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Teacher Preparation and School Partners: Pre-service Teachers' Impact on Third to Eighth Grade Students Identified with Reading Challenges

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Abstract

School partnerships are essential to teacher preparation programs. Within respective school settings, pre-service teachers have opportunities to experience authentic, problem-based learning (PBL) situations with students who are identified with reading challenges (SIwRC). Educators providing SIwRC research-based reading interventions selected from data-based decision making (DBDM) processes are crucial to teacher preparation curriculum. This study investigated the holistic impact of a university-based partnership with public schools serving 3rd-8th grade SIwRC. This partnership involved 123 tutors (i.e., pre-service teacher) applying research-based reading interventions from DBDM reflective processes. Tutees' respective independent reading grade levels and reading comprehension measures significantly increased. The results support the need for providing pre-service teachers opportunities to practice DBDM processes when applying research-based reading interventions with SIwRC.

Keywords: Teacher Preparation, Partner Schools, Reading Interventions

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Introduction

Literacy is fundamental to all disciplines. Successful people from every culture and nation read and write as a means to communicate ideas and perceptions to peers and colleagues. Learners gathering meaning from text and about themselves as readers in that complex process referred to as reading are crucial mile markers of human developmental growth (Adams & Palmer, 2017; Brown, 2018). Finding solutions and interventions aiding students with reading challenges emerges as the top priority for schools and parents today (Strauss, 2016; Wanzek, Stevens, Williams, Scammacca, Vaughn, & Sargent, 2018). In a recent meta-analysis of research from 1975 to 2017, Filderman, Toste, Didion, Peng, and Clemens (2018) found evidence that reading interventions coupled with data-based decision making (DBDM) provided "positive effects" for readers with difficulties, and "DBDM tends to improve outcomes overall" (pp. 184-185). Surprisingly, Filderman et al. (2018) only discovered 15 studies coupling reading interventions with DBDM for readers with challenges within the K–12 grade levels; more research efforts in this area of concern are needed. Pre-service teachers' opportunities for participation in authentic DBDM learning, mastery experiences with K-12 students who have reading challenges require partnerships with K-12 schools. Pre-service teachers' experiences with DBDM coupled with the authentic implementation of reading interventions for students with reading challenges in the K-12 environment are worthy of discussion, exploration, and further study.

University Teacher Preparation and K-12 School Partnerships

Pre-service teachers need authentic learning experiences with K-12 students who have learning challenges, and theses pre-service teaching experiences need to occur in K-12 school environments to prepare pre-service teachers for the teaching profession (Glomb & Mason, 2017; McCray, Rosenberg, Brownell, deBettencourt, Leko, & Long, 2011). Wasburn-Moses (2018) found limited research concerning the clinical teaching experience, which is "the single most powerful learning experience in pre-service teacher education in the United States" (p. 1). Wasburn-Moses (2018) provided four major implications; all the research implications discussed the need for a closer relationship between schools, cooperating teachers, and teacher preparation programs to successfully prepare teachers for the professional work of teaching. The future of teacher development resides in the clinical teaching experience and related field-based experiences hosted within the K-12 environment.

Reading Challenges and DBDM to Select Research-based Reading Interventions

Unfortunately, DBDM coupled with reading interventions for students with challenges is a rare occurrence, as evidenced by the research literature (Filderman et al., 2018). However, there are educational movements to improve DBDM in terms of assisting students with learning and reading challenges. One federally mandated movement has been instrumental, Response to Intervention (RTI); The idea behind RTI is built on educators using DBDM to select research-based interventions that fit a particular child's learning needs (Deno, 2016). Teachers who understand RTI implementation and have knowledge of school and leadership influences in many instances fail to comprehend the use of DBDM for students who struggle with reading (Otaiba, Baker, Lan, Allor, Rivas, Yovanoff, & Kamata, 2019). Perhaps, American schools can learn lessons from countries identified as having a world-class education system, like Finland. Finland is

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known for establishing a world-class educational system where teachers are known to receive quality educator preparation, especially with research-based reading interventions and data-based decision making, and are compensated as professionals (Gentry, Baker, Lamb, & Pate, 2016). It is not surprising for Finland to be counted among the top five nations in the world with the highest adult literacy rates (Simola, Kauko, Varjo, Kalalahti, & Sahlström, 2017) since Finland is known for the professionalization of the teaching profession within its borders (Gentry et al., 2016). When considering crime and other associated societal costs and concerns, lack of reading comprehension and reading progress have served as predictors for the United States (Stoehr, 2005; Packhem, 2017) and New Zealand (Rucklidge, Mclean, & Bateup, 2009). Judy Packhem (2017), Reading Specialist and Dyslexia Therapist, argues the cost of tutoring and reading interventions are less than the cost of housing and maintaining prisons; She posited reading challenges and lack of reading interventions for students in need as one pipeline to jail and future incarceration.

"Good teaching" is based on DBDM; blueprints for DBDM with literacy instruction are becoming popular as schools work to improve their practices (Nel, 2018). DBDM and reading instruction are linked, and together determine reading progress for individual students. However, little is understood about how teachers use data to make decisions concerning the learning and reading progress of students (Park & Datnow, 2017). Educators concerned with their students' progress in reading may find various obstacles while determining respective students' reading progress or reading needs. More research inquiry into DBDM and the linkage with various reading intervention strategies are critically important (Filderman et al., 2018) as educators seek to improve the lives of students and families served by their respective schools. Since DBDM is critical to literacy instruction and intervention implementation, pre-service teacher preparation must include DBDM experiences within K-12 school contexts.

Problem Based Learning (PBL) and Pre-service Teacher Preparation

Problem-based learning encompasses several constructivist goals that fit the current movement in higher education to provide authentic learning experiences which inspire personal accountability, engagement, critical thinking through inquiry, teamwork, and decision making (Camacho, Coto, & Jørgensen, 2018; Savery, 2006). PBL in conjunction with teacher preparation is not new; PBL experiences require decision making that is informed by the content and procedures set by a discipline's research and peer approved methods. John Dewey (1944), an American educator and philosopher, referred to life experiences as the primary means of motivated learning. Teacher preparation paired with field experiences remains one of the best frameworks for providing problem-solving experiences for clinical teachers transitioning to employable professional teachers (Barron & Wells, 2013). PBL as a means to improve pre-service teachers' understanding of pedagogical content and practice was substantiated by Efendioglu's (2015) research comparison between pre-service teachers experiencing PBL (n=60) experiences and pre-service teachers (n=67) receiving the lecture-based conditions were intriguing. The PBL group of pre-service teachers produced significantly higher achievement scores on a reliable academic achievement test (AT); Efendioglu (2015) reported high internal reliability for the AT with a "Cronbach's Alpha coefficient of 0.91" (p. 209). PBL as a framework has merit and should be considered by higher education institutions working to prepare pre-service teachers who

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are planning education careers that assist young students with reading challenges; PBL has a place in teacher preparation.

PBL has a place in teacher preparation by emphasizing problem-solving within social interactions (Vygotsky, 1978). PBL is "learning by doing" (Dewey, 1997). Therefore, learning through experiences that involve social interactions to construct an understanding related to encounters with a problem in question build a constructivist scaffold for learning about the problem and ultimately possible solutions to the said problem (Bruner, 1977; Piaget, 1977; Vygotsky, 1978). This constructivist framework for teaching is needed in today's culturally diverse classrooms (Wachira & Mburu, 2017). PBL is a vehicle that provides the focus pre-service teachers need to operate in the K-12 environment for constructivist teaching practices to flourish. Providing pre-service teachers the ability to learn through interactions with a focus on a problem or topic of learning exploration before, during, and after instructional experiences is the best means for preparing for life as an educator. For these experiences that continuously build on each other, pre-service teachers will have a model overlay for all instructional decision making with a diverse student population (Wachira & Mburu, 2017). PBL is a constructivist instructional framework that is based on experiential learning found in social contexts and interactions. Educators of future teachers often refer to this complex process as "churning the learning." PBL is foundational in crafting teacher preparation experiences within K-12 settings.

Educators' DBDM and Reading Interventions: Impact on Students' Reading Progress

Pre-service teachers have a wide variety of tools and skills to master before being able to monitor students' reading progress and growth competently. These tools and skills with formative assessments provide reading interventions for students' improvement in reading, regardless of reading level and challenge (Cecil, Gipe, & Merrill, 2017). There are many tools used to determine students' reading progress. Reading educators may use computer-based systems to help monitor reading progress and informal observations of students' reading individually or in groups. The possibilities are endless. However, whether it is by computer or from observation and interaction, all reading progress assessments use running records and informal reading inventory style assessments to determine the reading progress of a student since these measures merge fluency, comprehension, and word knowledge to determine a student's reading grade level.

Running records (RRs) and informal reading inventories (IRIs) are two essential progress monitoring tools used by effective reading educators to determine their students' reading strengths and challenges and ultimately individualized reading interventions (Cecil, Gipe, & Merrill, 2017; Gillett & Ellingson, 2017). RRs are teacher created assessments using research-based reading evaluation methods that can be used on any text with an identified grade-level while IRIs are organized RRs with grade-level text and assessment elements ready for use (e.g., comprehension questions). There are many IRIs an educator may choose to purchase, and many schools choose one or two IRIs as common assessments to maintain reading progress evaluation reliability of students' reading grade-level progress across a school year or over many years within a school. IRIs are "the most valuable diagnostic tools for assessing the reading progress of each student as well as diagnosing specific reading strengths or needs (Cecil, Gipe, & Merrill, 2017, p. 39). Based on the RRs or IRIs results (i.e., research-based reading

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progress measures) reading educators plan individualized research-based reading interventions for their respective students. Cheung and Slavin's (2016) longitudinal three-year study found teaching interventions that used DBDM, like Success for All, had a significant, positive impact on students with reading challenges with increasing effect size growth from year to year. "The findings provide further confirmation of the effectiveness of SFA in improving reading, though (as in previous studies) the program had to be provided for at least 2 years to show its full effect" (Cheung & Slavin, 2016, p. 8; cf. Borman, Slavin, Cheung, Chamberlain, Madden, & Chambers, 2007).

Educators who utilize research-based reading interventions that are determined from DBDM have the potential of providing students with reading challenges successful reading experiences that in turn lead to more successful reading experiences (Clarke, Paul, Smith, Snowling, & Hulme, 2017; Gentry, Sloan, & Pate, 2018). DBDM has a role in the use of RRs and IRIs assessments' fluency, comprehension, and word knowledge measures; however, a reading teacher's ability to use RRs and IRIs to apply needed research-based, individualized reading interventions appropriately are the critical, essential skills (Gillett & Ellingson, 2017). The pre-service teachers' ability to differentiate between a word identification challenge versus a fluency or comprehension challenge determines the reading intervention applied (Cecil, Gipe, & Merrill, 2017). The ability of any educator to appropriately apply a reading intervention is gained from work experiences with students who have reading challenges. Through DBDM processes and by following research-based assessments and intervention methods using RRs and IRIs, reading teachers can improve their application of appropriate fluency, comprehension, and/or word identification reading interventions. Reading progress is determined from fluency, comprehension, and/or word identification measures.

These measures matter. So, if a student with reading challenges progresses to a higher reading grade level or levels as determined from research-based IRIs or RRs measures, the student's improved reading progress is revealed by the assessment data and the artifacts created during reading intervention experiences. Pre-service teachers practicing DBDM while using RRs and IRIs materials and techniques in practicing K-12 classrooms allow pre-service teachers PBL experiences in the field with students who have reading challenges. These field-based experiences prepare novice teachers authentically with the challenges they will confront as professional teachers (Bruner, 1977). Bandura (1977, 2010) would identify theses DBDM pre-service teacher experiences of working to aid students with reading challenges as "mastery experiences." Mastery experiences providing pre-service teachers PBL opportunities for building self-efficacy to become confident educators with RRs and IRIs interventional tools, techniques, and measures utilized by professional educators of the teaching profession.

Pre-Teachers' Self-Efficacy Preparation: K-12 Students with Reading Challenges

Pre-service teachers have anxieties concerning everything a teacher is tasked to complete as a professional educator. For pre-service teachers, it is not necessarily disadvantageous to have such feelings or doubts. A teacher with high self-efficacy is one who has the confidence to learn the demands of the tasks and works to complete instructional goals set confidently, transcending the anxiety. Higher self-efficacy to confront challenges distinguishes true professionals in education (Bandura, 1977; 2010; Helfrich & Clark, 2016). Building ones self-efficacy to contribute and overcome

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challenges, personal or professional, may be daunting and may require personal courage to continue meeting set goals and related challenges (Bandura, 1977; 2010). "The most effective way of creating a strong sense of efficacy is through mastery experiences. They provide the most authentic evidence of whether one can muster whatever it takes to succeed" (Bandura, 2010, p. 3).

Pre-service teachers need experiences confronting the authentic problem of students who have reading challenges. Questions should arise. How do I help them? What can be done? Pre-service teachers must engage in these "mastery experiences" of confronting authentic difficulties in the K-12 context, like working with students with reading challenges. "If we are to produce teachers with high teacher self-efficacy who can influence student literacy achievement in meaningful ways, a close examination of the training they receive to teach reading and writing is necessary" (Helfrich & Clark, 2016, p. 945). Teacher education preparation programs do well to find service opportunities with school partners by listening to the challenges and needs school partners reveal as goals and challenges. "Mastery experiences" for pre-service teachers to build self-efficacy in aiding students with reading challenges are only experienced in authentic K-12 settings.

The Study's Purpose, Reading Progress Instruments, Interventions, and Procedures

This study investigated the holistic impact of a university-based partnership with public schools on K-8 students with reading challenges. This partnership involved tutors (i.e., pre-service teacher) interacting with tutees (i.e., students with reading challenges in 3rd-8th grades). University pre-service teachers were provided training and modeling of research-based intervention strategies and DBDM examples and simulations before working with their respective tutees. Before pre-service teachers were allowed to work with students identified with reading challenges, parental permissions and school partner permissions were obtained. Once the PBL tutor/tutee interactions began, pre-service teachers utilized related research-based reading interventions coupled with DBDM processes designed to assist third to eighth-grade students identified by teachers as having challenges with reading success. Pre-service teachers were required to work with students identified by the teacher as having reading challenges in a one-on-one setting. Improving assigned tutees' reading progress while providing pre-service teachers the needed PBL learning experience using research-based literacy interventions coupled with DBDM directed these tutors to tutee interactions. The following questions guided this study:

1. Do pre-service teachers' DBDM and the related PBL application of reading interventions have an impact on readers challenged with achieving independent grade level reading growth within authentic school settings?
2. Do pre-service teachers' DBDM and the related PBL application of reading interventions have an impact on readers challenged with gaining reading comprehension growth within authentic school settings?

Overall, researchers wanted to determine if the PBL/DBDM reading intervention application experience, also known as the case study experience, was a functional experience for pre-service teachers and the students served in the local public schools. The case study experience was designed to be a PBL experience for the pre-service

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teachers in the study by providing authentic DBDM processes related reading intervention selections that professional teachers perform daily while serving students with reading challenges.

Participants

Pre-service Teachers as Reading Intervention Tutors for the Case Study Experience

The tutor/tutee reading intervention experience is referred to as the case study experience by pre-service teachers and their respective professors alike since data is gathered and used to determine research-based reading interventions would swerve the tutee best. The pre-service teachers who participated in this tutor/tutee experience must have maintained a 2.75 GPA as required and have met the university's teacher education requirements and standards from respective interview assessments and writing assessments. Any pre-service teachers not meeting the GPA, interview, or writing assessments standards and review will not be allowed to enroll in the reading assessment course that requires the reading tutoring intervention, case study, experience with children who have identified reading challenges between the third and eighth grades. Pre-service teachers who become tutors are considered to be the top candidates from the teacher education applicants to the teacher education program and are two semesters from graduating as a state certified teacher. Although it is unusual to have students leave the course and case study assignment, this does occur from time to time. Of the 132 pre-service teachers who began this study, 123 were able to complete the case study experience; therefore, nine pre-service teachers did not complete the study and related course due to life circumstances or academic issues that arose during the case study experience.

If a pre-service teacher was not able to complete the case study and related class, the case study professors contacted the respective tutee's teachers and/or parents impacted by the respective pre-service teacher's departure from the case study experience. Other arrangements were determined with the permission of the teachers and/or parents to complete the case study for their respective tutee. The results garnered by pre-service teachers who dropped the case study course were excluded from the study since the completed case study data were obtained from the tutee's respective campus teacher or the supervising professor.

The 123 completed case studies and their respective data were completed entirely by pre-service teachers. Professors and supporting campus teachers served as facilitators and guides. All the pre-service teachers passed a background check by their respective tutees' schools before being allowed contact with university partner elementary or middle school campuses. Pre-service teachers in this study were represented by 121 females and three males with an average age of 23 years. All pre-service teachers were considered to be in good standing with the university before beginning the case study experience. Pre-service teachers were enrolled in one of six sections of the case study experience course between 2016 to 2018.

Partner Schools' 3rd-8th Grade Students Served as Tutees for the Case Study Experience

Between 2016 to 2018, 123 students identified with reading challenges, 120 (97.5%) had school documented challenges with reading fluency from initial case study reports.

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The majority of the students served were male, 118 (95.9%), with five females (4.1%) remaining. Students with reading challenges represented various grade levels within the K-12 public school system: 3rd graders (n=65, 53%), 4th graders (n=34, 27.6%), 5th graders (n=15, 12.1%), 6th graders (n=4, 3.3%), 7th graders (n=2, 1.6%), and 8th graders (n=3, 2.4%). Students (n=110, 89.4%) receiving in-class response to intervention (RTI) classroom differentiation (RTI-Tier 1) represented the largest RTI grouping. Students (n=9) receiving RTI small group assistance (RT1-Tier 2) represented 7.3% of the study's population. Four (3.3%) students received special education services at their respective schools. Of the 123 students, 117 (95.1%) attended rural school campuses while six (4.9%) students attended suburban or urban school settings.

Study's Two Settings, Resources, and Protocols

Setting One: Literacy Assessment Class and Case Study

The field-based assessment class at the university. The university requires pre-service teachers to participate in a course concentrating on the development of skills and content related to the assessment of reading progress and the application of reading interventions based on DBDM assessments for children between the third and eighth grades with reading challenges. The prerequisite to this course is similar in purpose with a focus on early childhood to second-grade reading challenges and progress. Both courses employ PBL experiences in the school contexts related to assisting students with reading comprehension, word identification, and fluency challenges.

Course sections were available only when partner schools were in session during fall and spring 16 week semesters. The fall course sections typically began in August and ended in December while the spring course sections commenced in January and ended in May. Pre-service teachers submitted to the required background checks, evaluations, and orientations determined by the state and the various partner schools. Per-service teachers must have partner school clearance before contacting any third to eighth-grade students. Also, cooperating partner school teachers were aware of the requirements of the course and worked as a facilitator. Cooperating teachers identified students with reading challenges and matched them with respective pre-service teachers to begin the tutor/tutee reading intervention experience. Also, before the case study assessments and reading interventions were applied, students and their parents provided documented signed permissions for the pre-service teachers to conduct the case study in the respective school settings.

The learner's assessment profile. Each pre-service teacher completed a reading progress report titled, the learner's assessment profile (LAP) that served as a summary of the ten one hour meeting sessions with tutees. It is important to note most case study sessions were thirty minutes in length, so most pre-service teachers met with tutees over twenty sessions or more. The LAP was a framework course professor created to help organize DBDM results gained from the utilization of research-based RRs and a specific IRI's tools and measures. Data included reading grade level progress, comprehension gain or losses, fluency (rate and qualitative measures), and word recognition (aka: miscue analysis) results. A closed, password-protected website maintained and offered by university professors created scaffolding how-to videos, research-based reading assessments, research-based reading interventions, and other LAP related examples to

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support pre-service teachers engaging in this PBL/DBDM case study experience. Pre-service teachers and course professors referred to this as the case study project. The case study was designed to assist third to eighth-grade students attending partner schools who were identified with reading challenges while providing pre-service teachers the mastery experiences to develop the skills and self-efficacy confidence needed to assist young students with reading challenges in comprehension, fluency, word identification, and overall practice with reading.

Course texts and case study assessment resources. Throughout the 16-week course, pre-service teachers met with cooperating teachers and course professors concerning their tutee's reading assessments, interventions, and overall progress. Each pre-service teacher built an assessment kit following an IRI model developed and authored by Shanker and Cockrum (2014), the *Ekwall/Shanker reading inventory (ESRI)*; course professors created videos and concept maps on the course's password protected internet site to guide pre-service teachers' ESRI kit building. The professors included two check-in times during the semester course for pre-service teachers to provide course professors their LAPs as works in progress. Professors provided feedback related to the respective RRs and ESRI assessment protocols use and results. Pre-service teachers implemented other individualized research-based procedures as required from findings acquired during sessions with their respective tutees and received feedback as needed. During the time pre-service teachers attended the course's class times, professors and pre-service teachers discussed readings and examples or research-based assessments and interventions related to comprehension, word identification, fluency, and overall reading practice. The professors used various research-based, literacy department approved internet resources and used a common text by Cecil, Gipe, and Merrill (2017), *Literacy in grades 4-8: best practices for a comprehensive program*, to engage pre-service teachers in discussions concerning research-based reading assessments and interventions.

Pre-service teachers received learning support and scaffolding during the PBL case study experience from their required text readings, course discussions with peers, conferences with course professors, and case study/LAP feedback from cooperating teachers and professors, which all aided their DBDM processes. From these PBL/DBDM experiences, the case study, pre-service teachers gathered information about their tutee's reading progress from RRs, the approved informal reading inventory, ESRI (Shanker & Cockrum, 2014), and other formative reading assessments' results to apply appropriate reading interventions.

Setting Two: Third to Eighth Grade Schools Hosting Case Study Tutor/Tutee Interactions

Pre-service teachers/tutors were assigned to schools to complete their field experience requirements following state-mandated field experience hours by the university's teacher certification office. Two counties in North Central Texas were represented. Eight public rural school campuses served populations between 266 to 550 elementary to middle school students. The two suburban public school campus settings served between 540 to 796 students. The average median income for families between these two counties ranged from $43,000 to $60,000. The student to teacher ratio for all campuses included in the study ranged from 15:1 to 18:1. School campuses serving free and reduced lunch to their students ranged from 32% to 80%. All public school

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campuses have several partnerships with the university and have included pre-service teachers in various service learning projects over the years.

Method

Two types of statistical procedures were utilized: parametric and non-parametric testing. Descriptive statistics in the form of percentages and frequency counts were utilized where appropriate. The ESRI reading material leveled by grades, ordinal data, offered a growth comparison for the students served by pre-service teachers from the first to last oral reading selections. Percentages of correct responses using ESRI reading comprehension questions from the first to last oral readings by students identified with reading challenges (SIwRC) were compared. This data provided interesting comparisons and discussion. In summary, the data provided a measure of reading growth or loss by students during their work with pre-service teachers implementing one-on-one reading interventions.

DBDM Tools Utilized to Measure Tutees' Reading Challenges

The case study experience required tools to determine a student's comprehension, word identification knowledge, fluency, and overall reading progress during the tutor/tutee assessment, intervention sessions. Basic RRs (Cecil, Gipe, & Merrill, 2017) measures and the ESRI (Shanker & Cockrum, 2014) measures served as the primary tools to assess reading progress. RRs measures and other qualitative tools were utilized to check measures from the ESRI.

Overall independent grade-level progress. Movement of independent grade-levels within the ESRI reading passages represented holistic reading progress since this included growth or loss in word identification and comprehension.

Comprehension measures. For comprehension, this study used the ESRI oral reading comprehension measure (Shanker & Cockrum, 2014, p. 10). However, preservice teachers compared RRs comprehension measures gained from trade books with ESRI reading comprehension results and reassessed if discrepancies arose.

Grade-level Reading Progress and Reading Comprehension

ESRI grade leveled independent oral reading of passages holistic progress/achievement measure. The ESRI (Shanker & Cockrum, 2014) provides teachers with various assessments and diagnostic tools to ascertain a student's reading strengths and challenges while offering one-on-one tutoring materials to address reading challenge concerns directly. With the diverse tools offered, ESRI includes reading passages that range from pre-primer to early high school grade levels. Pre-service teachers followed the research-based standards used for determining a readers' independent, instructional, and frustration levels (Shanker & Cockrum, 2014, p. 10). For oral reading, readers were deemed independent with a grade level passage by correctly identifying 99% or more of the words read with minimal miscues and be able to answer 90% or more of the reading comprehension questions at the end of the passage. The instructional level was determined similarly with 95% or more word recognition during an oral reading paired with 60% or more of the reading comprehension questions answered correctly. The frustration level was determined as well with 90% or less of the word recognition in an oral reading paired with 50% or less of the reading comprehension questions answered correctly. Pre-services teachers

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moved their respective students with reading challenges up to the next grade level when the individual student met the independent reading level criteria for both oral reading word recognition (99% or more recognized correctly) and reading comprehension questions (90% or more answered correctly).

ESRI Oral Reading Comprehension Questions Achievement Measure. The ESRI includes comprehension questions after each grade level reading passage. Lower grade level reading passages (i.e., grades pre-primer, primer, and first grade) average five comprehension questions per reading passage while the remaining grade levels above first grade average ten reading comprehension questions per reading passage. Three comprehension question types exist within the ESRI for oral and silent reading passages: factual (F), vocabulary (V), and inference (I). F type comprehension questions have answers that are found word-for-word in the text and can also be referred to as explicit. V type comprehension questions concern word meanings and concept understanding. I comprehension questions are inferential; therefore, readers need to read the actions and events as well as the dialogue to generate or infer meaning from the text. The I type questions were more prominent past the second-grade reading level passages. Therefore, reading comprehension was a priority for pre-service teachers while working with their respective students during the case study experience. Pre-service teachers worked with their students to achieve a 90% correct answer comprehension rate with reading comprehension questions (Shanker & Cockrum, 2014; p. 10). Any strategy or approach found that improved the reading comprehension rates of students with reading challenges were discussed each week with the professor and with peers during the three-hour weekly class meetings held during the case study experience.

The Research-based Interventions Utilized by Pre-service Teachers/Tutors

Many interventions could be utilized and pre-service teachers were able to access research-based reading interventions from the course's password protected internet site and from the common course text, *Literacy in grades 4-8: best practices for a comprehensive program* (Cecil, Gipe, & Merrill, 2017). The interventions used by preservice teachers were all approved by the course professors. Any strategy without research-based connections was dismissed as a nonviable intervention for the case study.

Comprehension interventions. Comprehension interventions needed to elicit or provide at least one of the five principles: a.) prediction of what comes next, b.) the generation of questions from reading, c.) checking back to clarify unknown or unsure content, d.) allowing for imagery or visualization of a concept or event from reading, and e.) summarization of the main message and points (Cecil, Gipe, & Merrill, 2017). Pre-service teachers would find or generate interventions based on their DBDM process during the case study sessions that fit one or more of the five comprehension interventions principles. Pre-service teachers implemented and modified many intervention strategies that aligned with the comprehension reading instruction principles from the Cecil et al. (2017) text: "reciprocal teaching," "QAR," "sketch to stretch," and graphic storyboard style organizers (pp. 149-169).

Word identification vocabulary interventions. Word identification ties fluency and comprehension vocabulary together. Depending on the needs of the students from

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DBDM, pre-service teachers may employ sight word review, prosody practice, phonemic awareness instruction, and/or alphabetic principle style strategies that were mastered in the prerequisite course. Interventions related to semantic miscues should follow the one or more principles of vocabulary instruction: a.) "relate new words [to known words]," b.) at least have twelve exposures to the new terms in meaningful and varied contexts, c.) "consult a [reputable resource independently] when necessary," and d.) provide vocabulary instruction that engages students to independently process word meanings (Cecil, Gipe, & Merrill, 2017). Pre-service teachers utilized several of Cecil et al.'s (2017) word identification interventions like the "four levels of word knowledge" (p. 95) or the "clarifying table" (p. 111).

Data Analysis

Students' ESRI Grade Leveled Independent Oral Reading Passages Achievement Analysis Using the Wilcoxon Procedure

Descriptive statistics and the non-parametric Wilcoxon signed-rank test procedure were utilized to determine if statistically significant increases occurred between students' ESRI ordinal grade level rankings (Sheskin, 2011) for reading materials regarded at the independent reading level from the first oral reading interaction to the last oral reading interaction with pre-service teachers implementing individualized reading interventions. The effect size was provided using Cohen's *d*, and since this was a non-parametric test using ordinal data, another standardized effect size (i.e., *r*) was reported as an equivalent (Pallant, 2007; Rosenthal, 1994).

Students' ESRI Oral Reading Comprehension Achievement Analysis Using Paired *t*-test Procedure

Descriptive and inferential, parametric, statistical procedures allowed researchers to compare the data gathered from pre-service teachers. The paired *t*-test procedure was utilized to analyze the mean differences in the percentages of ESRI reading comprehension questions answered correctly from the first to last one-on-one tutoring experience. For the paired t-test procedure, normal distributions were determined using the Shapiro-Wilk's tests. Cohen's *d* effect size was reported for the significant paired *t*-test result.

Results

ESRI Independent Oral Reading Grade Level Growth of Students

The 30% mean increase in reading comprehension was meaningful when considering the independent reading grade level increased at least one median grade level for most participating students (n=123). The one-on-one tutoring and focus on individualized interventions using research-based practices elicited an increase in ESRI independent reading grade levels (ESRI-IRGLs) for 102 (83%) students identified with reading challenges by their respective teachers, whereas 19 (15.4%) students saw no improvement, and two (1.6%) students regressed one ESRI-IRGL. A Wilcoxon signed-rank test determined a statistically significant increase in ordinal ESRI-IRGLs from the first reading (*Mdn* = 3) to the last ESRI reading (*Mdn* = 4) with a median gain of one ESRI-IGL, z =8.837, $p < .001$, a large effect size (d=1.3 or r=.563) (Pallant, 2007, p.

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255; Rosenthal, 1994).

ESRI Reading Comprehension Growth Achievement of Students

The means representing the percentage of reading comprehension questions correctly answered (RCQs-CA) from the first to last ESRI oral reading by students (n=123) with reading challenges were 44.7% (*SD*=.20) and 74.7% (*SD*=.22), respectively. The assumption of normality was not violated, as assessed by the Shapiro-Wilk's test (*p*=.104). SIwRC gained in reading comprehension with higher percentages of correct answers to ESRI reading comprehension questions from the first oral reading to the last oral reading with a significant percentage mean increase of 30%, 95% CI [24.9%, 35.3%], *t*(122)= 11.44, *p*=.001, *d*=1.03. Note, the effect size (*d*=1.03) is large, providing a measure of practical significance (Cumming & Calin-Jageman, 2017) (See Table 1).

Table 1: Descriptive statistics and paired t-test results (n=123) from the ESRI reading comprehension growth of the students served by pre-service teachers

	Before		*After*		*95% CI for Mean*			
Measure	*M*	*SD*	*M*	*SD*	*Difference*	*t*	*df*	*d*
ESRI-RCQs-CA	*44.7%*	*.20*	*74.7%*	*.22*	*24.9%, 35.3%*	*11.44***	*122*	*1.03*

*** p < .001. Note. N=123, M=mean, SD=standard deviation, t=t-test statistic, df=degrees of freedom, d=Cohen's d effect size. ESRI-RCQs-CA=Comprehension was the percentage of comprehension questions answered correctly from the Ekwall Shanker Reading Inventory (ESRI) (6th edition) by students identified with reading challenges.*

Discussion

Teacher preparation programs need school partnerships for pre-services teachers to have those PBL, critical "mastery experiences" (Bandura 1977, 2010) with DBDM. Although the research revealed positive results for reading interventions coupled with DBDM, few studies investigated this pairing from published studies between 1975 to 2017 (Filderman et al., 2018). Teacher preparation programs and schools could assist each other. Teacher preparation programs could supply an abundant number of pre-service teachers as tutors who are learning to use DBDM to select research-based reading interventions. In this study, SIwRC 's reading progress was positively impacted by their tutor/tutee experiences with pre-service teachers who followed DBDM to select appropriate reading interventions. Reading is critical to a human being's development and success. A teacher's ability to use DBDM appropriately to apply reading interventions is important (Otaiba et al., 2019) and may provide an individual student a chance to progress with learning even as texts become more sophisticated.

The PBL/DBDM experiences embodied with the case study project provided learning opportunities for pre-service teachers and the third to eighth-grade students they served; both received what was needed. This study's results supported the findings from the literature; the reading interventions initiated by the pre-service teachers within the school setting provided research-based reading interventions to students who needed

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differentiated instruction most (Glomb & Mason, 2017; McCray et al., 2011; Wanzek et al., 2018). The pre-service teachers needed experiences and confidence using DBDM to apply research-based reading interventions with SIwRC . The students who have challenges with reading received research-based reading intervention in a one-on-one interaction. This tutor/tutee interaction in this study produced positive results in reading comprehension and overall independent reading grade-level growth. The results support the need for more partnerships between teacher preparation programs and schools who have students with reading challenges. All teacher preparation programs and schools can form partnerships to reduce the salary costs for tutors. However, since this approach benefits SIwRC, any associated costs in tutoring salaries for qualified reading intervention experts are reasonable considering societal costs regarding students who are not able to progress in reading skills (Packhem, 2017).

Conclusions

After review of the significant and meaningful results from this study, pre-service teachers need to have more PBL opportunities working within partner school settings. Pre-service teachers were able to learn and apply research-based reading interventions that were beneficial to SIwRC. Significant overall independent reading grade level (i.e., ESRI-IRGL) average increases over a short tutoring time period (i.e., at least ten one-hour tutoring sessions) with significant increased reading comprehension (i.e., ESRI-RCQ-CA) average growth results for SIwRC support the benefits of one-on-one tutor/tutee interactions with respective pre-service teachers who follow DBDM application of research-based reading interventions. Yes is the answer for research questions one and two; independent reading grade level growth and reading comprehension growth of SIwRC were significantly impacted for the better from efforts of pre-services teachers/tutors using DBDM to apply research-based reading interventions within partner school settings.

Limitations and Future Research

This study included pre-service teachers' case study efforts within a reading assessment course's sections at one university in the southern United States. Replication of this study investigating DBDM utilized by pre-service teachers to address various reading differentiation needs of SIwRC within partner school settings is needed. Since research is limited regarding DBDM's connection to reading interventions (Filderman et al., 2018), more research is needed from diverse populations before further generalizations are conceived.

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