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Abstract

Quality science, technology, engineering, and mathematics (STEM) teaching and learning are essential in the early grades and projects to enhance these efforts are supported through federal grants such as the Mathematics and Science Partnership (MSP). The authors' purpose was to use project evaluation data to explore the impacts of an MSP project on effective instruction as framed by the Slavin's 2014 QAIT model. A Southern University partnered with 5 local school districts to collaborate with 25 Grade K - 4 teachers in 100 hours of science PD. Comparisons of pre- and post-scores using dependent samples *t* tests indicated that participants' ability to distinguish new science standards for their grade level from other grade levels was not statistically significant [$t(21) = -0.18$, $p = .859$]; however, participants' abilities to identify science and engineering practices and the cross-cutting concepts of the new science standards [$t(21) = 5.19$, $p < .001$, $d = 1.45$], science content knowledge [$t\ (18) = 3.43$, $p = .003$, $d = 0.54$], and science teaching self-efficacy [$t(20) = 3.37$, $p = .003$, $d = 0.77$] all exhibited statistically significant increases. Thus, the collaboration between university faculty and elementary teachers was a successful model for impacting teachers and classroom instruction. Using Slavin's model for instruction to be effective, it must encompass more than a teacher's pedagogy. Future professional development funding regarding effective instruction should consider encompassing the broader elements to which teachers can contribute.

Introduction

The science, technology, engineering, and mathematics (STEM) labor shortage in the U.S. has received national attention and impacted policy, practices, and funding throughout K-16 education (Change the Equation, 2011; National Academy of Sciences, National Academy of Engineering, and Institute of Medicine, 2010; National Science Board, 2010; President's Council of Advisors on Science and Technology, 2012). Yet more recent reports indicate that shortages are more nuanced within specific areas rather than an all-encompassing shortage (Anft, 2013; Xue & Larson, 2015). No matter the size of the STEM shortage, virtually every future scientist, programmer, engineer, mathematician, and medical professional will begin their STEM learning within a classroom. Students' STEM foundational knowledge cannot wait for a high school advanced-placement course; nor for middle-school when many lose interest (Gottfried, Marcoulides, Gottfried, & Oliver, 2009); but the passion should be cultivated in their early school years (Mulligan, Hastedt, & McCarroll, 2012).

Parents, policy makers, educators, and employers at the local, state, and national level are working to strengthen K-16 STEM Education. At the national level, the Elementary and Secondary Education Act (ESEA) was reauthorized in 2015 and identified STEM as a crucial educational component. The legislation began in 1965, when President Lyndon Baines Johnson signed the landmark Elementary and Secondary Education Act (ESEA) as part of his war on poverty. A key portion of the legislation was providing grant funds to school districts serving low-income students to decrease the disparity of schools, particularly urban and suburban. Title II provided financial support for professional development for mathematics and science teachers but was reauthorized and expanded to include all content areas. President George W. Bush signed the reauthorization of ESEA as the No Child Left Behind Act (NCLB, 2001).

Funding for this study was provided by the Mathematics and Science Partnerships (MSP) Program Under the NCLB Act. The purpose of MSP was improving the mathematics and science knowledge of classroom teachers, enhancing their use of innovative teaching approaches, and, thereby, increasing student learning (U.S. Department of Education, n.d.). The substantive content focus is less common in professional development (PD) across the nation and is, therefore, a distinguishing feature of MSP (Wei, Darling-Hammond, & Adamson, 2010). The required grant elements were research based such as the requirement for sustained professional development (Yoon, Duncan, Lee, Scarloss, & Shapley, 2007). To meet both state and federal requirements, a Southern University partnered with 5 local school districts to collaborate with 25 Grade K - 4 teachers in 100 hours of science PD (Arkansas Department of Education, 2011). As per the RFP, the foci included increased science content knowledge, STEM pedagogy, and knowledge of that state's new K-4 Science Standards. The purpose of this manuscript was to use relevant portions of the project evaluation data to explore the impacts of an MSP project on effective instruction as framed by the Slavin's 2014 *QAIT* model.

Theoretical Model

The core intention of MSP *grants* was to increase students' knowledge of information within STEM. Because MSP's mechanism for change was teacher development, the researchers selected Slavin's (2014) *QAIT* model of effective instruction. Within the model, Slavin posited four elements a teacher can implement to ensure students learn the material. These elements are (a) *Quality of instruction*, (b) *Appropriate levels of instruction*, (c) *Incentive* and, (d) *Time*.

Quality of Instruction. The first element of the Slavin model (2014) encompasses the concept of a high quality instruction facilitating learning for students. Because students do not know the breadth of the subject matter, they rely on the teacher's skills and choices to guide their learning. Those choices have a profound impact on what material students learn and to what extent. Presumably, the teacher possesses the practical knowledge and pedagogical skills necessary to teach that information and can combine the two into effective instruction. What is presented during lecture times is, arguably, the most important concept of the QAIT model, though all four elements are important for various reasons. The choice of information presented, order of presentation, examples utilized, wording/vocabulary chosen, and the text selected are some of the factors a teacher must consider when making decisions regarding instruction presentation. How much class time does the teacher allocate for individual work and how much for small group work? When lecturing, what balance is given to deploying information or employing the Socratic method? In conjunction with an appropriate quality of instruction, a teacher must consider the level of instruction to deliver to students.

Appropriate Levels of Instruction. The second element of Slavin's model encompasses the teacher ensuring that students in their classes are ready to learn the material. This involves, in part, making judgments regarding the level of knowledge, the writing skills, the vocabulary level, the level of relevant emotions (e.g. fear, excitement, apathy), and the utility level with which students begin the course. Although none of these entry factors are under the control of the teacher, they will determine the pacing and organization. The teacher must decide whether to assume all students enter with no prior knowledge of the topic, a great deal of knowledge, or some level in between. The teacher must determine if students possess the writing skills necessary to complete homework and exams or, if writing should be minimized or even oral or performance based assessments used. The teacher must analyze if the student is apprehensive regarding the course material, is eager and curious, or more ambivalent. Lastly, the teacher must assess whether the student understands the long-term value of the material or is simply learning for the exam. Although all these considerations will influence how a teacher develops lessons, the teacher is only in partial control of the outcomes of these issues, not the issues themselves. The aforementioned considerations are simply a few of the characteristics to consider for each student. Students enter class with their own set of characteristics. Teachers do their best to determine those characteristics and then adjust lessons to ensure the most effective learning for the greatest number of students in the class. However, do students have the appropriate level of incentive to learn the material?

Incentive. This element of the model is one in which students are motivated to learn the material and complete the course tasks necessary to do so. All effort ultimately originates within an individual, yet the impetus to begin to exert effort can be either internal (from within a person) or external (from outside a person). Homework due dates and scores, exam frequency and scores, project type and weight, subject interest, lectures with little or no student input, lesson pacing, lecture time organization, and future usability of the information impact motivation, resulting in either increases or decreases in student motivation to learn. Motivation is specific to each and every student. Therefore, for some (e.g. those who love projects), homework and projects may be motivating. For others (e.g. those with exam anxiety), multiple, smaller exams in a course may be demotivating. Students may also be demotivated by coursework they feel has no utility value. Adjusting the aforementioned characteristics will help ensure the teacher has done all he or she can to increase motivation. From there, the student must want to devote the time and effort necessary to learn the content.

Time. This element of the model is one in which students have enough classroom time to learn the material being taught (Slavin, 2014). It is largely a function of how much time is given to classroom instruction, how much of that time is spent actually teaching, and how much of that time students are learning. The length of the lesson and the breadth of the material are, largely, somewhat within the purview of the teaacher, but will influence each class meeting. A characteristic the teacher must consider is how much class time is devoted to science instruction?

A second factor to consider is which facets of the content are most important, semi-important, or less important. Having made these decisions about prioritizing content, the teacher must then use their knowledge of the students' characteristics to make assumptions regarding how much time is necessary for students to learn each part of the material in the course. The teacher also controls which material to present during instruction time and which to assign as outside work. The teacher must also decide which material to include in assessments and how to assess. These factors will partially decide the sequencing and pacing of the lesson.

The last time factor to consider is how much time students are paying attention and how a teacher can structure instruction time to maximize attention span. There are multiple ways to keep student interest and, by capitalizing on them, students may be more willing to devote the time necessary to master the course concepts.

Elementary STEM Needs

In 2015, only 38% of Grade 4 students scored proficient on the National Assessment of Education Progress (NAEP) science scores (U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, 2015). Research suggests that teaching quality is one of the most important factors in student learning (Boonen, Van Damme, & Onghena, 2014; Harris & Sass, 2011). The 2012 National Survey of Science and Mathematics Education (NSSME) data revealed that only 39% of elementary teachers felt well prepared to teach science and 4% indicated they felt prepared to teach engineering (Banilower et al., 2013). More specifically, few reported confidence in encouraging female participation in science (30%), interest in science (25%), science participation of students from low SES backgrounds (31%), and science participation of racial or ethnic minorities (30%). This lack of confidence may be the result of a lack of college science coursework. Although 90% have completed a college life science course, only 47% have completed a chemistry course, 32% physics, 33% environmental science, and 1% engineering. Thus, the data indicate a need to assist elementary teachers with science instruction.

In the 2012 National Survey of Science and Mathematics Education (NSSME), elementary teachers' responses indicated four areas as serious problems for science instruction (Banilower et al., 2013). Inadequate funds for purchasing science equipment and supplies was rated as a serious concern by teachers in 30% of schools, lack of science facilities (27%), insufficient time to teach science (27%), and inadequate science-related PD opportunities (23%). The lack of time was corroborated on another question about the number of minutes per day of instruction in Grades K-3. On average, only 19 minutes per day is devoted to science instruction in the early grades. Thus, elementary teachers report a need for more time to teach science, the resources and facilities to promote effective instruction, and support enhancing science teaching and learning. Positive findings to this 2012 NSSME question were only 4% of elementary teachers indicated that a lack of teacher interest in science was a serious problem for science instruction, 5% for low student interest in science, and 10% for lack of parental support for science education. We cannot logically interpret the 4% value for *lack of teacher interest in science as a serious problem for science instruction* to indicate that 96% of elementary teachers are *interested in teaching science*. The lower problem reports for teacher interest, student interest, and parental support for science education are, nevertheless, encouraging and, as a whole, the data allow programs to target the areas of greatest need (time, resources, and PD).

National studies reveal lower STEM scores for students in families with income below the federal poverty level when compared to those in families with income at or above 200% of the federal poverty level. The 2011 Early Childhood Longitudinal Study (ECLS) data identified a 5 point gap in kindergarten science scores that widened to an 8 point gap in third grade. The 2015 National Assessment of Educational Progress (NAEP) data documented the poverty gap in science for all grade levels (4, 8, and 12). All too often, teachers who are well prepared to teach science are not equitably distributed across SES levels and teachers in high-poverty schools more often report student behavior as a hindrance to effective instruction (Banilower et al., 2013). Yet, a quality STEM education can transform the career trajectories and lives of historically

underrepresented populations (Doerschuk et al., 2016). In alignment with the original intent of ESAE as part of the war on poverty, the MSP programs provide support of low-income schools. A requirement of all MSP programs is a partnership with at least one high-need school to help alleviate the SES disparity in science scores.

Low proficiency percentages on science measures, low reports of elementary teachers' confidence in science instruction, limited science training for elementary teachers, and a report by elementary teachers that a lack of science PD is a serious problem all indicate a need to embolden elementary teachers science instruction. Through professional development, teachers can acquire new content knowledge, extend their repertoire of teaching techniques, join a community of learners, and deepen their understanding of science learning all of which strengthen the quality of teaching and learning (National Science Board, 2014). Research indicates that teacher collaboration with colleagues who face similar challenges is an important component of effective PD (Banilower et al., 2013). Best practices in PD align with best practices in teaching and learning. The PD leader should facilitate learning inquiry oriented learning where teachers engage in investigations to extend their content knowledge and collectively determine how both the content and context will apply in their classrooms.

A meta analysis of 16 mathematics and science PD studies by the Council of Chief State School Officers (CCSSO, 2009) indicated that effective PD can have significant effects on student performance. Using meta analysis, the results revealed a consistent gain in students' achievement for the teachers who participated in PD. Thus, the literature supports the need for elementary science PD and the potential benefits to teaching and learning.

Prior to MSP Grant Proposal submission, the principal investigator conducted a needs assessment of science training needs with elementary teachers in central Arkansas (*Author*, 2015) with 27 teachers responding. On a scale of 1 to 5 (with 5 as highest), teachers indicated their overall science content knowledge as 3.15 (*SD* = 0.72), familiarity with the upcoming state K-4 Science Standards as 2.15 (*SD* = 1.06), comfort level teaching science content as 3.15 (*SD* = 0.99) current level of integration of science content as 2.59 (*SD* = 0.84), interest in teaching science as 3.70 (*SD* = 0.95), students' interest in learning science as 4.30 (*SD* = 0.82), and students' science content knowledge as 2.78 (*SD* = 0.89). In response a prompt about teaching science, the majority of teachers mentioned concerns about time. One respondent shared, "With the
daily schedule, it is very difficult to have a decent amount of time to teach. Therefore, integration is really the only sufficient form and a lot of times it is hard to get a decent amount of content in during that time and integration." Several also indicated the need for more ideas/resources for successful integration. When asked what types of PD would be most helpful in the integration of science content, teachers requested sample lessons and hands-on activities.

Research Questions

In light of the literature above, the following research questions were created to measure effective instruction in the current study:

1. Quality of instruction: What are the impacts of teacher professional development on teachers' content knowledge related to K – 4 Science content and on teaching skills of professional development material?
2. Appropriate levels of instruction: What are the impacts of teacher professional development on teachers' knowledge of the K-4 Science Standards?

3. Incentive: What are the impacts of teacher professional development on teacher self-efficacy in teaching science and teachers' reports of student interest in science instruction?
4. Time: Did the PD influence the amount of classroom time devoted to science instruction?

Methods

This project used a quasi-experimental design with a single group pretest posttest for evaluating teachers' science teaching self-efficacy, knowledge of state K-4 Science Standards, knowledge of participants' science content knowledge, and changes to their teaching methods within their classroom. A focus group was used to determine teachers' perceptions of the impact of the PD on their student's interest in science instruction.

Participants

In alignment with requirements of the MSP grant, a purposive sample of high need and private schools from the local area were selected for this study which resulted in one private and four public schools. Each school was allowed to send up to 5 teacher participants of the school's selection. Of the 22 participants, 3 were from a faith-based preK-12 institution with a student population of 1450. The remaining participants taught at four schools from a large district which serves 23,363 students with 74.92% classified as low income. Of the 46 schools in the district, 39 are designated as *priority*, *focus*, or *needs improvement*. Participating teachers had an average of 10.59 (*SD* = 7.67) years teaching experience, were predominately female (86%) and 9 (41%) hold a master's degree. Two were kindergarten teachers, 1 taught Grade 1, 7 taught Grade 2, 6 taught third Grade 3, and 6 taught Grade four.

In addition to the measured outcomes included in the five research questions, building a community of experts among partnerships schools and the university was a desired project outcome. The MSP leadership team consisted of nine faculty from either Earth science or education including the principal investigator and evaluator.

Instruments

***Science Content Knowledge*.** An independent assessment company was hired to construct and score an assessment of teachers' Earth and Space Sciences content knowledge aligned with the Arkansas K-4 Science Standards. The assessment contained 25 items consisting of selected response, constructed response, table completion, and modeling. No validity or reliability information were provided.

***Reformed Teaching Observation Protocol (RTOP)*.** As an observational measure, the RTOP was used due to the strong psychometric record and to adhere to grant requirements. The RTOP was developed as an observational tool to measure reformed teaching, or teaching that shifts from the traditional teacher-centered classroom to a learner-centered classroom that is collaborative and activity based. The measure is comprised of 25 items across three subsets: Lesson Design and Implementation (5), Content (10), and Classroom Culture (10). Sample items from the three subscales are, "In this lesson, student exploration preceded formal presentation," "The lesson promoted strongly coherent conceptual understanding," and "There was a climate of respect for what others had to say."

Observers rate teachers on each item using a five-point scale of 0 to 4 with anchors of Never Occurred and Very Descriptive resulting in possible RTOP scores ranging from 0 to 100. Previous studies of score reliabilities reported inter-rater reliability estimates ranging from .90 to

.95 for the total score and .67-.95 for subset scores (Piburn & Swada, 2000). Piburn and Sawada (2000) provided a discussion of face, construct, and predictive validity and concluded that, "Analysis of the RTOP suggests that it is largely a uni-factorial instrument that taps a single construct of inquiry….the instrument seems amply able to measure what it purports to measure regarding reformed teaching" (p. 27). To ensure that participating teachers are implementing strategies learned in the professional development training, researchers utilized the Reformed Teaching Observation Protocol (RTOP). The RTOP provides a "standardized means for examining classroom instruction in science". These scores were collected to examine implementation of the PD topics within participants' classrooms.

State K-4 Science Standards. To measure teacher's knowledge of the science standards, the MSP leadership team created a 20 item assessment that assessed the science standards themselves as well as identified performance expectations teachers are expected to utilize at their grade level. The *standards scale* required participants to correctly identify the science standard for their grade level from a list of science standards across grades K-4 for 9 items (maximum score = 9). On the *grade level identification scale*, participants were asked to correctly identify the science and engineering practices for five items and the cross-cutting concepts for 5 items (maximum score = 10).

To validate that the items selected would actually measure the content objectives of the grant, an expert panel of science subject matter experts (SME's) reviewed the items and made a determination of the degree to which each item aligned with the content objectives for the professional development and that there were sufficient items to measure program objectives. A scale reliability analysis was performed on the measure and, although low, Cronbach's alpha (.42) would ordinarily be problematic (.70 is generally considered acceptable), this scale was modified for use with each of the 5 grade levels of teachers. Therefore, having only 1 to 6 participants per grade level taking this assessment does not provide enough statistical power for an appropriate reliability analysis.

Science Teacher Self-Efficacy Belief (STEBI). The STEBI is a 25 item Likert instrument designed to measure teachers' beliefs toward science teaching and learning. The instrument consists of 2 scales, the efficacy belief scale and the outcome expectancy scale, based on a confirmatory factor analysis of responses from 324 teachers (Enochs, Smith, & Huinker, 2000). Both scales have acceptable validity coefficient at .92 and .77, respectively. The scale relevant for this study was the efficacy belief scale comprised of 13 items with 9 reverse-coded items to measure teachers' self-efficacy in science instruction. The internal consistency reliability estimate, Cronbach's alpha, was .80 for both the pre- and post-administrations of the instrument (n = 21).

Focus Group. Participants were asked three guiding questions, "Prior to starting this professional development, what would you say your students' interest level in Science was?", "Now that you're taking this PD, what would you say your students' interest level in Science is?", and "What, specifically, would you say is responsible for this change?"

Program Evaluation Survey. The MSP leadership team developed a program evaluation survey to ascertain participants' perceptions of the program. The survey consisted of 2 demographic, 16 Likert (4 point scale), and 2 open-response items. The Likert items were constructed as three scales (a) teacher knowledge, (b) teaching, and (c) working with the university. The prompt for all items was, "Reflecting on your participation in the MSP, please rate each of the following items." Sample items from each respective scale include, "My science content knowledge has increased," "I am more comfortable teaching science with my students,"

and "I am more comfortable requesting assistance from the university." Internal consistency reliability estimates, as measured by Cronbach's alpha, were reasonable for each scale [teacher knowledge = .89 (4 items), teaching = .79 (7 items), and working with the university = .78 (5 items)].

Procedures

Professional Development Sessions. To meet the identified needs of teachers and ultimately impact state K-4 students' interest in and understanding of science content, the leadership team provided 100 hours of teacher professional development from November – July. Meetings were held on five Saturdays during the academic year, online, and for two weeks during the summer. Participating teachers received a stipend of $2500. Through the PD, we studied, applied, and *unpacked* the new state K-4 Earth and Space Sciences (ESS) Standards. We accomplished this through science content activities from university science faculty, model lessons with applications content from university teaching faculty, connections to literature from University Early Childhood Education faculty, and participant-to-participant interactions across schools.

Each PD meeting featured active science participation aligned with the new state K-4 Science Standards with emphasis on the Earth and Space Sciences (ESS) Standards. A key feature of the PD was encouraging participants to *think like scientists* and to *do science* with experts in the field. During the Saturday meetings, we exposed teachers to community resources and used those places as field sites. We explored metrology with a NOAA meteorologist at the North Little Rock Weather Center and learned how to construct weather classroom weather stations. We toured the Big Dam Bridge and learned about the construction and operations from a resident engineer. We participated in the University Emerging Analytics Center event which featured virtual and augmented reality projects, applications, and developments. We practiced geology field techniques with the geologists at the state Geological Society who provided hands-on workshops and classroom kits to participants. Our final off-site field event included data collection at Coleman and Forsche Creeks lead by an Earth science faculty member. The online lessons allowed participants to explore astronomy. Lessons included information, classroom lesson suggestions, and data collection. Many participants also explored the stars by participating in optional stargazing events with the University astronomy faculty events throughout the year.

During a typical on campus PD day, teachers participated as students in model lessons on the new standards taught by master teachers during the morning. The majority of lessons followed the 5E approach and the trade books often served as the *Engage* feature to get students interested in the STEM topics and ready to *Explore* and learn. In the afternoon, participants worked with university science faculty conducting experiments and deepening their understanding of the science content of the model lesson. Topics included: reducing the impact of humans on the local environment, earthquakes and volcano science, interactions with plants, animals and the environment, how the Earth is changing, reading geological maps, weather's impact on land and water, structures to reduce the warming effect of sunlight, and science literacy. Two days during the summer, the morning model lessons were replaced with the EiE Unit – *A Stick in the Mud: Evaluating a Landscape*. During the EiE training, teachers were introduced to engineering and guided through the structure of the EiE curriculum while participating in hands-on, problem-based learning. Through this process teachers boosted their confidence in teaching engineering while exploring the pedagogy behind the curriculum.

Pre- and Post Assessments. During the first and last PD meetings, teachers completed the State K-4 Science Standards Assessment, Science Content Assessment, and STEBI. To allow for matching of pre and post scores, participants included their name and school on each assessment with assurances of confidentiality. At the last meeting, teachers also completed an anonymous program evaluation survey which they placed in a separate envelope from the other assessments.

RTOP. The logistics of teacher classroom observations were complicated by the constraints of grant reporting dates. Ideally teacher observations would occur prior to, and after the conclusion of, PD. Because the grant began in October, and the final report was due the following September, it was not possible to conduct post observations during the fall term. Thirteen participating teachers were identified in advance of the PD and their classrooms observed before summer break and again at the end of the spring term. Thus, those participants had participated in the Saturday portions of the Earth Science PD but had not yet attended the two week summer sessions. MSP leadership team members worked with participants to identify a time to visit and conduct the classroom observation. Due to illness and schedule conflicts, pre- and post-observations were obtained for 9 participants.

Focus Group. Participants were asked to volunteer for a focus group to ascertain the effects on student motivation to learn science content and provide examples of teacher application of PD information. The focus group of four teachers met with the evaluator one afternoon of the summer institute. Inquiries were made about the effects of the sessions on their teaching and impacts on student learning and interest in science.

Results

All data were entered into the Statistical Package for the Social Sciences (SPSS) version 20 analysis. Researchers used casewise deletion of missing data; specifically, all cases remained in the sample and participants were excluded from analysis only if they had missing data on the variable(s) needed for that analysis. To examine teachers' change on the State K-4 Science Standards, Science Content Knowledge, RTOP, and STEBI researchers conducted dependent samples *t* tests for pre and post scores. Researchers examined the Shapiro-Wilk test to test for normality of data assumption. Responses to the program evaluation survey were analyzed via descriptive statistics. The focus group transcript was analyzed for themes among the responses from the four participants.

Science Content Knowledge

To investigate potential changes in participants' science content knowledge, researchers conducted an dependent samples *t* test to compare the pre-test scores of the treatment group to the post-test scores of the treatment group in order to measure the level of knowledge growth [$M_{pre} = 67.00$, $SD = 13.26$, $M_{post} = 74.18$, $SD = 13.28$; $t\ (18) = 3.43$, $p = .003$]. This finding indicated that participating teachers learned statistically significant amounts of science content knowledge over the life of the PD. The mean increase of scores was 7.18 with the 95% confidence interval ranging from -11.58 to -2.79. Cohen's $d = 0.54$ revealed that the increase was moderate.

Participant Observation (RTOP)

To detect potential differences in classroom instruction, researchers conducted a dependent samples *t* tests comparing the pre- and postscale means on the five RTOP scales. The

Shapiro-Wilk test results indicated that the normality assumption on the distribution of the difference scores between the pre- and post-scores was reasonable for all scales with the smallest $p = .355$. The test results, presented in Table 1, indicated statistically significant gains in propositional knowledge, communicative interactions, and student/teacher interactions with large values for Cohen's *d* ranging from 0.99 to 1.23. With multiple *t* tests, there is a potential for inflated alpha; however, the small sample sizes also result in lower power so no adjustments were applied.

Table 1
RTOP Test Results

Scale	Pre *M(SD)*/Post *M(SD)*	*t*	*p*	*d*
Lesson	1.71(1.18)/2.44(0.75)	1.32	.225	0.76
Propositional knowledge	2.22(0.70)/3.02(0.76)	2.85	.022*	1.10
Procedural knowledge	1.87(0.73)/2.29(1.20)	0.81	.443	0.44
Communicative Interactions	2.03(0.76)/2.93(0.70)	4.03	.005*	1.23
Student/Teacher Relationships	2.65(0.56)/3.18(0.51)	2.46	.044*	0.99

State K-4 Science Standards

To examine participants' knowledge of the state K-4 Science Standards, participants completed a two part pre- and posttest. The nine item *standards scale* (maximum score = 9) required participants to correctly identify the science standard for their grade level from a list of science standards across grades K-4. Researchers conducted a dependent samples *t* test comparing participants' pre- ($M = 2.18$, $SD = 1.33$) and posttest ($M = 2.09$, $SD = 2.11$) scores on the identification of science standards for their grade level. The Shapiro-Wilk test results indicated that the normality assumption on the distribution of the difference scores between the pre- and post-scores was reasonable [$W(22) = 0.94$, $p = .230$]. Test results indicated that participants' identification of science standards for their grade level was not statistically significantly [$t(21) = -0.18$, $p = .859$] different at the conclusion of PD.

On the *grade level identification scale*, participants were asked to correctly identify the science and engineering practices for five items and the cross-cutting concepts for 5 items (maximum score = 10). Researchers conducted a dependent samples *t* test between pre- ($M = 1.73$, $SD = 1.91$) and posttest ($M = 4.86$, $SD = 2.42$) scores on identification of science and engineering practices and cross-cutting concepts. The Shapiro-Wilk test results indicated that the normality assumption on the distribution of the difference scores between the pre- and post-scores was reasonable [$W(22) = 0.96$, $p = .453$]. Test results indicated that participants' scores statistically significantly [$t(21) = 5.19$, $p < .001$] increased over the course of their participation in the PD and the Cohen's $d = 1.45$ revealed that the increase was substantial.

Science Teacher Self-Efficacy Beliefs (STEBI)

To ascertain teachers' efficacy in teaching science content, researchers conducted a dependent samples *t* test comparing the pre- ($M = 2.68$, $SD = 0.30$) and posttest ($M = 2.92$, $SD = 0.32$) scores on the self-efficacy scale of the STEBI for participating teachers. The Shapiro-Wilk test results indicated that the normality assumption on the distribution of the difference scores between the pre- and post-scores was reasonable [$W(21) = 0.96$, $p = .554$]. Test results indicated that participants' reports of self-efficacy in teaching science statistically significantly increased

[$t(20) = 3.37$, $p = .003$] over the course of their participation in the PD and the Cohen's d of 0.77 supports that the increase was moderate.

Focus Group

Analysis of focus group transcripts revealed that all teachers felt that students were more interested in, and excited for, science instruction now because they get to do more experiments now instead of worksheets. This is because the professional development has taught them more hands-on ways of teaching and to be okay with messy instruction, both figuratively and literally. Some teachers had not been covering much science before the PD because of the mess and their lack of confidence in their teaching skills; now they are doing more of it and their students love it. The self-efficacy measure corroborates this finding because teachers' self-efficacy gained statistically significant amounts over the course of the PD. The teachers feel they are making more of an effort in their science instruction and are actively seeking effective pedagogy from sources within their school, which they had not been doing prior to the PD. They also shared that students remind them of the science experiments they had done and shared how much they had liked them. These instances made the teacher feel good to know they were having a lasting impact on their students, which makes them even more willing to delve even further into the PD and gain effective pedagogy and knowledge in the future. This improved student/teacher relationships was corroborated by the statistically significantly RTOP student/teacher interactions scale.

Program Evaluation Survey

Results from the program evaluation survey (4 point scale, *strongly agree* to *strongly disagree*) indicated the PD benefited teachers' content and standards knowledge ($M = 3.45$, $SD = 0.60$, 4 items); science teaching ($M = 3.59$, $SD = 0.36$, 7 items); and collaboration with the university ($M = 3.53$, $SD = 0.39$, 5 items). Agreement with the time item (*I will spend more time on science with my students*) was also high ($M = 3.33$, $SD = 0.28$, 1 item).

Discussion

Findings from the Current Study

An important MSP goal is increased teacher content knowledge which results in *Quality of Instruction*. Participants' content knowledge revealed a statistically significant increase from the beginning of PD ($M = 67.00$, $SD = 13.26$) to the end ($M = 47.18$, $SD = 13.28$) on the science content assessment. Thus, the focus on the application of Earth and space science with university faculty throughout the year depended teachers' understanding. This finding was expected because participants were essentially compensated to participate in a targeted Earth and space science mini-course taught by faculty who are passionate about assisting teachers.

Appropriate Levels of Instruction in this project referred to improving teacher familiarity with, and understanding of, the state's new K-4 Science Standards. The project accomplished this goal to some extent. The *standards scale* for identification of the science and engineering practices and cross-cutting concepts was statistically significant, the *grade level identification scale* was not. However, the PD only covered the Earth and space science section of the state K-4 Science Standards so only a small treatment effect was anticipated in participants' ability to distinguish any K-4 standard for their grade from a K-4 standard for a surrounding grade. Teachers' self-reports via the program evaluation survey and during the focus group indicated that their knowledge of the new standards and science content increased throughout the PD.

Thus, there is some evidence to support PD as part of plan for enacting new teaching and learning standards.

In addition to the increased content knowledge, participants' science teaching self-efficacy also improved through participation. The magnitude of gain from pre- (M = 2.68, SD = 0.30) and post- (M = 2.92, SD= 0.32) STEBI scores was moderate (Cohen's d = 0.77). For the nine teachers with pre- and post-observation scores, gains were observed in three of the five RTOP categories indicating changes in teacher classroom practice of science instruction. Responses to the *Program Evaluation Survey* also supported the assertion that participating teachers would spend more *Time* on science instruction. The positive changes in teacher motivation and *Incentive* may lead to the goal of student *Incentive* and *Time* as a scientist.

Collectively, these findings are what the MSP leadership team hoped to accomplish. Teachers' knowledge and understanding of the new K-4 standards, science content, self-concept, classroom practices and enthusiasm for teaching science all increased to some extent. Because they feel more confident in teaching science, they are making more time to do so in their classrooms. Students are also more excited about science time and love getting to do more experiments. Students' comments about prior experiments speaks to long term student excitement regarding science instruction.

Limitations and Delimitations of the Current Study

Onwuegbuzie (2003) cautioned with most educational studies, population and ecological validity threats were methodological concerns. Specifically, the use of only a few school districts and the small sample sizes limit the external generalizability of the findings.

A delimitation was the absence of student achievement data. The state does not require science achievement data for Grades K-4. The leadership team was unable to locate measures of science achievement which aligned with the PD content and were appropriate for all grades, especially kindergarten. Development of student science measures across five grades was beyond the scope of the project.

Effective Instruction

The authors began by discussing Math and Science Partnerships Grants' intent to ensure effective instruction. We framed effective instruction, for the purposes of this paper, with the QAIT model. In this model, we examined the Quality of instruction, Appropriate levels of instruction, Incentive, and Time to learn in which Slavin (1995) posits that if all four of these elements are attended to by teachers and/or schools, instruction will, in fact, be effective in ensuring student achievement.

We applaud the intent and funding the MSP Grants have provided to ensure effective instruction, yet, the stated focus on teacher factors (a single element of a more faceted system) is somewhat limiting when trying to ensure students learn information. Teacher actions, and the elements of learning they encompass, are critically important (Boonen, et al. 2014) but they are not the sole factor determining what students learn in the classroom. Certainly pedagogy is an important factor in the QAIT model's Quality of Instruction element. However, choosing a relevant text and appropriate instructional materials are important as well. Typically, these elements are not chosen by the teacher, for the most part. They are chosen school officials or district curriculum committees. Therefore, programs such as the MSP, should consider expanded involvement to include key decision making personnel to enact greater change in the instructional quality of elementary STEM.

An Appropriate Level of Instruction (the second element of the QAIT model) in which students have the pre-requisite level of vocabulary, background knowledge, appropriate writing skills, and emotions appropriate to learning the course material are all factors that are relevant to whether a student learns course information or not. Teachers' awareness with and adherence to state science standards should support several aspects of appropriate levels of instruction because of the intentional sequential nature of the standards. Because the MSP programs support multiple-grade levels, participating teachers were also exposed to the science standards above and below their grade level and thus inform that knowledge of student preparation in science.

Ensuring students apply the appropriate incentive (QAIT's third element) to the course information is also important and, although they intersect a teacher's instructional strategies, they operate on a somewhat separate plane. However, changes from the historical model of *sit and get* to the active, project based lessons modeled in the PD were made to inspire students' curiosity and engage them as partners in learning.

Lastly, time (the fourth element of QAIT) is a very important factor in ensuring student achievement. Students need the time to adequately process the information presented in class and to complete course assignments designed to facilitate learning. Yet school districts largely determine the amount of instructional time being devoted to STEM education, not teachers. Therefore, a teacher's effectiveness is constrained or facilitated by the amount of time allocated for instruction.

Conclusions

Data from this PD program exhibited measurable progress in effective instruction as outlined by the MSP grant. The substantial 100 hour collaboration between university faculty and elementary teachers was a successful model for impacting teachers and classroom instruction. However, using Slavin's model (1995) we noted that programs should encompass more than a teacher's pedagogy for all elements of the *QAIT* model to be supported. Future professional development funding regarding effective instruction should consider broader programs for greater impact.

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Relationship between Physical Activity and BMI of Fourth Grade Students

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Abstract

The purpose of this study was to determine if there is a significant indirect relationship between physical activity during the school day and body mass index (BMI) of fourth-grade elementary students. We monitored the physical activity of 49 fourth grade students using Fitbit Charge HR activity trackers. The students wore the activity trackers one day per week at school for nine weeks. At the end of the study, we applied the students' BMI and average daily step data to a Pearson Correlation. There was a low ($r = -.162$, $p > .05$) indirect relationship between the two variables.

Introduction

Obesity is putting many children at high risk for disease starting at a young age (Center for Disease Control and Prevention, 2019). Physical activity can help a child maintain a lower BMI by balancing energy from calories consumed. In addition, a lower BMI can decrease the risk of acquiring diseases such as, cardiovascular disease, Type 2 diabetes, and cancer. Obese children are more likely to become obese adults, and the risk for disease follows the path of these individuals as their BMI and goes up. According to the Centers for Disease Control and Prevention, the percentage of children with obesity in the United States has more than tripled since the 1970s (Center for Disease Control and Prevention, 2016). Low levels of physical activity can increase the likelihood of developing obesity and chronic diseases later in life for overweight, obese, and even lean but physically inactive children (Froberg & Andersen, 2005). Therefore, we need to monitor the physical activity of children, and activity trackers (e.g., Fitbits, pedometers, etc.) provide an objective means of doing so (Kim & Lochbaum, 2017).

In an effort to decrease the rising number of overweight and obese students, the Arkansas State Assembly passed Act 1220 of 2003 requiring all public school children to have their BMI assessed annually (Arkansas Center for Health Improvement, 2018). According to Arkansas state law, elementary children must receive a minimum of 40 minutes of physical education and 90 minutes of physical activity (such as recess) each week during the school year. Physical education standards, such as maintaining moderate to high intensity cardiovascular exercise, begin to increase at fourth grade. In addition, physical educators are to advise their students on how BMI, nutrition, exercise, and their growing bodies are related (Arkansas Department of Education, 2011).

Considering that Arkansas elementary children spend approximately 6.89 hours per day in school (U.S. Department of Education, 2008), how active they are during that time can greatly impact their total day's activity. Couple this with the results of research that demonstrate how important physical activity is in helping to decrease body fat, the purpose of this study was to determine if there is a significant indirect relationship in fourth-grade students' physical activity during the school day and their BMI.

Review of Literature

The United States' number one health risk for children is obesity (Centers for Disease Control and Prevention, 2019). U.S. childhood obesity costs an estimated $14 billion yearly in

directly related healthcare costs. The rise in childhood obesity is not limited to the U.S. alone. This crisis is becoming a global problem. A study with 12 sites representing all continents found that on average, 12.6% of ten-year-old children are obese (Broyles et al, 2015).

With increasing curricular demands, in school physical activity is dwindling while childhood obesity is increasing. Nearly 25% of children do not use free time to participate in physical activity. Instead, the average American child spends up to five hours watching TV or playing computer/video games daily (American Heart Association, 2011, Johansen et al, 2015). Teachers and parents must intervene. Schools can provide (a) nutrition education for parents and their children, (b) healthier, easily accessible, and more appealing meal and snack options, and (c) additional physical activity opportunities. After school programs, recess, and programs during class can help to increase physical fitness and decrease body fat (Kain, et al, 2004). Furthermore, researchers conducting a longitudinal study in Finland found a direct correlation between physical activity and a high-grade point average (GPA) as well as a strong indirect correlation between obesity and GPA (Kantomaa et al, 2015). The choices children make can form habits for the future. Physical activity is an effective way to bring back into balance all the physiological markers negatively influenced by obesity including lung capacity, mood, and cardiovascular disease. The American Heart Association (AMA) suggests that children should strive for 60 minutes of moderate to vigorous activity daily. The AMA also recommends that electronics be limited to no more than two hours per day (American Heart Association, 2011).

While the results of many studies indicate that physical activity can help to decrease adiposity in children, not all studies are consistent. Large scale longitudinal studies may be limited to surveys on paper and these surveys may lack clarity needed to provide accurate information (Zou, Yang, & Zhu, 2014). More rigorous tracking methods may be useful in finding correlations. A study of 5th and 6th graders had physical activity integrated into their science lessons. These classes wore activity monitors such as heart rate monitors and pedometers to track physical activity. The results of the study showed that the average activity levels and caloric expenditure of the students met national recommendations. Additional data indicated these children beginning to enjoy physical activity more (Finn & McInnis, 2013). However, aerobic activities may not be enough to sufficiently decrease children's BMI. The addition of resistance training may increase fat loss more than aerobic training alone (Nemet, 2015).

Devices such as pedometers can be used to record and track activity levels. Fitbits and other pedometers help provide motivation by allowing the user to see their steps throughout the day, giving them independence and control over their activity level. The use of these devices at a young age can help children start thinking about their physical fitness (Miller & Mynatt, 2014) while providing details about their heart rate and steps taken. Providing motivation and allowing children independence can encourage children to be more active (Colgan, Lenz, Starkoff, Bopp, & Lieberman, 2015). Providing children with step goals and a means to track them (e.g., Fitbit) can be an effective way for children to decrease their BMI and sustain a healthy weight (Staiano et al, 2017).

Methods

Forty-nine fourth grade students (n = 19 males, n = 30 females) at a rural elementary school, whose parent/s or guardian/s gave permission, participated in this study. We determined physical activity by the number of steps the students took from 8:00 a.m. to 3:00 p.m. as measured by Fitbit Charge HR activity trackers. Students wore the Fitbits once a week for nine weeks on the day they had physical education. Each student had 40 minutes of recess and 45 minutes of physical education each day of data collection. At the end of nine weeks, we

correlated the mean number of steps of each student with their BMI by applying the data to the Pearson Correlation using the SPSS statistical package. The university's Institutional Review Board approved this study.

Results

Of the 49 students, 28 were in the healthy weight category, 15 were in the overweight category, and 6 were in the obese category. The mean number of steps each day was 5996.52 (males = 6686.32, females = 5580.7), and the mean BMI was 19.1 (males = 18.6, females = 19.4). The results of the Pearson Correlation found a low indirect relationship between physical activity and BMI ($r = -.162$, $p = .267$).

Discussion

Research indicates that increasing physical activity helps in decreasing adipose tissue (Froberg & Andersen, 2005; Kain, et al, 2004); however, nutrition also plays a pivotal role and was not monitored in this study (Kipping, Jago, & Lawlor, 2008). We calculated the activity level of the students solely based on the number of steps and did not consider the intensity of the activity (e.g., moderate and/or vigorous). In addition, there are constraints on physical activity at school with students primarily limited to physical activity during recess and physical education classes. Even in physical education classes, students are expected to complete the same tasks during the same amount of time leaving little opportunity for deviation or individual differences. If we monitored the activity level of students after they left school, when they have more freedom to choose between being physically active or sedentary, the results might give a more accurate relationship between physical activity and BMI (American Heart Association, 2011, Johansen et al, 2015). Finally, BMI is a screening tool based on the child's height and weight and not a measurement of body fat (Widhalm, Schönegger, Huemer, & Auterith, 2001). All of these factors may have contributed to us not finding a significant relationship between physical activity and BMI.

Conclusion

There was a low, indirect relationship between students' physical activity during school and their BMI. With greater than 39% of the students in this study falling above the healthy weight category, there are factors other than children's number of steps taken during school impacting BMI. Therefore, further research needs to be conducted to determine what these factors are (e.g., physical activity outside of school, nutrition, parental education, socioeconomics, etc.) and possible interventions and/or programs to help students make healthy decisions during and outside of the school day in order to obtain and maintain an appropriate BMI.

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The Use and Effectiveness of ePortfolio in Online Courses: Perceptions of Undergraduate Education Students

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Abstract

This research study used a survey design to determine student use and perceptions regarding Brightspace ePortfolio in the online classroom. One hundred ninety-three undergraduate Early Childhood Administration students participated in this study. The findings of the study indicated that participants perceived ePortfolio to be useful in completing their coursework. However, participants indicated the need for more instruction and direction regarding the use of ePortfolio in their degree program. Further, the need for consistent and effective use of ePortfolio throughout the degree program was identified. Overall, the primary findings indicated that, of those students who used ePortfolio, the tool was perceived to be beneficial and useful. This finding indicates that the use of ePortfolio can assist students in successfully completing their coursework and degree program.

Introduction

Brightspace is a Learning Management System that delivers online learning. One of the tools within Brightspace is ePortfolio which is made available for student use during the completion of their degree program. Brightspace ePortfolio "is a personal portfolio tool for storing, organizing, reflecting on, and sharing items that represent [student] learning" (Brightspace Help, n.d., para. 1). ePortfolio is an electronic portfolio collection of artifacts that can be consolidated into a format that can be shared with others. Items such as documents, graphics, audio files, videos, presentations, and coursework are typical items stored in ePortfolio. This research study sought to determine the current use of ePortfolio by Early Childhood Administration students in their online courses. Further, the study sought to explore how Early Childhood Administration students who frequently used ePortfolio perceived the effectiveness of the tool in completion of their coursework and degree program.

Literature Review

Education in the 21st century is ever evolving. The advancement of the Internet and of online learning has greatly connected the world and changed the environment in higher education. As a result, the lives and the learning styles of students have transformed (Koraneekij & Khlaisang, 2019). The attention to program quality and new forms of learning enabled by technology has further increased varied practice in higher education (Farrell, 2018). ePortfolios are learner-centered and allow students to become independent in the learning environment. An ePortfolio can be used to view student learning over a period of time, allowing for assessment of outcomes and providing opportunities for faculty/student exchanges on grading and curriculum. Organizations use ePortfolios for various purposes, such as recordkeeping or validation of learning and progress, and they can be a powerful means for facilitating authentic

learning for students (Farrell, 2018**;** Hsieh, Chen, & and Hung, 2015; Ibrahim & Callaway, 2019).

How ePortfolios are used

An ePortfolio can be used to satisfy many functions: it can be a tool or technology, an instructional model, and a framework for learning. ePortfolios are becoming increasingly utilized in higher education. Statistics from 2018 indicate 57% of colleges are using ePortfolios as a representation of student accomplishments and growth achieved through a program (Cleveland, 2018; Farrell, 2018). The purpose of using an ePortfolio must be clear and unambiguous to students and faculty, promoting quality and documenting knowledge. Farell (2018) identifies four uses for ePortfolio practice in higher education: 1. Assessment, 2. Development, 3 Placement, 4. Careers. For this study, the ePortfolio was viewed as an instrument for bringing together thoughtfully chosen artifacts of student work and achievements inside and outside the classroom and therefore is considered developmental or process based.

The developmental features of the ePortfolio in higher education involve the central principle that evidence, and artifacts are amassed over the course of a program. The process portfolio focuses on documenting the process of learning, allowing for the collection of such items as photos, documents, and audio files. Students take part in choosing content that reflects the development and outcomes of their work, giving them access to digital tools and allowing them to act as decision-makers in the learning process (Koraneekij & Khlaisang, 2019). One of the key differences between process portfolios and other portfolios, such as assessment or career portfolios, is that process portfolios are focused on the pathway of learning rather than a final creation. Many students prefer the pathway of learning focus, giving them a sense of control to manage and support their own goals and communicate their progress with others (Farrell, 2018; Ibrahim & Callaway, 2019). However, it is important to note the flexibility with an ePortfolio can also be a source of confusion and a barrier at the higher education level.

Impact of using an ePortfolio

Acceptance surrounding the use of the ePortfolio has been related to attitudes, beliefs, knowledge, and skill (Tur & Marin, 2015). In general, students show a positive attitude towards the documentation of learning and faculty appreciate the student-centered approach of an ePortfolio (Tur & Marin, 2015). ePortfolios are viewed as a part of the curriculum with a workplace preparation piece, encouraging a sense of belonging to a community with peers and enabling students to learn in a self-regulated way (Cleveland, 2018; Farrell, 2018). In the diverse online environment, traditional forms of assessment may not be the ideal way to evaluate student mastery. Research recommends assessment take other forms such as written reports, presentations, or an ePortfolio (Cleveland, 2018; Farrell, 2018; Koraneekij & Khlaisang, 2019). Using the ePortfolio may provide a more authentic assessment of overall learning as compared to traditional methods that measure what students know at a point in time. Higher education programs may find the readiness of tools and technology a way to streamline methods for digital archiving of assignments and ultimately as a form of comprehensive assessment of learning (Koraneekij & Khlaisang, 2019).

Implications of Use

The main purposes of an ePortfolio are to support student transition from higher education to the workplace and to develop student employability. It is possible that having an

ePortfolio can give a student an advantage over others with only a resume when applying for a job. A recent report indicated 80% of employers found ePortfolios to be useful when interviewing applicants (Farrell, 2018). There is growing evidence that ePortfolios can have an impact on student learning and progress if students are given the opportunity to integrate their learning and make connections. The shift may need to be from using the ePortfolio as an archive or developmental tool to viewing it as a collection of work to showcase learning (Farrell, 2018; Koraneekij & Khlaisang, 2019).

Research Design

The research questions for the study were as follows: 1) At what point during the undergraduate program do students begin using ePortfolio? 2) What perceptions do students have regarding the use of ePortfolio in completing their undergraduate degree program?

Participants

The research was conducted at a public online institution. A survey research design approach was implemented. One hundred ninety-three students currently attending the university completed the survey to participate in the study. The participants in the study are undergraduate students completing the Early Childhood Administration degree program. Based upon responses to question items, progression through the survey items may be discontinued. Students continued to respond to items based upon their use and experience with Brightspace ePortfolio. If students were not familiar with ePortfolio or were not actively using ePortfolio in their coursework, the student was asked to discontinue participation in the survey. As such twenty-four Early Childhood Administration students were identified by the survey as actively using ePortfolio resulting in the completion of all survey items. Further, the opportunity for additional comments was provided to participants at the end of the survey. Three participants from the twenty-four available provided additional comments regarding their experiences and perceptions of the effectiveness of ePortfolio in their degree program.

Instrument

The participants responded to a survey developed by the researchers. The survey contains seven quantitative question items. The survey was designed to address the research questions by determining the current use of ePortfolio by the participants. If the participant was not aware of ePortfolio, the participant was asked to discontinue participation in the study after the first question. If the participant was not currently using the ePortfolio tool, the participant was asked to discontinue participation in the study after the second question. If the participant was currently using the ePortfolio tool, the participant was offered the opportunity to answer all questions on the survey regarding experience and perceptions of the usefulness of the tool in preparing for coursework and completion of the degree program. The seven questions were multiple choice questions, response items varying depending upon question type. Once the seven questions were completed, participants had the option to add additional comments if preferred. The additional comments were open-ended, qualitative comments regarding participant experience and use of ePortfolio in the degree program and coursework.

Procedures

The survey was administered to participants directly in the online Brightspace courses through an integrated application. The survey was distributed to Early Childhood

Administration students in three separate terms. Further, the survey was collected in two courses offered at the beginning of the Early Childhood Administration program as well as two courses offered at the end of the program in each of these three terms. This process provided researchers with the ability to measure student use and experience across multiple terms and throughout the entire degree program. All survey responses were collected anonymously by the researchers through the Brightspace integrated application. Due to enrollment procedures, students did not have access to the survey for more than one term ensuring that there was no duplication in participant responses.

Data Analysis

Survey results were analyzed using quantitative methods to determine the frequency of participant responses for each question. Question response frequency was determined for each individual term as well as for the total across all terms. The data analysis method used to determine the frequency of responses of participants for each question, displayed for the individual terms and across all terms, was Simple Percentage Analysis. "Simple and rapid comparisons of frequency percentages are suggested as an alternative to scoring and scaling methods in analyzing many attitudes questionnaires" (McCormick, 1945, p. 390). The current study seeks to determine participants perceptions or attitudes regarding ePortfolio use. As such, a simple percentage analysis is used as the data analysis method to determine the frequency of response of participants for each survey question.

Results

In question one, participants were surveyed to indicate the depth and breadth of their knowledge and use of the personal portfolio tool. Forty-four percent of the 193 students surveyed answered affirmatively that they had heard of ePortfolio in Brightspace while fifty-six percent indicated that they were not aware of ePortfolio. See Table 1

Table 1
Question 1: Are you aware of ePortfolio in Brightspace?

	Yes	No
Term 1	24	27
N=51	47%	53%
Term 2	26	41
N=67	39%	61%
Term 3	35	40
N=75	47%	53%
Total of Terms	85	108
	44%	56%

Note. N=193

Of the eighty-six students completing question two in the survey, twenty-nine percent agreed that they were using ePortfolio while seventy-one percent indicated that they were not actively using ePortfolio for the completion of their degree program. See Table 2

Table 2
Question 2: Are you using ePortfolio?

	Yes	No
Term 1	6	19
N=25	24%	76%
Term 2	10	16
N=26	38%	62%
Term 3	9	26
N=35	26%	74%
Total for Terms	25	61
	29%	71%

Note. N=86

There are many ways in which students can use ePortfolio in Brightspace. Moreover, eighty-eight percent of the twenty-four responding participants agreed or strongly agreed that ePortfolio has been helpful in completing their degree programs. Students frequently indicated that the Brightspace core is more than just a learning management system when all of the tools and support, such as ePortfolio, are combined. See Table 3.

Table 3
Question 3: ePortfolio has been helpful to me in completing my degree program.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Term 1	0	0	1	2	3
N=6	0%	0%	17%	33%	50%
Term 2	0	1	0	4	4
N=9	0%	11%	0%	44%	44%
Term 3	0	1	0	4	4
N=9	0%	11%	0%	44%	44%
Total of Terms	0	2	1	10	11
	0%	8%	4%	42%	46%

Note. N=24.

Easy to use was indicated by sixty-eight percent of the twenty-four responding survey participants. Therefore, the user interface of ePortfolio with Brightspace is perceived by students as being easy to navigate within the learning management system. See Table 4.

Table 4
Question 4: ePortfolio is easy to use.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Term 1	0	0	1	2	3
N=6	0%	0%	17%	33%	50%
Term 2	2	0	3	3	2
N=10	20%	0%	30%	30%	20%
Term 3	0	1	1	3	4
N=9	0%	11%	11%	33%	44%
Total of Terms	2	1	5	8	9
	8%	4%	20%	32%	36%

Note. N=25

Thirty-three percent of the students participating in the survey indicated that they used ePortfolio in all of their courses. Twenty-nine percent indicated that they used ePortfolio in Brightspace in most classes while thirty-eight responded that they used ePortfolio in only a few courses. See Table 5.

Table 5
Question 5: In how many courses do you use ePortfolio?

	Only a Few Courses	Most Courses	All Courses
Term 1	2	1	2
N=5	40%	20%	40%
Term 2	3	4	3
N=10	30%	40%	30%
Term 3	4	2	3
N=9	44%	22%	33%
Total of Terms	9	7	8
	38%	29%	33%

Note. N=24

When students were asked to identify their primary use of ePortfolio in their degree program, twenty-nine percent of the participating students indicated on the survey that they use ePortfolio to prepare for their capstone course. Thirty-three percent used ePortfolio for studying or completing assignments throughout the program. Sharing their work with others for feedback

was indicated by four percent of the participants while eight percent used ePortfolio for storing information for easy reference throughout the program. Moreover, twenty-five percent of the participants agreed that they use ePortfolio for yet other reasons. See Table 6.

Table 6
Question 6: What is your primary use for ePortfolio

Preparing for Capstone Course	Studying or Completing Assignments throughout the Program	Sharing my Work with Others for Feedback	Storing Information for Easy Reference Throughout the Program	Other
3 50%	0 0%	0 0%	1 17%	2 33%
2 20%	4 40%	1 10%	1 10%	2 20%
2 25%	4 50%	0 0%	0 0%	2 25%
Total of Terms 7 29%	8 33%	1 4%	2 8%	6 25%

Note. N=24

Interestingly, seventy-nine percent of the participants responding to the survey overwhelmingly agreed that they would recommend the use of ePortfolio to classmates. None of the participants disagreed and twenty-one percent indicated “maybe” regarding recommending ePortfolio to classmates. See Table 7.

Table 7
Question 7: Would you recommend the use of ePortfolio to your classmates?

	Yes	No	Maybe
Term 1 N=5	4 80%	0 0%	1 20%
Term 2 N=10	7 70%	0 0%	3 38%
Term 3 N=9	8 89%	0 0%	1 11%
Total of Terms	19 79%	0 0%	5 21%

Note. N=24.

Three participants were further questioned on their use and perceptions of ePortfolio in Brightspace during their degree program. When asked what would make ePortfolio more useful, one student stated that it would be "useful to me . . . to learn more about how it works." Another student indicated that "a button that inputs all completed assignments directly to ePortfolio" would be helpful. When asked if students had any additional thoughts about ePortfolio, one student suggested "a mini course showing students how to start up their ePortfolio and what artifacts are needed." The student indicated that "this can be done before students embark on their educational journal." These additional insights provide a more in-depth understanding of students' perceptions and needs regarding their use of ePortfolio.

Discussion

The results of the survey indicated that more than half of the students were not aware of the ePortfolio tool in Brightspace. In addition, the majority of participants were not using ePortfolio in their coursework. However, of those who were using ePortfolio, the vast majority of these participants indicated that the tool was helpful in the completion of their degree program and that they would recommend use of the tool to their classmates. Further, more than half of the participants indicated that ePortfolio was easy to use. This supports previous research indicating that the majority of students show a positive attitude toward the use of ePortfolios (Tur & Marin, 2015). Of the participants who use ePortfolio, there was not a consensus on how the tool was used, revealing that participants used the tool in various ways. Previous research supports this by indicating that ePortfolio can be used effectively for various purposes (Farrell, 2018**;** Hsieh, Chen, & and Hung, 2015; Ibrahim & Callaway, 2019). When asked for additional comments, students primarily shared their suggestions regarding the need for further instruction and information on the use of ePortfolio in their coursework and degree program. Previous research by Farrell (2018) supports these comments by participants regarding the importance of clearly identifying and communicating the university's purpose of using ePortfolio to students. The findings of this study indicate that students perceived ePortfolio to be beneficial and useful in completing their coursework. Further, the findings indicate an opportunity to further expand student knowledge and consistent use of ePortfolio within the degree program. These findings are supported by previous research studies, indicating that the use of ePortfolio can have a positive impact on students in the completion of their degree program.

Conclusion

A primary finding from this study was that of those who used ePortfolio, the participants found the tool to be beneficial in the completion of their coursework and degree program. This finding indicates that the tool can be useful in degree programs to assist students in successfully completing their coursework. An additional important finding was that most participants were not aware of ePortfolio and, of those who were using ePortfolio, more instruction on the use of the tool is needed. This finding indicates the importance for institutions to provide instructional tools or aids to students in the use of ePortfolio. Instructional guides and optional modules can be developed in online courses to allow students to reference these regarding the use of ePortfolio. In addition, guidance to instructors and students on when and how to use ePortfolio is important for consistent and effective use. For further studies, qualitative research could be collected to indicate how the participants are actually using ePortfolio to support their coursework. Additional research is also needed to determine the actual impact of ePortfolio on student academic progress. Further quantitative studies aligning the use of ePortfolio to student

persistence and retention would provide an effective measure of academic progress. As Farrell (2008) indicated, ePortfolios have the potential to increase student academic achievement and employability upon completion of the program. Previous research coupled with the findings of this study indicate the significance of using ePortfolio as a tool to support learning in an academic program. However, further research and support is needed to fully investigate the impact of ePortfolio on student success.

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Computer Science Teacher Preparation in Arkansas

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Abstract

The purpose of this study was to identify how computer science teachers are prepared to teach computer science and programming content. Eighty-one computer science teachers in Arkansas participated in an online survey. The majority of the participants indicated that most often, teachers received computer science professional development training through the Arkansas Education Service Cooperatives. Additionally, the participants received training through university coursework and self-teaching. Participants were asked to rate their level of preparedness across three areas – content knowledge, teaching strategies, and assessment knowledge. Participants generally felt more prepared than less prepared in teaching across these areas of computer science. Results also suggest that teachers licensed in Computer Science (4-12) and Mathematics (7-12) may feel the most prepared in teaching computer science courses.

Introduction

The advancement of K-12 computer science education has been identified as critical need in the United States to prepare students in our ever advancing technological and computer-driven society (Wilson, Sudol, Stephenson & Stehlik, 2012). This need has spawned efforts for policy-makers and educators to expand computer science in the K-12 curriculum. Arkansas now mandates that all students have access to computer science classes and that all K-8 students have some type of exposure to computer science learning (Camera, 2015).

Remarkably, Arkansas has increased the number of certified computer science teachers from 20 to 370 in the last four years (2019, National Summit Report) and is one of six states that currently has a state plan for K-12 computer science education (2018 State of Computer Science Education, 2018; Arkansas Department of Education, 2019) and one of 22 states that have adopted K-12 computer science standards. Arkansas does not place prerequisites on students who wish to enroll in computer science courses, and the placement of students is determined by the individual districts and schools.

The rising demand for computer science teachers has seen an increase in computer science teacher preparation programs and professional development efforts around the nation. In 2016, the U.S. graduated only 75 students from teacher preparation institutions (Title II) prepared to teach computer science in 2016 (Title II, 2019). The need to prepare computer science teachers has increased initiatives in Arkansas to offer teacher professional development including workshops by the Arkansas Department of Education, online and on-campus classes offered by universities around the state, and online training from external agencies.

According to the Arkansas Computer Science Education Fact Sheet (2019) the teacher of record for any Arkansas high school computer science course (course codes beginning with a 465 or 565) must have a Computer Science Teacher Certification (528) or Computer Science Approval Code (516). Additionally, teachers may be placed on an approved Alternative Licensure Plan for Computer Science.

According to the Arkansas Department of Education computer science web site there are nine computer science courses listed for secondary students (Arkansas K-12 Computer Science,

2019). In addition, four courses are listed for AP students. All schools, beginning with the 2015 – 2016 school year, are required to offer at least one computer science course at the high school level. Arkansas is one of 15 states to require all high schools to offer computer science (2018 State of Computer Science Education, 2018). This trend can be seen in other states as school districts are revising graduation requirements to include computer science (Zinth, 2015; Grover & Pea, 2013). Given these efforts, there is a need to understand how computer science teachers are being prepared to meet this growing demand.

Purpose

The purpose of this study was to identify how Arkansas teachers are prepared to teach computer science courses. The researchers developed an online instrument seeking input from practicing computer science teachers about their preparation to teach computer science. Additionally, the participants were asked to examine their level of preparedness related to content knowledge, teaching strategies, and assessment knowledge. This study provides an insight to how Arkansas computer science teachers receive their training and identifies resources that may be useful to teacher candidates preparing to teach computer science.

Methodology

An online survey was sent to all members of the AR Computer Science Listserv via an email listserv on May 15, 2019. The survey consisted of a selection of researcher-generated checkbox lists, open-response questions, and Likert-style items. Of the 1,181 recipients of the survey, 6.9% submitted a complete survey, resulting in a final participant count of 81 submissions. Of the 81 participants, 59% (n = 48) identified as female and had an average overall teaching experience of 13.1 years (SD = 9.0) with an average of 3.3 years of experience teaching computer programming (SD = 3.5).

Participants' undergraduate degrees included business/marketing (n = 25), computer science (n = 12), English (n = 2), mathematics (n = 10), and education (n = 17). Other degrees included engineering, history, and political science, among others. Fifty-one (69%) of the participants had obtained one or more graduate degrees, of which 39 were in education, one in computer science, and 19 listed as "other."

Participants represented a wide range and combinations of licensure areas. Of the 81 participants, 60 (74.1%) were licensed in Computer Science (4-12), 44 (54.3%) in Business Technology (4-12), 22 (27.2%) in Secondary Mathematics (7-12), 9 (11.1%) in Mathematics (4-8) at the middle level, and 7 each (8.6%) in both Science (4-8) and Social Studies (4-8). Other licensure areas representing more than 5% of the sample included English Language Arts (ELA) for grades 4-8 and 7-12, Marketing Technology (7-12), Social Studies (7-12) and Career Development / Orientation.

Participants indicated that the most often received training for teaching computer science was through the Arkansas Education Service Cooperatives (Computer Science PD) (n = 55, 67.9%), followed by university courses (n = 27, 33.3%) and self-teaching (n = 12, 14.8%). Additional open-responses included trainings through the Arkansas School for Math, Sciences, and Arts (ASMSA), AP Summer Institutes, other relevant workshops and trainings, and professional experience in the field.

Participants taught a number of courses during the 2018-2019 school year. Teachers most frequently taught Computer Science with Programming/Coding (n = 51, 63%), followed by AP Computer Science Principles (n = 21, 25.9%), AP Computer Science A (n = 16, 19.8%), and Robotics (n = 10, 12.3%). Other courses often mentioned by participants included Mobile

Application Development, Advanced Programming, Computer Science with Information Security Emphasis, Advanced Information Security, Advanced Networking, Keycode, and Independent Studies.

Results

Preparedness for Teaching Computer Science

Participants were asked to rate their perceptions of their preparedness to teach computer science across three areas—content knowledge, teaching strategies, and assessment knowledge—on a scale of 1 to 5 with 5 representing "I feel very prepared" and 1 representing "I do not feel prepared." Participants' responses ranged from 1 to 5 for each item with a sample mean of 3.59 (SD = 0.93) for preparedness in content knowledge, 3.63 (SD = 0.97) in preparedness in teaching strategies, and 3.51 (SD = 1.00) in preparedness in assessment knowledge. These results suggest that this sample of secondary school teachers generally felt more prepared than less prepared in teaching across these areas of computer science education. Teaching strategies and assessment knowledge were most highly correlated, $r(81) = 0.78$, $p < .001$, followed by content knowledge and assessment knowledge, $r(81) = 0.72$, $p < .001$, and content knowledge and teaching strategies, $r(81) = 0.58$, $p < .001$. There were no statistically significant correlations between teaching preparedness and years of teaching experience or years teaching computer science.

Tests for significant differences across participant categories could not be conducted due to the use of individual, non-composite Likert items and unequal group sizes. Nevertheless, means, standard deviations, and sizes for groups within each category of interest are provided. Table 1 illustrates differences in perceptions of preparedness across licensure codes. Once again, while differences significant cannot be identified, those 56 participants licensed under *528 CS Teacher Certification* tended to express that they felt the most prepared to teach computer science across the three areas.

Table 1

Licensure Codes by Areas of Teaching Preparedness

	5016 ADE / ARCareer ED CS	*528 CS Teacher Certification*	*Alternative Training Plan*	*Other*
N	15	56	3	7
Content Knowledge	3.07 (0.80)	3.77 (0.85)	3.33 (1.53)	3.43 (1.27)
Teaching Strategies	3.20 (0.94)	3.77 (0.89)	3.00 (1.00)	3.71 (1.38)
Assessment Knowledge	3.13 (1.06)	3.61 (0.87)	3.00 (2.00)	3.71 (1.38)

Note. N = 81; standard deviations in parentheses.

Table 2 illustrates the means and standard deviations for each licensure area across the three areas of computer science teacher preparedness. Only licensure areas with at least 5 participants were included. It is important to note that most of the participants (79%) were licensed in two or more areas, with an overall average of 2.8 licensure areas per participant. While the results should be interpreted with caution due to the nature of the data, the results suggest that teachers in this sample who were licensed in Computer Science (4-12) and Mathematics (7-12) may feel the most prepared in teaching computer science courses. Other areas that demonstrated consistently high levels of preparedness, although with smaller group sizes that should be considered with caution, were English Language Arts (7-12) and Marketing Technology (7-12).

Table 2

Most Common Educator Licensure Areas by Areas of Teaching Preparedness

	N
Business Technology (4-12)	44
Career Development (?)	6
Computer Science (4-12)	60
English Language Arts (4-8)	6
English Language Arts (7-12)	6
Marketing Technology (7-12)	6
Mathematics (4-8)	9
Mathematics (7-12)	22
Science (4-8)	7
Social Studies (4-8)	7
Social Studies (7-12)	6

Note. *N* = 81; standard deviations in parentheses.

Table 3 illustrates the levels of preparedness participants expressed in terms of the most frequently mentioned coding languages they used in class. Java (57%) and Python (46%) represented the most frequently taught coding languages, followed by Javascript (17%), C++ (12%), and MIT App Builder (10%). Other languages taught included Processing, block-based languages, Scratch, HTML, Coffeescript, Snap, CSS, Swift, BASIC, C, C#, Robot C, Arduino, Vex, Xcode, and Pencilcode. The mean number of coding languages taught was 1.81 (*SD* =

1.30). There were statistically significant moderate, positive correlations between the number of coding language taught and preparedness in teaching computer science: content knowledge, $r(81) = 0.33$, $p = .003$, teaching strategies, $r(81) = 0.22$, $p = .045$, and assessment knowledge, $r(81) = 0.32$, $p = .003$. This suggests either 1) teachers who feel prepared in these areas are more likely to go out and learn new coding languages to teach, or 2) teachers who learn more and more coding languages begin to feel more prepared to teach computer science. Based on the analysis, feelings of preparedness do not increase as teachers gain more years of teaching experience.

Table 3

Coding Languages Most Frequently Taught by Areas of Teacher Preparedness

	N	*Content Knowledge*	*Teaching Strategies*	*Assessment Knowledge*
C++	10	3.50 (0.97)	3.70 (0.82)	3.60 (0.84)
Java	46	3.74 (0.74)	3.80 (0.83)	3.61 (0.88)
Javascript	14	4.07 (0.92)	4.07 (0.73)	4.00 (0.78)
Python	37	3.73 (0.87)	3.57 (0.90)	3.57 (0.93)
MIT App Builder	8	3.88 (0.83)	4.13 (0.35)	4.00 (0.76)

Note. *N* = 81; standard deviations in parentheses.

Resources for Beginner Teachers

Participants were asked to provide specific resources, websites, or other technology that would be helpful for a beginning computer science teacher. Participants' recommendations generally fell into one of two categories: online resources and collaborative resources. Participants listed countless online and print resources they would recommend to beginner computer science teachers. Resources most often listed included websites and workshops such as Code.org, Repl.it, CodeHS, Codeacademy, Project Lead the Way, Mobile CSP, Lynda, and ASMSA workshops from D Moix. Other less frequently listed tools included Python for Beginners, NICERC courses, Codingbot, Tynker, Pycharm, Cybrary, Cryptocorner, Eclipse, Canvas, Hour of Code, GitHub, Snakify, Project Euler, Coderbyte, Youtube videos, UCA Cyber Range Curriculum, Alice, A+ Computer Science Curriculum, EdX, Solo Learn, Toxicode, and Khan Academy. Participants also recommended books such as Blown to Bits, No Starch Press, and Python Crash Course.

In addition to online and print resources, participants strongly encouraged new teachers to seek the support of other experienced computer science educators. This could include teachers in an online setting, such as other educators in Collegeboard discussion groups or Facebook groups, as well as other educators at the school or district such as the local education cooperative specialist. Multiple participants recommended that teachers become connected with the Arkansas Computer Science listserv and find a mentor to learn from. As one participant stated, new teachers should seek out "other seasoned instructors … they will point a beginner to the best resources." This was echoed by another teacher:

> "I can't over-emphasize the need for ONGOING YEAR LONG SUPPORT! Teachers can not be dumped into the classroom and left to try to survive. For the most part a CS teacher will be the only one in the district. They MUST build a strong cohort of CS teachers from around the state to collaborate with and be able to reach out to for help."

Lastly, one participant encouraged new teachers to challenge their students and make the course of the content relevant to and practical for students:

> "My students like to be challenged, so I write problems for them and host local programming competitions to challenge them appropriately. I try to be original with the problems to make them think, but to also make the competition relevant. Each competition has a new theme and last year's was 'Fast Food Employee', where students had to write programs that solved problems related to working in the fast food industry. I use Vex Robotics for competition based learning and opportunities, but I also use Arduinos and breadboards in conjunction with electronic components to teach practical programming and circuitry in robotics. Much of my curriculum is self-made and changes year to year in order to better fit the needs of the students and to better engage them with the material. The languages I teach differ based on the level of the class."

Discussion and Implications

The purpose of this study was to identify how Arkansas teachers are prepared to teach computer science courses and examine their level of preparedness. Over the past five years Arkansas has been on the forefront in computer science education and many teachers have completed professional development training in order to meet the demand of new computer science teachers. While this study provides guidance for teachers who are interested in teaching computer science, it is important for teacher preparation programs to expose students earlier to pathways leading to certification computer science education (K–12 Computer Science Framework, 2016). Although the majority of participants reported being certified to teacher computer science, many teachers currently teaching computer science are certified in business technology and mathematics. Teacher preparation programs in those two areas may consider adding a computer science courses to their program of study to better meet the need for computer science teachers.

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Developing Preservice Elementary Teachers' Understandings with Foundations of Literacy and Language: A Preliminary Exploration of Current Preparation Practices

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Abstract

Preservice elementary teachers must experience coursework and field-based experiences that develop teacher knowledge for foundations of literacy and language. The present study used conceptualizations of teacher knowledge as a theoretical lens to examine current preparation practices reported by a purposive sample of 59 literacy teacher educators. Relevant qualitative data were analyzed through three coding cycles and produced four categories that identified an array of preparation practices and views concerning practice-based teacher preparation practices. Findings suggested implications for literacy teacher educators to improve upon current efforts and better support preservice elementary teachers' understandings with foundations of literacy and language.

Keywords: elementary teacher preparation, language, literacy teacher preparation, preservice teachers, reading, writing

Introduction

Preparing effective literacy teachers for classroom instruction is of great importance. Effective literacy teachers know how to design and deliver impactful instruction to all students (Flynt & Brozo, 2009; Fountas & Pinnell, 2018), including students who have cultural and linguistic differences (Mora & Grisham, 2001; Ortiz & Robertson, 2018), exceptionalities (Copeland, Keefe, Calhoon, Tanner, & Park, 2011; Lemons, Allor, Al Otaiba, & LeJeune, 2016), and are considered at-risk for literacy difficulties (Fien et al., 2015; Weiser & Mathes, 2011). To implement impactful instruction, literacy teachers must possess a complex network of professional knowledge (Shulman, 1986), cast instructional visions (Vaughn, 2015), and continually reflect upon their instruction to make appropriate adaptations (Parsons, 2012; Vaughn, Parsons, Gallagher, & Branen, 2016). Teacher effectiveness is shaped by continuous education and experiences across the span of one's career and begins with preservice teacher training (Callahan, Griffo, & Pearson, 2009).

Research continually uncovers new understandings about foundational knowledge for literacy (i.e., reading and writing) and language, thereby influencing education policy and teaching practices (DiCerbo, Anstrom, Baker, & Rivera, 2014; Moats, 2009; Wilcox, Jeffery, Gardner-Bixler, 2016). To support high-quality preparation of literacy professionals, the International Literacy Association (IRA, 2010; ILA, 2018) has developed research-based professional standards that define specific knowledge and skills preservice teachers must master prior to entering classrooms as novice literacy professionals. One of these standards, Standard 1: Foundational Knowledge, focuses upon the major theories, concepts, components, and instructional approaches for literacy development, as well as the interconnectedness of general and disciplinary literacy processes (ILA, 2018). However, a number of researchers have pointed out long-standing shortcomings in the professional knowledge base of practicing teachers (Brindle, Graham, Harris, & Hebert, 2016; Cunningham, Perry, Stanovich, & Stanovich, 2004;

Cutler & Graham, 2008; Gilbert & Graham, 2010; Mather, Bos, & Babur, 2001; Moats & Foorman, 2003; Piasta, Connor, Fishman, & Morrison, 2009; Spear-Swerling & Cheesman, 2012) and preservice teachers (Grisham et al., 2014; Myers et al., 2016; Scales et al., 2018; Wolsey et al., 2013) in the elementary grade levels. These phenomena are troubling, particularly since studies have suggested associations between teacher preparation and student literacy achievement (Boyd, Grossman, Lankford, Loeb, & Wyckoff, 2009; Goldhaber, Liddle, & Theobald, 2013).

It is vital for literacy teacher educators to develop teacher expertise among preservice elementary teachers that generalizes into their future teaching practices as novice literacy professionals (Duke & Block, 2012; Pomerantz & Condie, 2017). Literacy coursework and field-based experiences offered in teacher preparation programming must be rigorous, systematically aligned, and mutually reinforcing (ILA & National Council of Teachers of English [NCTE], 2017). Furthermore, literacy teacher educators must use preparation practices that provide preservice elementary teachers with a solid foundation of conceptual tools from which they learn to link to literacy teaching practices in a pedagogically-sound manner (Courtland & Leslie, 2010). With this in mind, our goal for the present study was to conduct a preliminary exploration of the current preparation practices literacy teacher educators use to develop preservice elementary teachers' understandings with foundations of literacy and language. By conducting this preliminary exploration, our principal aim was to respond to a recent call for "increased attention to how preservice educators are prepared for teaching literacy" (ILA, 2015, p. 8).

Review of Relevant Literature

Preservice elementary teachers must enter their future classrooms as skilled professionals who attend to components of reading, writing, and language during literacy instruction (ILA, 2018). We present the following review of relevant literature to highlight fundamental ideas that underpin each of these literacy components, instructional considerations, and factors that limit preservice elementary teachers' understandings. Although we addressed reading, writing, and language separately in this review, we acknowledge that these literacy components are deeply intertwined and interconnected within all content area disciplines (Lennox, 2012; Siffrinn & Lew, 2018).

Reading

Preservice elementary teachers must develop foundational knowledge for components of reading (i.e., comprehension, concepts about print, fluency, phonics, phonological awareness, vocabulary, word recognition) and learn how to implement evidence-based teaching practices that support reading development among all students (ILA, 2018). Learning to read is developmental (Chall, 1983), and attending to components of reading in the early elementary grade levels has the potential to facilitate later reading success among students (National Early Literacy Panel, 2008; National Institute of Child Health and Human Development, 2000).

Preservice elementary teachers often hold erroneous notions and understandings about "principles, practices, and terminology" associated with components of reading (Duffy & Atkinson, 2001, p. 89). Oftentimes, they also feel unprepared to adjust reading instruction according to students' differences (Bos, Mather, Dickson, Podhajski, & Chard, 2001). Literacy teacher educators must ensure that their preparation practices cultivate competence and

confidence with components of reading among preservice elementary teachers (Berenato & Severino, 2017; Clark, Jones, Reutzel, & Andreasen, 2013).

Writing

Preservice elementary teachers must develop foundational knowledge for writing development and writing process, as well as learn how to implement evidence-based teaching practices that support the production of specific types of texts for different purposes among all students (ILA, 2018). Similar to reading, writing is developmental (Clay, 1975; Dyson, 1991) and has its own "distinct symbol system" that students use to communicate meaning (Dyson, 1991, p. 157). While writing, students work recursively through a series of cognitive process to plan, write, and revise (Flower & Hayes, 1981; Graves, 1975, 1979) and attend to specific conventions associated with writing, such as handwriting (Asher, 2006) and spelling (Simonsen & Gunter, 2001).

Many preservice elementary teachers enter teacher preparation programs with unfavorable attitudes and beliefs about writing and writing instruction based upon their own personal experiences (Hall & Grisham-Brown, 2011; Norman & Spencer, 2005; Street, 2003). These preconceived attitudes and beliefs typically lead to low levels of self-efficacy (Helfrich & Clark, 2016) and underscores the critical importance of literacy teacher educators explicitly attending to writing during literacy teacher preparation (Martin & Dismuke, 2018). Unfortunately, prior research has documented that preservice elementary teachers generally receive inadequate teacher training to address writing instruction effectively (Brenner & McQuirk, 2019; Grisham & Wolsey, 2011; Myers et al., 2016; National Commission on Writing in America's Schools and Colleges, 2003; Norman & Spencer, 2005).

Language

Preservice elementary teachers must develop foundational knowledge for language components (i.e., listening, speaking, viewing, visually representing) and learn how to implement evidence-based teaching practices that support language development among all students (ILA, 2018). Contemporary views of literacy have broadened traditional notions that only considered an individual's ability to read and write (International Reading Association & NCTE, 1996). In today's classrooms, literacy instruction must also attend to the ways in which students receive information by listening and viewing, as well as how students express information through speaking and visually representing (Henn-Reinke & Chesner, 2007).

During teacher preparation, preservice teachers must first construct understandings of language components independently, followed by guidance with how to "incorporate them in an integrated way pedagogically" (Bender-Slack & Young, 2016, p. 117). Literacy teacher educators should situate language components within modern-day contexts and focus on the requisite 21st century skills of creativity, critical thinking, collaboration, communication, and information and communication technology skills (Urbani, Roshandel, Michaels, & Truesdell, 2017). Despite the increased attention given to language within contemporary views of literacy, Bender-Slack and Young (2016) noted that preservice elementary teachers frequently overlook language components in their articulations of literacy and literacy instruction.

Theoretical Framework

The present study drew upon conceptualizations of teacher knowledge as a theoretical lens to examine preparation practices that literacy teacher educators use to develop preservice

elementary teachers' understandings with foundations of literacy and language. Teacher knowledge encompasses three domains: knowledge about content (i.e., content knowledge), knowledge about pedagogy (i.e., pedagogical knowledge), and content pedagogical knowledge (Evens, Elen, Larmuseau, & Depaepe, 2018). Shulman (1987) considered content pedagogical knowledge the most important domain of teacher knowledge and defined it as a "special amalgam of content and pedagogy that is uniquely the province of teachers, their own special form of professional understanding" (p. 8). Essentially, content pedagogical knowledge synthesizes how a teacher links their pedagogical knowledge to develop students' understandings with content knowledge (Shulman, 1986) and is recognized as an important feature of high-quality teacher training (Risko & Reid, 2019). Literacy teacher educators must ensure their preparation programs offer literacy coursework and field-based experiences that sufficiently develop requisite teacher knowledge for foundations of literacy and language among preservice elementary teachers (Clark, Helfrich, & Hatch, 2017; ILA & NCTE, 2017; Jordan, Bratsch-Hines, & Vernon-Feagans, 2018).

Methods

Context

The present study was part of a previous state-level analysis we conducted among literacy teacher educators who were affiliated with university-based teacher preparation programs in the South Central United States. The goal of the previous analysis was twofold: 1) to ascertain viewpoints of preservice teachers' preparedness, and 2) to explore current preparation practices used during literacy teacher preparation. In the previous analysis, we employed a cross-sectional survey research design using a researcher-created electronic questionnaire (Ruel, Wagner, & Gillespie, 2016). The questionnaire consisted of closed-ended questions to collect demographic data for respondents and ratings of their viewpoints for preservice teachers' preparedness with each of the six professional standards for literacy professionals serving as classroom teachers (IRA, 2010). For each professional standard, we included an open-ended question for respondents to describe preparation practices they use to promote preservice teachers' understandings with associated behaviors, knowledge, and skills.

Data Collection and Analysis

To achieve the goal of the present study, we retrieved qualitative data from the previous analysis related to preparation practices for foundations of literacy and language. We analyzed data manually and systematically during three coding cycles (Saldaña, 2016). In the first cycle, initial concepts present in the data were assigned codes. In the second cycle, codes were reevaluated, refined, and rearranged into categories. In the third cycle, codes within each category were reviewed to identify possible subcategories. Categories were also compared to each other in order to formulate key assertions. Throughout each coding cycle, Sharp coded data individually, maintained a codebook, and made analytic memos to document thoughts, reflections, and understandings. Sharp also facilitated frequent peer debriefings with Raymond and Piper. During peer debriefings, Sharp shared coded data, the codebook, and analytic memos with Raymond and Piper so they could perform audits that cross-checked data and interpretations (Lincoln & Guba, 1985).

Results

In the present study, we retrieved data from 59 respondents, of whom five were male and 54 were female literacy teacher educators. Each of these respondents indicated that they had two or more years of experiences with preparing preservice teachers for classroom teacher certification in the elementary grade levels. Therefore, we determined that these respondents were a representative group of experienced literacy teacher educators.

Our data set consisted of 1,448 words, and four categories emerged during data analysis. Three of these categories described specific preparation practices that respondents use to develop preservice elementary teachers' understandings with foundations of literacy and language. These categories were: Class-based Preparation Practices, Program-based Preparation Practices, and Field-based Preparation Practices. The fourth category, Practice-based Approach, depicted respondents' views concerning practice-based teacher preparation practices. In Figure 1, we presented an overview of these categories and offered a more thorough summary of our findings for each category below.

Class-based Preparation Practices	Program-based Preparation Practices	Field-based Preparation Practices	Practice-based Approach
Describes preparation practices literacy teacher educators use during coursework.	*Describes preparation practices literacy teacher educators intersperse throughout teacher preparation programming.*	*Describes tasks preservice elementary teachers complete in authentic school settings.*	*Describes viewpoints literacy teacher educators have concerning practice-based preparation practices.*
• Facilitate class discussions • Implement in-class activities • Plan out-of-class assignments • Review information • Use specific learning materials	• Ensure quality and substance of course content • Offer a coherent sequence of coursework • Systematic assessment and evaluation	• Complete case study of one student • Interact with students and teachers • Reflect on field experiences • Tutor individual students	• Differences exist between face-to-face and on-line courses • Preparation programs require a combination of coursework and practical application • Teaching practices must be linked to theoretical and evidence-based foundations of literacy and language

Figure 1. Overview of categories that emerged from data analyses.

Class-based Preparation Practices

Within this category, respondents identified specific preparation practices they use during coursework to develop preservice elementary teachers' understandings with foundations of literacy and language. For example, respondents indicated that facilitating class discussions was an optimal way to address "various scientifically-based reading instructional strategies" and "what they look like in practice." In addition, respondents noted that they promote preservice elementary teachers' understandings with foundations of literacy and language through in-class activities (i.e., "case study scenarios," "direct instruction," "lectures") and out-of-class assignments (i.e., "article reviews," "course readings," "inquiry projects," "lesson plans," "reflective papers," "scholarly research"). During coursework, respondents explained that they review information relevant to foundations of literacy and language, such as:

- current and seminal research, including "broad-scale meta-analyses and literature reviews;"
- discipline-specific literacy strategies, such as "using a Frayer model or other graphic organizers;"

- "the five essential components of literacy;" and
- specific theorists and theories, such as "the work of Marie Clay regarding emergent literacy."

Respondents also shared types of learning materials they use to reinforce concepts taught in class, such as "professional teacher books," "research articles," "textbooks," and "videos."

Program-based Preparation Practices

Within this category, respondents identified specific preparation practices they intersperse throughout teacher preparation programming to develop preservice elementary teachers' understandings with foundations of literacy and language. Some respondents relayed overarching preparation program goals that offered assurances of quality and substance with course content. For example, one respondent shared that courses offered in their respective preparation program "focus on deep understandings of theoretical models for language and reading development." On the other hand, other respondents offered a more detailed summary of how coursework in their respective preparation programs were organized and sequenced to promote preservice elementary teachers' understandings. As an example, one respondent explained:

> One of the first literacy courses provides foundations, which looks at both educational and literacy-based theories. This leads to balanced literacy and the gradual release model, which are then carried into practical perspectives over the rest of the literacy courses. This includes one course that focuses on analytic phonics instruction and how to teach it both systematically and merged within a program.

Furthermore, respondents emphasized the importance of conducting systematic assessments and evaluations to gauge preservice elementary teachers' proficiency with knowledge and skills associated with foundations of literacy and language.

Field-based Preparation Practices

Within this category, respondents identified tasks that preservice elementary teachers complete in authentic school settings to develop understandings with foundations of literacy and language. According to respondents, "practice in the field" provided preservice elementary teachers with "opportunities for application and reflection" under the direction of a mentor, who was typically the classroom teacher. Examples of field-based tasks included composing "reflective responses," conducting "case studies with multiple assessment measures," and "tutoring individual students." Respondents stressed the importance of preservice elementary teachers interacting with students and classroom teachers in real world contexts in order to make explicit connections between "field work, theory, and research."

Practice-based Approach

Within this category, respondents expressed viewpoints concerning the use of practice-based preparation practices they use to develop preservice elementary teachers' understandings with foundations of literacy and language. Through a practice-based approach, respondents asserted that preservice elementary teachers must first develop a strong foundation of "early literacy skills," "significant theorists and their contributions to the profession," and "evidence-based practices." Then, preservice elementary teachers should be afforded frequent opportunities to observe classrooms in authentic school settings and practice working with actual students. Respondents indicated that they implement practice-based approaches through

"carefully planned and sequenced coursework" that is coupled with "focused, supervised, and mentored in-school experiences with children and literacy professionals." Two respondents further specified that working in professional development school settings "makes this process seamless," and another respondent contended that their summer reading clinic supported preservice elementary teachers to "apply reading theory as they work with elementary students." In knowing that practice-based approaches rely heavily upon in-person interactions, one respondent questioned the effectiveness of online coursework.

Discussion

Novice elementary teachers must be sufficiently trained to attend to components of reading, writing, and language during literacy instruction (ILA, 2018). Thus, literacy teacher educators must provide rigorous, systematically aligned, and mutually reinforcing literacy coursework and field-based experiences (ILA & NCTE, 2017) that cultivates content and pedagogical expertise with evidence-based literacy teaching practices among preservice elementary teachers (Courtland & Leslie, 2010; Duke & Block, 2012; Pomerantz & Condie, 2017). While it is clear what effective and impactful literacy teacher preparation should look like, multiple researchers have pointed out shortcomings in the professional knowledge base of practicing elementary teachers (Brindle et al., 2016; Cunningham et al., 2004, Cutler & Graham, 2008; Gilbert & Graham, 2010; Mather et al., 2001; Moats & Foorman, 2003; Piasta et al., 2009; Spear-Swerling & Cheesman, 2012). To address this inconsistency, we sought to conduct a preliminary exploration of current preparation practices literacy teacher educators use to develop preservice elementary teachers' understandings with foundations of literacy and language. To make sense of reported preparation practices, we used conceptualizations of teacher knowledge as a theoretical lens (Shulman, 1986, 1987).

Our findings in the present study have added contemporary insights to existing literature concerning literacy teacher preparation by highlighting ways in which literacy teacher educators develop preservice elementary teachers' understandings with foundations of literacy and language. These findings identified an array of preparation practices that literacy teacher educators use in coursework and throughout teacher preparation programming, as well as knowledge-building tasks that preservice elementary teachers complete during field-based experiences. Our findings also showed that literacy teacher educators make efforts to implement practice-based approaches by continually linking content and theory addressed in university-based coursework to literacy teaching practices encountered in school settings. Some literacy teacher educators also noted specific characteristics of their teacher preparation programs that support practice-based approaches, such as the establishment of professional development schools and a summer reading clinic.

In addition to contemporary insights, our findings in the present study have drawn attention to specific areas in which literacy teacher educators may improve upon current preparation practices to better support preservice elementary teachers' understandings with foundations of literacy and language. First, our findings have suggested a need for literacy teacher educators to carefully examine the content addressed throughout their respective preparation programs and ensure all requisite concepts are sufficiently addressed. Shulman (1987) maintained that content pedagogical knowledge was the most important domain of teacher knowledge; thus, our findings should have uncovered preparation practices that develop requisite teacher knowledge for foundations of literacy and language (Clark et al., 2017; ILA & NCTE, 2017; Jordan et al., 2018). As delineated in ILA's (2018) professional standards, this

knowledge base encompasses components of reading (i.e., concepts about print, phonological awareness, phonics, word recognition, fluency, vocabulary, comprehension); writing development and writing process; and language components (i.e., listening, speaking, viewing, visually representing). However, the literacy teacher educators who participated in the present study made very few references to preparation practices that address specific components of reading. Furthermore, no explicit references were made to preparation practices used to address writing development, writing process, or language components.

Implications

It is imperative that literacy teacher educators provide preservice elementary teachers with explicit instruction for all components related to foundations of literacy and language. Research has shown that preservice elementary teachers struggle with defining these components, as well as determining ways to support students' development through individualized instruction (Bender-Slack & Young, 2016; Bos et al., 2001; Duffy & Atkinson, 2001; Hall & Grisham-Brown, 2011; Helfrich & Clark, 2016). Since literacy teacher educators often contend with time constraints during teacher preparation (AUTHORS, 2018), they might consider using multimedia instructional supports in the form of literacy- and language-focused learning modules (Sayeski et al., 2015). Within these learning modules, literacy teacher educators can provide preservice elementary teachers with explicit and evidence-based information on a single concept in a clear, instructionally-sound manner. Maintaining a repertoire of literacy- and language-focused learning modules also enables literacy teacher educators to practice differentiation and address individual learning needs among preservice elementary teachers.

Literacy teacher educators should also revisit existing activities and assignments to ensure they maintain appropriate levels of rigor and relevance. For example, literacy teacher educators in the present study identified case reading as a common in-class activity. However, broadening this activity to include case writing empowers preservice elementary teachers to cultivate deep understandings of concepts under study as they make sense of their own lived teaching experiences (Hammerness, Darling-Hammond, & Shulman, 2002). In order to realize the full potential of this activity, literacy teacher educators must first expose preservice elementary teachers to theoretical readings coupled with cases that typify a specific concept under study. Then, literacy teacher educators implement guided learning activities, such as class-based discussions, to foster preservice elementary teachers' ability to analyze and interpret teaching practices in relation to concepts and theoretical principles presented in the readings. Once preservice elementary teachers demonstrate proficiency with applying theory to cases, they should then compose a case about their own experience with teaching the specified concept. Literacy teacher educators ought to scaffold case writing using the writing process (e.g., prewriting, drafting) and provide preservice elementary teachers with multiple opportunities to receive instructor and peer feedback on their writing. By using case reading and case writing, literacy teacher educators promote "strategic understandings for extending capacities toward professional judgment and decision-making" among preservice elementary teachers (Shulman, 1986, p. 13).

Our findings in the present study have also suggested a need for literacy teacher educators to clearly define and clarify preparation efforts that employ practice-based approaches. Based on our analyses, it was clear that the literacy teacher educators who participated in the present study primarily develop preservice elementary teachers' understandings with foundations

of literacy and language in university-based classrooms. Forzani (2014) pointed out that while many definitions for practice-based teacher preparation abound with "little consensus about what it means or should mean" (p. 358), the term generally signifies that preservice teachers spend an increased amount of time completing authentic tasks in real school settings. With this in mind, literacy teacher educators must establish processes to select and train mentors who support preservice elementary teachers during field-based experiences (Wang & Odell, 2003). Mentors must be skilled with implementing coaching strategies that offer support and provide feedback to encourage growth and improve fidelity with implementing impactful teaching practices (Husbye, Wessel Powell, Vander Zanden, & Karalis, 2018). Moreover, literacy teacher educators and mentors must be collaborative partners who coordinate and plan a coherent curriculum of university-based coursework and field-based experiences (DeGraff, Schmidt, & Waddell, 2015). As collaborative partners, literacy teacher educators and mentors must also communicate periodically to ensure preservice elementary teachers "draw meaningful connections between the theoretical concepts covered in their coursework and the practical realties of working with children" (Kosnik, Menna, Dharamshi, & Beck, 2018, p. 113).

Limitations and Recommendations for Future Research

We must acknowledge three major limitations in the present study because they may affect generalizability of our findings. First, a master list of literacy teacher educators was not in existence, so we used a higher-risk sampling technique. Second, we limited participation in the present study to literacy teacher educators who were affiliated with university-based teacher preparation programs located in one state because each state education agency sets its own requirements for acquiring initial classroom teacher certification. Third, we collected data via an electronic questionnaire sent by email, which resulted in a small sample size. Potential respondents may have been hesitant to respond to an electronic questionnaire, or emailed invitations may have been blocked by spam filters. Due to these methodological limitations, the full range of literacy teacher educators may not have been represented and warrants caution with interpretations of our findings.

Correspondingly, future research studies should continue exploring preparation practices that literacy teacher educators use to develop preservice elementary teachers' understandings with foundations of literacy and language. Future studies should include course- and program-based investigations of current preparation practices and analyses of practicing elementary teachers who are preparation program graduates. These studies would inform literacy teacher educators of specific areas needing improvement, particularly concerning the generalization of knowledge and skills for specific components of reading, writing, and language.

Conclusion

Literacy teacher educators are responsible for ensuring preservice elementary teachers enter their future classrooms as well-prepared novice literacy professionals. Through rigorous, systematically aligned, and mutually reinforcing literacy coursework and field-based experiences, literacy teacher educators must implement preparation practices that develop preservice elementary teachers' understandings with foundations of literacy and language. As a result, future elementary teaching professionals are primed to link conceptual understandings with strategically selected literacy practices that effectively address components of reading, writing, and language among all students.

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Mentoring Matters: The Exchange Between a Mentor and Mentee and the Effect on Teacher Retention

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Abstract

Teacher retention is currently one of the most pressing issues in education. This study encourages educational leaders to view mentoring programs that foster reciprocal relationships between beginning teachers and veteran teachers as a means of improving teacher retention. Mentoring develops relationships that provide increased intrinsic motivation and self-awareness for all involved. The mentoring process provides the support and guidance necessary for new teachers, engages veteran teachers in their profession, and improves teacher retention in all.

The purpose of this study is to determine whether mentoring programs could be a means of improving teacher retention. This article targets the importance for educational leaders to utilize mentoring programs as a method for building relationships while fostering increased teacher retention within school districts.

Introduction

Nearly 40-50% of teachers leave the profession within the first 5 years of beginning teaching (Ingersoll, 2012). Schools with mentoring services showed higher new teacher retention rates than those schools in which such services were not provided to the new teachers (Di Carlo, 2015). Educational leaders should consider mentoring programs that foster reciprocal relationships between the beginning teacher and the veteran teacher as a means of improving teacher retention.

Educational leaders benefit from research to determine if there are any reciprocal benefits experienced between a mentor and a new teacher during a mentoring relationship. Leaders also

benefit from determining how to best utilize mentoring as a method for building relationships while fostering increased teacher retention among their school districts (Sorbet, 2018). This mixed-methods study highlights the personal experiences of mentors and mentees engaged in a K-5 mentoring relationship in public elementary schools across Southeastern Louisiana. This study will ultimately seek to explore the following research questions: (a) what are the motivational factors for the mentor? (b) what are the motivational factors for the mentee, (c) how do the motivational factors differ between a mentor and a mentee, and (d) what are the reciprocal benefits, if any, within a mentoring relationship between a new teacher and a mentor teacher?

Significance

This study's results provide educational leaders the idea that fostering reciprocal relationships between the mentor and the mentee could be a means of motivating our teachers through instilling reflection, growth and challenge. If a mentee and a mentor are engaged within a mentoring relationship then reciprocal intrinsic motivation will develop from within (Sorbet, 2018). Intrinsically motivating mentors and mentees; specifically, in areas of reflection, growth and challenge, improve job satisfaction in both new and veteran teachers and drive both new and veteran teacher retention (2018).

Research Questions

Questions posed by the researcher for this study include: (a) what are the motivational factors for the mentor? (b) what are the motivational factors for the mentee, (c) how do the motivational factors differ between a mentor and a mentee, and (d) what are the reciprocal benefits if any within a mentoring relationship between a new teacher and a mentor teacher?

Literature Review

New teacher retention is a major issue in education, and it affects school systems both financially and academically. First-year public school teachers attrition rates rose from 21.4% to 28.5% from 1988 to 2004 (Ingersoll & Merrill, 2010). In 1991, about 61,000 beginning teachers participated in an induction or mentoring program, and in 2008 that number had risen to 179,000 (Ingersoll, 2012). Mentoring programs are necessary to improve teacher retention across all

levels of experience through creating relationships that provide increased intrinsic motivation and self-awareness (Sorbet, 2018).

Current Status of Teachers

According to the National Center for Educational Statistics, (NCES) in 2012-2013, out of 1,077,900 total teachers in early childhood/elementary education, nearly 64,900 left the profession. In the United States, 80% of new public-school teachers in 2012-2013 with less than 3 years of experience, remained at their base school. Within these statistics, 13% moved to another school, and 7% of these new teachers left the teaching profession (U. S. Department of Education NCES, 2014). Over the course of the last 20 years, there has also been a growing increase in the percentages of experienced teachers leaving the profession as well (Doan & Peters, 2009).

In Louisiana, the number of teachers leaving the profession doubled from 3,164 to 6,083 from 2011-2012 to 2012-2013. In 2014-2015 there were about 998 less teachers who chose to leave the teaching profession in Louisiana with a total of 5,487 teachers. This may seem like a significant reduction in the number of teachers exiting the profession, but over 5,000 teachers exited the profession annually in Louisiana since 2012 (Louisiana State Board of Education, 2011).

Cost factors

Teacher retention is costly, both financially and in student achievement. The cost of teacher turnover includes recruitment, advertising and hiring for a position as well as training and administrative costs related to the hiring process (Kurtz, 2015). Nationally, teacher attrition and retention cost the country billions each year (Darling-Hammond, 2006). In student achievement, teacher turnover affects the school's ability to provide effective instruction and results in repeated professional development and trainings.

Reasons for Exiting the Profession

One of the primary reasons teachers are exiting the profession is salaries (Hughes, 2012, Ingersoll, 2001). The national average salary for public school teachers in 2012-2013 was $56,383 (U.S. Department of Education and the NCES, 2014). Other reasons include discipline issues, lack of support from school administration, and a lack of faculty input in school-related decision making (Ingersoll, 2001). Increasing teacher workloads and lack of parent and student participation were also major concerns of teachers (Hughes, 2012).

Mentoring

As a means for supporting new teachers in the profession, designing a mentorship program provides many advantages. The relationship between the mentor and new teacher is developed to promote the professional and personal growth through coaching, support, and guidance. Mentors are coaches, teachers, and cheerleaders whose tasks include helping new teachers prepare for their first experiences on the job. Mentors are to develop a trusting relationship with the mentees while assisting them in their profession (Sorbet, 2018).

Mentoring in Education

The original idea of mentoring in education was to encourage veteran teachers to serve as mentors while assisting new teachers in learning professional norms and teaching pedagogy that best equipped them to remain in the profession longer than the rate of attrition at that time which was 3 years (Feiman-Nemser, 1996). Mentoring programs within 1 to 3 years of beginning teaching can provide personal encouragement, assistance in curriculum development, advice about lesson planning, individualized feedback on lesson planning (Sorbet, 2018).

Mentoring as Job-Embedded Professional Development

Mentoring has been referred to as job-embedded professional development. It aligns professional development with the specific needs and goals of educators (Templeton & Tremont, 2014). Because mentoring is an individualized personal learning opportunity, each of the exchanges between mentors and new teachers are tailored to meet the needs of both educators within the relationship to improve practice (Templeton & Tremont, 2014).

The mentors reflect about their own beliefs on teaching methods, students learning and the profession while coaching and assisting the new teachers (Huling & Resta, 2001). The mentor works with the mentees to learn new skills or reflect on teaching practices and assists them while being immersed in the actual profession. The mentors provide support through the process and addresses the areas of concern or weakness that those viewed as needing improvement present. Mentoring helps the beginning teacher by providing feedback in classroom management and lesson planning while simultaneously challenging the mentor teacher in becoming a more reflective practitioner (Sorbet, 2018).

Alignment of Theoretical Framework

This study focuses on the possible relationship between *Maslow's Hierarchy of Needs* (1943), Hertzberg's *Two-Factor Theory* (1959), and Frase's connection of these two theories into education (1989). In looking through this lens educational leaders can view mentoring as the key to increasing teacher retention.

Maslow's Hierarchy of Needs

In Maslow's *A Theory of Human Motivation* (1943), humans were labeled with having 5 needs. The physiological needs at the bottom of the pyramid are the most basic and include food, water, warmth, and rest and are those needs most closely related to the basic physical needs the body must have for survival. The second level depicts the safety needs such as warmth and safety. The third level shows the need for love and belonging. The fourth level contains the esteem needs which refers to self-respect and self-esteem and also leads to increased feelings of self-confidence, self-worth, strength, and feelings of being useful and capable in modern society. The fifth and final stage refers to the need for self-actualization. Self-actualization is the highest or most complex degree of needs in *Maslow's Hierarchy of Needs* (Figure 1.1). According to Maslow, the need for self-actualization may develop as we are expecting a new need of a challenge (1943).

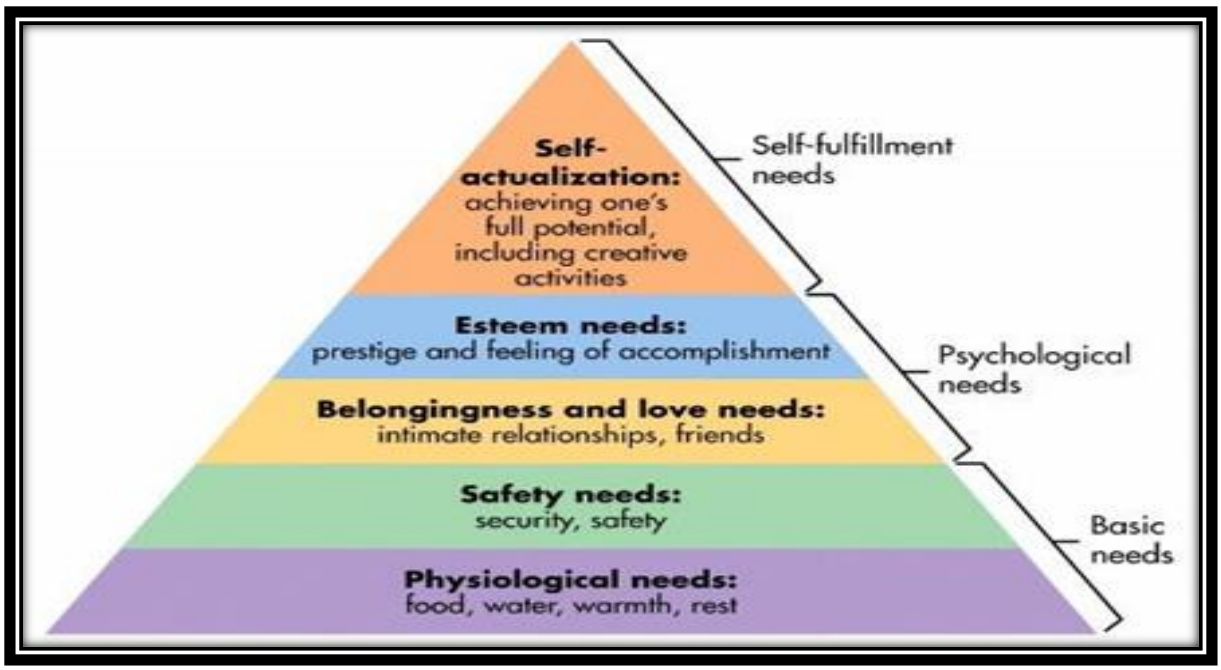

Figure 1.1 Maslow's Hierarchy of Needs (adapted from A Theory of Human Motivation (1943)

Hertzberg's Two-Factor Theory

Frederick Herzberg discovered the *Two-Factor Theory of Hygiene and Motivator Factors.* Hertzberg's intrinsic motivators satisfy the need for self-actualization (Stello, 2011). These motivators include those aspects of the status, recognition, wages, achievement, responsibility, and advancement or growth (Hertzberg, 1959).

Herzberg studied intrinsic motivation as a motivational factor in any workplace through achievement, recognition for achievement, responsibility, growth and advancement, and the work itself which are his motivator factors as listed in Figure 1.2. Hertzberg focused on the ability to have personal achievement and experience personal psychological growth (Frase, 1989). He believed that it was important for supervisors to be able to differentiate between motivators and hygiene factors because hygiene factors may lead to greater levels of job satisfaction, but does not necessarily add to the employees' motivation.

Hygiene factors

- Salaries, wages and benefits
- Company policy and administration
- Good interpersonal relationship
- Quality of supervision
- Job security
- Working conditions
- Work and life balance

Motivator factors

- Sense of personal achievement
- Status and recognition
- Challenging and stimulating work
- Responsibility
- Opportunity for advancement
- Promotion
- growth

Figure 1.2. Hertzberg's Two-Factor Theory of Motivation (adapted from Hertzberg's 2-Factor Theory of Motivation as taken from Hertzberg's One More Time: How do you motivate employees? (1968) reprinted in Harvard Business Review in 1987 and 2002.)

Frase-Connections of Theory

The interconnectedness of these theories came into education as Frase (1989) analyzed Herzberg's findings of 1966. His study attempted to differentiate between intrinsic and extrinsic motivators in the teaching profession. Frase found that intrinsic rewards serve as motivators. He also noted that teachers tend to achieve satisfaction from simply reaching and educating their students and only secondly by job recognition. His study supported the belief that school boards and administrators cannot buy teachers' motivation through salary raises. These intrinsic and extrinsic motivators are compared to that of Hertzberg's *Two-Factor Theory of Motivation* (1966).

Connecting Maslow, Hertzberg, and Frase-Reciprocity in Mentoring Relationships

Mentoring provides new teachers the availability of mentors' skills and knowledge of teaching along with their expertise and wisdom. Mentoring is a productive and professional model that can help new teachers while providing experienced or veteran teachers a unique way to contribute to the teaching profession (Ganser, 1997). A focused and systematic mentoring program has a positive influence on the performance of the new teacher, but it also has many advantages for the mentor teacher (Holloway, 2001).

Reciprocal Gains of Mentor and Mentee

Educational leaders should understand that allowing experienced teachers to mentor new teachers could ultimately provide benefits to the students within both the mentor and mentee's classrooms, thus improving the overall school organization (Huling, & Resta, 2001). Mentoring relationships are routes for gaining the professional and personal skills that are necessary for working in collaborative work environments (Kochran & Smith, 2000).

By comparing *Maslow's Hierarchy of Needs* with the *Hierarchy of Teachers' Needs*, (see Figure 1.3) we can see factors that are either intrinsic or extrinsic as described in *Hertzberg's 2-Factory Theory of Motivation*. In *Maslow's Hierarchy of Needs*, the first basic level of need is food, water, warmth, and rest while the first level of the teacher needs includes the basic desires to find organizational skills, classroom management, schedules, and environmental familiarity. As the new teachers progress throughout their professional careers, they move upward through these beginning extrinsic factors.

The mentor and new teacher relationship encourages intrinsic growth upward as it allows the new teacher to become far more interested in the mentoring relationship and the collaborative process to problem solve and set goals for students (Ganser, 1997). The second level of the teacher needs chart like Maslow's second level describes one of comfort, safety, and familiarity with school building and job responsibilities. The new teachers gain experience and slowly arrives at the third stage where they are interacting with partner teachers, sharing among other teachers within their grade levels, and learning how to communicate in professional learning communities and with others as he or she acts as part of a team. Through this upward climb the new teachers reach the fourth stage and become mentor teachers themselves.

The veteran mentor teachers reach the final and highest level of the chart when they are self-actualized as described very similarly in *Maslow's Hierarchy of Needs*. This level is the selfless leader who is willing to assist and support others in the profession for personal gain of intrinsic satisfaction and contribution to the field of education (See figure 1.3). For the mentees or new teachers, the self-actualized or highest level of *The Hierarchy of Teachers' Needs* may not actually be reached until mid to late career stages.

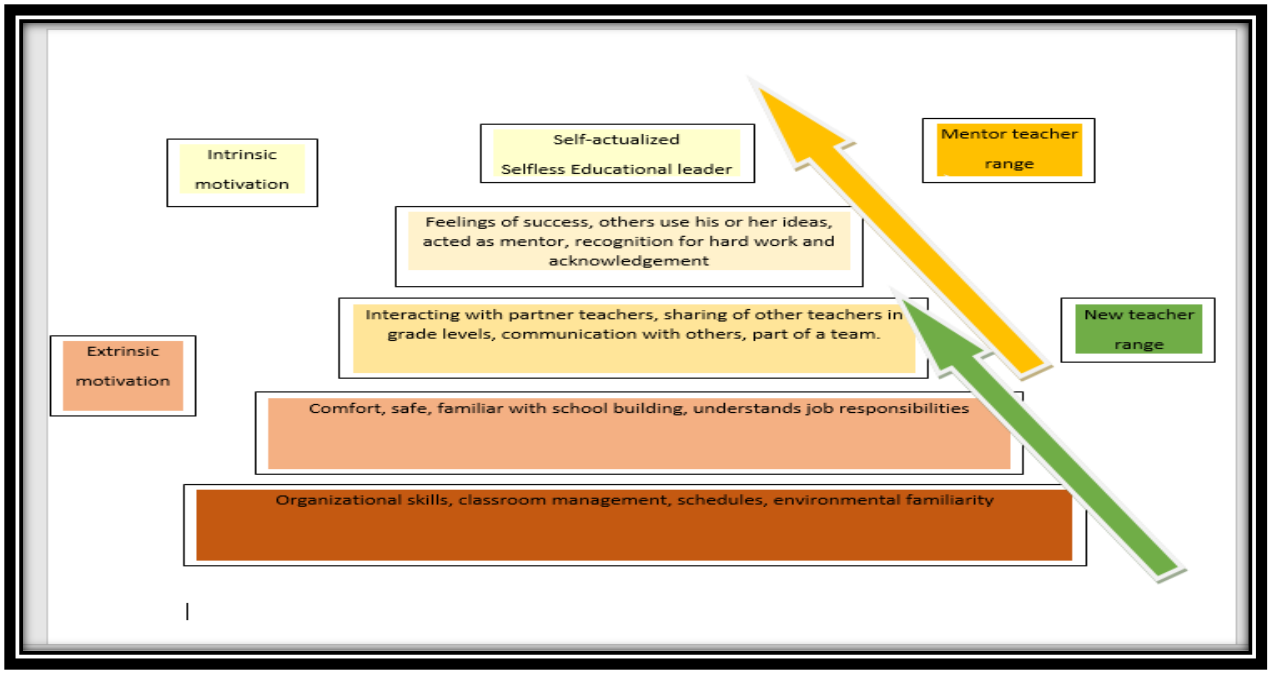

Figure 1.3 Hierarchy of Teachers' Needs Chart

The Areas of Reciprocity within a Mentoring Exchange

The Areas of Reciprocity within a Mentoring Exchange between the mentor and a mentee within a mentoring relationship spans three major areas. These are: (a) reflection, (b) growth, and (c) challenge (See Figure 1.4).

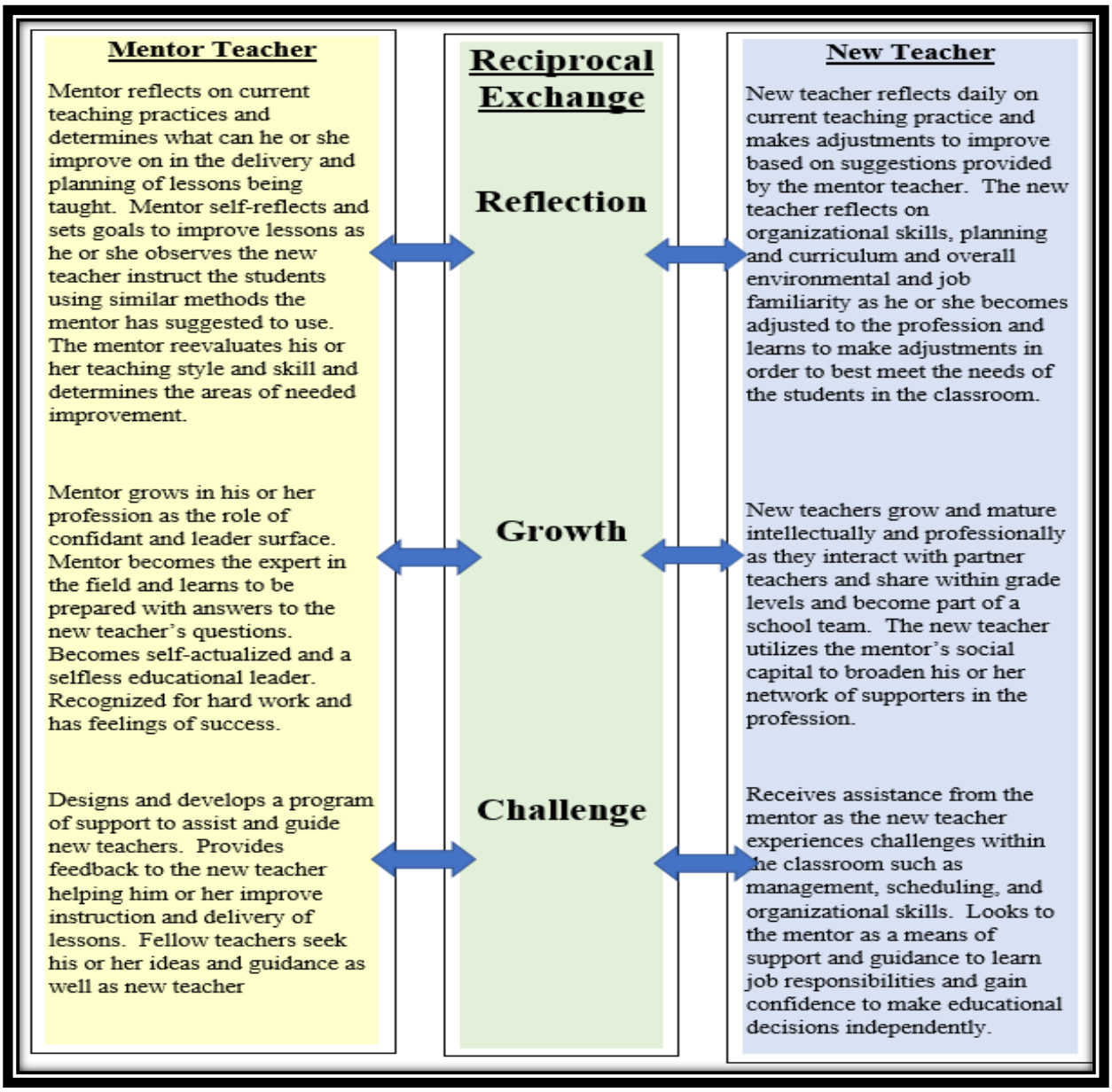

Figure 1.4 Areas of Reciprocity Within a Mentoring Exchange

Reflection

Mentoring promotes self-analysis of the mentor's own teaching practices, including teaching students, learning, and teaching as their own career (Ganser, 1997). The mentor assists and supports the new teacher through the day to day routines of planning, instructing, assessing and intervening with students as they reflect on current teaching practices. The mentors become reflective practitioners by reflecting on current practices and assessing if these practices are appropriate enough to meet the needs of the students in their classroom. Through mentoring, the veteran teachers better understand their own personal strengths and challenges as teachers and desire professional development opportunities to improve (Olson, 2008).

The mentees become more reflective practitioners in that as they teach, the mentor teachers provide feedback and assist the mentees in areas of planning, curriculum design, organization, management, and overall instruction of students. As the mentor teachers' model and demonstrate pedagogy and methods of teaching to new teachers, the mentors reflect and determine if their current methodology is working in the classroom as they observe the new teachers (Sorbet, 2018).

Growth

The mentors take on the new teachers as a means for fulfilling their intrinsic need to grow professionally. The mentors know that through assisting and collaborating with the new teachers, they will essentially grow in their professional career. The mentor teachers grow in task development through improving their ability to better assess student learning, improving teaching strategies, and heightening their use of questioning methods (Olson, 2008). The mentors spend their time modeling and providing quality examples of teaching pedagogy and methodology for the new teachers and become stronger teachers while refining practice through careful planning and execution of thought-out lessons. The new teachers grow professionally in this process as they lean on the mentors. Through growth, the mentors assist in bringing the new teachers through the basic needs of teaching to arrive higher on the teachers' needs chart. The new teachers show growth over time and slowly arrive at the stage where they are interacting and sharing with partner teachers and learning how to communicate in professional learning communities with others as they act as part of a team at their school (Sorbet, 2018).

Challenge

During the mentor and mentee exchange, the mentors begin to take on challenging work as they assist and support the new teachers with challenges of the new position in the teaching profession. The new teachers experience the challenges ranked low on the teachers' needs scale such as classroom management, organizational skills, scheduling, and basic environmental familiarity. The mentors are challenged as well as they assist the new teacher to raise their feelings of the second level of needs which include comfort, safety, and general familiarity with school building and job responsibilities. The new teachers are continuously challenged as they climb through the extrinsic factors in the profession.

Methodology

The purpose of this study is to determine whether mentoring programs that foster reciprocal relationships between the beginning teacher and the veteran teacher can improve teacher retention. The conceptual framework is grounded in the *Areas of Reciprocity within a Mentoring Exchange* between the mentor and the mentee within a mentoring relationship. The framework has three main areas of concern. These are: (a) reflection, (b) growth, and (c) challenge. This study provides data for educational leaders to view mentoring programs that foster reciprocal relationships between the beginning teacher and the veteran teacher as a possible means of improving teacher retention.

A mixed-methods approach was chosen for this study. Within the mixed methods research for this study, a quantitative approach was applied to describe phenomena and investigate relations and describe current conditions. To examine the qualitative data, the method of triangulation was used. For the purposes of this study, the analytic and interpretive procedures included comparing the findings from both the quantitative and qualitative data. This

study answers the following guiding research questions: (a) what are the motivational factors for the mentor; (b) what are the motivational factors for the mentee; (c) how do the motivational factors differ between a mentor and a mentee; and (d) what are the reciprocal benefits if any within a mentoring relationship between a new teacher and a mentor teacher.

Application of Design

A survey comprised of 27 Likert-type items as the quantitative component used to address the five levels of teacher needs from the *Hierarchy of Teachers' Needs Chart* as well as the degree of reflection, growth, and challenge of the *Areas of Reciprocity within a Mentoring Exchange* was utilized for this study. In addition to using quantitative research methods in the form of a survey to fully analyze the proposed theoretical framework, a qualitative approach in the form of open-ended response questions was also necessary for providing deep, rich information to further describe the relationship between the *Hierarchy of Teachers' Needs* and the *Areas of Reciprocity within a Mentoring Exchange*.

Population and Sampling Plan

The population of this study came from southeastern Louisiana public schools with elementary grades K-5. To examine the relationships between the mentor teacher and the mentee within a public-school setting, teachers were selected from southeastern Louisiana public schools to participate in an online survey that addressed the conceptual framework presented in the study.

Instrumentation

The survey was comprised of items from three previous surveys within three studies that were previously shown to be valid and reliable. Of the 40 original items, 30 items were intended to measure the *Hierarchy of Teachers' Needs* using the *Areas of Reciprocity within a Mentoring Exchange.* The five levels of teacher needs presented were: (a) self-actualization, (b) feelings of success, (c) interacting with others, (d) safe and comfortable with job responsibilities, and (e) basic needs. Within these five areas there were two items from each of the three areas of the reciprocal exchange within a mentoring relationship: (a) reflection, (b) growth, and (c) challenge.

The survey was administered online through *SurveyMonkey* (www.surveymonkey.com). The final survey contained 27 Likert-type items and an additional five open-ended response questions. This survey focused on a series of questions for mentors and mentees to consider about their own experiences using self-evaluation. The collected data from the survey was downloaded from *SurveyMonkey* into an Excel file and then imported into SPSS for analysis.

Analysis

A series of descriptive statistics were utilized to determine the frequencies, means, and standard deviations of responses by survey item. Pearson's Chi-square was the analytic data procedure used to determine the differences between group means among the two groups. For the five open-ended questions, the researcher collected the data obtained from these questions within the survey and used inductive coding to identify themes that emerged from the responses.

Sample

Of the 22 districts who were invited to participate, 12 agreed to engage in the study. These 12 districts ranged from metropolitan urban districts with over 39,000 students to rural

districts of barely 1,200 students (LADOE, 2017). These 22 districts included 525 schools with a total of 24,143 teachers. These schools housed 352,136 students which included 11.1% Special Education and 69.9% economically disadvantaged (http://www.louisianabelieves.com/resources/library/workforce). A convenience sample of teachers from public elementary schools within the 1st, 2nd, 3rd, 6th and 8th BESE regions within the southeastern area of Louisiana were chosen.

Of the 427 individuals who accessed the survey, 208 qualified based on teaching K-5 and participating in a mentoring relationship within the past 5 years. Of these 208, 5 were disqualified because they did not identify themselves as a mentor or mentee. Based on the analysis of the data, the 203 participants included 130 mentors and 73 mentees who participated in a mentoring program within the last five years in the elementary grades K-5 setting.

Of the 203 participants, 153 completed at least one motivational item on the survey. Table 1 presents data to show 153 participants, 102 mentors and 51 mentees. Of the 153 total participants, 2.00% were male while 98.00% were female. These mentors and mentees were comprised of teachers of grades kindergarten through fifth.

Findings

The purpose of this study was to investigate the reciprocity within a mentoring exchange on the *Hierarchy of Teachers' Needs* with respect to *Areas of Reciprocity within a Mentoring Exchange*. This study is contextually bound in the beliefs that both mentors and mentees grow within this mentoring relationship.

Demographics

All five ethnic groups had at least one participant, and four participants chose to not respond (See Table 1.1). Additionally, participants could mark more than one choice for their ethnicity. American Indian or Alaskan Native (Ai_Al), Asian or Pacific Islander (As_Pi), and Hispanic (H), participants had either 1 or 0 represented in each category for both mentors and mentees. Only 7.00% of mentors identified as Black (Bl), while 16.00% of mentees identified as such. Caucasian (Ca) had the largest representation of the participants within this study with 90 (90.00%) mentors and 39 (78.00%) mentees. There were three participants who chose not to respond to this question, and 4 participants indicated *no response*.

The mean age of the mentees was 32.14 (SD = 8.43) and, the youngest mentee was 21 years of age. The oldest mentee was 54 years of age. The mean age of the mentors was 43.13 (SD = 9.13). The mentor teachers' ages ranged from 27 to 64 years of age. Fifty-five percent of the mentee respondents had less than 7 years of teaching experiences. Eighty-three percent of the mentors had 15 years of experience or more.

	Mentor		Mentee	
	N	%	N	%
Gender				
Male	2	2.00%	1	2.00%
Female	98	98.00%	48	98.00%
Grade level*				
K	27	26.47%	10	20.83%
1	35	34.31%	15	31.25%
2	29	28.43%	8	16.67%
3	34	33.33%	9	18.75%
4	28	27.45%	4	8.33%
5	26	25.49%	11	22.92%
Ethnicity*				
Ai_Al	1	1.00%	1	2.00%
As_Pi	0	0.00%	1	2.00%
Bl	7	7.00%	8	16.00%
H	1	1.00%	0	0.00%
Ca	90	90.00%	39	78.00%
NR	2	2.00%	2	4.00%

Table 1.1 Demographic Characteristics of Mentors and Mentees
**Respondents could select more than one ethnic group and grade level. Total may exceed the total number of mentors and mentees.*

Results of the Mentors

The results showed that the mentors scored items the highest in the self-actualized or highest level of the Hierarchy of Teachers' Needs. Mentors considered the Hierarchy of Teachers' Needs in this order: (a) self-actualized, (b) interacting with others, (c) comfortable and safe, (d) feelings of success, and lastly, (e) basic needs including organizational skills and classroom management.

The results showed that the mentors scored items the highest within the *Areas of Reciprocity within a Mentoring Exchange* in this order: (a) challenge, (b) reflection, and (c) growth. The mentor had strongest agreement within the areas of *reflection* and *challenge*.

Results of the Mentees

Mentees scored items the highest in the self-actualized or highest level of the *Hierarchy of Teachers' Needs*. Mentees considered the *Hierarchy of Teachers' Needs* in this order of highest to lowest: (a) self-actualized, (b) interacting with others, (c) comfortable and safe, (d) feelings of success, and (e) basic needs including organizational skills and classroom management.

Mentees scored items the highest within the *Areas of Reciprocity within a Mentoring Exchange* in this order of highest to lowest: (a) challenge, (b) reflection, and (c) growth. The mentee had strongest agreement within the areas of *reflection* and *challenge.*

Similarities and Differences Between Mentors' and Mentees' results

The results of this study showed that of the five levels of *Hierarchy of Teachers' Needs* being: (a) self-actualized, (b) feelings of success, (c) interacting with others, (d) comfortable and safe, and lastly, (e) basic organizational skills and classroom management, both mentors and mentees scored highest in the self-actualized level. Both mentors and mentees considered the *Hierarchy of Teachers' Needs* in this order: (a) self-actualized, (b) interacting with others, (c) comfortable and safe, (d) feelings of success, and (e) basic needs including organizational skills and classroom management, mentors and mentees scored highest in the self-actualized level.

The responses within the *Areas of Reciprocity within a Mentoring Exchange* of reflection, growth, and challenge showed most significant difference between the mentors and mentees responses to be in *growth*. The Chi-square statistical analysis presented in Table 1.2 from this study showed there was a statistically significant difference between the responses of the mentor and the mentee in *growth*. These results are further supported by the qualitative data in that mentors described *reflection* as being more important than growth but mentees described *growth* more often than *reflection* and *challenge*.

Item	x^2	p	Areas of Reciprocal Exchange
1. I reflect on my own personal professional practice regularly.	0.519	0.772	reflection
2. I am passionate about my job.	1.367	0.713	reflection
3. Teaching gives me a sense of purpose.	2.535	0.469	growth
4. My professional growth is a priority for me.	**11.571**	**0.003**	**growth****
5. I am committed to professional growth to improve teaching and learning.	7.750	0.051	challenge*
6. I provide opportunities to collaborate with other teachers about improving.	1.414	0.702	challenge
7. I understand my strengths and challenges as a teacher.	2.262	0.520	reflection
8. I am perceived as a leader in my school or district.	7.695	0.053	reflection*
9. I believe my job performance is likely to improve when I am engaged in a mentoring relationship.	**14.024**	**0.003**	**growth****
10. I have the opportunity to share and discuss current literature in education.	**13.137**	**0.004**	**growth****
11. I take advantage of opportunities to attend professional development activities away from the school to improve teaching knowledge and skills.	6.230	0.101	challenge
12. I am comfortable having other teachers observe my teaching.	4.113	0.249	challenge
13. I intend to remain in education as a career.	1.171	0.760	reflection
14. I spend time in professional reflection about my work.	2.832	0.418	reflection

15. I genuinely enjoy working with peers to accomplish goals to improve and understand teaching and learning.	2.354	0.502	growth
16. I set professional goals for myself.	1.418	0.701	growth
17. I have the opportunity to participate and make decisions about curriculum planning with faculty members.	1.148	0.766	challenge
18. I am motivated to help others improve teaching and learning.	6.201	0.102	challenge
19. I feel competent about my teaching.	4.039	0.257	reflection
20. I would choose teaching as a career if I had to do it over again.	4.288	0.232	reflection
21. I make opportunities to discuss ways to improve my teaching and learning in the classrooms.	0.471	0.790	growth
22. I have the skills necessary to foster positive relationships with peers, parents, and students.	0.121	0.941	growth
23. I am able to help students who are having difficulty understanding a lesson.	0.624	0.732	challenge
24. I create an environment of respect and rapport in my own classroom.	1.891	0.595	challenge
25. I care about what other members of this teaching community think of me and fitting in is very important to me.	4.284	0.232	reflection
26. I am able to redirect disruptive students to a more appropriate behavior.	4.996	0.172	reflection
27. I have the opportunity to grow professionally through interactions with other teachers within my school.	7.075	0.070	growth*

Table 1.2
Chi Square Results Comparing Mentors and Mentees with Respect to Areas of Reciprocity Within a Mentoring Exchange and Hierarchy of Teachers' Needs Note: *Statistically significant with x=.10; **statistically significant with x = .05

Note: Teacher Hierarchy of Needs: 1-6 Self-actualized, 7-12 Feelings of success, 13-18 Interacting with others, 19-24 Safe and comfortable with job, 25 management and organization

Quantitative data from this study showed that mentors and mentees chose *challenge* to be a top *Area of Reciprocity within a Mentoring Exchange*, but qualitative data suggested some variation in these results. Mentors still described *reflection* to be the area of most reciprocity within a mentoring exchange while mentees named *growth* as more of a factor for them within a mentoring relationship.

The data in this study indicate that mentors and mentees have stronger agreement to the items connected to the highest level of the *Hierarchy of Teachers' Needs* chart with respect to (a) self-actualization, (b) feelings of success, (c) interacting with partner teachers, (d) comfortable, safe and familiar with school building and job, and (e) basic needs such as organizational skills, management and environment. Although the quantitative results indicates no significant difference between mentors and mentees regarding the *Hierarchy of Teachers' Needs*, the qualitative data suggest that reflection or being highly reflective (self-actualized) is repeated more often within the mentors' responses than the mentees' responses. Mentees' average mean scores were higher in the five levels presented of the *Hierarchy of Teachers' Needs* than that of mentors.

The quantitative data were also indicative that mentors and mentees had similar views in the aspects of mentoring with respect to the *Areas of Reciprocity within a Mentoring Exchange.* Although the mentors and mentees chose items within these three areas in the order of (a)

challenge, (b) reflection, and (c) growth, the qualitative data show mentors referred more to *reflection* and mentees referred more to the areas of *growth*. This indicates that mentors are further supporting their self-actualization level of the *Hierarchy of Teachers' Needs.*

In looking at the qualitative data for mentees, *growth* was a major theme, and one can determine that mentees valued professional and personal growth as a teacher through the mentoring process over reflection. With this idea, one can see that mentees could still be at an earlier level of the *Hierarchy of Teachers' Needs* than they originally perceive themselves to be in the survey.

Discussion of Emergent Themes

The results of this study indicate that mentors and mentees are motivated by differing levels of the *Areas of Reciprocity within a Mentoring Exchange* (see Figure 1.4). According to the quantitative data, mentors' and mentees' motivation come primarily from the intrinsic need for a *challenge* within the *Areas of Reciprocity within a Mentoring Exchange.* Qualitative data shows that mentors looked to *reflection* as the area in which they gained the most in the relationship, while mentees thought *growth* was their largest gain. Based on the open-ended responses of the participants, the mentors and mentees shared these five reciprocal themes of the benefits within the mentoring relationship: (a) collaboration, (b) teaching skills, (c) reflection, (d) growth, and (e) feedback.

Conclusions

Conclusions from this study are aligned with both conceptual frameworks to include the *Areas of Reciprocity within a Mentoring Exchange* as well as the *Hierarchy of Teachers' Needs* in regards to both mentors' and mentees' responses.

Areas of Reciprocity Within a Mentoring Exchange

The data suggest that the mentors and mentees are motivated similarly within the *Areas of Reciprocity within a Mentoring Exchange.* Although the mentors and mentees both chose the same order of importance within the *Areas of Reciprocity within a Mentoring Exchange,* the mentees' mean for *challenge* was slightly higher than that of the mentor's average mean score. The mentors and mentees both scored *reflection* second, followed by *growth.* The data are also indicative that if challenge, reflection, and growth were what was gained in this relationship in this order, then both mentors and mentees were driven while engaged within a mentoring relationship due to some intrinsically motivational factors.

Of the *Areas of Reciprocal Exchange*, the largest significant difference between mentors and mentees was in the area of *growth*. Mentors did not see the mentoring process providing them the level of growth that the mentees thought mentoring was providing for them as a new teacher. It was *challenge* and *growth* that intrinsically drove mentees.

In looking at the *Areas of Reciprocity within a Mentoring Exchange*, this study indicates that mentoring relationships encourage both mentors and mentees to grow stronger within their profession (Sorbet, 2018). Through this reciprocal relationship, the mentor and mentee become more engaged in the profession thus creating a stronger presence of intrinsic motivation, which is the driving force in motivating employees (Hertzberg, 1959). If motivated employees are more likely to remain in the profession, then this idea of motivation could also increase teacher retention (Perrachione, Petersen & Rosser, 2008). There is a positive relationship between satisfaction with teaching and the intent to remain teaching in the profession (2008).

Hierarchy of Teachers' Needs

Within the *Hierarchy of Teachers' Needs* (Figure 1), new teachers progress in their professional careers and move upward through the levels of need as their motivation changes. Mentees, motivated by challenge and growth, continue to grow and mature professionally as they interact with partner teachers, share within grade levels, and become part of a school team while facing the challenge of becoming skilled within the profession (Sorbet, 2018).

Within the qualitative data, mentors and mentees both considered time to be a barrier Mentors considered teaching skills and communications to be barriers, whereas mentees considered the lack of feedback as a main barrier. In a mentee, the self-actualized or highest level of *Hierarchy of Teachers' Needs* may not actually be reached until mid to late career stages, yet some new teachers may perceive themselves at this highest level of self-actualization prematurely. There was a question about release time for mentoring program participation when the mentor described it as necessary and most useful and the mentees didn't see the release time as particularly important. This shows a difference in self-awareness between the experienced and inexperienced teacher. Mentors and mentees grow when engaged within a mentoring relationship as they begin at their own individual level on the *Hierarchy of Teachers' Needs* and gradually move upward. This journey continues as mentors become more self-aware and as mentees become more engaged within the mentoring relationship. The mentoring relationship encourages the collaborative process of mentoring for both educators to grow, problem solve, and set goals for their students (Ganser, 1997).

Mentors and mentees within this study named five reciprocal benefits during their mentoring relationship. The common areas of reciprocal exchange within the mentoring relationship in this study that were specifically identified within the qualitative data were: (a) collaboration, (b) teaching skills, (c) reflection, (d) growth, and (e) feedback.

Conclusions

When addressing who really grows in a mentoring relationship, the mentor or the mentee, the answer is both. This study provides evidence that *challenge* and *reflection* intrinsically drive mentors while *challenge* and *growth* drive mentees. Mentors are motivated due to the *challenge* of taking on a new teacher, showing him or her best practices, and reflecting on their own teaching skills and ways to improve. The mentee is motivated by the *challenge* of a new teacher position and the *growth* experienced throughout the relationship with a mentor teacher (Sorbet, 2018).

This study's results provide educational leaders the idea that fostering reciprocal relationships between the mentor and the mentee could be a means of motivating our teachers through instilling *reflection, growth* and *challenge*. This study provides evidence that if a mentee and a mentor are engaged within a mentoring relationship then reciprocal intrinsic motivation could develop from within. Intrinsically motivating mentors and mentees specifically in areas of reflection, growth, and challenge, could improve job satisfaction. Improving job satisfaction in both new and veteran teachers could be the driving force behind new and veteran teacher retention (Sorbet, 2018).

Educational leaders should look to mentoring relationships and programming to increase intrinsic motivation by providing the challenge that veteran teachers or mentors long for, the growth necessary for new teachers or mentees to become successful in the profession, and the reflection necessary to adjust and improve throughout their career. Fostering mentoring

programs within school districts while encouraging supportive, mentoring relationships within the school buildings could be a start to increasing intrinsic motivation while improving new and veteran teacher retention (Sorbet, 2018).

Implications of this Study

By creating mentoring programs to support mentors and mentees, districts motivate community and relationships between veteran and new teachers which also encourages both to remain within the profession. School districts could begin to feel a shift of focus from teacher evaluation and remediation of teachers to more of a community of support and continuing professional development for beginning and veteran teachers. If educational leaders take time to invest in their beginning teachers, helping them to form bonds and a community within their schools through engaging as mentees within mentoring relationships, then beginning teachers may become more motivated to continue in the profession (Sorbet, 2018). Educational leaders also should invest interest in their veteran teachers by fostering intrinsic motivation through encouraging these teachers to engage as mentors within mentoring relationships with new teachers. These mentors would continue to grow into strong leaders within their schools.

Through the mentoring process, mentees could become confident in their abilities and, in turn, meet their own needs as indicated by the *Hierarchy of Teachers' Needs* allowing them to become intrinsically motivated. This may result in a roll forward effect with those who were mentored making the decision to become mentors themselves and supporting the next generation of new teachers.

Recommendations for Future Study

Perhaps a deeper qualitative, comparative look at the growth between the mentor and the mentee would also be beneficial to educational leaders because *growth,* one of the areas of findings within the study, improves the practice of teaching. A deeper look could also provide information about the degrees of *growth* that a mentoring program could provide to the mentor and the mentee.

A further examination of the instrument and the response format is also suggested. The expansion of the survey responses from 4 to 6 or more or even the use of a sliding scale may yield more significance upon analysis.

Final Thoughts

Teachers need support, and mentoring programs are the key to rekindle the intrinsic motivation of veteran teachers while supporting and modeling that same motivation for new teachers. Mentoring relationships could foster intrinsic motivation within the mentor and the mentee while creating a cycle of reflection, growth, and challenge that could be carried on through the years. Mentoring relationships encourage and support the mentee to grow while providing an opportunity for the mentor to be challenged to strengthen and reflect on his or her own teaching abilities (Sorbet, 2018). If teachers are appreciated, supported, and intrinsically motivated within their profession, they will want to be in their schools, and they will remain there for the years to come.

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Raising the Bar: Conducting Highly Reliable Data Analysis by Redesigning the Organizational Landscape in an Initial Educator Preparation Program

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Abstract

After training and a review of literature, an Initial Educator Preparation Committee (IEPC) at a university located in a rural Arkansas community initiated the charge to implement a collaborative action research system most commonly referred to as a Professional Learning Community (PLC). This professional learning initiative consists of a semi-structured plan that involves shared responsibility distributed to all committee members. In addition to the re-design of the organizational structure of the committee, evidence-based practices were also utilized to modify the means for disseminating and examining data. The fidelity of this PLC process has shown great outcomes in effectively monitoring candidate data. The data-informed decision making has become more purposeful and productive with results positively shaping the experiences of candidates and ultimately yielding improved classroom practices of completers. The collaborative manner in which this university faculty established the PLC approach has provided actionable insights for the IEPC and may serve as a model system for other groups in higher education.

Introduction

The Arkansas Division of Elementary and Secondary Education (DESE) adopted Professional Learning Communities (PLC) as a form of professional development for teachers in Arkansas (DESE, n.d.). For the past three years select Arkansas schools have been placed in cohorts in order to learn and develop through the PLC model. DESE is working to ensure the model is implemented with fidelity to ensure teachers and students are making significant gains in practice and learning. Dufour et.al (2016) noted teaching practices and student learning improve drastically when schools fully implement the PLC model. As teachers across Arkansas invested in the implementation of the process, the university faculty in an Educator Preparation Program (EPP) in rural Arkansas began researching the PLC model. The EPP quickly recognized the benefits for K12 student learning and overall success reported by institutions utilizing the PLC approach.

As this EPP continued to learn about the process, DESE began to partner with universities across Arkansas that were teaching the PLC process. After attending a Solutions Tree conference and researching the PLC model, this EPP began to implement the method and teach concepts of the PLC model in coursework. The PLC approach aligned well with current exercises of the EPP since collecting and analyzing data to inform decision making was already part of the culture of the university. Therefore, the EPP took the initiative to investigate the restructuring process necessary to gain more insight to this in-depth practice that would provide continuous quality improvement through data-informed decision-making. The findings provide the means for how this EPP restructured the Initial Educator Preparation Committee's (IEPC) data review process and benefits noted after the implementation of the process.

Review of Literature

K-12 schools across the nation are grasping the Professional Learning Community (PLC) concept and implementing these collaborative networks within their systems (Dufour, Dufour, Eaker, Many, & Mattos, 2016). Major gains in student achievement have been recognized through these collaborations. Although higher education institutions were not the original focus for PLC's evidence-based practices, many higher education units are now seeking to modify and make applicable PLC practices due to the success reported in the K-12 studies (Eaker & Sells, 2016).

Dufour, et.al (2016) defined Professional Learning Communities (PLC) as "an ongoing process in which educators work collaboratively in reoccurring cycles of collective inquiry and action research to achieve better results for the students they serve" (p. 10). This faculty reviewed literature outlining PLC practices in various school settings and then structured a model best-fit for the needs of this higher education unit. This customization allowed for a more effective model for reviewing data and making programmatic changes in order to improve candidate outcomes. In addition, local school districts serviced by this university also requested completers come prepared to join in a PLC environment and work collaboratively with their team. Therefore, the university faculty not only embraced becoming a PLC but also committed to teaching the process during program coursework.

Implementation of a PLC Model

Initiating the implementation of a PLC model in higher education provided many challenges. This university faculty discovered that members tend to protect the current culture, responsibilities, and organizational structure. Effective leadership practices and acts of strategic support were found to be instrumental in making the necessary changes in the structure of an educational organization (McBrayer, Chance, Pannell, & Wells, 2019). A strong leadership team was already in place at the university and provided the support for obtaining the necessary professional development to learn about and implement the PLC practices. In preparation for initiating the PLC process, the faculty took the crucial step of initiating a self-reflective system analysis. To make such changes, the faculty must first understand current practices in order to identify the procedures that are less than effective and in need of re-structuring.

The Initial Educator Preparation Committee (IEPC) became the data review team leading this PLC process. Due to the collaboration established early in this organizational restructuring, members of the IEPC embraced the PLC model and started the restructuring process. The trust of members, over time, provided the necessary foundation for true collaboration and a focus on best practices. Hord (2004) acknowledged that the re-designing of a system-wide professional learning environment provides the potential to further enhance improvements with candidate performance.

McBrayer et al. (2019) recognized a link between school effectiveness and teacher perceptions. The shared responsibility of IEPC members through the PLC process held all members accountable and suggests that all members of the team are essential for the common good of every candidate graduating from initial programs at this university. In turn, faculty perceptions of the committee work are now stronger due to the shared committee responsibilities and the need for all candidates to graduate as prepared completers.

IEPC Structure and Design

Inspired by the myriad of designs and structures offered through the PLC support framework (Dufour, 2004), this university faculty took the initiative to re-design the IEPC's organizational landscape. In order to reflect and better understand the current state of the teacher preparation program, make productive data-informed decisions, and ultimately improve student outcomes, the PLC (Dufour et.al, 2016) framework provided a structural foundation. The first step was to ensure faculty members from each initial program had representatives to serve on the IEPC. Equal representation sets the stance that all initial programs hold value and each member is to collaborate with a mindful purpose that will serve initial programs as a whole. This representation in structure provided multiple perspectives for collaborative networks to take place throughout initial programs. The group was able to review data through an aggregated perspective, although program representatives were also able to see the disaggregated data. In the new IEPC membership structure it was apparent that individual faculty members were willing to share successes and failures, based on data, for specific programs. Dufour (2004) documented that the PLC design supports diverse membership that is focused on student learning and provides observable benefits of developing a healthy faculty culture and ensuring positive academic results.

Hord (2004) described other essential PLC characteristics such as shared leadership, shared faculty practices, and supportive conditions for maintaining the community, as contributing factors responsible for forming a collaborative team. For this university, the collaborative approach fostered in the PLC model has brought diverse and isolated faculty together for the common purpose of sharing the responsibility in the data review process. Previously, faculty in departments outside of the College of Education had voiced a feeling of being "uninformed" and after the revised IEPC was formed there was clarity in the conversation and process. With such diverse members coming together in a group as this, the unique skill sets and experiences are likely to foster collegiality and build trust (Blitz, 2013; McConnell, Parker, Eberhardt, Koehler, & Lundeberg, 2012). As this change developed, members felt more connected and partnerships began to grow, thus, allowing for in-depth conversations pertaining to candidate performance. With the new structure in place, the IEPC was able to focus on continuous quality improvement through data-informed decision-making.

Along with the organizational restructuring, the IEPC created a shared vision across all programs by developing a mission statement, "Ensuring all candidates succeed." Ensuring that all students learn is the basis for the model described in *Learning By Doing* (Dufour et.al, 2016). A major component for all candidates succeeding is that all members have a role in the committee and know their part is essential for making the group function more effectively.

The IEPC team also recognized the need for establishing a common meeting time. Originally, the IEPC met monthly and data was discussed in monthly meetings. This timeline was useful, but actions among members was inconsistent due to poor attendance and lack of communication to those not present. At various meetings, faculty might not attend because of class and other professional conflicts or obligations. Without the faculty representation in those specific programs present, essential insights and conversations about candidates and the data in those programs was often overlooked. The IEPC then made the decision to dedicate an entire day to data review (Data Day) multiple times a year. The purpose for these intensive Data Days was so members would be able to identify observable patterns across multiple data sets when compared at the same time. As data-informed decisions were indeed recommended and then implemented across programs, members were more consistent in sharing changes with other

faculty members in their individual programs. This intensive data review practice proved to be very effective.

As members worked collaboratively in reoccurring cycles of collective inquiry and action research, the practices required deeper collaboration and communication. Although Data Days were found to be quite productive, the IEPC recognized that holding more frequent meetings would assist in the development of the in-depth goals that surfaced through the more collaborative process. Therefore, a common time was strategically made available during the weekly schedule in the case additional collaboration would be necessary to thoroughly examine specific agenda items that required more focused conversations. The designated time also allowed for ad-hoc committees to meet when the data revealed a need for deeper analysis or program changes. Such conversations have the potential to concentrate more intently on student learning outcomes, faculty development opportunities, or broader conversations, e.g., inter-rater reliability, admissions criteria, or dispositions.

Protocol for Examining Data

As the IEPC continued to develop, the team established essential practices and group norms for examining the data. The Data Quality Campaign (2017) provided a framework that addressed the need for program faculty and leaders to focus on continuous improvement while reviewing data systemwide. The IEPC developed and adopted a Quality Assurance System (QAS) that provides a framework for data collection. This QAS structure ensures appropriate data is being collected and analyzed to make informed decisions. This plan also provides a framework for IEPC meetings and a comprehensive plan for data collection across all programs. The QAS for the EPP provides an approved data cycle timeline for Initial Programs. The timeline is split into three categories: admissions to completion, assessment, and survey data. Purposeful ordering of the data provided the IEPC appropriate time to make data-informed decisions and implement new practices for candidate growth and achievement.

The overarching goal for the IEPC is to ensure all candidates are meeting program expectations by completion. Secondary goals for the IEPC are based on data sets and allow for short term changes, when needed, to improve candidate learning outcomes. Dufour, et.al (2016) discussed "effective goals generate joint effort and help collaborative teams clarify how their work can contribute to schoolwide or districtwide improvement initiatives" (p. 42). The data review cycle holds all members mutually accountable to submit appropriate data on time and review the data for all candidates.

When it comes to analyzing the data, Sagor (2010) referred to this process as collaborative action research. Although any single faculty member could be tasked with interpreting the data sets for the unit, more insight is gained from the data when members who hold shared visions and values systematically review the data together (Sagor, 2010). This university found that the collaborative action process does indeed bring about a deeper analysis of data and allows members to truly determine "What's the story behind the data?" For this reason, the CAEP coordinator for the Educator Preparation Program (EPP) and the chair of IEPC meet weekly in order to collect data that will undergo review as well as ascertain the manner in which the data will best be presented for members to make informed decisions.

Collaborative action research must also be organized with a means for conducting the inquiry necessary for reviewing the data. Before each data meeting, the leadership team of this IEPC collected the data and prepared it into meaningful formats. And since the purpose of this process was to create a deeper understanding between the actions of the EPP on student

outcomes, both Sagor (2010) and Peery (2011) recommended impact or essential questions be generated in order to effectively conduct the data review. These essential questions along with prepared data was categorized and disseminated to IEPC data teams. Each data team consisted of two faculty members from different programs. Having diverse program members review the same subsets of data provided diverse perspectives and the greatest analysis. At the IEPC data meeting, each data team would present the data set they reviewed by addressing their responses to the essential questions with the IEPC group as a whole. With the data teams' thorough analysis and ability to address essential questions, the group would then be able to identify needs and propose areas of action if necessary.

The essential questions developed by the IEPC for data review provided a method to guide members through the data analysis process. During the IEPC data meeting each individual group member would be able to independently utilize level 1 essential questions for determining the facts revealed by the data. Next, members would utilize the level 2 prompts which asked members to look more analytically in to making sense of the data and determining if any trends were noted or whether any actions should be initiated. Then in level 3, the whole group discussed findings and proposals that were generated or discussed at level 2. Finally, members collectively determined actions and made recommendations.

This collaborative action research process that so richly fostered the PLC format allowed IEPC members to take ownership of the data assigned for review point out strengths and weaknesses of every set of data. Implementing proper protocol for reviewing data caused members to actively discover, adjust, adapt, and explore creative ways to achieve difficult things that have yet to be accomplished (Sagor, 2010). With collaborative action research, members were able to recognize and make note of where candidate performance overall as well as face challenges with unknown solutions. The in-depth analysis by each subgroup allowed members to see trends across data sets and collectively determine any plan of action deemed necessary. In turn, the collaborative process ensured members' perspectives provided multiple measures to make data-informed decisions that each member believed in and are based on observable trends across data sets.

Measures of Success

In alignment with the literature review, the IEPC's implementation of a PLC structure and design has shown definite measures of success. Positive impact was identified in both the faculty members and candidates (Hilliard, 2012; Yendol-Silva, 2003). Specific programmatic changes have been identified and implemented due to the new process.

One programmatic example included faculty noticing multiple data sets that revealed concerns for candidates implementing appropriate techniques to ensure an appropriate learning environment for all students. The IEPC voted to review coursework where these concepts were taught and make recommendations back to IEPC. Therefore, a sub-committee was formed. This committee reviewed the current course content and made specific recommendations for change. As a result, the course has been revamped providing candidates with more learning experiences

A notable measure of impact for faculty was the means of collegiality exhibited while sharing the challenges set forth during the IEPC meetings (Bedford & Rossow, 2017). This collegiality in return forms a bond or system of trust amongst the IEPC members (Blitz, 2013; McConnell, Parker, Eberhardt, Koehler, & Lundeberg, 2012). Yendol-Silva (2003) explains how this model of collaboration reinforces members to think and act like a team, thus creating a sense of member-accountability. Members are now more willing to ask colleagues for help and

borrow strategies from other faculty. Overall, the IEPC benefits greatly from the PLC by taking advantage of their own faculty members' unique skill sets, expertise, experience, and motivation (Cox, 2012; Koch, 2008). Faculty are vested in their personal growth and that of all candidates in the programs.

Significance of Findings

Overall, the scope of this study was to present a plan that other initial Educator Preparation Programs (EPP) could potentially replicate or modify when incorporating their own structure for a PLC. Through this IEPC's implementation of a PLC structure, significant findings were acknowledged in the areas of professional networking and program accountability.

While some professional networks can occur in work settings in which colleagues are formally assigned working teams. Other professional networks are derived from those who are drawn to work together due to like-minded backgrounds, philosophies, and experiences. Neither of these network systems are ideal when it comes to generating system-wide decision-making. Through the use of a PLC model, this IEPC found that the professional networking within the department was enhanced. Contrary to traditional committee formations, this PLC structure consisted of both new and seasoned faculty. The new faculty members posed beneficial questions that brought about greater insight to the professional community as a whole. Likewise, experienced faculty provided knowledge that was acquired through diverse and rich experiences. Urquhart, et al (2013) affirms that the collaborative nature of a PLC provides a more valuable and robust output than that of individual efforts. In short, the full engagement of the faculty in this PLC structure provided a critical and more thorough review of the data before making decisions.

Another significant finding pertaining to the professional networking was the change in culture. The restructuring of an inclusive membership of the IEPC led to a cyclical series of events that started with relationship building. Once relationships were solidified, then came the members' confidence in the process, followed by trust in the data-informed decisions, and ultimately a sense of ownership. Smith and Rust (2011) suggest that the unity brought about by the PLC collaboration instills collegiality and empowerment. The greater sense of community among those members involved in the PLC process evolves from engaged members seeking out peers for sharing and learning from one another as well as generating solutions together.

Perhaps the most significant discovery through this study is the IEPC's ability to effectively monitor, compare, and evaluate trends in program data; thus, improving program accountability. Higher performing educator preparation programs must be committed to learning from candidates' performance outcomes. Peery (2011) acknowledges that members capitalize on their professional abilities to acquire and transfer knowledge through the structured design and collaborative delivery method of the PLC process. Ultimately, this study found a key outcome of the PLC process is that the collaborative analysis is more effective in generating continued growth and development of the program.

Conclusion

Effectively implementing PLCs in higher education takes a modified approach when compared to that of K-12 schools. Therefore, it is essential higher education institutions embrace concepts of PLC using their own approach. This university has structured an approach within the IEPC that effectively developed a QAS and provides shared responsibility among all members. This re-designed organizational system has led to high quality data-informed

decisions that provides the faculty the means to better prepare candidates who are best prepared for teaching on the first day of school. Likewise, the re-structuring and collaborative actions along with the implementation of a PLC model within the IEPC could stand as an example for other groups in higher education.

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Applications of Readers Theater in One Small, Mid-Southern State's Foreign Language Classroom

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Abstract

The purpose of this paper is to investigate teachers' understanding and implementation of Readers Theater (RT) in one small mid-southern state's foreign language classrooms. A review of previous research shows that RT as an art-integrated instructional strategy is effective on students' reading fluency, comprehension, retention of information, and engagement. However, the findings of this study reveal teachers seldom use this strategy in their teaching, and their understanding of RT is limited as well. Therefore, it is necessary to first recognize the gap existing between research and practice, then continue the inquiry on how to help teachers gain a better understanding of RT and eventually increase their application of it.
Key Words: Readers Theater, reading fluency, comprehension, retention of information, engagement.

Introduction

Listening, speaking, reading, and writing are four principal language skills to address in the context of any language classroom. According to the three modes of communication developed by the *ACTFL Performance Descriptors for Language Learners 2012*, reading is considered as an interpretive skill. "Historically, however, interpretive skills have received less attention in language teaching than have interpersonal skills" (Shrum & Glisan, 2015, p.182). Reading is an essential ingredient for acquiring a language successfully. Students need to be able to read comprehensively and extensively in the target language to hone their use of the target language and to better their understanding of the culture. Mikulecky (2008) argues that reading is "the basis of instruction in all aspects of language learning: using textbooks for language courses, writing, revising, developing vocabulary, acquiring grammar, editing, and using computer-assisted language learning programs" (p. 1). Benefits of reading are numerous, such as expanding vocabulary, improving writing ability, increasing oral proficiency, developing grammar knowledge, promoting confidence and motivation, for example (Day & Bamford, 1998). McRae (1991) describes reading as "... a space for the exercise of mental energy; it is a space for creativity, it is a space where the personal elements of interaction, involvement, concern and personality can all be accommodated" (p.15). During the reading process, readers actively construct the meaning of their learning through the interaction between the text and their background knowledge. Top-down and bottom-up factors, such as reading strategies, text structure, language proficiency, cultural context and so on may also affect this process (Shrum & Glisan, 2015).

Taking the importance of reading into consideration, teachers need to be equipped with effective instructional strategies to improve students' reading skills. According to R.I.S.E. (Reading Initiative for Student Excellence), the state reading initiative, there are five components of reading: phonological awareness, phonics, vocabulary, fluency, and comprehension. Previous research has proven Readers Theater as a powerful way to enhance students' fluency and comprehension (McAndrew, 2004, Young & Rasinski, 2009; Visser, 2013). In addition, this paper considers the benefits of Readers Theater in the areas of students' retention rate and engagement with the reading (Flynn, 2004/2005; Haughey, 2015). A literature review of

previous studies that further delineate these four benefits of Readers Theater is included in the section below.

Knowing Readers Theater as an effective instructional strategy for reading from numerous research, this study thus endeavors to explore the state of Readers Theater in this state's foreign language classrooms. Two research questions that guide the investigation include the following:

1. What are foreign language teachers' understanding of Readers Theater?
2. How have they implemented it in their own classrooms?

A questionnaire (See Appendix A) was designed to elicit responses from foreign language teachers to these questions, and findings are summarized in the end.

Literature Review of Readers Theater

Definitions of Readers Theater

There is a variety of definitions for Readers Theater from different researchers. Ratliff (2001) describes that "one of the primary principles of Reader's Theater, however, is to 'dramatize' literature in classroom performance and to provide a visual and oral stimulus to students who are unaccustomed to using imagination to appreciate literary texts" (p. 42). Moran (2006) argues for it as "a staged reading of a play or dramatic piece of work designed to entertain, inform or influence" (p. 317). Gullat (2008) defines it as a technique that facilitates reading instruction through dramatic performance of a text. Forney (2015) defines it as "a method of presenting stories, information, or content material through dramatic readings with assigned parts" (p. 11). Haughey (2015) delineates it as "a reading strategy where two or more participants perform while reading from a script" (p. 2). Young and Rasinski (2009) state "Readers Theater is a performance of a written script that demands repeated and assisted reading that is focused on delivering meaning to an audience" (p. 5). Young and Nageldinger (2017) define it as "an educational activity that requires students to perform a text. These texts can be from existing literature, nonfiction, poetry, parodies, or student generated" (p. 50). Building upon the traditional readers theater, Flynn (2004) develops Curriculum-Based Readers Theater (CBRT) and defines it as "a rehearsed group presentation of a script that is read aloud rather than memorized" (p. 360). Moreover, CBRT "allows teachers to dramatize content learning by infusing basic performance elements with classroom subject matter" (Flynn, 2007, p. 2) and CBRT scripts "are based on curriculum topics and are written to address prescribed standards of learning. They can focus on, but are not limited to, stories and literature" (Flynn, 2004, p. 361). Regardless of different wordings, it is evident that all the aforementioned research acknowledges the performance and script or text as indispensable components of Readers Theater. Moreover, in contrast to traditional readers theater, Readers Theater as a reading instructional strategy does not require costumes, props, or memorization of the script, students entertain the audience with their prosody.

Benefits of Readers Theater

After conducting a thorough review of previous research on Readers Theater, there are four benefits of RT that keep recurring: fluency, comprehension, engagement, and retention of information (Worthy & Prater, 2002; Kinniburgh & Shaw, 2007; Clementi, 2010; Flynn, 2004; Haughey, 2015; Mraz et al., 2013; Visser & Edge, 2013; Young & Rasinski, 2009; Young et al.

2019; Suggs 2019). Thus, this section of the literature review will focus on the analysis of these components and how they are promoted through Readers Theater.

Fluency. According to the National Reading Panel Report (2000), "Fluent readers can read text with speed, accuracy, and proper expression" (p. 189), and it is "one of the five essential components of reading as determined by the National Reading Panel in 1999 (Suggs, 2019, p. 68). Caluris (2006) elucidates that "Fluency is consistently defined throughout research as the ability to read at a good pace, without errors and with expression" (p.2). Hudson et al. (2005) state that "reading fluency is one of the defining characteristics of good readers, and a lack of fluency is a common characteristic of poor readers" (p.702). Corcoran and Davis (2005) explain fluency as "the ability to read a text with speed and accuracy, recognizing each word effortlessly and beginning to construct meaning from each word and group of words as they are read" (p. 105). Rasinski (2006) summarizes three key elements of reading fluency as accuracy in word decoding, automaticity in recognizing words, and appropriate use of prosody or meaningful oral expression while reading. Young and Rasinski (2009) further contend that accuracy refers to the ability to read a text without errors in pronunciation; automaticity refers to the ability to read the words effortlessly; and prosody refers to the ability to read with proper expression and phrasing. They also state "modeling fluent reading for students, assisted reading, and repeated readings" are specific methods to promote fluency in reading (p. 4), and Readers Theater provides an authentic approach to these methods. Mraz et al. (2013) argue that "the repeated reading method, which is used with Readers Theater, is one research-based strategy that has been shown to increase children's fluency" (p. 165) and during Readers Theater, "the student repeatedly reads short, meaningful passages until reaching a high level of fluency" (p.169). Clementi (2010) asserts "One strategy for improving fluency is Readers Theater, which incorporates repeated reading in an engaging manner. Students practice roles within scripts that are at their reading level. The activity culminates in a performance, where even the most reluctant readers are stars" (p. 85). Flynn (2004) states that "rehearsals and performances of CBRT scripts increase students' abilities to read the text fluently" (p.361). As research consistently shows, fluency can be greatly developed through repeated readings, and the performance element of Readers Theater makes repeated readings engaging and fun. It is worth mentioning here that Readers Theater has also been proven effective on fluency growth of struggling readers and English language learners (Forney, 2015), and students with special needs (Corcoran & Davis, 2005). As Young and Rasinski (2009) describe "Readers Theater can create an academic avenue that leads to increased reading fluency, regardless of whether students are striving or thriving" (p. 4).

Comprehension. The last essential component of reading is comprehension as many view it as the ultimate goal of reading. According to the state R.I.S.E related resource *It's All About Meaning*, "reading comprehension is the process of simultaneously extracting and constructing meaning through interaction and involvement with written language." Suggs (2019) states it "involves constructing meaning that is reasonable and accurate" (p. 32). Although comprehension and fluency are two distinct concepts, they are closely interconnected. Worthy and Prater (2002) point out "there is undoubtedly a reciprocal relationship between reading fluency and reading comprehension" (p. 295). Kellerher (1997) views comprehension as the byproduct of fluency. According to Rasinski (2006), the gateway to comprehension actually comprises the same three key elements of reading fluency: accuracy in word decoding, automaticity in recognizing words, and the appropriate use of prosody or meaningful oral expression while reading" (p.704). When students become fluent readers, they become automatic

at recognizing words. Thus, "Their intentional awareness can then be devoted to comprehension, not to word decoding" (Young et al., 2019, p. 615). Moreover, Rasinski et al., (2011) find that there are significant correlations between oral reading prosody and oral and silent reading comprehension. In order to read with prosody that includes appropriate expressions, pace, phrasing, emphasis, and intonation, students need to "consider the overall meaning of the text and the oral expression that reflects that meaning" (Young et al., 2019, p 616). *The Science of Reading* developed by the state R.I.S.E. initiative describes fluency as "the bridge between decoding words and understanding what has been read" and "as children become fluent readers, they are able to interact with text on a higher level." Clementi et al. (2010) claim that "If students are fluent readers, then they use less attention on decoding. This leaves enough attention for adequate comprehension" (p. 3). Tsou (2011) summarizes from previous research that "rapid and automatic lower-level reading processing, such as word recognition, seems to be critical for successful reading comprehension, because it is unlikely that good readers lack well-developed word recognition skills" (p. 728). Flynn (2011) states "reading proficiency directly contributes to successful comprehension of the texts they read in all curriculum areas" (p. 9). As Pikulski (2006) summarizes, fluency is crucial to reading comprehension. Through repeated readings of the same script during Readers Theater, students read more fluently by decoding words automatically and reading with appropriate expressions, which in turn help them better understand what they read.

Retention of information. Flynn (2011) argues "Reading the script silently, then reciting it orally, and repeating and reviewing that information through rehearsals lead to the retention of that material" (p. 11). She further uses a formula to summarize these four ingredients needed for retention: Reading + Recitation + Repetition + Review = Retention. According to the information-processing theory (Atkinson & Shiffrin, 1968), "Like the computer, the human mind takes information, performs operation on it to change its form and content, stores the information, retrieves it when needed, and generates responses to it" (Woolfolk, 2016, p. 302). One way to store the information longer is through maintenance rehearsal that involves repeating and revisiting the information. Only the information that has been processed and encoded will be remembered for a longer time. Moreover, the more varied encoding processes we use, the better we can remember the information. Readers Theater offers students opportunities to encode the text through many different ways, such as repeated readings, rehearsals, facial expressions, voices, gestures, and movement, thus helping them retain the information. In addition, Flynn (2004) elucidates that the movement component of Readers Theater also aids memory, "Any relevant gestures contribute not only to a more dynamic performance but also to increased retention of the material" (p. 362). Jenson (1998) and Forney (2013) maintain that physical movement also helps students recall the learned materials later.

Engagement. There is no doubt that teachers at all levels and from all disciplines desire their students to be engaged in their classrooms. Rangvid (2018) defines student engagement as "a multidimensional concept that is typically used to refer to students' degree of involvement, connectedness and commitment to school as well as their motivation to learn" (p. 266). Christenson, Reschly, and Wylie (2012) in their book *The Handbook of Research on Student Engagement* state,

> Student engagement refers to the student's active participation in academic and co-curricular or school-related activities, and commitment to educational goals and learning. Engaged students find learning meaningful, and are invested in their learning and future. It is a multidimensional construct that consists of behavioral, cognitive, and affective

subtypes. Student engagement drives learning; requires energy and effort; is learned by multiple contextual influences; and can be achieved for all learners. (p. 816-817)

According to the definition above, Readers Theater engages students by asking for their active participation in the reading, rehearsing, and performing process. More specifically, it requires students to pay attention to their assigned roles and others' reading on the behavior aspect of engagement; secondly, it requires students to use their mental energy to decode words and comprehend the meaning of the text on the cognitive aspect of engagement; lastly, it requires students to read with appropriate tones and expressions to convey the meaning of the text and make their reading lively on the affective aspect of engagement.

Mraz et. al. (2013) argue that "in addition to improving fluency and comprehension, Readers Theater also engages readers and serves as a motivational tool for students" (p.169). Flynn (2004) states "Readers Theater has resulted in lots of laughter and enthusiasm from teachers and students. Actors prepare and rehearse for hours and hours because they love the process, the people, and the performance" (p. 364). With the anticipation of the final performance, students remain engaged throughout every component of the Readers Theater, "whether they are speaking their parts or listening to their peers" (Clementi, 2010, p. 3). By comparing a group of students using everyday classroom instruction with a group that uses the same instruction with Readers Theater as 15 minutes of the instruction, Haughey (2014) reports "there was a significant difference found in the growth of engagement of students who participated in Readers Theater to those who did not" (p. 2). Peebles (2007) argues Readers Theater "orchestrate the essential elements of fluency instruction while providing the motivational incentive for students who would rather move about than sit at a desk and reread passages" (581). Not only kinesthetic learners benefit from the movement required by Readers Theater, struggling readers are also more motivated and engaged to repeat readings through the movement. Forney (2013) and Elisa (2009) also remind us another way that Readers Theater engage students is by putting them in groups where students make positive contributions to the group and receive encouragement from peers and the teacher.

Method

Participants

In order to understand how teachers use Readers Theater in one state's K-16 foreign language classrooms, all the registered members of the state Foreign Language Association were invited to participate in the study. Currently, the state is divided into five districts: the northeast region (district 1), the southwest region (district 2), the northwest region (district 3), the central region (district 4), and the southeast region (district 5). Eventually, 30 teachers from all five districts responded to the questionnaire, and the demographic information is displayed in the table 1 below:

Table 1

Demographics Information of Participants in the Study (N = 30)

	n
District	
1	3
2	3
3	16
4	6
5	2
Gender	
Male	4
Female	26
Grade Level	
Secondary	24
Post-Secondary	5
Missing	1
Ethnicity	
White	24
Hispanic/Latino	5
African American	1

Measures

Guided by the aforementioned two research questions, a questionnaire (see Appendix B) that includes 19 items was created using Qualtrics. Items include both forced-choice and open-ended questions to obtain responses from participants regarding their demographic information, their understanding and implementation of Readers Theater. More specifically, teachers were asked to explain what Readers Theater is in their own words, for what purpose(s) they use it, how often they use it, what benefits of Readers Theater do they perceive, how much training they have received regarding Readers Theater, and what aspect of Readers Theater they would like to learn more about. According to Mathers and Hunn (2009), questionnaires are useful when the respondents are widely distributed. Ravitch and Carl (2016) elucidate due to various reasons, questionnaires can be a useful data sources, such as an "efficient way to collect data from a range of people across locations; responses can be easier to compile and analyze than other forms of data..." (p. 172). In this study, the questionnaire allows researchers to collect data from a wide range of foreign language teachers across the state.

Procedures

First, the researchers obtained IRB approval before the distribution of the questionnaire. Then an Email consent that explains the purpose of the study was sent out to foreign language teachers by the state foreign language association. The foreign language specialist at the state Department of Education also helped with the distribution of the questionnaire. Over a period of two months, 30 teachers agreed to participate in the study by responding to the questionnaire that is included in the email consent. SPSS version 24 was used to gather all the data and generate a basic analysis of the returned responses, such as participants' demographic information as shown in Table 1. Open coding and axial coding were applied to conduct a qualitative data analysis (Maxwell, 2012; Ravitch & Carl, 2016).

Results

Individual responses collected from participants are listed below under each question and are then summarized into similar categories through coding. It is important to note here that for people who have not heard about Readers Theater, they were not able to give answers to these questions. For people who have heard but never used Readers Theater, they were not able to answer questions with respect to implementation.

Question 1: If you have heard about Readers Theater, please write down the definition in your own words below.

1. I don't have enough information about it to explain

2. Actors describe the play in words rather than using visual cues

3. I've only heard about it, but know nothing about it really

4. It's a method/strategy to teach reading fluency

5. Reading for comprehension with expressions

6. A group of people reading a play in a theatrical way at times using props, scripts as props, facial expressions, etc.

7. Reading with animated voices

8. I've heard of it but don't know what it is really.

9. Collectively reading and acting out play

10. Performers practice a given work and perform it with intonation and inflection while reading. It is much like the old classic radio shows.

11. Students receive a script in the form of a play. Each student is assigned a part. Students read their parts using their voices to "act" their part.

12. A teaching strategy used for students to present text in a modified performance mode.

13. Participants read parts from common scripts, they are "in character" as they read.

14. A dramatic presentation of literature where the participants read their parts from a script.

Table 2

Coding of Responses for Question 1

Total Number	Coding of Definitions	Individual Response Number
3	Not sure what it is	1, 3, 8
4	Reading and acting out a play	2, 6, 9, 11
3	Performing and presenting a text	10, 12, 14
4	Others (Reading fluency, reading comprehension, read with animated voices and read “in character”)	4, 5, 7, 13

Table 2

Question 2a: For what purpose did you implement Readers Theater?

1. To bring Nicolas Guillen’s poetry to life and for students to use/hear the Cuban accent
2. Practice pronunciation and engage students in learning the language in context
3. To practice oral proficiency and fluency
4. To help with pronunciation and repetition of vocab, and fluency of speech
5. Cooperative learning. Students divided into groups and each presenting a separate story to the class (usually with fables/legends/fairy-tales). Or to recap part of a story we are studying

Question 2b: How often do you use Readers Theater?

1. Once a year, mostly

2. I have only used this one time
3. Once or twice per year
4. 2X a quarter
5. 1-3 times per year

Question 2c: What benefits do you see for your students?

1. It is great for inflection and pronunciation as well as pride in heritage and confidence in their linguistic abilities.
2. I didn't see many benefits, but I also haven't been trained. I feel like there would be some benefits.
3. Increased confidence in oral production of language; confidence in presentations; increased fluency and improved pronunciation
4. Students gained comfort in speaking the target language
5. Gives them repetitions in hearing the language in addition to practice speaking and presenting.

Table 3

Coding of Responses for Question 2

Coding of Responses for Question 2a		
Total Number	Coding of Purposes	Individual Response Number
2	Practice pronunciation	2, 4
2	Practice fluency	3, 4
3	Others (bring poetry to life, engagement in context, and cooperative learning)	1, 2, 5

Coding of Responses for Question 2b		
Total Number	Coding of Implementation Frequency	Individual Response Number
3	1-3 times per year	1, 3, 5
2	Others (once, 2 times a quarter)	2, 4
Coding of Responses for Question 2c		
Total Number	Coding of Benefits	Individual Response Number
3	Confidence in using the language	1, 3, 4
2	Others (not sure and repeated input)	2, 5

Table 3

Question 3a: For how long (hours) have you received any training in using Readers Theater?

1. 3 hours
2. 5 hours

Question 3b: Is there any particular aspect of Readers Theater that you would like to focus on?

1. Choosing texts for readers
2. Unsure what this question is asking

Since there are only two responses for the last two questions, no coding tables are needed.

Discussion

In examining Question One, the definition of RT, the researchers found that most of the teachers have different levels of understanding of Readers Theater while a few have very limited

knowledge about it. Many of the definitions described the components of RT, which reflects the research included in the literature review (Flynn, 2004; Moran, 2006; Gallat, 2008; & Haughey, 2015). In Question Two, the purpose of RT, the respondents noted that Readers Theater was used mainly for practicing pronunciation, improving fluency, increasing engagement and participating in cooperative learning, which reflect two (fluency and engagement) of the four components explained in the literature review-fluency, comprehension, retention of information, and engagement (Kinniburgh & Shaw, 2007; Clementi, 2010; Flynn, 2004; Haughey, 2015; Mraz et al., 2013; Visser & Edge, 2013; Young & Rasinski, 2009). In addition, the researchers found that teachers seldom use this strategy (Question 3). In response to Question Four, the benefits of Readers Theater, teachers included improvement in students' pronunciation, increased confidence in speaking and giving presentations, improved reading fluency, more exposure to language input, and increased pride in heritage. Teachers' perceived benefits of Readers Theater not only include one of the components delineated in the literature review-fluency, but also point out how Readers Theater helps increase students' confidence and pride in using the language. Finally, only two teachers had a very small amount of training on Readers Theater.

As a summary, the table below shows the number of teachers who have heard about Readers Theater and if they want to know more about it. There are more teachers who are interested in learning about Readers Theater than teachers who are not. Moreover, among these 23 teachers who are interested, 12 of them have not yet even heard about Readers Theater.

Table 4

The number of teachers who have heard about Readers Theater and if they want to know more about it

	Yes	No	Total
Have you heard about Readers Theater?	14	15	29
Would you be interested in learning more about Reader Theater?	23	6	29

Conclusions

In general, most of the teachers who have responded to the survey show some understanding of Readers Theater. They mentioned components, such as script, performance, collective reading, expression, and so on. Two of them stated that the scripts are provided to the students, which is not always the case, for the teachers can help students develop their own scripts. In addition, there is a mismatch between teachers' demand of wanting to know more about this strategy and the training that's available to them. Only two teachers stated they had some training and only for a few hours. Therefore, it is important to find out reasons for the lack of training for Readers Theater in future studies. Another area that is worth further investigation regards the question about why teachers rarely use Readers Theater. The researchers suggest

additional studies to understand the reasons that RT is not a favored instructional strategy. Uribe (2019) argues Readers Theater has long been investigated as a reading intervention that can improve students' literacy skills, such as reading fluency, comprehension, and so on. However, it is rarely researched in the content areas. Through her mixed-methods study, she finds that CBRT incorporates many effective ESOL instructional practices, such as modeling, repetition, explaining key concepts, and flexible grouping; thus, she suggests "a need for teacher education and professional development programs that make connections among literacy, content areas methods, and ESOL instructional strategies" (p. 259). This serves as a great reminder for future studies to also focus on how Readers Theater, especially Curriculum-Based Readers Theater (CBRT) can be used to meet foreign language teaching and learning standards.

This study was an exploratory effort conducted to "test the water" regarding what foreign language teachers in a small, mid-southern state know about Readers Theater. Both researchers are former language teachers in a Research One institution and both are participants in an Arts Integration professional development cohort, so we acknowledge the bias inherent in our positions. We also acknowledge that our research tool, the questionnaire was developed to gather information so the tool has limited validity and reliability. As an exploratory study, the results are unique to this state only. Other researchers may find entirely different results should they wish to explore the understanding of Readers Theater among the foreign language teachers in their own states.

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Appendix A
Questionnaire for Readers Theater

Demographic Information
School_____ Grade Level_____
Language Taught _____
# of students in class (avg.) _____
# of Years Teaching _____
Gender (please circle): Female/ Male
Ethnicity (please circle): African American/ Latino/ White/ Asian/ Other
What is the highest academic degree you have earned? _____
1. Have you heard about Readers Theater? (please circle) Yes/ No
If yes, please write down the definition in your own words below.
_____
2. Have you implemented Readers Theater in your instruction? (please circle) Yes/ No
If yes, for what purpose?
_____
And how often do you use it?
_____
What benefits do you see for your students? _____
3. Have you received any training in using Readers Theater? (please circle) Yes/ No
If yes, for how long (hours)? _____
If yes, is there any particular aspect of Readers Theater that you would like to focus on?
_____
Would you be interested in learning more about Readers Theater? Yes / No
If so, please contact me by email.