Improving Literacy Rates For Students With Dyslexia in a Rural School District

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Abstract

This applied research study aimed to improve literacy rates for students identified as having dyslexic tendencies in the Lynn County School District (LCSD). The need to improve literacy rates of students with dyslexia in the Reaching Reading Success Program was identified through Mississippi K-3 Assessment Support System data. Using the two elements found in the program evaluation, accurate identification of dyslexic students and multisensory interventions the study sought to improve the literacy rates for students with dyslexia in kindergarten. Assessment, survey, and interview data were used in this applied research study to determine success. The findings indicated early identification, multi-sensory remediation, and organizational learning does improve literacy rates for students with dyslexic characteristics in kindergarten.

BACKGROUND

The purpose of this applied research study is to improve literacy rates for students identified as having dyslexic tendencies in LCSD. The central phenomenon of improving literacy rates of students with dyslexia in the Reaching Reading Success Program (RRSP) was identified through Mississippi K-3 Assessment Support System (MKAS) data. The MKAS data showed students do not achieve grade-level reading performance before RRSP conclusion. The Mississippi Department of Education policy determines the MKAS cutoff score of 681 to indicate grade level reading proficiency for kindergarten students. Through a collaborative process with the LCSD leadership team, the central phenomenon was examined through a review of pertinent school- and district-level data as well as research on the disorder. An action plan was then developed to address the issue of dyslexia identification and intervention for students. The present study will involve a mixed methods approach using both qualitative data and qualitative data to evaluate the action plan to address the issue. The action plan includes inquiry for a set of qualitative and quantitative questions designed to formatively evaluate the action plan and aspects of organizational learning. Implementation began in the Fall of 2017 and process outcomes will be evaluated between Spring 2018-Spring 2019.

Research Questions

This applied research study was guided by two sets of questions used at different points in the process. An initial set of preliminary questions were used to develop the action plan. The purpose of these questions was to provide the information necessary for the collaborative development of a comprehensive action plan designed to address the problem of improving literacy rates for students with dyslexia and accompanying tendencies.

1. Did the collaborative process to select a screening tool which identifies kindergarten students with dyslexic tendencies increase the number of students identified to 52 or more?

2. Did scores for students receiving RRSP services show a score on spring MKAS reading assessments of 681 or more?

Dyslexia and Learning

Depending on who is asked, dyslexia is not perceived as a disability. In some circles, dyslexia is viewed as an opportunity to discover the processes of the mind outside of the norms set forth by the general population. For others, dyslexia and accompanying tendencies present a barrier to one of most important skills we acquire: literacy.

The estimate of the population with this disorder is between 10% and 17% (Morken, Helland, & Specht, 2016). Statistically speaking, the Lynn County School District (LCSD) should have between 52 and 105 kindergarten students identified with dyslexia, yet currently do not have any identified and receiving interventions. The following research review will be used to provide necessary information to evaluate and improve the district intervention program to ensure all students receive theoretically grounded high-quality instruction. The literature review also provides a theoretical grounding for organizational learning. As the literature review developed, four areas were identified as being significant to improving the literacy rates of at-risk and all other students. Therefore, the literature review is organized into four sections: description of dyslexia, effects of dyslexia,

teacher preparation for reading instruction, and dyslexia intervention strategies. The description of dyslexia is critical because of the numerous misconceptions associated with the disorder.

Description and Causes of Dyslexia

In the book, *Basic Facts About Dyslexia & Other Reading Problems*, Moats and Dakin (2008) state, "Dyslexia literally means *difficulty* (dys) with *words* (lex)" (p.1). The medical profession was the first to develop interest in why children unexpectedly could not read (Moats and Dakin, 2008). The International Dyslexia Research Association (2017) defines dyslexia as: A neuro-biological specific learning disability which includes difficulties with accurate word calling and is unexpected because people with dyslexia have otherwise normal cognitive abilities (Moats and Dakin, 2008). Moats and Dakin (2008) define a specific learning disability as a neuro-biologic impairment which affects one or more academic areas arising from brain wiring and his or her life experiences. Fluency is the ability to read the printed word quickly and accurately and decoding is the ability to spell and use letter sound correspondence and syllable patterns (Moats and Dakin, 2008). The researchers also describe the phonological component of language as pronouncing, remembering, or thinking about sounds to make words.

In a review of literature to improve understanding of reading disorders and how it relates to current proposals for their classification in the Diagnostic Statistical Manual-5, Snowling and Hulme (2012), found dyslexia research has been conducted for over a century and has been identified as being associated with a neurological disorder. The review reports

the ease with which children learn to read depends upon the language which they are learning. Snowling and Hulme (2012) state, "Reading is a complex skill requiring the development of a system of mappings between the visual symbols of the writing system and the pronunciation of words" (p. 595). Snowling and Hulme (2012) report dyslexia and accompanying tendencies has its origins in phonological deficits which are pronouncing, remembering, or thinking about letter sounds to make words.

Morken et al. (2016) performed the only longitudinal study using functional magnetic resonance imaging (fMRI) of the brain for dyslexic and non-dyslexic readers. Both groups of readers were followed and repeatedly measured throughout the reading stages. The fMRI of the brain showed connectivity differences in the brain regions for dyslexic readers as compared to normal readers. Differences have been identified in pre-literacy stages (six years old), and emergent reading stage (eight years old). However, the connection differences were not significant in the literacy stage of those who are 12 years old. The study showed literacy skill differences were greater by the age of 12 between the types of readers although brain connectivity was the same. This study provides evidence of the differences in the brain functions of dyslexic individuals and of the biological cause of the disorder.

In a case study Miles, Wheeler, and Haslum (2003) used a cohort of British children born in April 1970. The hypothesis was normal achievers with dyslexic tendencies would perform lower than normal achievers on assessments. The study showed significant evidence the hypothesis was accurate. Findings also

added to the complexity of the disorder, because some people with the tendencies were able to be academically successful. The research also confirmed the view of dyslexia occurring in varying degrees of severity. Miles et al. (2003) warned "The consequences for the concept of dyslexia are discussed, and it is suggested that the needs of dyslexics with only mild literacy problems should not be overlooked" (p.1). This information provides actionable areas which may improve literacy rates for our dyslexic students.

Effects of Dyslexia

Dyslexia is not a disease to be cured; the disability and the effects of dyslexia are with a person for a lifetime, as reported by the International Dyslexia Association (2017). Lima, Azoni, and Ciasca (2013) performed a quantitative study on Brazilian children with dyslexia and not at-risk children using several assessments to compare performance on attention span and executive functioning. Executive function controls the ability to plan, organize, and manage time. The aim of the first experiment was to analyze oculomotor parameters and phonological awareness of heathy children. The second experiment compared visual-auditory capabilities between healthy and dyslexic children. The results suggested dyslexic students have more difficulty than healthy kids do in tasks involving attention skills, quantitative reasoning, short-term memory, and processing speed. Foster (2011) investigated the comorbidity of dyslexia and constructional apraxia. A sample of 23 children who met the criteria for a reading disorder completed two subtests the Wechsler Individual Achievement Test and the Rey Complex Figure Test. The test was used to determine if dyslexia affected word

recognition. Correlation coefficients and multiple regression analysis showed a statistical significant positive relationship between word reading and performance of dyslexic children. These results will be used to guide scheduling decisions and instructional strategies by the LCSD planning team and broaden the supports to include math interventions.

Lyytinen, Erskine, Tolvanen, Torrpa, Poikkeus, and Lyytinen (2006) performed a prospective follow-up study which lasted nine years on 200 Finnish children. The families agreed to participate in the study before the children were born. Half of the families had at least one parent who had literacy problems and half did not have any family history of reading problems. Theoretically, half of the students were considered at-risk. The data was gathered for the report beginning at 12 months of age and ended when the children entered second grade. The seven skill domains of receptive language, expressive language, morphology, memory, rapid serial naming, letter knowledge, and phonological awareness were assessed multiple times throughout the nine years. Preliminary findings indicated 40% to 50% of the children had reading difficulties during the first two years of school. The mixture-modeling feature of the Mplus program was used to analyze the study data. The study shows the significance of letter knowledge, ability to pay attention, and ability to manipulate sound (phonological awareness) skills are developed before the acquisition of reading. Lyytinen et al. (2006) found four different reading trajectories in the study which are declining, typical, dysfluent, and unexpected. Declining trajectory was more common in the at-risk group and the students continued to decline through

second grade. Typical trajectory was the normal scores expected at each assessment. Dysfluent trajectory was exhibited by slow reading students and had the highest percentage of at-risk students who showed the lowest comprehension scores. The unexpected trajectory was composed of students with higher early assessment scores with a continued decrease until second grade. The unexpected trajectory groups surprisingly had students with good speaking skills but poor readers. The first key finding was the trend of reading development is more predictive than reading level. The second key finding was the correlation of early literacy supports in the home for at-risk students and reading ability. The third key finding was the indication of the need for a comprehensive assessment of development required for early detection of reading problems. The final key finding was the predictive value for students of identifying parents with reading problems.

Using three groups, one group of dyslexic students and two control groups without dyslexia of 20 college students each between the ages of 17 and 28, Bruck (1990) examined patterns of dyslexia in children who continue to have the characteristics in adulthood. The dyslexic students were assessed during childhood using word recognition and oral reading and the Wechsler Intelligence Scale for Children. The average childhood IQ score was higher than 85. The word recognition assessments showed the dyslexic scores to be 1.3 grades below grade level and oral reading scores 2.3 grades below grade level. The three groups were given a battery of standardized tests to access functioning as compared to the control groups. The results clearly show how word recognition deficits and lack of age-

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appropriate word recognition continue among adults with dyslexia. The study shows adult college students with dyslexia scored on the level of a sixth grader. One unintended finding was the dyslexic group had the same pattern reading errors as some readers in the control group. This finding could indicate a connection of the deficiencies of reading instruction across the educational system.

Teacher Reading Instruction Preparation

This section of the literature review provides ways to engage in systematic organizational learning community and improve literacy rates for all children by providing continued professional development for reading instruction. This section will provide current research describing classroom teacher readiness to teach reading and provide interventions for students with dyslexia.

Joshi, Cunningham, Binks, Hougen, Dahlgren, Ocker-Dean, Smith, and Boulware-Gooden (2009) tested the hypothesis that instructors responsible for training future elementary teachers are not familiar with the linguistic concepts of the English language. Joshi et al. (2009) administered a survey of language concepts to 78 instructors with 68 of the instructors having doctoral degrees from various colleges and universities around the southwest United States. The results showed the instructors performed poorly on morpheme and graphene concepts. In a second study, of 40 instructors interviewed 32 defined phonological awareness incorrectly and failed to mention phonics as a key component. The study shows the need for professional development focused on reading instruction so teaching

strategies can be integrated into pre-service training courses.

Previously cited research by Lyytinen et al. (2006) reported fluency correlations with reading comprehension especially for students at-risk for dyslexia. Van den Hurk, Houtveen, and Van de Grift (2017) surveyed 109 primary teachers in the Netherlands. The pedagogical content knowledge of reading was assessed using a questionnaire. Standardized observation instruments measured the quality of instruction. One instrument measured quality of fluency modeling during instruction and the other measured teacher support during fluent reading practice. Van den Hurk et al. (2017) suggests domain expertise does not play a strong role in classroom practice. This finding is relevant to LCSD teacher evaluation practices and ensuring knowledge leads practice.

Wasburn, Binks-Cantrell, and Joshi (2014) surveyed pre-service teachers from the United Kingdom and the United States knowledge of dyslexia. "Results indicated that participants in the two groups demonstrated similar accurate knowledge about dyslexia as well as displaying some common misunderstandings about dyslexia" (Washburn et al., 2014, p.1). The findings by Washburn et al. (2014) was the majority of teachers in both groups falsely believe dyslexia is visual perception deficit but correctly understand dyslexia is a language-based disorder involving decoding and spelling. The research also found teachers, both pre-service and in service, lack a foundational understanding about basic language and linguistic concepts related to reading instruction for beginning and struggling readers. This section of the review reveals teacher-reading skill is negatively

impacted by the failure of pre-service training programs and the lack of teacher professional development in literacy instruction.

Interventions for Students At-Risk for Dyslexia

Federal law and Mississippi law fails to require interventions for students with dyslexic tendencies. Even after being identified in the Elementary and Secondary School Act, many years ago requirements for remediation are still lacking (International Dyslexia Research Institute 2017).

Youman and Mather (2013) reviewed state laws and amendments in 1997 to the Mississippi Code of 1972, which required pilot programs for testing certain students for dyslexia in order to check status, highlight differences between state laws, and to suggest law-initiating strategies. Youman and Mather (2013) found Mississippi HB 1494 provided funds for educator training and HB 1031 allowed students to transfer to a different school or district and required kindergarten through first grade screening. LCSD developed a dyslexia screener based on research many years ago, but it now requires districts to use one of two screeners approved by the Mississippi Department of Education (MDE). According to MDE July 1, 2017, Section 37-173-15 of House Bill 1046 mandates the use of one of the two approved screeners for dyslexia screening given the under-identification of students with the disability. Mississippi, however, does not fund or require dyslexia interventions. The lack of or absence of funding is a factor in the failure of children with a reading disorder and why LCSD uses Title I funds to provide help for identified students.

Holifield (2011) performed a study of the MDE Dyslexia Grant Program for the fulfillment of dissertation requirements. Holifield (2011) determined the impact of the MDE Dyslexia Grant Program on the achievement of students on the MCT2. Third grade language arts scores for the year preceding the grant were compared to scores for the year after implementing interventions funded by grant. Dollar amounts were examined to see if they affected scores. Interviews were conducted with grant recipients to determine and progress tracked. The research study revealed no significant differences between scores pre-and post-grant award.

Piotrowski and Reason (2000) evaluated the usefulness of teaching materials in terms of eight questions based on learning theory relevant to reading acquisition. The researchers compared three types of commercially published teaching materials. The three types are phonics schemes/materials intended for all children, materials intended for learners making slower progress in literacy, and materials targeted at and learners with difficulties of a dyslexic nature. Piotrowski and Reason (2000) found materials focusing only on phonological development were not successful and efforts to improve literacy with single intervention techniques have proven to be ineffective. The comparison showed students need remediation in all components of reading to improve skills, indicating the need for multi-skill interventions. Findings also show a need for more instructional time above one hour.

The National Reading Panel (2000) designated the five components of reading instruction as being: phonemic awareness, phonics, text comprehension, fluency, and

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vocabulary instruction. Phonemic awareness is the ability to hear and manipulate the smallest units of sound. Phonics combines the units of sound and their spelling. Text comprehension is the ability to understand the meaning of the words being read. Fluency is the speed and accuracy of reading words. Vocabulary instruction is teaching students to use context clues, exposure, and definitions to learn new words. The review has indicated the need for interventions to strengthen multiple skills for students at risk for dyslexia.

Schneider, Roth, and Ennemoser (2000) performed a comparison of three intervention programs for children at-risk for dyslexia. The three intervention programs were phonological awareness only, phonological awareness and letter sound, and letter sound only. Schneider and et al. (2000) provided overwhelming evidence the reading and spelling abilities of at-risk kindergarten children who received combined phonological awareness and letter sound intervention outperformed the students only receiving one-skill interventions and equaled literacy development in the control group of not-at-risk readers. Schneider et al. (2000) also found the combined intervention prevented at-risk children from developing reading difficulties. In the comparison, kindergartners who received the combination training better performed in second grade.

Ritchey and Goeke (2006) describes the Orton-Gillingham approach as a systematic, sequential, multisensory synthetic and phonics based approach to teaching students the basic concepts of reading, spelling, and writing. Multisensory interventions include visual, auditory, and kinesthetic /tactile strategies

(Hwee and Houghton, 2011). Hwee and Houghton (2011) performed an empirical evaluation of a yearlong Orton-Gilingham intervention program on Singaporean primary aged children. Hwee and Houghton (2011) used a pre-test/post-test experimental research design which was incorporated into a hybrid multiple baseline design. The reason Hwee and Houghton (2011) used this approach was because all dyslexic children in Singapore are given phonological interventions and a control group could not be established. Orton-Gilingham shows a highly significant effect on word recognition, word expression age, and sentence reading age (Hwee & Houghton, 2011). Also, of importance, Hwee and Houghton (2011) found instructors are not a significant variable on gains. Faught (2012) examined the effects of the Orton-Gillingham training on the preparedness teachers working with dyslexic students. The study considered differences across four scales: teacher preparedness, quality intervention programs, assessment related factors, and the effects of specialized construction. The study was performed using questionnaires based on Likert type questions. A significant difference was found between the group with Orton-Gillingham and the group without Orton-Gillingham training. Dyslexic children have shown growth with Orton-Gillingham based approaches with most being personalized to fit the specific needs of the child to ensure future growth.

Andreou and Vlachos (2013) performed a study to examine the relationship between preferred learning style and the reading disorder of dyslexia. The random sample of 129 students was chosen from schools in Volos, Greece. The sample consisted of a control group of students with dyslexia and a comparison group was matched by gender and age.

The students self-administered the VAK learning style assessment. Andreou and Vlachos (2013) report visual learners have a natural inclination to visualize learning goals through drawing, imaging, and mapping. Auditory learners prefer drama, talking, and hearing text. Kinesthetic learners learn best using role play, body movement, and manipulatives. Multi-sensory learners use a combination of seeing, hearing, and doing (Andreou & Vlachos, 2013). The study did not find a relationship between learning style and a dyslexia diagnosis. However, Andreou and Vlachos (2013) noted the need of a student knowing his or her learning style and the importance of educators to consider all styles in lesson preparation.

Kempf (2015) performed a comparative case study to fulfill requirements for a dissertation on perceptions of all levels of school system personnel concerning educational practices for dyslexic students and found five themes in common. These themes are communication, professional development, dyslexia program essentials, transitions, and emotional aspects of dyslexia. Kempf (2015) also discovered the significance of additional support beyond reading. Studies by Washburn et al. (2014) and Kempf (2015) show how unprepared teachers are when it comes to teaching children and the effort districts must make to meet the needs of these children. Worthy et al. (2016) performed a study using interviews to get teacher perspectives of dyslexia reading instruction. A random sample of 32 teachers from central Texas were used as research participants. The purpose of the study was to lift up teacher voices to bring their understanding into the conversation about dyslexia. Worthy et al. (2016) found the most salient theme was the strong

sense of responsibility participants had to provide appropriate supportive instruction geared toward their student's strengths and needs. Also, the responsibility to know the laws and to improve of practice were noteworthy.

METHODOLOGY

Development of the Action Plan

In August 2017, during an initial attempt to improve interventions to students with dyslexia, two problematic areas emerged. School staff members, RRSPLT, and parents echoed the lack of student success in meeting exit criteria from the program. The feedback showed in the last five years, only 10% of students met the exit criteria of at least a scale score of 681 on MKAS assessments. Using this feedback, the development of the action plan was based on two initial questions. First, why are students with dyslexic tendencies under-identified by the district screening process? Second, what does research on student identification, program structures, and organizational processes suggest to successfully improve academic programs? These questions resulted in the identification of two elements in need of improvement. The two elements were accurate identification of kindergarten students with dyslexia and remediation based on data analysis.

Action Plan

The action plan addressed the need to accurately identify kindergarten students with dyslexic tendencies as early as possible in the educational process. Since students were identified in kindergarten, the decision was also made by the district team to provide remediation at the kindergarten level. This section

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begins with a table outlining each element of the action plan, the three action steps, and the cost for each of these steps. The action plan narrative follows the table and explains the plan in detail. Table 1 provides the elements of the action plan.

Table 1
Action Plan

Element	Goals	Action Step	Timeline	Who	Budget
Accurate Identification of dyslexic students	Short-term Increase in number of kindergarten students identified as having dyslexia in LCSD to 52 or more district wide in a smaller time frame	Identify Screener to be used in LCSD	August 2017- Spring 2019	RRSPLT	$93,364
		Train RRSPI to administer Screener		RRSPI	
	Long-term The reduction of students being identified as dyslexic by other means than screening	Screen kindergarten and first grade students	Spring 2019– ongoing	Primary School Principals	
Provide remediation to identified Kindergarten students	Short term – Kindergarten students receive interventions	Schedule Students for intervention time	September 2018- ongoing	RRSPI	$211,714
	Long term – Dyslexic kindergarten students have a reading level of 681 or higher	Remediate student reading skills		RRSPLT	
		Progress monitor student reading abilities		Primary School Principals	

Accurate identification of students with dyslexia.

       The first element in the action plan was to accurately identify district kindergarten students who have dyslexic tendencies using an approved and accurate screening tool. To achieve this goal, the first action step was to identify an accurate screening instrument. The previous

screener was developed by the district to satisfy the Mississippi state law of screening all students before the end of first grade. The screener was adequate for accountability requirements. However, the instrument failed to identify all students with dyslexia in LCSD. Therefore, as 2017 data confirmed, students were being identified through the Response to Intervention (RTI) process as having dyslexia well beyond first year of district enrollment. Inaccurate screening prevented students with dyslexia from receiving available help during the most critical time of reading development (Schneider et al., 2000).

       The district team gave the responsibility of identifying an accurate screening tool to the RRSPLT. The Reaching Reading Success Program lead teachers are multi-sensory certified reading trainers for LCSD. Two screeners have been approved by Mississippi Department of Education (MDE) for use in districts. The two approved screeners are the Mississippi Dyslexia Therapy Association (MDTA) screener and the Lexercise screener. In September 2017, LCSD trial tested the two screeners using 200 students in multiple grades from across the district with 50 of them ranking in the top 25% on MKAS test data, and 50 kindergarten students. Of the two, the MDTA screener was chosen. The trial testing showed the MDTA screener to have better identification accuracy and to be more consistent with suggested research populations. When tested, the Lexercise screener identified every child assessed in the trial. Therefore, the Lexercise screener was excluded from use in the district because of over-identification. In October 2017, the LCSD adopted the MDTA screener. The MDTA screener was adopted to screen district

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students in accordance with MDE guidelines. However, the MDTA screener identified all of the kindergarten students tested. A second field trial was conducted, using 100 kindergarten students from across the district. The MDTA and the Dynamic Indicators of Basic Early Literacy Skills Next (DIBELS) screeners were used to screen the second group of 100 kindergartners. The MDTA again identified all of the kindergarten students screened. The DIBELS screener identified 31 kindergartners. DIBELS is more in-line with the research but identified more than the upper ranges of research suggestions. The district leadership team discussed the results. The team determined the over identification was within a tolerable range of program capacity, and it was better to over-identify than under-identify. The district team decided progress monitoring would correct misidentification. The district team chose to purchase the DIBELS screener to be used for the initial screening of kindergartners.

The implementation of the new screeners offered the district the opportunity to decrease the number of intervention hours missed by students waiting on the screening process. The screening process previously took three weeks to assess all first-grade students. However, with the addition of another screener and kindergarten students to the screening process, a three-week window would not be a sufficient amount of time using only three people to administer the assessment. Since certification is not required to administer the screener, anyone with the proper training could perform the task.

The second action step was to train the 16 RRSPI to screen students with the aim of reducing screening time. The

Reaching Reading Success Program lead teachers facilitated the training sessions for RRSPI to administer the MDTA and DIBELS screeners from February 25, 2018, to February 28, 2018. The training was conducted at the LCSD central office. The purpose of the training exercises was to increase the accuracy and efficiency of the screening process. The implementation of the new screener training required intensive, hands-on preparation using RRSP staff members as screening subjects. The training allowed the lead teachers to provide helpful and constructive feedback to those preparing to administer the screeners to LCSD students and ensured each interventionist is prepared to accurately screen students. The lead teachers trained the RRSPI for three days and ensured screener administration mastery. These trainings were executed with fidelity. The accurate and efficient administration of the new instrument was evident throughout the LCSD in the initial steps of screening and identifying dyslexic students. A collaborative approach involved all RRSP stakeholders and expedited the initial screening phases by disseminating the workload among the team of well-prepared professionals, in lieu of one RRSP staff member per school.

The third action step was to screen kindergarten and first-grade students. The 2018-2019 first graders were not screened last year because of policy and procedures. Therefore, to ensure proper identification and remediation this first grade group was included. The screening began the last week in August 2018. The screening had a target completion of the first week in September 2018. The short-term goal for this element was to identify 52 or more kindergarten students with dyslexia in the LCSD. This element also had the long-

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term goal of reducing students being identified as dyslexic by means other than screening. This element combined with remediation aimed to improve literacy rates for dyslexic students.

Kindergarten remediation.

The second element in the action plan was to utilize data to revise and implement interventions for kindergarten students. The first action step in this goal was to schedule all identified students for remediation pullout time. The Lynn County School District previously focused RRSP resources on improving literacy rates for students from the first grade through fifth grade. However, research suggested literacy is influenced before systematic reading instruction occurs (Lyytinen et al., 2006). Also, Bruck (1990) purported the application of remediation interventions in kindergarten students had shown to have positive life-long effects. With the addition of kindergarten students scheduled in the RRSP, all district students received interventions in accordance with current research.

After pullout time was scheduled for all dyslexic students, the second action step provided interventions. The Reaching Reading Success Program Interventionists (RSPI) provided reading intervention instruction to identified kindergarten students starting in September 2018. Hwee and Houghton (2011) contended approximately 45 minutes per day of intense multi-sensory remediation can improve reading abilities of dyslexic students. Multisensory interventions include visual, auditory, and kinesthetic/tactile strategies (Hwee & Houghton, 2011). Andreou and Vlachos (2013) noted the need of a student to know his or her learning style and the

importance of educators to consider all styles in lesson preparation. Andreou and Vlachos (2013) reported visual learners have a natural inclination to visualize learning goals through drawing, imaging, and mapping. Auditory learners prefer drama, talking, and hearing text. Kinesthetic learners learn best using role play, body movement, and manipulatives. Multi-sensory learners use a combination of seeing, hearing, and doing (Andreou & Vlachos, 2013). Also, multi-sensory instruction has been shown to work best for dyslexic students because dyslexic students tend to be multi-sensory learners (Andreou & Vlachos, 2013).

The Reaching Reading Success Program Interventionists provided the multi-sensory instruction to the identified students. Some RRSPI were certified-teachers, and others were highly trained assistant teachers. The lack of formal teacher-certification has been shown not to be a factor in intervention effectiveness (Hwee & Houghton, 2011). Monthly RRSP professional learning communities (PLC) meetings provided targeted training to the RRSPI. The kindergarten remediation began in September 2018 and continued throughout the 2018-2019 school year.

The third action step for the goal of kindergarten remediation was to monitor student progress using assessment data. Program interventionists monitored student progress and adjusted instruction to focus on strengths and improve areas of weaknesses. Each dyslexic student received individualized instruction. Worthy et al. (2016) found the teachers must feel a responsibility to provide instruction geared toward each student's strengths and weaknesses for students with dyslexia to progress. A reading skill

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baseline for kindergarten students was determined during October 2018 using the MKAS assessment. Monitoring each student's nine-week language arts grade provided additional data points for instruction modifications. Progress monitoring ensured each child's reading skill weaknesses was targeted for improvement. The three action steps were intended to achieve the short-term goal of kindergarten students receiving interventions for dyslexia and the long-term goal of dyslexic kindergarten students having a reading level of 681 or higher. The two elements needed the support of resources and staff member ownership to be a sustainable initiative.

RESULTS

Qualitative Research Question One

The first research question addresses the collaborative process to select a screening tool to increase the identification of kindergarten students ranging between 52 and 104.

Goal one description.

The team reviewed data and determined students were not being identified accurately in the previous years. The average number of students with dyslexia being served in LCSD during the 2017- 2018 School Year (SY) was 323, which included 35 kindergarten students. The team determined it was best to identify students in kindergarten to avoid the loss of a critical year of instruction. The goal to identify kindergarten students ranging between 52 and 104 was set by the research team.

Implementation.

The first implementation step was to train the Reaching Reading Success Program interventionists (RRSPI) to administer the DIBELS and MKAS screeners in July 2018. Field trials held in the fall of 2017 identified the DIBELS screener as the most accurate tool available. The Mississippi mandated MKAS screener was also used. The mastery of each screening tool for each RRSPI was verified by a checklist (See Appendices A & B). All kindergarten students in the LCSD were screened using the two screeners. After each RRSPI mastered the use of the screening tools, the RRSPI and the RRSP Lead Teachers (RRSPLT) worked together to screen the students across the district. The team also conducted a survey using the Qualtrics program (See Appendix C), which included two open-ended questions and staff interviews (See Appendix D) after the administration of the screener. The interviews and open-ended questions were reviewed and organized into themes based on screening implementation, weaknesses, screener impact, and other areas illuminated by staff viewpoints.

Evaluation of goal one.

The screening process identified 218 students in kindergarten with dyslexic tendencies. The number of students identified well exceeded the goal range of between 52 and 102. Table 3 shows the results by school.

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Table 3
Identified Students

School	N Count
Shan Primary	31
Vern Elementary	55
Salt Primary	91
Moore Elem.	41
Total	218

Staff responses to screening improvement and accuracy.

The district team implemented several changes to improve the accuracy of student identification during the 2018-2019 SY. Staff members were asked to give their perception of the entire screening process and make suggestions for improvement during the RRSP staff interview (See Appendix D). The following statements were recorded during the interview of the RRSPI staff members and provided the information for developing themes. One interviewee stated that the district worked as a team to screen the students in a shorter period of time, making the process quick and smooth. Another statement was made that lead teachers were very informative on how to administer the screener. She went on to say, "When a child is struggling with reading, it is not always because of dyslexia. Vision plays a huge part. So, I think vision should most certainly be ruled out first." It was suggested that the maximum number of students in a group should be three. The following statement supported the previous response: "Based on this number, I would make sure that all

groups stayed at a maximum of three and some groups need to be less." A teacher asserted the following statement "I feel some students are misidentified because they do not understand the directions not that they cannot do the task." One teacher felt that classroom teachers need screener administration training. Also, one interviewee suggested providing literacy training for preschool centers. The district screened each kindergarten student one-on-one for first sound fluency and letter naming. "The average interventionist has 22 students on their role."

Qualitative findings of significance for research question one.

Numerous significant findings related to the dyslexia screening process for kindergarten students are noted as follows. The first finding indicated the process reduced time needed to identify students. The following finding expressed the training to screen kindergarten students was effective and thorough. The next finding identified the need for vision screening before being assessed. Another finding indicated students show a lack of literacy exposure pre-kindergarten. The next to last finding of significance was the need to train preschool care givers effective strategies for pre-literacy skills. The final finding of significance was the first screening found 218 kindergarten students with reading deficiencies.

Qualitative Research Question Two

Did the spring MKAS scores indicate LCSD kindergarten students receiving RRSP services are reading on grade level?

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Goal two description.

The research team reviewed data of students who had received remediation in 2017-2018 SY and determined only 10 students from across the district were reading on grade level and were able to exit the program. This meant the district was failing to provide the proper interventions to the students during the most effective window for student success. The research team chose to provide remediation to identified students in kindergarten beginning in the fall of the 2018-2019 SY with the goal of all students scoring 681 or higher on the Spring 2019 MKAS assessment.

Implementation.

All kindergarten students in the LCSD were given the DIBELS screener to identify those in need of reading remediation. The staff at each primary and elementary school scheduled the identified students to receive multi-sensory reading interventions for 45 minutes a day beginning in September 2018. This intervention strategy used methods to reach all learning styles. The intervention time was scheduled so students would not miss core classroom instruction. This allowed the students to receive multiple learning opportunities covering the same skill from different instructors using different instructional methods.

Evaluation of goal two.

The qualitative data was gathered in October 2018. The data to determine goal achievement was generated from two open-ended questions on a survey, using the Qualtrics program (See Appendix E) administered to all kindergarten staff. The Reaching Reading Success Program

Interventionists were also interviewed and observed using a checklist and the interview responses were categorized according to the perception of remediation implementation, improvements, impact, and other areas of learning significance.

Of the 27 staff members completing the survey (See Appendix E), the two open-ended question responses follow. The first open-ended survey question asked for recommendations to improve the remediation process. The first response claimed the need to allow teachers suggest the pullout time. The second response identified the need for a math intervention pullout time. The third response highlighted a need for a faster response to get students interventions. The final response indicated only certified teachers should provide interventions. The second open-ended survey question asked what the staff member would like to see changed. This question garnered two responses. The first response indicated students should not miss instructional time for pullout. The last response noted a need to reduce pullout frequency.

A random sample of ten interventionists were chosen for the initial observation of remediation. The observation checklist (See Appendix F) covered the parts of the lesson, lesson presentation, and other. If the action was marked observed, it was being implemented satisfactorily. If the action was marked not observed, it was not performed or was not performed satisfactorily. All 16 areas were monitored in the 10 observations with the exception of one interventionist, who failed to include handwriting as part of the required lesson. The positive observation comments were complimenting and encouraging. The comments also included a reprimand for

starting late and need for addition of more reading time for students.

Emergent themes for providing dyslexic kindergarten students remediation.

The emergent themes were remediation implementation, improvement, and the overall impact. The implementation theme was supported with the reported effectiveness of early phonological awareness, alphabet knowledge, and handwriting remediation. Students are receiving instruction to use multi-sensory strategies for decoding and encoding was the last implementation observation noted. The improvement theme was supported first with statements indicating students should begin remediation as soon as identified. The second improvement suggestion noted remediation should be five days a week, thirty minutes a day. The last improvement recommendation was students need to exit the program after meeting benchmark two consecutive times. The first program impact theme support was letter recognition improvement was evident after remediation. The next support noted was classroom grades and progress monitoring showed remediation to be effective. The final impact theme support was the lowest scoring students on the MKAS winter administration were not students receiving remediation. The theme which unexpectedly appeared from the interview responses was the need to have students receiving remediation to be progress monitored more frequently.

Qualitative findings of significance for research question two.

The staff perception findings are as follows. The student needs to receive remediation immediately after being identified as having dyslexia was the first finding. The next finding was student remediation should be five days a week for 30 minutes a day. The third finding indicated student reading grades improved after receiving interventions. The next to last finding supported students receiving remediation should be progress monitored every two weeks and interventions adjusted accordingly. However, the most telling and final finding was the lowest scoring students on the MKAS winter administration were not students receiving remediation.

Quantitative Research Question One

Did the collaborative process to select a screening tool which identifies students with dyslexic tendencies identify 52 or more kindergarten students district wide?

Descriptive statistics and assumptions.

The EXCEL program was used to calculate the descriptive statistics. A scatterplot showed a linear relationship between the two variables of DIBELS screening and student identification. This was predictable because of the increase in students identified as having dyslexic tendencies.

Results for quantitative research question one.

The mean for students identified as having dyslexic tendencies for the 2017-2018 and 2018-2019 SY is 91.5 with a sample population mean of 511. The standard deviation for the sample population is 12 and 80 for students identified as having dyslexic tendencies. The number of kindergarten students identified was 218. The research team

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removed the students who scored three standard deviations above the grade level of 681 on the winter assessment because of misidentification. This adjustment still identified a higher percentage of students than previous research suggests. The district identified 148 students in the study and research suggests the highest number identified should be 130. There was a 22% increase in the number of students identified with dyslexic tendencies in kindergarten for the 2018-2019 SY as compared to SY 2017-2018. The use of a new screening tool and earlier identification increased the number of students identified in kindergarten significantly. Table 4 shows a visual representation of the findings.

Table 4
Students Identified

School Year	n	Students	Percentage
2017-2018	502	35	7%
2018-2019	519	148	29%

The kindergarten staff survey (See Appendix C) consisted of nine questions designed to determine if the screening implementation, improvements, and impact were successful. The survey had 30 participants. Table 5 provides a breakdown of the questions by response category.

Table 5
Screener Survey Responses

Question	Agree	Not observed	Disagree
The dyslexia screening process was completed in less than 3 weeks.	26	3	1
I was involved in the screening process.	15	12	3
I was prepared for the screening process	25	3	2
The screening process interrupted instruction more than three times.	10	3	17
The dyslexia screening process did not interrupt instruction.	14	3	13
The benefit of screening kindergarten students, offsets lost instructional time.	21	4	5
One or more of my students were identified during screening.	27	3	0
I had one or more students identified by screening who did not seem to need interventions.	16	9	5
I had one or more students who seem to need interventions yet were not identified.	4	12	14

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Significant screener survey responses.

      The responses to the first, fourth, sixth, and ninth remediation survey questions are of significance. The first survey response was used to determine if the perception of the screening process was completed faster than in years past even though an additional screener was administered. The survey results showed 86% of the respondents agreed the process was completed in a timely manner. The survey responses to question four showed 56% felt the instruction was interrupted more than three times. However, the responses to question six indicated 70% of the staff agreed the screening was worth the instructional interruptions. The responses to question nine indicated only 13% of the respondents thought there were students who were unidentified for dyslexia.

      The Likert Scale showed the perception of the identification process improved with 74% of respondents agreeing, 16% saw no change, and 10% disagreeing. The mean for respondents agreeing to the process improved is 52.67%, not observed is 11.56%, and disagreed is 6.67%. The standard deviation for the three responses is 23.48 for agree, 8.05 for not observed, and 6.30 for those who disagreed. Table 6 includes a summary of the survey data.

Table 6
Screening Improvements Overall

Measure	Agree	Not Observed	Disagree	Total Points
1. Mean	52.67	11.56	6.67	
2. SD	23.48	8.05	6.30	
3. Percentage	74%	16%	10%	100%

Quantitative Research Question Two

      Did scores for kindergarten students receiving RRSP services indicate a reading level of 681 or higher on the spring MKAS?

Statistical analysis and assumptions.

      The EXCEL program was used to calculate the statistical findings. A scatterplot showed a positive linear relationship between the independent variable of remediation and the dependent variable of spring MKAS scores. This was predictable because kindergarten students have not received instruction based on MDE guidelines.

Results for quantitative research question two.

      The kindergarten staff remediation survey (See Appendix E) had 27 respondents. The survey consisted of 14 questions and used a Likert Scale of three points for agree, two points for not observed, and one point for disagree. The mean was 60 for survey respondents who agreed kindergarten remediation was successful, 4.09 disagreed, and 10.10 did not observe success. The standard deviation for the responses is 17.55 for

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those who chose to agree, 6.4 for those who did not observe change, and 7.48 for those who disagreed there were any program improvements. The survey showed the perception of 86% of the participants agree kindergarten remediation was successful. The survey also showed nine percent observed no change and .05 percent disagreed with program changes. Table 7 displays kindergarten staff survey findings.

Table 7

Kindergarten Remediation

	Question	Agree	N/O	Disagree
1	I teach in the grade span of KG through 2nd Grade.	27	0	0
2	I teach in the grade span of 3rd through 5th Grade.		1	26
3	My pre-service training prepared me to teach reading.	21	1	5
4	In-service training prepared you to teach reading.	27		
5	My pre-service training prepared me to teach reading to students with dyslexia.	9	2	16
6	My pre-service training prepared me to teach reading to students with dyslexia.	19	2	6
7	One or more students are pulled for reading remediation.	26	1	0
8	Identified students participated in my reading class before interventions started.	25	2	0
9	Identified students participation improved in my reading class after interventions started.	26	0	1
10	Identified students displayed behavior issues before interventions started.	15	8	4
11	Identified students displayed fewer behavior issues after interventions started.	15	8	4
12	Identified students made academic gains in reading.	23	3	1
13	Identified students showed progress in math after reading interventions.	14	9	4
14	Math should be included in the intervention process.	22	1	4

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Significant remediation survey responses.

The responses to the third, fourth, sixth, ninth, and twelfth remediation survey questions are of significance. The second survey was used to determine if the perception of the remediation process success. Survey question three results showed 77% of the respondents agreed pre-service reading training prepared them to teach reading. The survey responses to question four showed 100% felt their in-service reading training prepared them to teach reading. The responses to question six indicated 70% of the staff agreed their pre-service training prepared them to work with dyslexic students. The ninth survey question showed 93% of survey respondents thought students receiving remediation had higher class participation rates after the interventions started. Survey question twelve responses showed 85% of kindergarten staff thought the students in the RRSP made academic gains.

Based on the Likert Scale the kindergarten staff survey (See Appendix C), 74% of respondents agreed that the identification process improved, 16% did not see a change, and 10% disagreed. The mean for respondents agreeing the process improved was 52.67%, not observed was 8%, and disagreed was 6%. The standard deviation for the three responses was 23.50 for agree, 8.05 for not observed, and 6.30 for those who disagreed. Table 8 provides a summary with overall survey data.

Table 8
Remediation Survey Analysis

Measure	Agree	Not observed	Disagree	Totals
Mean	60.5	10.10	4.09	
SD	17.55	6.40	7.48	
Percentage	86%	9%	5%	100%

The spring 2019 MKAS scores indicated the mean average score was well below the grade level score of 681. The mean score for the spring assessment was 714. The average growth rate for students receiving remediation was 162 scale score points after receiving interventions. The average growth rate for all kindergarten students from the fall test administration to the 2019 spring assessment was 220 scale score points. The comparison of MKAS growth rates for all students from SY 16 through SY 18 indicates the SY19 students average growth was 220 compared to 215 for the previous years. Table 9 shows the mean growth for students on the MKAS.

Table 9
Mean Growth Comparisons

Year	Fall MKAS	Spring MKAS	Average Growth
SY 16-18	527	721	215
SY 19	494	714	226
SY 19 remediated	433	595	162

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Summary

The above sections presented the findings of the applied research plan evaluation. The findings in Chapter Four will be used to identify study limitations, program recommendations, and ideas for future study. Chapter Five will detail how the findings will be used to report study limitations, program recommendations, and ideas for future study.

Conclusions

The screening time was successfully reduced from three weeks to two weeks as reported by staff members. The time was reduced even with the addition of the DIBELS screener for each student. The screener identified 218 students. Screening accuracy was skewed because other reading impairments closely resemble dyslexic traits and caused the number to be higher than the 17% suggested by research (Morken, Helland, & Specht, 2016). The schools and district leadership team used progress monitoring results and MKAS testing results to correct the misidentification. The research team erred on the side of caution and over identified rather than under identified. This would allow for students to be thoroughly examined by classroom teachers, interventionists, and assessment before removal from the program. The staff surveys showed staff perception was favorable for the screening implementation of kindergartners. The data showed a 22% increase of identified kindergarten students, 90% of survey respondents had students identified for services, and 70% of the staff thought the loss of instructional time was offset by screening benefits. As a district, 74% of the kindergarten staff thought the screening process was improved. The Reaching Reading Success Interventionists' (RRSPI) interviews indicated the district worked as a team and reduced the time required to screen students. All interventionist had an average of 22 students on their rolls. Also, noted was the need for district staff to train preschool caregivers in the appropriate pre-literacy teaching strategies. These findings provide the

results which answer the driving questions of the action plan and supports the success of the program evaluation goal to accurately identify dyslexic students in Lynn County School District (LCSD).

The descriptive statistics indicated an average growth rate of 61% for students with dyslexic tendencies in SY 2019 as compared to 70% for all students in SY 2016 through SY 2018. With the addition of kindergarten students scheduled in the RRSP, all district students are receiving interventions in accordance with current research.

The survey administered to LCSD teachers showed 77% believed their preservice training prepared them to teach reading to all students which includes students with disabilities. This finding is aligned to prior research which found teachers falsely believed they were prepared to teach reading (Wasburn, Binks-Cantrell, & Joshi, 2014). Prior research by Wasburn, Binks-Cantrell, and Joshi (2014) found teachers, both pre-service and in service, lack a foundational understanding about basic language and linguistic concepts related to reading instruction for beginning and struggling readers. Other survey findings indicated 96% of the staff saw an improvement in class participation after remediation. The most important survey response was 85% of kindergarten teachers saw academic gains after multi-sensory remediation began which aligns with the prior research of Hwee and Houghton (2011). A significant difference was found between the group with multi-sensory Orton-Gillingham training and the group without Orton-Gillingham training with the multi-sensory group outperforming the other group (Hwee & Houghton, 2011). Similarly, in the current study, the lowest scoring students on the Mississippi K-3 Assessment Support System (MKAS) winter administration were not students receiving remediation.

The interviews of the RRSPI indicated early phonological awareness, alphabet knowledge, and handwriting remediation were

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effective. The interviews also reported remediation to be effective and allowed the students to catch up with their peers which aligns with the research performed by Andreou and Vlachos (2013). The addition of multi-sensory remediation for kindergarten students with dyslexia did not achieve the goal of all students scoring 681(grade level). The remediation addition did increase the growth percentage for SY 2019 by 5%. The evaluation study shows multi-sensory remediation was successful in LCSD based on the findings with the exception of all students scoring 681 or better on the spring 2019 MKAS assessment.

The creation of an organization based on collaborative learning was achieved. This applied research study produced an environment where stakeholders were able to identify systematic inconsistencies in teaching phonics skills across the district. Phonics is one of the key components of literacy, but the phonics program finding was not part of the applied research study. It was an unintended discovery of the organizational learning environment created through the district working as a team. Also, multiple stakeholders collaborated to overcome all obstacles in performing this study and suggesting areas of improvement. However, there was a certain individual in the district who chose to impede the program evaluation and could not be persuaded to use their energy in a positive manner. With the staff member's opinion of the applied research process being fundamentally flawed, the individual could not be persuaded to the contrary.

Recommendations

The study found a lack of student vision testing before dyslexia screening. The research team will report this to the curriculum department and recommend students receive vision screening before any assessments are given. The principals and Reaching Reading Success Lead Teachers will increase the number of observations performed to ensure interventionists are implementing the multi-sensory interventions with fidelity. The final

program change will be the implementation of progress monitoring every two weeks for all students receiving remediation and adjusting interventions accordingly.