a class, this is the TEK we need to meet. It's about what aren't we meeting, where do we need to go from here. I feel it's really authentic.

SPED candidates appeared to have more authentic opportunities to implement assessments and progress monitoring strategies than ESL candidates as part of an authentic lesson cycle with students.

## Future Teaching Contexts

Toward the completion of the MIPs, PSTs were asked two questions to determine their level of confidence and motivation in intervening with future students. The first question was regarding the comfort level in implementing mathematics interventions to students in need; the second question asked teachers about their confidence to implement an RTI process with students. Responses to these questions varied greatly and differences were seen between the ESL and SPED candidates in the second question. Table 1 illustrates the number and percentages of responses to both questions:

Table 1

*Frequency of Positive and Negative Responses to Future Interactions Questions*

| Confidence to Intervene Mathematically |           | Confidence to Implement RTI |          |           |
|--|-----------|-----------------------------|----------|-----------|
| Positive                               | Negative  | Positive                    | Neutral  | Negative  |
| 10 Total                               | 2 Total   | 5 Total                     | 2 Total  | 15 Total  |
| 7 ESL                                  | 2 ESL     | 5 SPED                      | 2 ESL    | 15 ESL    |
| 3 SPED                                 |           |                             |          |           |
| 83% Total                              | 17% Total | 23% Total                   | 9% Total | 68% Total |

Regarding the mathematical question, there were 12 overall responses, with ten participants sharing their relative confidence to intervene mathematically with future groups of students. There were no significant differences in the responses from the degree plans – both SPED and ESL teachers proportionally responded that they were confident in intervening mathematically. There were, however, differences in how they attributed this confidence. Some teachers cited their learning in the mathematics methods or prior math learning courses while some talked about their experiences with the MIP. The PSTs who expressed a lack of confidence cited their discomfort with teaching more difficult math content as part of an upper grade curriculum and the confusion with using so many mathematics strategies to teach a

particular math concept. The positive responses about intervening mathematically were the only responses in which both ESL and SPED teachers responded. The following quote illustrates a representation of some of the comments PSTs had about their confidence to intervene mathematically:

I now have a better grasp on how to kind of start that process and at least may do some pre-assessments or something more like needs assessment to kind of see where they are, gather their work, just since we've practiced a lot, kind of looking critically at student work. I mean, even in other subjects other than math, I think I would at least know where to start...I think I feel more prepared to at least start get that ball rolling.

Responses and perceived confidence regarding the second question were much more varied. Overwhelmingly, 68% of the responses to the question about the confidence to implement RTI with a struggling student were negative or demonstrated a lack of perceived confidence. Five of the 22 responses were positive in nature, but were all from SPED candidates. All fifteen of the negative responses were from ESL candidates across all four focus groups. There were two responses from ESL PSTs that talked about RTI in a neutral context. Both of these participants shared that during their field experience they witnessed their mentor teacher implementing RTI, which led them to understand more about the process. But this did not necessarily lead them to respond that they were confident about implementing RTI in a future setting. The following two quotes from a SPED and ESL candidate demonstrate common responses to the question about confidence to implement RTI in future settings:

I feel pretty confident. I'm special ed certified, or I will be. I think that with that, we've gotten a lot of additional strategies and stuff that we can use, specifically within RTI classes and things like that. I feel like I'm pretty prepared for that, and math is a big part of what we do. My first rotation, the majority of what we did was math, one-on-one or in small groups, so I got a lot of information from that, also. [SPED participant quote].

I know I need to work on it [RTI] because I don't feel that confident because I'm ESL, so we haven't discussed it in any of my classes at [university] either, so I'm not aware. I know what it is, but I don't know how to implement it. [ESL participant quote]

These questions revealed discrepancies between ESL and SPED candidates in factors that influenced PSTs' understanding of mathematics intervention as RTI; both groups of PSTs were confident to intervene mathematically with students in future settings after completion of the MIP, but only SPED candidates shared their confidence to implement RTI.

### MIP

There were no specific learning references to the tier model, RTI triangle, intervention or assessment process as elements specific to RTI in the MIP samples from PSTs. The only specific mention of RTI came in the form of a quote from one student saying that she wished she had learned more about RTI within the context of the MIP. She stated:

A suggestion that I would make is to familiarize the student teachers with the RTI program prior to the math interaction project. I say this because as an ESL teacher, I came into this math methods class knowing nothing about RTI, except that it was divided into three tiers of learning when working with a child. However, I wish I had a deeper knowledge about RTI and how to weave it into math intervention strategies with various grade levels of students. I feel like I could have learned much more about RTI at a deeper level if I was able to learn some of the strategies in class. [MIP sample participant quote]

RTI was not specifically inherent in the MIP projects based on the results of this study.

### *Principle 7 – Culture and Context of Transfer*

Haskell (2001) advocated that learning takes place in a particular context and that often times learning is cued by the specific place or environment in which it first occurred. He stated, “In place learning, cues from the environment facilitate the recall of the learning. In the absence of such cues, information may not be retrieved” (p. 139). Additionally, Haskell believed that the culture and norms of a social structure also served to support or hinder the transfer process. For example, he found that student teachers often failed to demonstrate transfer from what was

learned in the teacher preparation program to the teaching environment. He believed that the culture and norms of the school often facilitated a reversal of what was learned in the academic setting. Information shared in the focus group interviews and MIP samples revealed several contextual and/or cultural components that supported pre-service learning.

### Field Based Experiences

PSTs participated in field-based experiences as part of the PDS program requirements in elementary schools across four partner districts in the north Texas area. These field experiences served as an important context to support PSTs' learning about RTI within the context of the MIP and differed according to the specific class and grade level that was assigned. Some of the common themes that arose within field experiences included opportunities to observe mentor teachers providing intervention time, factors that affected the PSTs' ability to interact with students as part of the MIP, and the ability to attend relevant campus RTI meetings. There were relatively few differences in what ESL majors and SPED majors witnessed in their respective field experience assignments.

### *Intervention Observations*

The majority of both ESL and SPED PSTs indicated that they witnessed mentor teachers providing a specified intervention time, before or after school tutoring, or small group tutoring during class time as an identified way to work with struggling learners in the class, although these references were not always specifically tied to students in a specific RTI tier or process. Providing accommodations and modifications on assignments was also part of this process. Many of the PSTs also discussed limited observations since they only spent two days a week in

field experience while attending university classes on the other days.

I would like more practice on how to do interventions and how to work with kids who are struggling. Because that's one of the things I asked my mentor teacher to help me with this semester, too, but she can't really because Mondays is the intervention days. And so it's hard for me to see because I'm not there that day.

Often these intervention or tutoring times were referenced as opportunities for mentor teachers to work on basic content rather than actually intervening with a student on his/her instructional level as part of an intervention; Some PSTs shared that they witnessed the mentor teacher working on reading passages or less authentic work than what was being taught at the university as appropriate ways to intervene with students. For example:

I see the intervention time during the last 45 minutes of school. Unfortunately, a lot of times they're either doing [computer interventions] or they're doing this reading passages because they're always trying to prepare for the state test. So I don't really see much interaction there. I mean, I know that my teacher also does tutoring before school with the kids that are struggling, again, with more reading passages and just really going over and over those kind of things.

### *MIP Implementation Factors*

There were certain factors that affected PSTs' opportunities to observe authentic intervention as part of an RTI process or work with students as part of the MIP in their field based settings including the State of Texas Assessment of Academic Readiness (STAAR) test, student behavior concerns, mentor support, and the ability to attend campus based meetings. Many of the PSTs shared that STAAR was a factor in implementing the MIP. Pre-service participants shared that they often observed mentor teachers tutoring and intervening with students solely based upon assessment passages or had trouble beginning to implement their MIPs due to the timing of the test in the spring and the unwillingness of many teachers to let PSTs work with students during precious instructional time.



Student behaviors and not knowing how to redirect students was another concern that arose and complicated the ability to work with students in the MIP. The PSTs frequently stated that they spent more time redirecting students during the intervention time than actually working on instructional activities or struggled to get the students to listen as the PST was not seen as an authoritative figure, but rather someone who came to play games with the students. For example:

I am learning that it is difficult to keep some students engaged, especially when we have to sit out in the hallway and there are lots of distractions in the hallway. So just keeping them focused is a lot more challenging than I thought it would be, especially since I tried to make my activity really fun.

Mentor teachers exhibited a certain level of control in choosing students for PSTs to work with as part of the MIP, assigning the pre-assessment, and selecting an appropriate time to work with students. Nearly every participant indicated that their mentor teacher was involved in at least one of these capacities; there were no cases in which the PST had free reign to implement a pre-assessment and/or topic to work on and choose the students that needed the intervention. In many cases, mentor teachers demonstrated a supportive stance of the PST implementation of the project. In the following examples, the PSTs indicated a level of perceived support in conjunction with mentor control for initial implementation of the MIP:

The mathematics teacher helped because she told me what she wanted me to work on with them, but when I did the pretest I learned that I couldn't even touch mixed numbers until we figured out what a least common denominator was.

My teacher told me these three kids still don't know all their numbers and they're getting better. Then she just had suggestions. Like next time we're going to play Bingo, identifying the numbers. Then we're also going to go back and work on making the numbers with cubes or with bears. So she just kind of told me what to really work on.

However, there were a few instances where PSTs indicated difficulty in implementing the MIP due to limited interaction with students allowed by the mentor teacher. These two statements

best illustrate the concerns of the PSTs regarding the implementation of the MIP in the field-based environment:

After my first rotation, I felt pretty confident...but, now in third grade, I feel like this teacher doesn't really allow me to do anything. In kinder I felt extremely confident that I was able to kind of pick up the slack. Third grade is just a whole other ball game.

Mentor teachers - I think that's our common denominator. My first and second rotation have never had a student teacher so they're just 100% clueless. I've explained to her [the teacher] this project. I don't think she realizes this is a pressing situation so I don't know if that's just me but it seems like I've been hearing even from other classes that the mentor teachers are just kind of oblivious to what we're supposed to do even though we're explaining what we need.

The mentor teachers served as "gatekeepers" for PSTs to work with students and exhibited a great deal of control on the capacity in which the PSTs could select, implement assessments, and intervene mathematically with students.

### *Campus RTI Meetings*

A final concern regarding the contextual support of field-based experiences was the opportunity for PSTs in grade level placements to attend relevant RTI or campus based data and decision-making meetings. There were some disparities in the opportunities for PSTs to attend these meetings. On several occasions, PSTs were allowed full access to attend a campus RTI meeting with permission of the parents and/or other relevant administrators. This is an example of one of the pre-service participants who was able to attend an RTI meeting at the campus:

I sat in on an RTI meeting actually my first day of being in fourth grade. It was just about a girl who was just having a hard time being motivated and she was kind of being mean to the other children, so it was just like a meeting with her dad. I can't disclose what we talked about.

In another case, a PST was allowed to attend the RTI meeting, but was being counseled by her mentor teacher that there was no clear purpose or outcome of the meetings:

So, my third grade teacher and I talked about it [the RTI meeting], she had said that the RTI meetings didn't do anything. There was nothing that came of them really, except gather more information and my fifth grade teacher now has said the same thing.

And in further situations, many PSTs shared that they were not allowed to attend RTI meetings at all:

They [the mentor teachers] had an RTI meeting, but I wasn't allowed to go...They were having problems with a student and the parents wanted to call the meeting. So I wasn't allowed to go to the RTI meeting, but they have had one since I've been there.

Great discrepancies existed in access to campus RTI practices in the field-based environment.

### Methods Course

The mathematics methods course was a recurrent context that supported instructional mathematics practices and intervening with children as part of the MIP. Responses were mixed when asked about how the methods course supported participant understanding of these topics. Participants in two sections of the course shared that they did not feel like the methods course supported their understanding of teaching mathematics or implementation of the MIP; participants in these two sections also shared frustrations with the endorsed use of the inquiry method of learning. PSTs shared that they were encouraged to continually use questioning to guide students to an understanding rather than directly giving an answer and that the instructor used this method in the course, teaching the PSTs. For example:

Honestly, I don't feel like our math class has really helped us with this. I think it's especially frustrating for us because--well I think the inquiry method is--it can be used and it's great sometimes, especially when we're supposed to be learning how to teach this. The constant questioning and never getting a solid answer is not helping us. I feel like I have a very shaky foundation, that everything's been disrupted and nothing is reaffirmed because we never get a solid answer in our class.

PSTs in the other sections of the course did not express these sentiments.

Other PSTs discussed how learning opportunities in the mathematics methods course

were supportive of mathematics teaching contexts. Specifically, participants repeatedly cited the introduction, modeling, hands-on experience, and use of manipulatives in mathematics teaching methods that were applied to course experiences and experiential learning in the field based setting. While there were mixed feelings on the use of the manipulatives as many PSTs were unfamiliar and shared discomfort with using them initially, many of the PSTs concluded that they were helpful in teaching students about mathematics as part of the MIP. These quotes express the sentiments shared about manipulatives use in the course:

There's another thing in the Methods courses that we have been working on. It's just a lot of manipulatives. It's a lot of hands-on activities. They might not always work out very well. But it has helped in the classroom just knowing that using something hands-on does help.

Well, I learned that manipulatives play a big role in teaching math. I knew that hands-on is better, but I never realized how important it is until I actually taught the lesson then used manipulatives and saw the pretest and posttest scores because of the use of manipulatives.

While responses varied, the mathematics methods course was an important context for PST learning and implementation of best mathematical instructional practices including learning about the inquiry method of instruction and the use of manipulatives in modeling conceptual mathematics. There were no specific responses regarding how the mathematics methods course supported RTI learning; thus the course was a contextual support only for pre-service understanding of mathematical instructional knowledge.

### Instructor Background with RTI

During the focus group interview series, pre-service participants were asked about their perceptions of how familiar their course instructors were with the RTI process as a way to gauge support of RTI learning in the university context. Responses from the pre-service participants

varied greatly and tended to be specific to the participants' degree plan. SPED participants consistently and confidently responded that their course instructors in SPED specific courses were knowledgeable about the RTI process.

They were very knowledgeable because every single class we did talked about RTI.

I feel they were very knowledgeable about the RTI process, and they were able to explain it to us in a way that we would understand it very well.

The teachers that I had that did RTI, they would have examples. A lot of times it was stories where the teacher would kind of discuss, not using any names, but what the children could do and what you would do to help them. And give examples, like very detailed examples, that really helped. Because I can read chapters, but stories stick better.

However, ESL pre-service participants were less certain. Often, ESL participants shared that they believed their course instructors were not as familiar with RTI other than what the textbook stated, or did not think that their course instructors had experience in actually implementing RTI.

I'm wondering if the reason that we didn't go into depth in it is because each classroom, each teacher may do it differently. And so trying to teach you would only teach you one way to do it, but just giving you the foundation or the framework for it, like repeating it will allow us to be more individualized with it once we're in the classroom.

I agree that they were knowledgeable, but in some cases I wasn't sure that the teachers themselves has actually done RTI. Because, they were like, "Well, this is how you should do it." But a lot of ours didn't give the stories...they definitely knew what RTI was and how to explain it. I just wasn't always sure that they had actually done it themselves.

In one focus group, ESL teachers referred to a specific course instructor and experience in their ESL classes that discussed RTI through the lens of ESL and appeared to demonstrate a stronger contextual support for RTI learning for ESL PSTs. For example:

[Professor name] seemed very passionate about it and she knew exactly what she was talking about and how to explain it.

We had the same professor, I agree, she was passionate.

She put us in groups and then we would review examples of students' work. And then

we would have to evaluate the students, what do you think what level they are in tier one, tier two?

Finally, all references of course instructor background knowledge shared by the pre-service participants were regarding prior course instructors; there was not a single reference to RTI knowledge and background from the mathematics methods or other methods course instructors during the focus group interviews.

### MIP Samples

In analyzing participant reflections within the MIP submissions, PSTs frequently discussed four contextual supports (or lack of supports): time, the methods course, mentor teachers, and the need for feedback. The most frequent concern mentioned was the time constraints that PSTs sensed to implement their projects. Participants repeatedly discussed a variety of factors that inhibited their time and ability to work with students during the mathematics interactions. These included:

1. A limited presence on campus as PSTs spend only two days in the field based setting per week.
2. In the spring semester, many upper grade teachers were preparing students for the STAAR exam. Thus, many of the mentors were unwilling to give students over to the PST for their interaction time on the project.
3. Missed intervention time due to student absences, weather days, or school breaks in between interactions or having only a small amount of intervention time to actually work with students.

PSTs expressed that these time constraints made it difficult for them to complete their interactions or to observe consistency in student progress using informal assessment data.

Participants also discussed how the methods course, mentor guidance, and the need for feedback were also predictors of their success in implementing the MIP. Many PSTs generalized

what they were learning in their math methods class to the field environment and the interactions with students, especially with the use of manipulatives and the inquiry method. Mentor teachers had a major role in the implementation of the MIP. PSTs consistently shared their discussions and interactions with the mentor teacher in picking students, selecting a math intervention topic, choosing a pre- and post-assessment, and discussing student progress. PSTs who perceived the mentor teacher as being more flexible appeared to also experience more support in the field based setting. Several participants shared their desire for feedback on their lessons and/or intervention implementation from both the mentor teacher and the methods course instructor.

For example:

I could have learned more if I had gotten feedback from my mentor teacher. She told me that she trusted me and just sent me off. I wish she had looked over my lesson before I taught them. Or looked in on the lesson as it was happening. I was worried that I would mess the kids up, not help them. [MIP sample ESL participant quote].

For future math interactions if it became part of the project that the lessons are rough-drafted out before hand and then having teacher feedback on them would be extremely helpful...I think it would be less confusing for us and the students. [MIP sample ESL participant quote].

There was no indication on any of the MIP reflections that PSTs received any sort of feedback on lessons or intervention implementation prior to or during the course of the interactions. All contextual support references from the MIP were in the context of mathematics instructional practices and not specific to the RTI process.

### *Principle 9 – Drill and Practice*

Haskell’s ninth principle can be summed up in the common saying, “practice makes perfect”. However, Haskell believed that opportunities for practice needed to be reflective in nature rather than by rote memorization and repetition strategies. The term “practice” has two

basic meanings that are important to consider in understanding this principle. First, practice is to do or perform something repeatedly in order to attain and master a skill; secondly, “practice is to continually work at something as in a profession or vocation” (p. 171). In other words, Haskell believed that in order for meaningful transfer to take place, learners must be provided with opportunities to meaningfully, reflectively, and repeatedly practice their learning.

Focus group interviews revealed relatively little information about opportunities for students to practice theoretical and practical knowledge of intervening with students as part of an RTI or intervention process, other than specific to the MIP. Students on the SPED plan referred to a ten-week RTI project and an additional project in which they worked with a student or person with disabilities. However, the consistency of implementation and specific components of this practice is unknown; many assignments seem to be tied to individual courses or course instructors. ESL candidates too referred to other experiences practicing reading assessments and instructional practice with ESL students, but the specifics are also unknown. One pre-service participant summed up her perceptions about the lack of hands-on practice, experience, and opportunities for PSTs to work with students by saying:

The practice, it is for kids who are supposed to make their educational experience hands on and authentic and mean something. And I don't get that feeling with our classes. It's all about the theory, what are you going to do, this is how you can modify it, this is how you could do it. But we're not getting the hands-on...For instance, role-playing; how about if a student had this? How would you handle it? Have our teachers give us feedback, things like that. That doesn't happen.

In discussing the MIP as an opportunity to get classroom experience working with students in an instructional cycle of intervention and assessment, one participant echoed the sentiments expressed by others regarding their lack of experience and practice opportunities. She stated:

I feel like this project will be a good way for us to get more experience, like



accommodating to the fit the needs of children and planning for children. But I feel like, it also will still kind of leave us feeling like, “Okay. Well, we know how to do this on a small scale. And I don't know if it'll give us what we need to be able to do it on a bigger scale for a whole class.

Drill and practice opportunities regarding intervention and assessment implementation were not positively identified and rarely connected to an explicit RTI process. Information gleaned from the data in this study demonstrated that the MIP is one of the relatively few opportunities that PSTs had to practice their learning in an authentic, instructional environment with students. The final quote above suggests a recurrent concern shared from PSTs and their ability to implement intervention and appropriate instruction to students on a larger scale, due to limited practical opportunities during their coursework at the university.

## Discussion

Differences in the levels of transfer existed between the ESL and SPED candidates. ESL candidates evidenced a lower level of application transfer regarding RTI understanding and practices. This level of transfer is best defined as using what has been learned and then applying it to a specific situation (Haskell, 2001). In this case, ESL teachers demonstrated knowledge and skills acquired in the mathematics methods course and applied this knowledge to their interactions with students as part of the MIP in the field based setting, but did not purposely see this interaction as an example of the RTI process in action.

There are several factors that contributed to this lower level of transfer. ESL candidates did not exhibit the first principle of transfer, a strong foundational knowledge of RTI. ESL PSTs repeatedly cited a lack of knowledge about RTI and inadequate opportunities to practice implementing RTI with students. Additionally, ESL teachers overwhelmingly admitted that they were not confident in implementing RTI in future teaching settings and many participants shared

that RTI was something they needed to learn more about before stepping into the classroom as a first year teacher. ESL PSTs were confident to mathematically intervene with struggling students in a future context as evidenced by interviews and MIP statements although participants appeared to be so wholly engrossed with the definition of RTI and related terminology (tiers, interventions) that they could not identify the underlying relationships between the MIP and RTI after completion of the project. This was mainly due to the inadequate foundational knowledge of RTI and lack of practical experiences with RTI in action prior to the MIP (principles 1 and 9) and the lack of contextual support in the mathematics methods course and field based experiences (principle 7), although failure to adhere to the other principles was also a contributor.

While principle 7, cultural and contextual supports of transfer, was seen related to mathematics instruction and intervention as part of the MIP, no evidence exists that these supports existed for RTI learning. PSTs stated that prior university coursework did not support RTI learning, prior course instructors were perceived as having little knowledge about RTI, field based settings were not consistent in providing access to RTI experiences, and RTI was not included as part of the mathematics methods course. Additionally, drill and practice opportunities were non-existent prior to the MIP.

Candidates in the SPED degree program evidenced a much higher level of near transfer regarding RTI understanding and practices. In this level of transfer, learners were able to use previous knowledge and transfer this knowledge to new situations that were similar but not identical to the original learning environment (Haskell, 2001). In this study, SPED teachers used prior knowledge, skills, understanding, and experiences in both prior SPED classes and assignments and the mathematics methods course to apply learning about RTI within the context

of the MIP assignment. Even before they started the MIP implementation, in many instances SPED candidates referred to the MIP as a project that “mirrored” other experiences they had in SPED coursework.

Several principles contributed to the higher level of transfer that SPED PSTs experienced. SPED candidates demonstrated a more thorough knowledge of RTI, including experiences and examples. ESL candidates were only able to recall basic definitions and topical details. The main difference between ESL and SPED candidates regarding RTI knowledge was that SPED teachers, unlike their ESL counterparts, were able to understand the similarities and underlying structural components of the MIP that represented RTI in action; and thus, experienced a higher level of transfer about the project. When asked about confidence to intervene mathematically in future settings and implement RTI, SPED candidates emphatically responded with confidence to do both. This suggests that SPED candidates were able to conceptualize the MIP, coupled with prior learning, as practice opportunities that mimicked RTI interactions.

RTI learning was not specifically supported through the mathematics methods course or field based environment, and SPED candidates indicated that prior learning opportunities and course instructors had served as a cultural and contextual support of learning about RTI (principle 7). Finally, SPED candidates indicated additional drill and practice opportunities to practice implementing RTI with students through prior learning as part of their SPED coursework.

## Implications

There appears to be a discrepancy between what RTI was intended to do and how PSTs are prepared to apply RTI principles. RTI has been repeatedly positioned as a general education intervention system intended to immediately target students struggling to achieve mastery in the regular curriculum (Fletcher & Vaughn; 2009; Mastropieri & Scruggs, 2005). Thus, it is expected that general education teachers will have the primary responsibility to implement screening, assessment, intervention, and monitor interventions that comes as part of RTI. However, in this case, PSTs in the ESL degree program had little to no background knowledge of RTI in coursework, and despite implementation of the MIP, were unable to demonstrate transfer of learning about the tenets of the MIP to a wider application of RTI in the MIP. SPED candidates achieved a greater degree of transfer since prior coursework in the degree plan allowed for a more thorough knowledge, understanding, and experience of RTI. The discrepancy in this case is that SPED candidates will almost exclusively teach students who have already been identified for special education services and will not actually implement RTI interventions with general education students. The implication is that confusion about RTI and its purpose in the general education venue will continue.

The special education program at the university takes ownership in preparing future teachers in RTI to assist struggling students, while the teacher education program responsible for training general educators does not. Thus, it can be assumed that while RTI is widely heralded as a general education intervention, it is actually seen as a process that still falls under special education authority. The findings are consistent with prior studies in PST education and RTI practices (Begeny & Martens, 2006; Kuo, 2013; Neal, 2013); SPED PSTs typically receive more in-depth preparation than their general education counterparts. Specifically, Neal (2013) was the

only study that included both general education and special education PSTs in the sample and similarly found that special education PSTs demonstrated higher levels of self-efficacy in implementing RTI due to more extensive coursework and implementation opportunities.

It is evident that by creating specialized degree plans (ESL, Bilingual, SPED), the university is preparing a generation of teachers who are highly trained to work with certain groups of students, but lack the skills and knowledge working with those who are not under that criteria. PSTs in the ESL program tended to see RTI as a feature of special education; reflections frequently cited that they only had one special education class while they had numerous classes about working with ESL learners. The interesting part about this is that students who most often need access to RTI interventions are those requiring ESL and language modifications and accommodations for learning. Thus, it appears that a thorough understanding of RTI and its practices is greatly needed among all general educators as a fundamental component of being prepared to work with a diverse group of students in our schools today.

Instrumental in achieving this point, it is necessary that RTI be consistently included within the context of general education intervention. As is, RTI learning occurs primarily in the context of special education courses at the university and is briefly mentioned in other courses. RTI learning was not part of the mathematics methods course or any other methods or ESL coursework according to the participants and mathematics methods course instructors. It is recommended that RTI be a foundational tenant of all education courses at the university in helping PSTs understand the important components of the intervention process. ESL classes, pedagogy, and methods/content coursework can achieve this point by simply incorporating the features of RTI within already existing instruction. In the case of the mathematics methods course, the MIP was an ideal assignment that exemplified the features of RTI in action and helps

teachers understand how to use assessment data and interactions with students in order to make decisions and drive future instruction. As evidenced by the SPED candidates, strengthening the foundational knowledge, contextual supports, and increasing the opportunities for drill and practice (principles 1, 7, and 9) can increase the level of learning transfer.

According to the latest report of the Office of Special Education Programs (2013), students with learning and other moderate disabilities are increasingly receiving all or the majority of their instruction in the general education classroom. Current educational trends emphasize general education interventions and differentiation as the way to meet individual learning needs rather than sending students to specialized classrooms. RTI serves as the “gatekeeper” between general education interventions and special education identification and requires that the general education teacher be familiar with the best instructional practices to work with diverse learning needs. Effective RTI practices are necessary to assist students, rather than just referring for special education placement, especially if all students require is small group or one-on-one interventions to master the curriculum. A comprehensive understanding of RTI is crucial at the university level so that PSTs can transfer these practices when confronted with diverse learning needs on a regular basis in the classroom.

### Limitations

Prior coursework was not used as a data source for this study. While differences in the degree programs related to generic content based on the course titles and descriptions were evaluated, specific assignments, practices, and knowledge from these courses were relatively unknown. Thus, in looking at the background knowledge of RTI learning from the SPED and ESL candidates, the main gauge for measuring principles 1 and 9 was from responses to

questions in the focus group interviews and written reflections on the MIP.

The cultural and contextual support of RTI learning in the field is something that the university has little control over outside of coursework. The university can most definitely oversee coursework and learning about RTI in specific courses such as SPED, ESL, and methods classes, but cannot guarantee that all PSTs have identical experiences in the field. PSTs were assigned to a variety of districts, campuses, grade-levels and teachers that all accounted for a wide variety of experiences according to the individual policies and practices of that district. As seen in the findings, the campus and mentor teachers exhibited quite a bit of authority over what PSTs had access to regarding RTI practices. Many PSTs did not see RTI practices or were unsupported in their efforts to learn about the process in a classroom setting. Cultural and contextual supports of learning are deeply dependent upon the participating district and mentor placement and cannot be regulated to provide consistent experiences for PSTs; it is the job of the university to support teachers in their learning about RTI implementation and any field based support should be considered as a bonus learning opportunity. Results of the study support the need for increased preparation in RTI practices for pre-service teachers, regardless of the degree program, but especially for teachers pursuing the general education classroom as a future career.

### Conclusion

RTI is a vital component of supporting at-risk students in schools today. General education teachers must be prepared to handle diverse learning needs. RTI is the accepted practice to assist students who struggle to master the curriculum by immediately identifying, targeting, and monitoring learning needs. Much of a teacher's preparation to implement academic interventions comes from their pre-service preparation. University preparation

programs should consider transfer of learning and generalization to future teaching practices as the ultimate goal for PSTs.



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