

PROFESSIONAL DEVELOPMENT DESIGN IN ELEMENTARY SCHOOL BLENDED
LEARNING ENVIRONMENTS:
CHANGES IN TEACHER MINDSETS AND ADAPTIVE THINKING SKILLS

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By:
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The undersigned, appointed by the dean of the Graduate School, have examined the dissertation entitled

PROFESSIONAL DEVELOPMENT DESIGN IN ELEMENTARY SCHOOL BLENDED
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presented by Angela Nicole Holt

a candidate for the degree of doctor of education,

and hereby certify that, in their opinion, it is worthy of acceptance.

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DEDICATION

To my husband and best friend, Josh-

You have consistently been the calming force and comic relief in my many moments of intense anxiety and stress. Thank you for remaining my biggest supporter and gentlest cheerleader. I am so thankful for the Lord's timing that brought you into my life and there is no one else that I would want to share in my successes both personally and professionally. Now it is officially your turn. Our household needs two Dr. Holts.

To my sweet boys, Lincoln and Theodore-

May you always know the greatness and potential inside of you. You were created to do amazing things for the Lord and I will fiercely support you in all your endeavors. It is my hope that this degree will remind you of the importance of education, perseverance, and finding your passion.

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ABSTRACT

This mixed method convergent study explored the impact of design and delivery of professional development practices in a large, urban school district in Missouri. Certificated classroom teachers at 23 pre-determined elementary school sites (541 participants) were electronically surveyed. Additionally, three department leaders were interviewed and their responses provided insights about core features of professional development (content focused, active learning, coherence, duration and collective participation) present within the district. The International Association for K-12 Online Learning's (iNACOL) Blended Learning Teacher Competency Framework and transformative learning theory both provided a lens for examining professional development design and practice within the research study. The quantitative results of the study reveal significant increase in teacher responses from the technical skill and adaptive thinking domains. Additionally, qualitative data collected during the study found professional development delivered during the implementation window did include all five core features of professional development (content focused, active learning, coherence, duration and collective participation). While significance was noted in several variables studied, the Mindset domain showed no significant improvements in teacher responses on either measurement.

SECTION ONE:
INTRODUCTION TO DISSERTATION

Background of Study

According to Christensen, Horn and Johnson (2008), just 45,000 students had access to online learning opportunities in the year 2000. However, by 2010, that statistic had grown to well over 4 million students participating in some degree of formalized online learning. Additionally, 29 states and Washington, D.C. had statewide online schools operating full-time as of 2013-2014 (Watson, Pape, Murin, Gemin, & Vashaw, 2014). It is clear digital learning opportunities are a growing trend in public education. As schools aim to improve performance, college readiness, and workforce preparedness, the addition of online programming across grades and systems appears essential to providing relevancy to student learning. While many schools have implemented some degree of digital-education programming within the last decade, the largest and fastest growing segment of online learning remains single and multi-district blended programs (Watson et al., 2014).

Blended learning emerged in K-12 education at the onset of the 21st century with a focus rooted in providing students with a physical location for their learning while integrating experiences which were also virtually based. Horn and Staker (2015) defined blended learning as:

a formal education program in which a student learns: at least in part through online learning, with some elements of student control over time, place, path, and/or pace; at least in part in a supervised brick and mortar location away from home; and the modalities along each student's learning path within a course or subject are connected to provide an integrated learning experience. (p. 34-35)

Digital Learning Now (2013) addressed the intent of blended learning by adding “blended learning is a shift to online delivery for a portion of the day to make students, teachers and schools more productive both academically and financially” (p. 10). Due to the fact that blended learning remains in the early stages of development, terminology surrounding this educational trend can be easily confused. Leaders in the field of disruptive innovation and research, Horn and Staker (2015) divided blended learning programming into four main models: rotation, flex, a la carte, and enriched virtual. Figure 1 provides a visual representation of the four blended learning models.

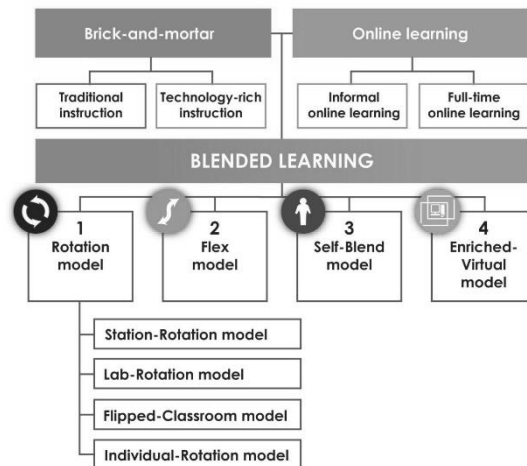


Figure 1. Blended Learning Models. This figure illustrates the relationship among the various blended learning models. Adapted from *Blended: Using Disruptive Innovation to Improve Schools* (p. 38), by M. B. Horn and H. Staker, 2015, San Francisco, CA: Jossey-Bass.

The rotation model is most commonly implemented in elementary learning environments and the majority of student learning is done at a brick-and-mortar-campus. “This category includes any course or subject in which students rotate-either on a fixed schedule or at the teacher’s discretion-among learning modalities, at least one of

which is online learning” (Horn & Staker, 2015, p. 37-38). Horn and Staker (2015) further identified four types of rotation models in blended learning programming: station rotation, lab rotation, flipped classroom and individual rotation. Figure 2 identifies the essential components of the station rotation model. During the station rotation model, students rotate through all designated rotations in the allotted time. The rotation can occur in one designated classroom or within a set of classrooms. While the concept of rotating students is not new to the elementary context, the addition of online learning as part of the classroom cycle is new (Horn & Staker, 2015).

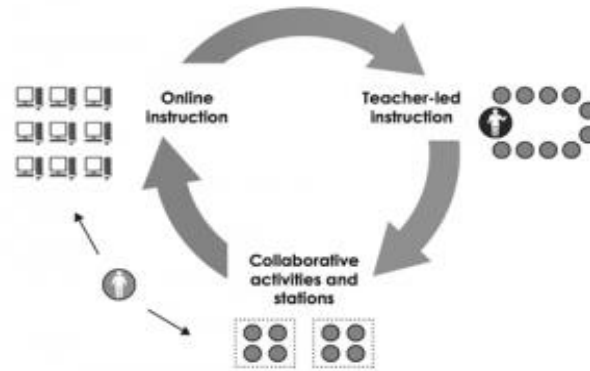


Figure 2. Station Rotation Model. This figure illustrates student and teacher experiences within a classroom implementing the station rotation model. Adapted from *Blended: Using Disruptive Innovation to Improve Schools* (p. 56), by M. B. Horn and H. Staker, 2015, San Francisco, CA: Jossey-Bass.

Lab rotation is the second rotation model for blended learning. Figure 3 identifies the components unique to lab rotation. Lab rotation closely mirrors station rotation, however, students move to the computer lab for the online learning portion of the rotation. Horn and Staker (2015) acknowledged “The idea is to free up teacher time and classroom space by using the computer lab and a different staffing structure for the online component” (p. 41).

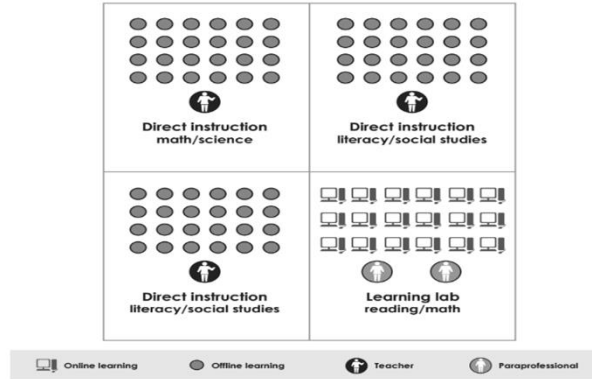


Figure 3. Lab Rotation Model. This figure illustrates student and teacher experiences within a classroom or group of classrooms implementing the lab rotation model. Adapted from *Blended: Using Disruptive Innovation to Improve Schools* (p. 57), by M. B. Horn and H. Staker, 2015, San Francisco, CA: Jossey-Bass.

Flipped classroom is the third type of rotation model and is the most highly publicized. In a flipped classroom, “students participate in online learning off site in place of traditional homework and then attend the brick-and-mortar school for face-to-face, teacher guided practice or projects” (Horn & Staker, 2015, p. 55). In this model, classroom time is spent on active learning as students have already consumed the bulk of lesson material and content online. Horn and Staker (2015) argued when a large portion of learning occurs online students have the ability to more readily control and determine the pace of their learning (Horn & Staker, 2015). Therefore, student ownership over learning is heightened in flipped classrooms. Figure 4 notes the dynamics within a flipped classroom blended learning model.

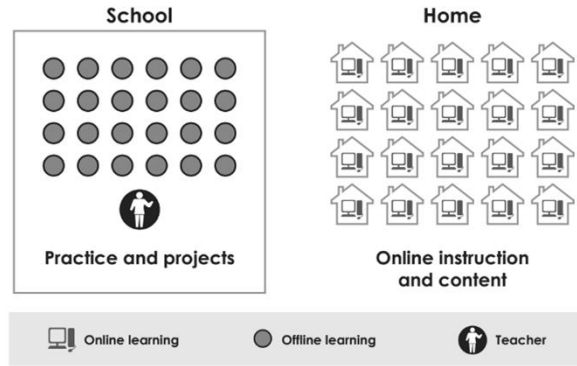


Figure 4. Flipped Classroom. This figure illustrates student and teacher experiences within a blended learning flipped classroom. Adapted from *Blended: Using Disruptive Innovation to Improve Schools* (p. 58), by M. B. Horn and H. Staker, 2015, San Francisco, CA: Jossey-Bass.

The final rotation model is individual rotation. Figure 5 provides an example of an individual rotation model within a school. Unlike the station rotation model in which students rotate to all available stations during a given rotation, this model allows students to customize their rotation to meet learning needs (Horn & Staker, 2015). Either an algorithm or teacher prepares students' daily schedules; the playlist include modalities specific to the individual.

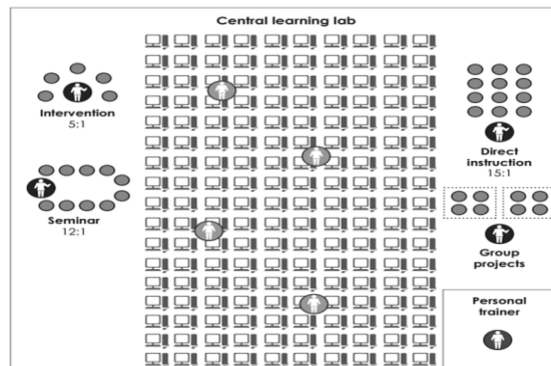


Figure 5. Individual Rotation Model. This figure illustrates student and teacher experiences within a classroom or group of classrooms school implementing individual

rotation. Adapted from *Blended: Using Disruptive Innovation to Improve Schools* (p. 58), by M. B. Horn and H. Staker, 2015, San Francisco, CA: Jossey-Bass.

With variance in instructional delivery models in blended learning contexts, traditional teacher roles and responsibilities also shift drastically. Wise and Rothman (2010) acknowledged “no longer are teachers the sole repository of content in classrooms...teachers also serve as guides, facilitators, and collaborators in student’s interactive educational experience” (p. 5). Similarly, Kaleta, Skibba, and Jooseten (2006) commented “teachers need to be prepared to leave their previous constructs of what a teacher is behind and to anticipate how the new model redefines them, their course and their students” (p. 137). Additional research suggested that implementation of blended learning models in schools requires fewer, more specialized teachers and increases school wide student-teacher ratios (Horn & Staker, 2011). In blended learning schools, teachers can become content experts, mentors, and learning coaches in their endeavors to personalize learning for students. Darrow, Friend, and Powell (2013) agreed that a shift in teacher practice is one of the key pieces to successful blended learning implementation. In the same vein, teachers also need exposure to professional development that addresses and provides understanding around how to navigate the change process related to newly assigned teaching roles (Darrow et al., 2013).

Research on effective professional development for teachers remain at the forefront of conversations surrounding change. Key findings from a national report on the status of teacher development in the United States revealed, “The intensity and duration of professional development offered to U.S. teachers is not at the level that research suggests is necessary to have noticeable impacts on instruction and student

learning” (Darling, Wei, Andree, Richardson, & Orphanos, 2009, p. 20). Statistics from the same report noted a significant amount of US teachers are displeased with the current state of professional development opportunities provided in their educational context (Darling et al., 2009). As a result, many districts and leaders have shifted professional development practice to include reform types of development (coaching and mentoring) instead more traditional approaches. Reform activities differ from traditional professional development practices in three ways: they occur during the school day, are responsive to how teachers learn, and influences changes in classroom practice (Garet, Porter, Desimone, Birman, & Yoon, 2001). The use of instructional coaching specifically as job embedded professional development is trending in today’s public school context. Currently, limited research is available linking coaching to increased student achievement, however, “...coaching does increase the instructional capacity of schools and teachers, a known prerequisite for increasing learning” (Neufeld & Roper, 2003, p. v).

Statement of the Problem

Although teacher support and professional development is cited as a central construct to successful blended learning program implementation, much of the research is underdeveloped in the current educational context. At the core of current professional learning in blended learning environments are technological skills-based trainings for teachers which neglect the reflective and adaptive side of instructional practice. Research conducted by the International Association for K-12 Online Learning (iNACOL) continues to advocate for the impact of in-person teaching in blended learning settings, however, a gap still exists in research connected to teacher perspectives aligned to

effective practice (Powell, Rabbit, & Kennedy, 2014). Additionally, to date, much of the scholarly discussions on blended learning have focused on student perspectives and learning approaches mainly at the middle and high school level. Gerbic (2011) noted “While there is literature on teaching online, empirical studies on teaching and teacher’s perspectives of blended teaching appear to be less substantively represented in the literature” (p. 221). Although a large body of work addresses student outcomes and guidelines for teachers implementing blended learning models, there remains a much smaller body of work which investigates teacher perspectives in blended learning contexts or applies a model for studying teacher thinking in blended learning environments.

A 2013 national study on over of 28,000 teachers revealed 52% of teachers find it difficult to use online web tools to receive information and 66% of teachers never share content online (Swanson & Jakes, 2013). Similarly, Darling-Hammond et al. (2009) reported great variance by state on the percent of teachers participating in professional development specific to the use of computers for instructional purposes. Today’s students and teachers face a complex and changing educational landscape, which requires agility and new lines of thinking void of previous practices and routines. Therefore, research and study on the design of learning opportunities and professional development practices in blended learning environments would support educational leaders in identification of strategies for assisting teachers with the development of a 21st century skill set. Swanson and Jakes (2013) acknowledged, “To change our schools, we need to change the culture of professional learning. We need to create shifts that increase the level of empowerment and ownership experiences for our nation's best learners: teachers”

(p. 5). Similarly, Darling-Hammond & McLaughlin (2011) noted “Effective professional development involves teachers as both learners and as teachers and allows them to struggle with the uncertainties that accompany that role” (p. 82). Specific research on understanding how teachers think about their learning and practice will fill three current gaps in the field of blended learning research: blended learning in the elementary school context, teacher perspectives in blended learning environments, and professional development for teachers in blended learning environment. Similarly, research on the use of instructional coaching in blended learning environments will further enhance the small body of research on the effectiveness of coaching in sustaining shifts in teachers’ thinking and instructional practices.

Purpose of the Study

The purpose of this research is to study the design and delivery of professional learning practices in a large urban school district in Southwest Missouri during implementation of a blended learning initiative. This study will specifically explore the relationship between professional development in blended learning contexts and changes in certified teacher mindsets and adaptive thinking skills. Additionally, the study will examine the degree in which core features of professional development are present in blended learning professional development. Close analysis of design and delivery of professional development during implementation of blended learning at the elementary level could provide insight into effective adult learning for blended learning research literature. The practices implemented at the elementary level would also provide a frame of reference for secondary school sites in the district looking to implement blended learning coaching models with teachers. Furthermore, the information gleaned from this

study has the potential to benefit other school districts that are looking to implement blended learning models in their school contexts. Similarly, the study has the potential to provide feedback on which professional development models are effective in shifting teachers thinking skills and change in instructional practice during blended learning implementation.

Research Questions

The following research questions guided the study:

1. To what degree does professional development affect teacher mindsets, qualities, adaptive thinking skills, and technical skills in an elementary blended learning environment?
2. In elementary school blended learning environments, how were Desimone's (2009) five core features of professional development (content focused, active learning, coherence, duration, and collective participation) present in professional development?
3. What is the relationship between professional development (duration) and shifts in teacher mindset and adaptive thinking skills in elementary blended learning environments?

Conceptual/Theoretical Frameworks

Both a conceptual and theoretical framework guided the work within the research study. The following section of the paper will identify and explore the two applicable frameworks. Key concepts and theorists will be highlighted and provide a reference for situating the study in the scholarly context.

Blended Learning Teacher Competency Framework

At the forefront of the discussions on blended learning and teacher learning is the research of two distinct organizations: International Association for K-12 Online Learning (iNACOL) and The Learning Accelerator (TLA). In October 2014, these organizations formed a national committee of blended learning practitioners and experts to determine the essential characteristics of teachers in blended learning environments. What emerged from their work was the iNACOL Blended Learning Teacher Competency Framework. The framework consists of 12 specific competencies related to effective or superior performance and is divided into four larger domains: mindsets, qualities, adaptive skills and technical skills (Powell et al., 2014). Figure 6 organizes the individual competencies into their domains. All domains will be described; however, the mindset and adaptive thinking domains will be critical to the researcher's study.



Figure 6. Blended Learning Teacher Competency Framework. This figure illustrates key competencies related to teacher effectiveness in a blended learning environment.

Adapted from “iNACOL Blended Learning Teacher Competency Framework,” by A. Powell, B. Rabbitt, and K. Kennedy, 2014.

Mindsets and adaptive thinking skills. “Mindset competencies include the core values or beliefs that guide an individual’s thinking, behaviors, and actions, and that align with goals of educational change and mission” (Powell et al., 2014, p. 7). The mindset domain consists of two specific teaching competencies: new vision for teaching and learning and orientation toward change and improvement. The overarching goal of mastery in this competency in a blended learning environment is the teacher’s ability to understand, adopt, and commit to a mindset that is receptive and open to new forms of teaching and learning.

Adaptive skills are more generalizable and have applicability across teacher roles and content areas. The skills in this domain are more complex and “help practitioners tackle new tasks or develop solutions in situations that require organizational learning and innovation” (Powell et al., 2014, p. 7). The adaptive skills domain also has three specific teacher competencies: reflection, continuous improvement and innovation, and communication. Like competencies in the qualities domain, adaptive skills are mastered through coaching, however, they also require modeling and reflective practice.

Other qualities and skills. “Quality competencies are those personal characteristics and patterns of behavior that help academic staff make the transition to new ways of teaching and learning” (Powell et al., 2014, p. 7). The qualities domain consists of three specific teaching competencies: grit, transparency, and collaboration. Competencies in the qualities domain require coaching and reinforcement to develop over time.

“Technical skills are domain-specific ‘know-how’ and expertise that educators used to execute against the known tasks in their jobs” (Powell et al., 2014, p. 7). The technical skill domain is the largest of the domains and has four key competencies: data practices, instructional strategies, management of blended learning experience and instructional tools. Technical skill acquisition is mastered through specific training, instruction and practical application.

Transformative Learning Theory

Transformative or transformational learning is one of the most widely studied and published adult learning theory of the last two decades. Taylor (2008) acknowledged transformative learning “has replaced andragogy as the dominant educational philosophy of adult education, offering teaching practices grounded in empirical research and supported by sound theoretical assumptions” (p. 12). Since its introduction in the late 1970s, the definition and components of transformative learning have been redefined multiple times, however, Mezirow’s comprehensive and complex definition remains at the forefront. Mezirow (1996) defined transformative learning as a process of effecting change in a frame of reference. Furthermore, Mezirow (1997) described four processes for transformative learning: elaboration on an existing viewpoint, establishment of new viewpoints, transformation of our viewpoint, and transformation of our habit of mind. Central to each of the processes of transformative learning is critical reflection. Mezirow (2009) added “Transformative learning may be defined as learning that transforms problematic frames of reference to make them more inclusive, discriminating, reflective, open, and emotionally able to change” (p. 22).

In response to challenges in Mezirow's theory of transformative learning and to further define essential components that shape educational practice, Taylor (1998) initially identified three core elements to transformative educational experiences: individual experience, critical reflection and dialogue. However, Taylor (2009) later noted the addition of holistic orientation, awareness of context and an authentic practice to the list of significant elements in transformative learning. For the purpose of the study, individual experience, critical reflection, dialogue and awareness of context will be described further.

Individual experience. Individual experience "consists of what each learner brings (prior experiences) and also what he or she experiences with the 'classroom' itself" (Taylor, 2009, p. 5). According to Mezirow (1995), learner experience is the tipping for transformative learning and provides the foundation frame for critical reflection to occur. Additionally, Taylor (2009) noted the more experiences a learner has the more adept the individual is when engaging with others in dialogue and reflection of practice.

Critical Reflection. "Critical reflection refers to questioning the integrity of deeply held assumptions and beliefs based on prior experience" (Taylor, 2009, p. 7). There are three forms of reflection in transformative learning: content (reflection on what we perceive, think, feel or act upon), process (examination of how we perform the above mentioned functions), premise (an awareness of why we perceive) (Mezirow, 1991). Premise reflection is the basis for critical reflection.

Dialogue/Discourse. Dialogue the essential medium through which critical reflection and transformation occur. Mezirow (1996) asserted "Discourse is not a war or

a debate; it is a conscientious effort to find agreement, to build a new understanding...” p. 170). Taylor (1998) identified five assumptions pertaining to discourse: it is rational only as long as it meets the conditions necessary to create understanding, it is to be driven by objectivity, all actions and statements are open to question and discussion, understanding is arrived through the weighing of evidence and measuring the insight and strength of supporting arguments, and the primary goal is to promote mutual understanding among others.

Awareness to Context. Awareness to context includes appreciating and taking into the account the personal and socio-cultural factors involved in the process of transformative learning (Taylor, 2009). These factors include but are not limited to the surroundings of the learning event, the learner’s prior experiences, and the background providing the context in which the learning is occurring (Taylor, 2009). The experience of learners is still a central construct to awareness to context and provides insights into a learner’s predisposition to change.

Design of Study

A mixed method convergent study was selected to explore the impact of professional development practice on teacher thinking and problem solving in blended learning environments. The researcher involved in the study was primarily interested in gleaning specific information on professional development design in blended learning environments from the perspective of those most closely associated with the phenomenon: teachers. Due to the timing of the study coinciding with the roll out of blended learning training for teachers at specific sites, quantitative data was already being collected in the school district studied for the purpose of program evaluation.

Additionally, the researcher gathered qualitative data during the implementation window from curriculum and blended learning department leaders to accompany the preexisting data set from the district representing classroom teachers.

Setting

The researcher elected to conduct the mixed methods study in the Springfield R-XII Public School District, a large, fully accredited public school district in southwest Missouri. Springfield R-XII Public School District consists of approximately 36 elementary schools, nine middle schools, five high schools, and three early childhood centers. Additionally, Springfield R-XII Public School District serves a student population of nearly 25,000 students. Springfield R-XII Public School District has historically recruited and retained high quality teachers, and certificated staff in the district average nearly 13 years of teaching experience. Recently, Springfield R-XII Public School District has experienced drastic leadership changes, and as a result, a shift in instructional focus district-wide has occurred. Blended learning and technology deployment has been at the forefront of discussions with building leadership and classroom teachers alike.

During the 2014-2015 school year, Springfield R-XII Public School District created a new department focused specifically on innovation. One of the main goals of the department was to assist leaders with developing innovative learning opportunities for students across the system. In an effort to determine a way to scale their work, the department launched a “proof of concept” (pilot) for use with 13 classroom teachers at four different elementary buildings within the district. Quantitative and qualitative data was collected on participating teachers and administrators at the proof of concept sites

using a pre and post survey. This data was utilized to assist with development of future teacher training and coaching models for use at 12 predetermined elementary sites set to implement blended learning during the 2015-2016 school year (Year One) and the 11 predetermined elementary sites set to implement blended learning during the 2016-2017 school year (Year Two).

Participants

Merriam (2009) reminded researchers to be aware of not only the topic of study, but also identifying the individuals most knowledgeable on a particular topic when determining who should participate in a research study. Due to internal research already occurring within Springfield R-XII Public School District, the researcher selected to conduct research on certified elementary teachers in the 23 district-selected sites implementing blended learning during the 2015-2016 and 2016-2017 school years. Springfield R-XII Public School District utilized a criterion-based selection process to determine the 23 elementary sites which included leadership readiness, staff readiness, current level of technology usage within the site, and equity of resources. Of the 12 elementary sites selected Year One, six were Title One (more than 70% of student receiving free or reduced lunch) and six were not. Similarly, of the 11 elementary sites selected Year Two, six were Title One and five were not. Additionally, sites range in size from 180-540 students and certified teachers at each site range in size from 15-32 teachers. Certificated classroom teachers at the 23 pre-determined sites were electronically surveyed. The total number of educator participants surveyed was 541. The researcher followed the district's procedures for obtaining access to secondary data for use in the study.

District level elementary demographic data provides a frame for further understanding of the sample as the data sets have little variance. There are 894 certified elementary teachers in the district that are dispersed across 36 elementary sites. Of the 894 teachers, 89% are female (799) and 11 % are male (95). Additionally, 97% of certified teachers at the elementary level are Caucasian (865), 14 are African American, seven are Hispanic, five are Pacific Islander, and three are multiracial. Certified teacher age is categorized into five ranges: 21-30 years (168), 31-40 years (281), 41-50 years (230), 51-60 years (175), and 61 years and older (36). Average years of teaching experience for teachers in the district is 12 years, and 65% of teachers within the district have advanced degrees (Master's degree or higher). Additionally, the average total teacher salary for a teacher in the district is \$49, 597 annually.

A purposeful sampling technique will be utilized for identifying interview participants. Merriam (2009) suggested researchers use a purposeful sampling when they want to identify those with special expertise and competence relative to the study topic or inquiry. Utilizing this strategy, the researcher selected three department leaders (Director of Blended Learning, Director of Learning Support, and the Director of Learner Development) for participation in the study due to their knowledge of professional development practices. The researcher will follow Springfield R-XII Public School District's established procedures for conducting research. After receiving permission, the researcher will contact interview participants via email requesting study participation.

Data Collection Tools

District level quantitative survey data will be collected from survey participants two different times during the implementation windows for Year One and Two

sites: prior to implementation for sites during their first year, at the beginning of the school year for site in their second year, and at the completion of the school year for both Year One and Two sites. The survey tool utilized by Springfield R-XII Public School District consisted of approximately 25, five-point Likert scale items in which respondents were asked how closely they agreed or disagreed with particular statements, how frequently a particular statement occurred, the quality of a particular statement and the ease of a particular statement. Additionally, all participant surveys were adaptive utilizing a questioning bank of over 300 questions to personalize by each respondent. The survey platform also protects participant anonymity and utilized a bank grade encryption security. Although Springfield R-XII Public School District's tool addressed several components of technology integration, the researcher focused specifically on 27 items from each of the domains that which were most closely aligned to the scope of the study (See Appendix A).

Interviewing as a data collection tool was tailored to department leaders currently providing blended learning professional development to classroom teachers at the 23 sites. To address the qualitative nature of the study, a semi-structured interview was selected as most appropriate for the individual interviews with the Blended Learning and Learning Support directors (See Appendix D). According to Merriam (2009), in a semi-structured interview "...all the questions are more flexibly worded or the interview is a mix of more and less structured questions" (p. 90). The researcher was careful to include several types of questions during the interviews to rouse participant responses. McDavid (2013) asserted the use of an interview plan with "open ended interview guides that contain a list of pre-planned questions that are always asked in the same order" are

common qualitative data collection instruments (p. 210). To ensure consistency across interviews, the researcher developed an interview protocol with a specific questioning route. Interviews were conducted at each director's office and lasted between 30-40 minutes. Each participant signed an informed consent prior to interviewing (See Appendix C). Additionally, in order to keep study participants' information confidential, the researcher assigned identifiers for use in analysis of the data collected. Interviews were audio recorded to ensure accuracy of information and transcribed for further data analysis.

Data Analysis

The researchers employed a multi-step system to organize and analyze the quantitative and qualitative data collected during the study. First, quantitative data generated from the pre-existing data set on teachers from the 23 elementary sites was analyzed using the district's data management and research analysis platform, Bright Bytes. Researchers conducted paired samples *t*-tests using eight variables from the platform for each of the 23 elementary sites participating in the research study. The eight variables analyzed were Teachers Use of the 4C's (Communication, Collaboration, Critical Thinking and Creativity), Teacher Foundational Skills, Teacher Online Skills, Teacher Multimedia Skills, Policies, Procedures, and Practice, Support, Professional Learning, and Belief. Due to variance in the number of teachers completing the sample at each site, the researchers weighted each data point according to the proportion of total certified teachers whom participated in the study ($N=541$). This process provided the researcher a more accurate measure of the effect of intervention as each school is treated as an individual proportion of the total sample rather than an equivalent. Next, the

researchers also ran repeated measures ANOVAs on the weighted scores using Bonferoni corrections for the multiple pairwise post-hoc comparisons of the four points of measurement in the first and second years using the 12 schools with 275 educator participants for which the full two years of data was available. Lastly, to assess clinical significance, mean scores for each of the eight variables at each of the time points were also analyzed by the researcher using the Bright Bytes Maturity Scale. The Maturity Scale is organized into five categories highlighting an organization's overall technology readiness and use of each the eight variables: Beginning, Emerging, Proficient, Advanced and Exemplary. Data is calculated using a numeric score (between 800-1300) which is aligned to the Maturity Scale. Score ranges are as follows: Beginning (800-899), Emerging (900-999), Proficient (1000-1099), Advanced (1100-1199), and Exemplary (1200-1300).

Qualitative analysis began with an initial reacquainting of individual interview data sets. Common words and phrases that were evident in multiple interviews were highlighted and additional jottings were made in the margins. Emerson, Fretz, and Shaw (2011) reminded researchers to open code "...without regard for how of ether ideas and categories will ultimately be used, whether other relevant observations have been made, or how they will fit together" (p. 175). Following open coding, the researcher utilized the essential components of transformative learning theory and the core features of professional development (Desimone, 2009) as additional layers of focused coding to refine and narrow ideas.

Merriam (2009) urged researchers to be keenly aware that categorizing data is only one step in the analysis process and linking themes together meaningfully provides

researchers with more insight into the phenomena of study. With this strategy in mind, the researcher compared the representative themes highlighted within the interview data with the descriptive statistics generated from the existing teacher survey data to establish commonalities in both data sets regarding professional development practice and shifting teacher's mindset and adaptive skills in blended learning environments.

Limitations and Assumptions

Limitations

When considering the scope of the study, there are several limitations that should be noted. First, the researcher elected to study teachers' adaptive thinking skills and professional development practice in one, K-12 district in Southwest Missouri. While there were many schools within the district included in the study sample, generalization of results to other organizations or school districts could be difficult and should be interpreted with caution. Additionally, the district studied is in Year 2 of a three year initiative specific to blended learning and access of modern technology tools for teachers and students. Researcher analysis of data at this point in time may not fully depict true levels of implementation or learning.

Another important limitation to note is related to research bias and inclusion in the study. The researcher is an elementary principal in the district studied and her school is included in the study sample. Therefore, the researcher had working relationships with many study participants and personalized experience with implementing professional development in a blended learning environment. This additional knowledge of the research setting and participants could benefit or bias the data.

A final limitation should be discussed relative to the survey instrument given to teachers in the study sample. The survey is given with two specific windows during the school year. Typically, there are time constraints given to teachers when completing the survey which could hinder respondent participation. Additionally, unlike an interview, survey design can drive participants in specific categories which could limit the range of responses.

Assumptions

Several assumptions were identified in the study. Initially, the researcher assumed survey and interview participants were honest and truthful in their responses to survey items and questions. Additionally, the researcher assumed professional development related to blended learning was occurring in some capacity in all sites selected in the sample. Finally, the researcher assumed that teacher sample size collected during the each survey window was enough to meet statistical significance.

Significance of the Study

Research related specific to teacher perspective in blended learning environments has implications for both scholarship and practice. The aim of the study was to provide understanding to elementary leaders on the use of professional development and instructional coaching to support shifts in teachers' thinking during implementation of blended learning. In the current school district, this study has the potential to assist with development of larger scale implementation of blended learning professional development throughout the district. Other educational leaders at the elementary level could use the information presented in the study on professional development practices to shift existing staffing models or develop more efficient training models for schools

looking to implementing blended learning in the future. With only a small body of research supporting the use of blended learning models to reduce staff to student ratios (Horn & Staker, 2011), continued study in this arena could better inform district level leadership looking to employ hiring models that are more financially sustainable.

Currently, there are only minimal links between professional development coaching and teacher learning, however, this study could provide an additional knowledge base for implementing coaching models in blended learning environments and provide a more comprehensive model for providing supports to teachers. Additionally, by conducting research specific to professional development and the on-going need to provide teachers support to shift thinking about their unique role in blended learning environments, student supports are also enhanced. Research from this study could better equip districts to not only provide personalization of learning for students but for teachers. Presently, research on the teacher perspectives does not have as comprehensive of a literature base relative to other segments of research on blended learning.

Summary

The blending of online and face-to-face instruction is expected to be standard practice in many classrooms in the future (Murphy, Snow, Mislevy, Gallagher, Krumm, and Wei, 2014). With such dramatic shifts in educational practice, professional development and training for teachers will also need attention from building and district leaders. iNACOL and TLA continue to leading contributors to the body of published work identifying best practices in blended professional development and provide insights for blended learning teachers about challenges to their shifting environments. Additionally, the organizations work specific to implementation of the Blended Learning

Teacher Competency Framework provides sound evidence for districts and leaders to measure effectiveness in teacher's mindsets, qualities, adaptive thinking and technical skills. However, more empirical evidence is needed to support the limited body of research.

Through use of a mixed method study, the research proposal will aim to examine the design and delivery of job embedded professional learning practices on teacher mindsets and adaptive thinking skills. The setting of the study is a large urban school district in Southwest Missouri during implementation of blended learning initiative targeting technology integration and instruction. Findings from the study could assist other sizable districts in implementing technology initiatives and provide insight to leaders regarding of best professional development practices for supporting teachers in blended learning environments. Therefore, the study has implications for both educational leaders and practitioners related to research on in the emerging field of blended learning as well as professional development.

SECTION TWO:
PRACTITIONER SETTING FOR THE STUDY

Introduction

Watson (2008) acknowledged, “Blended learning, combining the best elements of online and face-to-face education, is likely to emerge as the predominant teaching model of the future” (p. 4). In 2013-2014, 75% of all school districts in the United States were offering some component of online or blended learning courses as part of their curriculum. Clearly, implementation of new models for teaching and learning in the K-12 educational context is on the rise and districts across the country are seeking to integrate technology and learning to better prepare students for the workplace. Districts looking to implement blended and online learning should be systematic in their approach to ensure success for both students and teachers in this ubiquitous journey. Watson, Murin, Vashaw, Gemin and Rapp (2013) addressed the need for goal setting on the part of district leadership and stakeholders when implementing or expanding online or blended learning programs:

Those goals may include personalizing learning and improving college readiness for all students; creating new options for credit recovery and at-risk students; expanding the school day; providing innovative alternatives to challenge advanced students; and ultimately transforming the instructional model being used with a goal of improving student outcomes. Educational goals must be prioritized and grounded in an understanding of existing constraints (p. 44).

Clear goals and strategic planning are key features of successful blended and online learning implementation initiatives.

The purpose of this section of the paper is to provide a reintroduction to the specific organizational setting of the research study. A brief overview of the history and

status of the organization and initiative related to blended learning will be included. Additionally, insights will be provided on selected organizational and leadership theories and concepts to provide a lens for analysis. Lastly, information will be given related to potential implications for research in the identified study setting in light of the analysis of the organizational and leadership context.

History of Organization

Springfield R-XII Public School District (SPS) is the largest fully accredited district in the state of Missouri. SPS is comprised of five high schools, nine middle schools, one intermediate school (grades 5-6), 36 elementary schools and three early childhood centers. According to the Missouri Department of Elementary and Secondary Education (DESE), SPS served 24,883 students in 2016 and 54.4% of students within the district were eligible for free or reduced lunch. The student population of Springfield Public Schools is predominately White (78.8%) with an additional 7.7% identifying as Black and 5.8% as Hispanic. The four year graduation rate for SPS in 2016 was 87.84% with nearly 40% of high school graduates entering a four year college. As a system, Springfield Public Schools employs approximately 4,000 individuals. Certified teachers in the district average 13 years of teaching experience and 65% of all professional staff hold advanced degrees (Missouri Department of Elementary and Secondary Education, 2016).

The mission of Springfield Public Schools is “to prepare all students for tomorrow by providing engaging, relevant, and personalized educational experiences today” (Springfield Public Schools, 2016a). One way that SPS personalizes educational opportunities for students is through choice programming. Choice, as defined by SPS,

refers to providing unique learning opportunities to students within the public school setting (Springfield Public Schools, 2016b). SPS offers more than a dozen choice programs tailored to meet the unique learning needs of students. These programs provide options for students to engage in workforce development, science and math, and programs with heightened academic rigor and specialization. Currently Springfield Public Schools choice programs include the International Baccalaureate Program, Wonders of the Ozarks Learning Facility (WOLF), Health Sciences Academy, and Academy of Exploration. Approximately 11% of the total student population are enrolled in choice programs (Springfield Public Schools, 2016b).

History of Initiative

As a result of shifts in leadership and rising community support, Springfield Public Schools has continued to expand opportunities for choice programming and innovation for students. A priority for the new Superintendent during his inaugural year was leading staff and stakeholders in an envisioning process around the 21st century classroom. The outcome of the envisioning process was the creation of a new strategic plan, mission, vision, goals and values for Springfield Public Schools. Three specific initiatives emerged from the Superintendent's initial work: one related to system technology integration (IGNITE) and two related to external opportunities for professional development. The main initiative to drive personalized learning for students in SPS through technology integration was IGNITE (Inspire, Grow, Network, Innovate, Transform and Engage). Springfield Public Schools administration states the following about the IGNITE initiative (Springfield Public Schools, 2016c):

IGNITE is a district-wide initiative that will provide the resources and support necessary for all SPS teachers and students to access and experience an engaging, relevant and personalized learning environment. Ensuring equity of access to mobile technology for students and teachers is a key focus of the initiative, which will be deployed over a three-year period (para 4).

One of the key facets to the IGNITE initiative was increasing accessibility to modern technology tools for all students. Therefore, a plan was implemented in SPS to systematically distribute devices to students and staff at school sites in phases over a three year period. The department responsible for executing the IGNITE initiative was the Blended Learning Department. Third through twelfth grade students at each school site received a Hewlett Packard Chromebook 11 and were given the option to take the device home throughout the school year. Kindergarten through second grade classrooms at each school site were issued eight iPad Mini 2 tablets to be used in station rotation. Additionally, each building received a cart of 30 Chromebooks to be shared between primary classrooms.

Schools sites in SPS were identified as either Year One, Year Two, or Year Three sites depending on readiness indicators exhibited in the Bright Bytes survey, equity among Title One and Non-Title One sites, and the need to balance the total number of devices deployed of the three year period. Elementary, middle and high school sites were included in each of the three-year phases. Additionally, “Proof of Concept” classrooms were initiated in thirteen classrooms throughout the district prior to Year One deployment. The purpose of these specific classrooms was student and teacher exploration of new devices and monitoring of instructional shifts when utilizing a

blended learning environment. Year Two and Three sites also implemented a similar structure with “model classrooms” the semester prior to their deployment year.

In addition to providing technology to students, the IGNITE initiative also focused heavily on support for teachers implementing a blended approach to instruction in their classroom. Support services were provided via the Blended Learning Department and included both on and off-site training opportunities during the school site’s deployment year and each consecutive year of implementation. Training topics included information on Canvas (the District’s Learning Management System), Google Apps for Education, online curriculum resources, Design Thinking and other site specific needs. Blended Learning Specialists were also assigned to each site one day a week to serve as on-site trainers for staff members and provide before and after school professional development. Additionally, Blended Learning Mentors were selected by administration at each school site. These mentors were stipend teachers responsible for serving as model classrooms at each site, assisting teachers with basic technology questions, and providing on-site training opportunities as needed. Ongoing collaborative opportunities were also implemented across Year One, Two and Three IGNiTE Schools which provided teachers and administrators opportunities for learning within each deployment year.

Organizational Analysis

In 2014, Springfield Public School adopted a new strategic plan vetted by students, employees, stakeholders and community members. The redesign and shift in educational opportunities for students was an outcome of new leadership in the superintendent role for the district. The strategic plan was divided into three focus areas

for improvement: Student Success and Learning Support; Empowered and Effective Teachers, Leaders, and Support Personnel; and Financial Sustainability and Operational Efficiency. Bolman and Deal (2008) advocate that “clear, well understood goals, roles, relationships and adequate coordination are essential to organizational performance (p. 46). Systematic restructuring of the Springfield Public Schools Leadership Team occurred to support efforts and improvement toward the identified focus areas and enhance coordination among departments and teams within the system.

Structure and Change

The conceptual description of an organization developed by Henry Mintzberg (1979/2005) is well aligned structurally to the configuration for Springfield Public Schools. The Springfield Public Schools Leadership Team Structure consists of four main representative bodies: Cabinet, Executive Leadership Team, Senior Leadership Team, and Operations and Instructional Support Leadership Teams (See Appendix A). Cabinet includes the Superintendent, Chief Learning Officer, Chief Financial and Operations Officer, and the Chief Human Resources Officer. The role of Cabinet is to “collaborate with Board of Education and community in order to understand priorities, monitor alignment of objectives to the strategic plan and build leadership capacity” (Springfield Public Schools, 2016d). The Superintendent and each of his Chief Executive Officers serve as the “strategic apex” of Springfield Public schools and are charged with “managing the organization’s boundary conditions-its relationship with its environment” (Mintzberg, 1979/2005, p. 224). Cabinet is responsible for not only carrying out the mission of the district but also identifying global priorities and informing influential people about the district’s activities.

The Executive Leadership Team, Senior Leadership Team and The Operations and Instructional Support Leadership Teams of SPS all serve in what Mintzberg (1979/2005) identified as the “Middle Line.” The Executive Leadership Team consists of six Executive Directors who each have specialized areas of supervision for the district: Special Programs, Elementary Learning, Secondary Learning, Innovation and Information, Operations, and Learning Support and Partnerships. Additionally, the Executive Leadership team also includes the Director of Communication. The role of the Executive Leadership Team is to “establish action plans and strategic priorities through community and stakeholder collaboration, allocate resources and remove barriers and build leadership” (Springfield Public Schools, 2016e). The Senior Leadership Team consists of all leaders at the department and building level with the main role of collaboration and building of system capacity. The Operations and Instructional Support Leadership Teams consist of a variety of team members that function to implement and monitor action plans at the department level to ensure targets are met.

The distribution and levels of management within the middle line structure of SPS serve to support the needs of a larger district related to direct supervision and span of control. According to Mintzberg (1979/2005), the middle line manager in this simple organizational hierarchy “performs a number of tasks in the flow of direct supervision above and below him. He collects ‘feedback’ information on the performance of his unit and passes some of this up to the managers above him” (p. 225). Additionally, whether a Director or a building principal, each middle line manager in SPS is responsible for identifying and advocating for his or her unique unit’s needs. Similar to the roles of chief executives, the middle line must “...serve as a figurehead for his unit and lead its

members; develop a network of liaison contacts...allocate resources within his unit...initiate strategic change; and handle exceptions and conflict” (Mintzberg, 1979/20015, p. 226).

“At any given moment, an organization’s structure represents its best effort to align internal workings with outside concerns” (Bolman & Deal, 2008, p. 97). The shifting leadership of Springfield Public Schools coupled with a rapidly changing landscape in public education in the last few years fostered a need to reorganize and realign roles and responsibilities system wide. The creation of the Executive Director of Innovation and Information and the Blended Department was an additional organizational change in SPS to accommodate the growing stakeholder demand for choice programming and technology integration. Bolman and Deal (2008) acknowledged that one component of successful structural change is when leaders “design the new structure in response to changes in goals, technology and environment” (p. 97).

The Blended Learning Department for SPS is led by the Executive Director of Innovation and Information and consists of the Director of Technology, the Director of Blended Learning and the Coordinator of Innovation. Additionally, The Blended Learning Department’s main functions are to support and sustain the IGNiTE initiative and to create additional choice programming opportunities for SPS students. Kotter’s (2014) eight step for successful change initiatives provide an additional lens for analysis related to structural changes within SPS specific to the work of the Blended Learning Department and IGNITE initiative.

In step three of his eight step model, Kotter discusses the need for leaders to form a strategic vision and initiatives to drive change in any organization. Kotter (2014)

defined strategic initiatives as targeted and coordinated “activities that, if designed and executed fast enough and well enough, will make your vision a reality” (p. 137). The IGNITE initiative in SPS was structured to support both teachers and students with the implementation of blended learning. The vision for IGNITE was crafted by a diverse group of teachers and stakeholders and gave voice to the desired future state of SPS classrooms. The addition of the Blended Learning Department and the resulting three-year deployment and professional learning plan enable the mission of SPS to be realized.

Another step in Kotter’s (2014) change management process, is step five: Enable Action by Removing Barriers. This step involves leaders systematically minimizing inefficient processes or hierarchies, increasing employee collaboration across boundaries and heightening teams’ impact in the organization (Kotter, 2014). Alteration of the previous hierarchy in SPS collapsed silos and supported new ways of thinking and learning for all members of the middle line and operating core (teachers). The addition of a department solely dedicated to innovation and the creation of unique learning for students also increases the productivity of other departments, which had previously taken on roles linked to student learning experiences.

Human Resource

“The human resources frame centers on what organizations and people do to and for one another” (Bolman & Deal, 2008, p. 117). An understanding of the people with the system of SPS was critical for driving change within the organization. With the addition of a new superintendent and various other organizational shifts to the hierarchy of leadership in SPS, heightened anxiety and fear were observable characteristics.

Therefore, several human resources principles were implemented in order to support teachers and leaders within the system to navigate change.

Bolman and Deal (2008) stressed organizations should strategize by training and developing new skills and incorporating systems for participation and involvement with employees when there is anxiety and uncertainty in an environment. Focus Area Two of the Strategic Plan for SPS is dedicated to empowering employees within the system. Goal One for Focus Area two states: “Create a culture that empowers employees and provides each student access to a qualified and effective teacher in every classroom, an effective principal in every school and an effective employee in every position” (Springfield Public Schools, 2016a). The investment in adult learning within SPS became an even higher priority during the change initiative. As a result, the way in which professional learning and development was implemented also changed to create additional development opportunities for teacher and leaders.

Professional development for teachers in SPS is organized and conducted by three specific Directors and their individual teams: Director of Learning Support, Director of Learner Development and the Director of Blended Learning. Each of these Directors operate under a different Executive Director whom report to the Chief Learning Officer. The Learning Support team functions to “empower and equip educators to effectively engage and challenge all students by providing effective resources, professional learning, coaching support and modeling of our rigorous and relevant adopted materials” (Springfield Public Schools, 2016f). Professional development provided via the Learning Support team is connected to implementation of specified curriculum materials and instructional approaches supported within Springfield Public Schools and is normally

provided to all certified staff on designated professional learning days throughout the school year. Learning Support team members each have content specific expertise and work collaboratively to ensure fidelity with district curriculum.

The Learner Development team functions to provide pedagogical support to teaching staff in Springfield Public Schools. A primary focus for the Learner Development team is supporting, coaching, and mentoring new teachers and leaders. Specialists from the team work one-on-one with these individuals to increase their capacity. Additionally, the Learner Development team provides professional development opportunities to staff mainly after school and in the summer focused primarily on the theory and practice of educating students in today's classroom.

The Blended Learning team serves to “provide the resources and support necessary for all teachers and students in Springfield Public Schools to access and experience an engaging, relevant and personalized learning environment” (Springfield Public Schools, 2016g). Specialists from the Blended Learning team work collaboratively with principals to develop site specific professional development. Additionally, Blended Learning Specialists also work with individuals or with teams of teachers to support implementation and understanding of technology integration and blended learning at the classroom level. Professional development provided via the Blended Learning team is typically teacher directed, differentiated, and open to a variety of audiences. While it is primarily focused on integration of technology and blended learning best practice, it serves to continually drive change and keep new learning at the forefront of teacher practice.

Springfield Public Schools' approach to adult learning following the roll out of the strategic plan was aggressive and systematic. The learning process included both investment in teachers and leaders and increased opportunities for skill development around the blended learning initiative. Aubrey and Tilltette (as cited in Bolman and Deal, 1990/2008) asserted "Learning in an organization takes place when three elements are in place: good mentors who teach others, a management system that lets people try new things as much as possible and a very good exchange with the environment" (p. 144-145). A strong awareness to the to human resource aspects of organizational change is evident when analyzing SPS structures specific to professional learning.

Leadership Analysis

Researchers and practitioners alike have been defining and redefining the term leadership for decades. However, the term continues to be met with some degree of ambiguity. Nevertheless, Northouse (2013) described the word leadership as "a process whereby an individual influences a group of individuals to achieve a common goal" (p. 5). In recent decades, much attention has been given to the affective components of leadership with specific focus on the interactions between leaders and followers. Transformational leadership is one of the more popular approaches to leadership to date and has strong correlation to follower development and change processes. Several key factors and strategies commonly associated with transformational leadership help provide a clear lens with which to analyze the present status of leadership in Springfield Public Schools.

Transformational Leadership

Transformational leaders set out to empower followers and nurture them in change (Northouse, 2013, p. 199). Bass and Avolio (1994) identified several leadership factors associated with transformational leaders including inspirational motivation, intellectual stimulation, and individualized consideration. Each factor will be described further and connectivity to the leadership within SPS will be identified. Additionally, when applicable, key connections to change leadership will also be explored.

Inspirational motivation. Leaders who inspire or exhibit inspirational motivation “communicate high expectations to followers, inspiring them through motivation to become committed to and a part of the shared vision in the organization” (Northouse, 2013, p. 193). The superintendent of SPS demonstrated inspirational motivation when interacting with the broader community and asking for input in addressing the needs of students in their school experiences. Similarly, Bennis and Nanus (1985) acknowledged possessing a clear vision of the future state of their organization as a common strategy used by leaders in transforming organizations. The superintendent’s development of a new strategic plan that defined student and organizational success and measures of growth toward focus areas was a key component to planning for the classrooms of the future in SPS. Careful and deliberate inclusion of present students, parents and teachers in SPS during the initial phases of change increased ease of implementation of the new philosophy regarding blended teaching and learning. Bennis and Nanus (1985) advocate for growing the organizational vision out of follower experiences and ensuring they claim it as their own as fundamental to transformation of an organization.

Intellectual stimulation. Intellectual stimulation is another factor of transformational leaders. “This type of leadership supports followers as they try new approaches and develop innovative ways of dealing with organizational issues” (Northouse, 2013, p. 193). The professional development lead by the Blended Learning Department within SPS encourages and provides avenues for teachers to take risks within their classrooms concerning blended approaches to instruction. Additionally, teacher practices that incorporate elements of the strategic plan are celebrated and highlighted across the system. Kouzes and Posner (1987, 2002) identified this fundamental leadership practice as “encourage the heart.” Leaders who encourage the heart within their organization “use authentic celebrations and rituals to show appreciation and encouragement to others. The outcome of this kind of support is greater collective identity and community spirit” (Northouse, 2013, p. 199).

Not only do transformational leaders support followers in trying new approaches and systems for organizational success but they make risk taking a priority personally. Kouzes and Posner (1987, 2002) labeled this attribute as “challenge the process.” Leaders who possess the ability to challenge the process are willing to change the status quo through innovation. The Blended Learning Department in SPS continues to lead the district in ideating unique student experiences outside of the traditional schooling models. Although not all structures developed via the Blended Learning Department are implemented system wide, the superintendent provides the team the time and space to generate new ideas, experiment and inevitably make mistakes. Fullan (2011) stated a resolute change leader’s “attitude towards mistakes is completely different from the

attitudes of those with fixed mindset. You expect to learn from them. You believe there is room for improvement in yourself and others” (p. 47).

Individual consideration. A leader that exhibits individual consideration makes listening to individuals within the organization a priority and incorporates systems of support to enhance personal growth and fulfillment (Northouse, 2013). The initial listening and learning tour conducted by the Superintendent upon entrance into the district is a prime example of individual consideration. Additionally, a system has been incorporated within SPS for members of Cabinet and the Executive Leadership Team to visit school sites on a monthly rotation to talk with administrators about their building needs and level of implementation related to the strategic plan. Similarly, site administrators are encouraged to visit leaders and building outside of SPS to continually grow their professional learning network. Kouzes and Posner (1987, 2002) described this leadership practice as “enabling others to act.” Leaders who enable others to act promote systems of collaboration within their organization and work to “create environments where people feel good about their work and how it contributes to the greater community” (Northouse, 2013, p. 199).

Analysis of leadership themes within SPS demonstrate strong alignment to transformational leadership practices. Specifically, the attributes of inspirational motivation, intellectual stimulation and individual consideration defined by Bass and Avolio (1994) were connected to the leadership of both the superintendent and Blended Learning Department during implementation of the IGNITE initiative. Furthermore, Fullan (2011) also identified key factors of change leaders that are also closely connected to the leadership present in SPS. Fullan (2011) stated “Leaders in sustained successful

organizations focus on a small number of core priorities, stay on message and develop others toward the same end, making corrections as new learning occurs” (Fullan, 2011, p. 30).

Implications for Research in Context

Analysis of the organizational and leadership context in SPS revealed newly defined and roles and responsibilities have been shifted to support leaders across levels and departments. Research in this setting could occur easily due to consistency in identifiable system structures and consistency in connecting stakeholder input with district practices and initiatives. However, research specific to organization and implementation of professional development to specifically support blended learning instruction could be explored further structurally. The study aims to also investigate shifts in teachers’ adaptive thinking skills in a blended learning environment, therefore, connectivity to transformational leadership and learning could develop from participant responses.

Central constructs of the research study include blended learning, professional development, and teacher mindset and adaptive thinking skills. Therefore, I have selected to share my finding with departments in Springfield Public Schools that are most closely connected to the study: the Blended Learning Department, the Learning Support team and the Learning Development team. Due to the variance in department size, as well as, numerous employee roles within each team, I plan to invite only the directors of each department and their respective Executive Directors (Executive Director of Innovation and Information and Executive Director of Elementary Learning). This will allow me to tailor the presentation to those most closely linked to leading and

implementing professional development at the district level. Following my dissertation defense, I will contact all three district directors via email and request a meeting to discuss my research findings. Previous professional and personal relationships with all directors in SPS, should assist me in gaining the opportunity to present. The meeting will more than likely occur in a collaborative space in the district administrative offices, as all three directors work from that location.

Summary

Implementation of online or blended learning initiatives is becoming common practice for school districts across the nation as they seek to provide relevance for student learning and outcomes. Springfield Public Schools envisioning process and accompanying strategic plan included a systematic approach to integrate technology tools into classrooms across the district. Additionally, systems within the district were identified to support teachers with new instructional models integrating technology with teaching. Aspects of both structural and human resources principles served as a guide for understanding change within SPS. Additionally, key components of transformative leadership (inspirational motivation, intellectual stimulation, and individual consideration) have essential implications for understanding the status of leadership within SPS. In totality, the organization and leadership themes identified in this section provide a knowledge base for further research in the study context.

SECTION THREE

SCHOLARLY REVIEW

Introduction

The blending of online and face-to-face instruction is expected to be standard practice in many classrooms in the future (Murphy, Snow, Mislevy, Gallagher, Krumm, and Wei, 2014). In 2012, Watson, Murin, Vashaw, Gemin, & Rapp wrote “The total number of students taking part in these programs[online and blended learning] is...likely several million or slightly more than 5% of the total K-12 student population across the United States” (p. 5). By 2014, Watson, Pape, Murin, Gemin, Vashaw (2014) noted at least some students in all 50 states including the District of Columbia had access to online and blended learning opportunities. With sweeping changes to the model of education for today’s learners, it is equally important to look at shifts in educating teachers to support the implementation of 21st century skills in the classroom. Bailey, Hassell, Hassell, Schneider, and Ark (2013) noted:

Teaching in online and blended environments necessitates the development of new skill sets. Professional learning to develop these skills will be improved in a blended environment where the principles of individualized, competency based progressions can be applied to teacher professional development. (p. 1)

The following literature review will provide a context for research on professional development in blended learning environments. First, the researcher will explore the status of current research on the effectiveness of blended learning models relative to traditional forms of classroom instruction in K-12 education. Additionally, research on characteristics of effective professional development will also be highlighted and connectivity to the theoretical and conceptual frameworks that guided the research study

will be discussed. Finally, research specific to professional development and blended learning will be critiqued noting limitations and areas for additional research.

Blended Learning Defined

Blended learning is a fairly new concept to education; therefore, multiple meanings have been assigned to the term. It is easily and often confused with broader vocabulary associated with learning technologies such as online learning, personalized learning and customized learning. While blended learning's roots rest in online learning and the terms are related, they are not interchangeable. Garrison and Kanuka (2004) simply stated "blended learning is the thoughtful integration of classroom face-to-face learning experiences with online learning experiences" (p. 95). However, the most widely accepted definition of blended learning comes from the Clayton Christenson Institute for Disruptive Innovation; it provides a more complex view. Lead researchers Horn and Staker (2015) defined blended learning as:

a formal education program in which a student learns: at least in part through online learning, with some elements of student control over time, place, path, and/or pace; at least in part in a supervised brick and mortar location away from home; and the modalities along each student's learning path within a course or subject are connected to provide an integrated learning experience. (p. 34-35)

Studies by Watson et al. (2012) and E. Werth, L. Werth, and Kellerer (2013) suggest a main facet to blended learning instructional methodology is a shift to a more personalized opportunity for student learning. Digital Learning Now (2013) further articulated the intent of blended learning by adding "blended learning is a shift to online delivery for a portion of the day to make students, teachers and schools more productive

both academically and financially” (p. 10). Further, Garrison and Kanuka (2004) noted blended learning design “represents a fundamental reconceptualization and reorganization of the teaching and learning dynamic, starting with various specific contextual needs and contingencies (e.g., discipline, developmental level, and resources). In this respect, no two blended learning designs are identical” (p. 97). Regardless of the model type, schools are implementing blended learning because of the benefits. Results from preliminary adoptions of blended learning models acknowledge that the reorganization of schools in this manner produces higher levels of achievement for students and better working conditions for teachers (Digital Learning Now, 2013).

Effectiveness of Online and Blended Learning Models

The expansion of online learning to include blended learning models for instruction is an emerging field of study for practitioners and researchers. However, research specific to effective practice for online learning spans over a decade. Two specific studies, the meta-analysis by North Central Regional Educational Laboratory (NCREL) in 2004 (Cavanaugh, Gillan, Kromrey, Hess, & Blomeyer, 2004) and the revised US Department of Education meta-analysis and review of online learning studies (Means, Toyama, Murphy, Bakia, & Jones, 2010) show comparable or positive student achievement outcomes associated with implementation of online or blended learning over traditional brick-and-mortar instruction alone.

Cavanaugh et al.’s (2004) meta-analysis on web-based K-12 distance education provided a quantitative synthesis of research literature from 1999-2004. Researcher methodology included a rigorous criteria for inclusion that specified study type (quantitative, experimental, or quasi-experimental for which effect size could be

computed) and outcome variables (student achievement, motivation, attitude, retention, or conduct). Fourteen studies met the criteria for inclusion and researcher analysis generated 116 independent effect sizes from the combined sample of 7561 students in grades 3-12. Majority of the study results had sample sizes of less than 50 with only 16% containing sample sizes over 100. Eleven of the fourteen studies were published more recently in 2003-2004 and 85% of the sample studies were published in the United States.

Limited data was reported for elementary students in grades 3-5, as majority of the results, 75%, occurred with secondary students (grades 6-12) participating in web-based distance learning programs in comparison to students in traditional classrooms. Additionally, results varied across content area with seven specific academic contents represented: reading ability, mathematics, writing, science, social studies, physical education and listening. The overall weighted mean effect size across all results was -0.028 with a 95% confidence interval from 0.060 to -0.116, indicating that students in online or web-based learning programs performed as well as students in a traditional classroom settings. Additionally, each of the fourteen studies and 115 of the 116 outcomes within the studies had individual effect sizes that were not significantly different from zero asserting that distance education is as effective as classroom-based instruction (Cavanaugh et al., 2004). While this meta-analysis proves online learning can have similar effects on student academic achievement compared to face-to-face instruction, the number of studies was relatively small and did not provide detailed information on application for practice (Cavanaugh et al., 2004).

Means et al. (2010) also conducted a revised meta-analysis evaluating best practices in online learning from previous work reported by the US Department of

Education in 2009. However, this meta-analysis found overall students in online learning environments performed significantly better than those receiving instruction in a classroom context. Of the research literature from 1996-2008 that was screened, 176 studies met the criteria for inclusion: used experimental or quasi-experimental design, measured student outcomes, and provided suitable information to calculate effect size. Researcher methodology further included a categorical approach for selection that included studies comparing online learning to face-to-face (Category 1), blended learning to face-to-face (Category 2), and studies assessing the impact of online learning practice (Category 3). Of these 176 studies, 99 had one contrast between online and face-to-face learning or between blended learning and face-to-face learning; however, only 45 of those studies provided sufficient data to calculate effect size. Additionally, just nine of the studies included learners in the K-12 environments with four being excluded for similar reasons.

Results of the meta-analysis produced 50 independent effect sizes, 27 effects in Category 1 (online learning to face-to-face) and 23 effects in Category 2 (blended learning to face-to-face). Of the five studies involving K-12 students which compared student learning in a blended condition with student learning in a face-to-face condition, seven contrasts were identified: five included middle school students (grades 6-8) and two included elementary students (grades K-5). The majority of the remaining literature consisted of college or community college students, graduate students, or adult learners in a professional context. The number of students included in the studies ranged from 16 to 1857 students and the average learner age range was 13 to 44 years.

The mean effect size across all contrasts within the meta-analysis was $+0.20$, $p < .001$ indicating that students in online or blended learning environments perform better than their counterparts receiving solely face-to-face instruction. Additionally, 11 of the 50 individual study effects between online and face-to-face instruction, were significantly positive favoring the online or blended learning environment. Furthermore, within these 11 studies favoring the online condition, nine implemented a blended approach with a mean effect size was $+0.35$, $p < .001$. “This effect size is larger than that for studies comparing purely online and purely face-to-face conditions, which had an average effect size of $+0.05$, $p=.46$ ” (p. xv). While findings from the meta-analysis suggest positive effects on student outcomes associated with blended learning conditions, small sample size and limited research studies in the K-12 context require caution in generalization of findings for that research audience (Mean et al., 2010).

More recent work has accumulated nationally and internationally related to the impact of blended learning on student achievement for K-12 populations. Chen (2012) investigated types of blended learning on student achievement in comparison to online learning. The experimental study, involving 93 third graders, compared three groups with differing types of blended learning environments: online only, online plus peer interaction and online plus student-teacher interaction. Post achievement test results in three categories of questions (fact/recall, conceptual, and understanding) were analyzed using Multivariate Analysis of Variance (MANOVA). The results indicated students in both blended learning environments (online plus either peer or teacher interaction) performed significantly better on factual knowledge than their counterparts in the online environment ($F=23.56$, $p < .05$).

Similarly, Kazu and Demirkol (2014) analyzed the academic achievement of 54 high school senior students in a blended learning biology course. Study participants were divided into experiment and control groups respectively, each consisting of 27 students. Students in the experiment group participated in “flipped classroom” instruction while students in the control group were given a traditional learning environment over the course of six weeks. Independent samples tests were conducted to determine significance of academic grade averages for both groups. Research results indicated a significant difference ($p = 0.07$) in the final academic achievement of students who studied in the blended learning environment compared to the control group who studied in the traditional learning environment.

Yaghmour (2016) also conducted a semi-experimental study which investigated the use of blended learning teaching methodology on math achievement in third grade students. The study sample included 97 male and female participants whom were divided into experimental and control groups randomly. A 30 question multiple choice achievement test was applied to both groups following five weeks of instruction. Means and standard deviations for pre and post-tests were determined and Two Way ANCOVA analysis was applied to performance on items of the math achievement test. Researchers also calculated effect size using Eta Square. A statistically significant difference was found in the performance of students in the experimental group taught through the use of blended learning on items of the achievement test in mathematics. The results of this study are similar to Chen (2012) and Kazu and Demirkol’s (2014) findings that positive academic results are associated with implementation of blended learning for students in grades K-12 compared to traditional instructional models.

Professional Development Defined

Advancements in student learning and practice resulting from implementation of blended learning in the classroom require new instructional delivery models and adjustments to traditional teacher roles. Wise and Rothman (2010) acknowledged “no longer are teachers the sole repository of content in classrooms...teachers also serve as guides, facilitators, and collaborators in student’s interactive educational experience” (p. 5). Therefore, professional development becomes an integral piece in informing teacher practice in blended learning contexts.

DeMonte (2013) noted “In many ways professional development is the link between the design and implementation of education reform and the ultimate success of reform efforts in schools” (p. 2). Furthermore, Darling-Hammond, Wei, Andree, Richardson, and Orphanos (2009) stated “Efforts to improve student achievement can succeed only by building the capacity of teachers to improve their instructional practice and the capacity of school systems to promote teacher learning” (p. 7). To further understand professional development through the lens of online or blended learning, one can consider how professional development is defined and what research cites as effective components of professional development.

Fullan and Steigelbauer (1991) defined professional development as “the sum total of formal and informal learning experiences throughout one's career from preservice teacher education to retirement” (p. 326). Educational Resources Information Center (ERIC) database cited several learning experiences and activities that are considered professional development, namely, individual development, continuing education and in-service education, as well as curriculum writing, peer collaboration, study groups, and

peer coaching or mentoring. The premier online professional learning association in the United States, Learning Forward (2015) noted the term professional development means “...a comprehensive, sustained, and intensive approach to improving teachers’ and principals’ effectiveness in raising student achievement” (para 1). Grant (1996) further addressed the definition of professional development in relationship to the uses of technology for educational practice and teacher growth:

Professional development ... goes beyond the term 'training' with its implications of learning skills, and encompasses a definition that includes formal and informal means of helping teachers not only learn new skills but also develop new insights into pedagogy and their own practice, and explore new or advanced understandings of content and resources. [This] definition of professional development includes support for teachers as they encounter the challenges that come with putting into practice their evolving understandings about the use of technology to support inquiry-based learning.... Current technologies offer resources to meet these challenges and provide teachers with a cluster of supports that help them continue to grow in their professional skills, understandings, and interests. (p. 96)

Defining professional development is an ever evolving process. With the onset of newer technologies in the classroom, broadening that definition to include supports for teacher growth and skill acquisition related to the implementation of technology is necessary.

Research on Professional Development

Historically, research on professional development for teachers in the United States revealed the “event model” or workshop format to be the most common

(Lieberman, 1995; Sparks & Hirsch, 1997). Using nationally representative data from the National Center for Education Statistics' 2003-2004 School Staffing Survey (SASS), Darling-Hammond et al (2009) found "more than 9 out of 10 US teachers have participated in professional learning consisting primarily of short-term conferences or workshops" (p. 5). More recent research in the field noted the ineffectiveness of a traditional model of professional development delivery in assisting teachers' sustained growth. Barnett (2004) noted the use of seminar style professional development does not provide teachers with enough on-going guidance as they make shifts to their instructional practice. Additionally, Killion and Harrison (2006) commented that transfer of learning is difficult for teachers when professional development is delivered separate from classroom context. Furthermore, Darling-Hammond et al. (2009) acknowledged "episodic workshops disconnected from practice do not allow teachers the time for serious, cumulative study of the given subject matter or for trying out ideas in the classroom and reflecting on the results" (p. 9). Additional studies have addressed several other limitations to the current status of professional development offerings for teachers. DeMonte (2013) cited several shortcomings to professional development, namely, the disconnect from teachers' everyday practice, the infrequency of professional learning opportunities and the generic nature of delivery often not linked to instructional dilemmas or problems of practice.

Research literature on common components or features of effective professional development in the educational arena also exists. According to Learning Forward (2015), high quality professional development involves systematic planned, intentional, and regularly scheduled efforts to embed teacher learning within the teacher's daily lives.

This type of frequent professional development is described as job embedded (Wood & Killian, 1998). Sparks and Hirsh (1997) added, “[job embedded professional development] is based on the assumptions that the most powerful learning is that which occurs in response to challenges currently being faced by the learner and that allows for immediate application, experimentation and adaptation on the job” (p. 52). Similarly, Darling-Hammond and McLaughlin (2011) noted professional development “must be collaborative...sustained, on-going, intensive, and supported by modeling, coaching and the collective solving of problems of practice” (p. 82). Intensive professional development of this nature has a higher probability of influencing teacher practice and, in turn leading to gains in student learning and achievement (Garet, Porter, Desimone, Birman, & Yoon, 2001; Cohon & Hill, 2001). Moreover, Desimone (2009) suggested five core features of professional development associated with shifts in teacher knowledge and practice: content focus, active learning, coherence, duration, and collective participation.

Content Focused

Content focused professional development highlights both the academic content taught as well as the strategies for how students learn the subject matter. In a three year longitudinal study by Desimone, Porter, Garet, Yoon, and Birman (2002), the researchers examined key features of teachers' professional development. The study concluded when professional development focused on improving content understandings and was of extended duration, teachers were more likely to report changes to knowledge and practice in math and science. Similarly, a quasi-experimental study by Banilower, Heck, and Weiss (2007) on the impact of content based professional development on teacher

attitudes and classroom practice found that professional development activities which supported teachers with implementation of instructional materials was more transferable to classroom practice. An additional study by Heller, Daehler, Wong, Shinohara, and Miratrix (2012) further documented the importance of developing content knowledge through professional development specific to anticipating and addressing student thinking.

Active Learning

Active learning addresses teacher's active engagement in discussion, planning, or practice during professional development. Active learning can vary greatly in form and includes the following: observing teaching, giving and receiving feedback, reviewing student work, and leading discussions on content topics (Garet et al., 2001). Ball and Cohen (1999) acknowledged incorporation of active learning into professional development practice better enabled teachers to examine one another's instructional strategies and student learning, and provided an opportunity to discuss ideas for improvement. A two year in-depth study of the National Writing Project (NWP) conducted by Lieberman (2000) found techniques such as scaffolding, working in a collaborative group, writing for clarity and giving feedback and going public with work to be highly supportive of teacher growth and practice. Results from a national study conducted by Garet et al. (2001) also cited active learning as having a positive influence on enhanced teacher knowledge and skills.

Coherence

Coherence addresses the degree to which professional learning is aligned to district and state goals and standards for student learning. Garet et al.'s (2001) study on

effects of different characteristics of professional development on teacher practice noted “Teachers who experience professional development that is coherent-that is, connected to other professional development experiences, aligned with standards and assessments, and fosters professional communication-are more likely to change their practice” (p. 934). Penuel, Fishman, Gallagher, Korbak, and Lopez-Prado (2009) studied teachers' perceptions of curricular alignment and on curriculum implementation using empirical data from a statewide systemic inquiry science reform effort. Findings from this study emphasized coherence of professional development with district and state goals impacts teacher understanding and decisions to implement models and tools from professional development. In contrast, when there is disconnect between goals and designs for professional development and school or district level goals, teachers are faced with challenges that hinder improvement of classroom practice (Yamagata-Lynch & Haudenschild (2009).

Duration

Duration addresses the time spent in professional development and includes both span of time in which the activity is spread and/or the number of hours spent in the activity. According to a national survey by Garet et al. (2001), teachers view in-service activities to be most effective when they are sustained over time. A study by Smith, Desimone, Zeidner, Dunn, Bhatt, and Romyantseva (2007) found teachers who received at least two weeks of professional development in inquiry-oriented teaching reported changes to their practice consistent with creating a culture of inquiry in their classrooms. Similarly, teachers who were part of the Local Systemic Initiative that received extended professional development were more likely to use student-centered

instructional materials introduced in professional development in regular classroom practice (Banilower, Heck, & Weiss, 2007).

Collective Participation

Collective participation refers to teachers within the same school, grade, or department working together during professional development. In a five year study on secondary schools, McLaughlin and Talbert (1993) found that high school teachers involved in professional learning communities took more risk and invented new ways of collaborating with one another than teachers that tried to implement new learning independently. Newmann and Associates' (1995) national study on common characteristics of elementary schools' in the restructuring phase noted that professional development connected to the whole faculty or groups of teachers sharing effective practices was a characteristic of more successful schools. Additional studies of both the Community of Teacher Learners and QUASAR (Quantitative Understanding: Amplifying Student Achievement and Reasoning) projects also illustrated the need for interaction among adult learners in the professional development context and advocate for discourse as a powerful form of teacher learning (Borko, 2004).

Transformative Learning and Professional Development

Theories and research literature related to how adults learn have clear connectivity to high quality professional development. Professional development research consistently identifies the key features of content focus, active learning, coherence, duration, and collective participation to be correlated with changes in adult learning and practice (Desimone, 2009). Similar components are observable in transformative learning theory. Since its introduction in the late 1970s, the definition and

components of transformative learning have been redefined, however, Mezirow's comprehensive and complex definition remains at the forefront. Mezirow (1996) defined transformative learning as a process of effecting change in a frame of reference. Furthermore, Mezirow (1997) described four processes for transformative learning: elaboration on an existing viewpoint, establishment of new viewpoints, transformation of our viewpoint, and transformation of our habit of mind. Central to each of the processes of transformative learning is critical reflection. To further define essential components that shape educational practice, Taylor (1998) identified three core elements of transformative educational experiences: critical reflection, individual experience, and dialogue. However, Taylor (2009) later noted the addition of holistic orientation, awareness of context and an authentic practice to the list of significant elements in transformative learning.

There are three forms of critical reflection representative of transformative learning: content (reflection on what we perceive, think, feel or act upon), process (examination of how we perform the above mentioned functions), premise (an awareness of why we perceive) (Mezirow, 1991). Content focused professional development engages teachers in content and process reflection, a central construct to transformative learning. Darling-Hammond et al. (2009) suggested professional development is more valuable and more likely to shift practice when teachers study the material that they will eventually teach and experience the content as their students would. Kreber (2004) further looked at levels of critical reflection and concluded that when engaging in development experiences related to teaching practice, teachers should begin with premise reflection to make learning more meaningful.

Dialogue is equally as important to the transformative learning process. Taylor (2009) stated “Dialogue becomes the medium for critical reflection to be put into action, where experience is reflected on, assumptions and beliefs are questioned, and habits of mind our ultimately transformed” (p. 9). Professional development that incorporates space for collective participation and active learning establishes a venue for dialogue to occur within the school context. Dunne, Nave, and Lewis (2000) evaluated a peer observation system implemented in 12 schools and discovered that teachers who participated reported more opportunities to learn from peers and greater desire for ongoing teacher development. Similarly, studies by Lustick and Sykes (2006) and Sato, Chung, and Darling-Hammond (2008) concluded incorporation of videotaping and peer critique into professional development practice lead teachers to change and engage in more effective teaching practices. Merirow (1997) acknowledged ideal conditions of discourse [being empathetic and open to others, willing to listen and discover common ground, synthesizing differing points of view] are also ideal conditions for adult learning and education.

Research has also advocated the interdependence of core elements of transformative learning and effective professional development. Taylor (2009) noted “these elements are not a series of decontextualized teaching techniques or strategies that can be applied arbitrarily without appreciation for their connection to a larger theoretical framework for transformative learning” (p. 4). Similarly, Garet et al., (2001) acknowledged adult learning focused on multiple features of effective professional development simultaneously rendered greater instructional change: “Activities that are linked to teachers’ other experiences, aligned with other reform efforts, and encouraging

of professional communication among teachers appears to support change in teaching practice, even after the effects of enhanced knowledge and skills are taken into account” (p. 936). When key facets of professional development are clearly situated within the components of transformative learning theory, adult learners are more likely to shift their teaching practice and replicate the strategies gained in their individual teaching environments.

Blended Learning Teacher Competency Framework

With many school districts implementing online and blended learning practices in recent years, creation of a system for observing instructional practices and organizing professional development was necessary. The International Association for K-12 Online Learning (iNACOL) Blended Learning Teacher Competency Framework developed out of a need to clearly determine critical characteristics of teachers in blended learning environments (Powell, Rabbitt, & Kennedy, 2014). The framework consists of 12 specific competencies related to effective or superior teacher performance and is divided into four larger domains: mindsets, qualities, adaptive skills and technical skills (See Appendix A). This model is “intended to help a variety of educational actors understand the demands of new forms of pedagogy so that they can take action to help adult learners develop and grow” (Powell, et al., 2014, p. 5). Werth et al. (2013) also noted that clear identification and inclusion of pedagogical strategies in comprehensive teacher training for blended learning environments assists teachers in engaging and embracing necessary change. Powell et al. (2014) suggest competencies in four areas: mindsets, qualities, adaptive skills, and technological skills.

Mindsets

“Mindset competencies include the core values or beliefs that guide an individual’s thinking, behaviors, and actions, and that align with goals of educational change and mission” (Powell et al., 2014, p. 7). The mindset domain consists of two specific teaching competencies: new vision for teaching and learning and orientation toward change and improvement. The overarching goal of mastery in this competency in a blended learning environment is the teacher’s ability to understand, adopt, and commit to a mindset that is receptive and open to new forms of teaching and learning.

Qualities

“Quality competencies are those personal characteristics and patterns of behavior that help academic staff make the transition to new ways of teaching and learning” (Powell et al., 2014, p. 7). The qualities domain consists of three specific teaching competencies: grit, transparency, and collaboration. Grit encompasses the teacher’s ability to display persistence and optimism while pursuing goals and facing problems. Transparency addresses a teacher’s capacity to discuss successes and failures and their ability to view data objectively. Collaboration includes a teacher’s willingness to proactively seek opportunities to learn from others and their skill in balancing individual needs with team objectives. Competencies in the qualities domain require coaching and reinforcement to develop over time.

Adaptive Skills

Adaptive skills are more generalizable and have applicability across teacher roles and content areas. The skills in this domain are more complex and “help practitioners tackle new tasks or develop solutions in situations that require organizational learning

and innovation” (Powell et al., 2014, p. 7). The adaptive skills domain also has three specific teacher competencies: reflection, continuous improvement and innovation, and communication. Like competencies in the qualities domain, adaptive skills are mastered through coaching, however, they also require modeling and reflective practice.

Technical Skills

“Technical skills are domain-specific ‘know-how’ and expertise that educators used to execute against the known tasks in their jobs” (Powell et al., 2014, p. 7). The technical skill domain is the largest of the domains and has four key competencies: data practices, instructional strategies, management of blended learning experience and instructional tools. Data practice includes the teacher’s ability interpret a variety of data sets to personalize learning opportunities for students. Instructional strategies consist of the teacher’s capability to provide resources to students that are tailored and linked to mastery standards. Blended learning experience includes the teacher’s incorporation of online tools to support student learning experiences. Instructional tools address the teacher’s skill set to select and evaluate instructional materials to better develop and manage the learning environment. Technical skill acquisition is mastered through specific training, instruction and practical application.

Blended Learning Professional Development Research

While there is research literature on the use of blended learning for professional development, there are very few studies on professional development to support the implementation of blended learning. One of the more comprehensive bodies of research specific to professional development for online teachers is the Going Virtual! Research series, which began in 2007 and concluded in 2010. Initially, a national sample of

baseline data was collected on who was delivering professional development, who was receiving professional development, how it was delivered, as well as, what content and sequence of professional development was implemented (Rice, Dawley, Gasell, & Florez, 2008). Phases two and three of the Going Virtual! Series continued to describe the landscape of professional development for K-12 online teachers, but also sought to further identify the unique needs and challenges faced by these educators. While the synopsis of research studies collectively provided an adequate picture of various models of professional development for online teachers, it was not intended or designed for analysis and study of practice (Dawson & Dana, 2014). Therefore, more structured research approaches could support the body of work on blended learning professional development practices.

Blended Professional Development Delivery

Similar research has been conducted on delivery of blended professional development in the K-12 educational context. Holmes, Polhemus and Jennings (2005) analyzed a blended professional development program designed to assist K-6 teachers in the technology integration process. The Capital Area Technology and Inquiry in Education program (CATIE) utilized on-site mentors, off site technology workshops, and an online component to support teachers in learning new technology strategies to enrich student learning opportunities. The two year study included more than 40 teachers at four area schools. Study findings suggest that a blended approach to professional development was effective in increasing autonomous learning opportunities for teachers. Furthermore, Holmes, Polhemus and Jennings (2005) argued “blending technology in situated models of professional development may offer teachers a balanced approach to

technology integration that infuses rich resources in a supportive learning community” (p. 392).

Blended Professional Development Impact

Additional research on the topic of blended professional development addresses the impact specific to teacher practice. Owston, Sinclair, Wideman (2008) examined a two year blended professional development approach of 68 math and 65 science middle school teachers in an urban district in Canada. Study design included questionnaires to assess shifts or changes in teacher’s perceptions and learning as well as a series of interviews and observations to assess use of new technology knowledge and skills. Findings indicated professional development offered to teachers in a blended format positively influenced teachers attitudes and knowledge, which also lead to transformation of classroom practice (Owston et al., 2008). Additionally, “teachers [within the study] appeared to gain the confidence needed to experiment with new pedagogical approaches in their classroom and share and reflect upon their success and disappointments with colleagues” (Owston et al., 2008, p. 1056). While the initial findings of the study were positive, the researcher advocated that more controlled, experimental studies to support adoption of blended learning as a comprehensive professional development tool is needed.

A similar study by Berger, Eylon, and Bagno, (2008) examined blended professional development with 16 high school physics teachers. Teachers in the study were exposed to nine face-to-face monthly meetings and employed an online component for information exchange and reflection. The results of this research indicated the effectiveness of online professional development in complementing teacher learning and

instructional practice (Berger et al., 2008). Additionally, study participants reported feeling more experienced with their content and displayed an increased willingness to share with peers post blended learning professional development implementation. However, the researchers acknowledged small sample size in the study could limit the reliability. Therefore, additional studies with larger sample size would be necessary to validate the finding across a broader context.

Best Practices for Blended Professional Development Models

Wideman, Owston, and Sinitskaya's (2007) comparative analysis of teacher professional development initiatives that use a blended model for delivery provide more specific information on best practices for utilizing blended learning models for teacher professional development. The researchers outlined three professional development projects conducted with teachers in Canadian middle and high schools each spanning two years: the Advanced Broadband Enabled Learning Initiative, the Teacher eLearning Project, and the Learning Connections Project. The study projects all consisted of job embedded, face-to-face professional development (either day long or institute style), small group teaming and video conferencing, online discussions and assignments and hands-on experiences related to classroom practice.

Researcher data collection strategies included semi-structured interviews and focus groups, participant surveys, transcripts of online discussions, and observations of professional development activities both online and face-to-face. Study findings indicated several factors shared among the projects that promoted transformation of teacher learning and practice. Development of a cohesive learning community, reliability and simplicity of use related to the project's online portal, consistent leadership and

facilitator support, structured opportunities for teachers to share, reflect, and identify continued needs, and adequate time were all identified as markers for successful blended learning professional development implementation (Wideman et al., 2007). Additional research on blended professional development initiatives with similar methodology and focus to the above mentioned study would add to the limited research base on the topic.

Summary

The implementation of blended learning as an instructional practice for educating 21st century learners is on the rise. While initial research on the effectiveness of online and blended learning showed comparable results to more traditional models of instruction, recent research on the topic of blended learning specific to the K-12 context has revealed positive student achievement results and outcomes. Shifting teacher practice in blending learning environments requires a more intensive focus on professional development as means of support. Current research on professional development in the United States by Desimone (2009) suggested five core features associated with shifts in teachers practice: content focus, active learning, coherence, duration and collective participation. These key elements are also present in transformative learning theory as defined by Mezirow (1997) and are paramount to changes in teacher practice.

iNACOL continues to be a leading contributor to the body of published work identifying best practices in blended professional development and insights for blended learning teachers about challenges to their shifting environments. However, research in the arena of K-12 professional development designed to support blended learning remains limited. Current contributors to the field of blended learning research, Dawson and Dana (2014), recommended the need for research specific to implementation and

outcomes of professional development citing specifically “the sustainability of PD, the design of PD, and the practices used by those delivering PD” as well as research focused on “teacher knowledge, teacher practice, and student performance” (p. 256). Therefore, more empirical evidence of professional development design and implementation for use with teachers in K-12 blended learning environments is necessary to fill an existing gap in research.

SECTION FOUR:

CONTRIBUTION TO PRACTICE

Executive Summary: Professional Development Design in Elementary School

Blended Learning Environments

Problem of Practice and Purpose of Study

Blended learning emerged in K-12 education at the onset of the 21st century with a focus of providing students with a physical location for their learning while integrating experiences which were also virtually based. With variance in instructional delivery models in blended learning contexts, traditional teacher roles and responsibilities also shift, precipitating a need for exposure to professional development that addresses this change. The purpose of this research is to study the design and delivery of professional learning practices in Springfield Public School during implementation of the IGNiTE initiative. This study will specifically explore the relationship between professional development in blended learning contexts and changes in certified teacher mindsets and adaptive thinking skills. The degree in which core features of professional development were present in blended learning professional development is also examined.

Researcher Methodology and Design

A mixed method convergent study was conducted to explore the impact of professional development practice on teacher thinking and problem solving in blended learning environments in SPS. Electronic survey data (Bright Bytes) was analyzed from 541 certified teachers in 23 elementary sites across the District. Additionally, a semi-structured interview was conducted on three Blended Learning and Learning Support leaders currently providing blended learning professional development to classroom teachers at the 23 sites.

Summary of Findings by Research Question

Research Question 1: To what degree does professional development affect teacher mindsets, qualities, adaptive thinking skills, and technical skills in an elementary blended learning environment?

Significant changes were noted in teacher technical skills and adaptive thinking skills domains specifically in four of the eight variables studied: Teacher Use of the 4C's, Teacher Foundational Skills, Teacher Online Skills, and Teacher Multimedia Skills. Moderate changes were also noted in some facets of qualities domain. However, the teacher mindset domain show no significant changes. A decrease was noted from end of year one of implementation to end of year two of implementation on the Belief variable specifically. Additionally, regardless of the point in time for majority of variables, the average Maturity Scale did not change during implementation.

Research Question 2: In elementary school blended learning environments, how were Desimone's (2009) five core features of professional development (content focused, active learning, coherence, duration, and collective participation) present in professional development?

All core components of professional development were identified within interviews. Areas of strength within the data were found in the Content-focused, Active Learning and Collective Participation components. Duration was the most difficult to measure due to variance of teacher reported hours of participation and the fact that teachers "opt in" to professional development throughout the calendar year.

Research Question 3: What is the relationship between professional development (content focused and duration) and shifts in teacher mindset and adaptive thinking skills in elementary blended learning environments?

Results indicated there was a significant negative association between professional development (Duration) and teacher adaptive thinking skills (Teacher Foundational Skills). In other words, professional development in low duration (16 hours or less per year) was correlated to minimal shifts in teacher adaptive thinking skills during blended learning implementation. All other correlations were not significant.

Recommendations

1. Continue to implement and structure Professional Development that is Content Focused and incorporates Collective Participation and Active Learning. Provide more opportunities for teacher choice and teacher led professional development.
2. Provide increased clarity around procedures for site-based Professional Development to ensure implementation of core features of Professional Development are present across the District.
3. Additional site specific research on the Mindset domain following full implementation of the IGNiTE initiative.

Presentation of Findings

Professional Development Design in Elementary School Blended Learning Environments:

Changes in Teacher Mindsets and Adaptive Thinking Skills

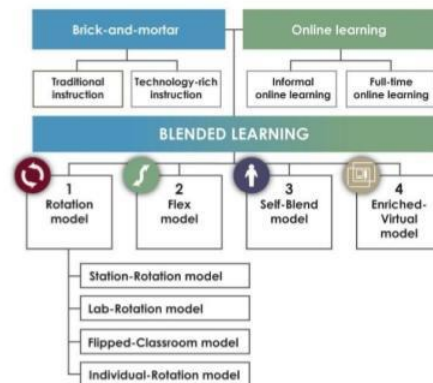


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Blended Learning Defined

“a formal education program in which a student learns: at least in part through online learning, with some elements of student control over time, place, path, and/or pace; at least in part in a supervised brick and mortar location away from home; and the modalities along each student’s learning path within a course or subject are connected to provide an integrated learning experience.

(Horn & Staker, 2015, p. 34-35).





Statement of Problem

Scholarly discussions on blended learning focused primarily on **student perspectives** and learning approaches mainly at the **middle school, high school and collegiate levels**

Gerbic (2011)

“While there is literature on teaching online, empirical studies on teaching and teacher perspectives of blended teaching appear to be less substantively represented in the literature” (p. 221).

Swanson & Jakes (2013)

“To change our schools, we need to change the culture of professional learning. We need to create shifts that increase the level of empowerment and ownership experiences for our nation's best learners: teachers” (p. 5).



Purpose of the Study

The purpose of this research is to study the **design and delivery of professional learning** practices in a large urban school district in Southwest Missouri during implementation of a **blended learning initiative**. This study will specifically explore the relationship between professional development in blended learning contexts and **changes in certified teacher mindsets and adaptive thinking skills**. Additionally, the study will examine the degree in which core features of professional development are present in blended learning professional development.

Although teacher support and professional development is cited as a central construct to successful blended learning program implementation, much of the research is underdeveloped in the current educational context. Specific research on understanding how teachers think about their learning and practice will fill three current gaps in the field

of blended learning research: blended learning in the elementary school context, teacher perspectives in blended learning environments, and professional development for teachers in blended learning environment.

The following research questions guided the study:



Research Questions

1. To what degree does professional development affect teacher mindsets, qualities, adaptive thinking skills and technical skills in an elementary blended learning environment?



Research Questions

2. In elementary school blended learning environments, how were Desimone's (2009) five core features of professional development (content focused, active learning, coherence, duration, and collective participation) present in professional development?





Research Questions

3. What is the relationship between professional development (content focused and duration) and shifts in teachers adaptive thinking skills in elementary blended learning environments?



Both a conceptual and theoretical framework guided the work within the research study: the International Association for K-12 Online Learning Teacher Competency Framework and Transformative Learning Theory.



iNACOL Teacher Competency Framework (International Association for K-12 Online Learning)

The framework consists of **12 specific competencies** related to effective or superior performance and is divided into **four larger domains**: mindsets, qualities, adaptive skills and technical skills



Critical to Research Study

Mindsets

“Mindset competencies include the core values or beliefs that guide an individual’s thinking, behaviors, and actions, and that align with goals of educational change and mission”
(Powell et al., 2014, p. 7).

Adaptive Thinking Skills

The skills in this domain are more complex and “help practitioners tackle new tasks or develop solutions in situations that require organizational learning and innovation”
(Powell et al., 2014, p. 7).



Critical to Research Study

Qualities

“Quality competencies are those personal characteristics and patterns of behavior that help academic staff make the transition to new ways of teaching and learning”
(Powell et al., 2014, p. 7).

Technical Skills

Technical skills are domain-specific ‘know-how’ and expertise that educators used to execute against the known tasks in their jobs.”
(Powell et al., 2014, p. 7).



Theoretical Framework

Transformative Learning Theory

Mezirow (1997 & 2009)

“Transformative learning may be defined as learning that transforms problematic frames of reference to make them more inclusive, discriminating, reflective, open, and emotionally able to change” (p. 22).

Taylor (1998)

- Individual Experience
- Critical Reflection
- Dialogue
- Awareness to Context

Transformative or transformational learning is one of the most widely studied and published adult learning theories of the last two decades. Mezirow’s comprehensive and complex definition remains at the forefront. Taylor also identified three core elements to transformative educational experiences. Individual experience accounts for what each learner brings or experiences in the classroom context (prior experiences). Critical reflection refers to questioning our beliefs and assumptions based on our individual experiences and challenges why we believe what we believe. Dialogue is the means by which we transform our learning and awareness to context involves appreciating and taking into the account the personal and socio-cultural factors of individuals.



Design and Methodology of Study

Mixed method convergent study

- **Quantitative data**
 - Electronic survey data from 541 certified teachers in 23 elementary sites across the District
- **Qualitative data**
 - Purposeful sampling to identify interview participants
 - 3 Department leaders in the areas of Blended Learning Learning Support
 - Semi-structured interview and specific questioning route

The researcher involved in the study was primarily interested in gleaning specific information on professional development design in blended learning environments from the perspective of those most closely associated with the phenomenon: teachers. Due to the timing of the study coinciding with the roll out of blended learning training for teachers at specific sites, quantitative data was already being collected in the school district studied for the purpose of program evaluation. Additionally, the researcher gathered qualitative data during the implementation window from the curriculum and blended learning department leaders to accompany the preexisting data set from the district representing classroom teachers



Design and Methodology

- **Setting**
 - Large, full accredited district in SW Missouri
- **Participants**
 - 541 certified teachers at 23 elementary schools
 - 3 District leaders from the Blended Learning Department and Learning Support Team
- **Collection tools**
 - BrightBytes electronic survey and a semi-structured interview tool

The district utilized a criterion-based selection process to determine the 23 elementary sites which included leadership readiness, staff readiness, current level of technology usage within the site, and equity of resources (12 sites set to implement blended learning during the 2015-2016 school year and 11 sites set to implement blended learning during the 2016-2017 school year). Of the 12 elementary sites selected Year One, six were Title One (more than 70% of student receiving free or reduced lunch) and six were non-Title. Similarly, of the 11 elementary sites selected Year Two, six were Title One and five were non-Title. Sites ranged in size from 180-540 students and certified teachers at each site range in size from 15-32 teachers. All certificated classroom teachers at the 23 pre-determined sites were electronically surveyed. The researcher followed the district's procedures for obtaining access to secondary data for use in the study. Additionally, the researcher selected three department leaders (Director of Blended Learning, Director of Learning Support and the Director of Learner

Development) for participation in the study due to their knowledge of professional development practices.

District level quantitative survey data was collected from survey participants two different times during the implementation windows for Year One and Two sites: prior to implementation for sites during their first year, at the beginning of the school year for sites in their second year, and at the completion of the school year for both Year One and Two sites. The survey tool utilized by the District consisted of approximately 25, five-point Likert scale items in which respondents were asked how closely they agreed or disagreed with particular statements, how frequently a particular statement occurred, the quality of a particular statement and the ease of a particular statement. Additionally, all participant surveys were adaptive utilizing a questioning bank of over 300 questions to personalize by each respondent.

To address the qualitative nature of the study, a semi-structured interview was selected as most appropriate for the individual interviews with the Blended Learning and Learning Support directors. To ensure consistency across interviews, the researcher developed an interview protocol with a specific questioning route. Each participant signed an informed consent prior to interviewing. Interviews were audio recorded and transcribed for accuracy and data analysis.



Data Analysis (Quantitative)

- **Paired Samples *t*-test**

- 8 variables from the Bright Bytes platform
- 23 elementary sites
- Weighted according to the proportion of the 541 educator participants in each school

- **Repeated Measures ANOVAS**

- Weighted scores using Bonferroni corrections for the multiple pairwise post-hoc comparisons such that $p < .05$ represents a significant difference
- 12 schools with 275 educator participants for which the full two years of data was available

To address the first research question, the researchers conducted both *t*-tests and ANOVAs to determine if differences between points of measurement on the eight variables were statistically significant and checked the practical significance using potential changes to the levels on the Bright Bytes, Maturity scale. Variables used in the study were: Teacher Use of the 4C's (Communication, Collaboration, Critical Thinking and Creativity), Teacher Foundational Skills, Teacher Online Skills, Teacher Multimedia Skills, Policies, Procedures and Practice, Support, Professional Learning, and Belief. Variables specific to Pearson Correlation were Teacher Foundational Skills and Belief.



Data Analysis

- **Pearson Correlation**

- 2 variables from the Bright Bytes platform
- 23 elementary sites (Year One)
- Weighted according to the proportion of the 541 educator participants in each school
 - 12 schools with 275 educator participants for which the full two years of data was available (Year Two)



Data Analysis (Qualitative)

- **Transcription**

- **Opening Coding**

- Common words and phrases identified throughout interviews

- **Focused Coding**

- Utilizing Desimone's (2009) core features of professional development
 - Content focused
 - Active learning
 - Coherence
 - Duration
 - Collective Participation



Findings

Research Question 1 (Paired Samples T-tests)

- To account for Bonferoni corrections, $p < .00625$ was used to interpret significance
- Average school scores on seven of the eight variables showed increases, but in only four variables, were there large, significant differences.
 - Teachers Use of the 4C's (Communication, Collaboration, Critical Thinking and Creativity)
 - Teacher Foundation Skills
 - Teacher Online Skills
 - Teacher Multimedia Skills

Average school scores on four of the eight variables showed significant increases using a Bonferoni adjusted significance of $p < .00625$. For the variables Teachers Use of the 4C's (Communication, Collaboration, Critical Thinking and Creativity) ($t(22) = -6.084, p < .001$), Teacher Foundation Skills ($t(22) = -3.611, p = .002$) Teacher Online Skills ($t(22) = -4.678, p < .001$), and Teacher Multimedia Skills ($t(22) = -5.242, p < .001$), there were significant changes in teachers' responses after one year of implementation. For the variables Policies, Procedures, and Practice ($t(22) = -2.005, p = .052$), Support ($t(22) = -2.148, p = .043$) Professional Learning ($t(22) = -1.449, p = .161$) and Belief ($t(22) = -1.500, p = .148$) the differences in scores were not significant.

Table 1 represents the data from the paired samples t -tests comparing the difference in the first year of implementation within schools weighted by proportion of teacher participants.

	<u>Mean</u> <u>Difference</u>	<u>SD</u>	<u>t</u>	<u>df</u>	<u>Significance</u>
Teacher Use of the 4C's	-1.655	1.305	-6.084	22	<.001
Teacher Foundational Skills	-0.284	0.378	-3.611	22	.002
Teacher Online Skills	-0.627	0.643	-4.678	22	<.001
Teacher Multimedia Skills	-0.863	0.789	-5.242	22	<.001
Policies, Procedures, and Practice	-0.482	1.126	-2.055	22	.052
Support	-0.797	1.781	-2.148	22	.043
Professional Learning	-0.313	1.038	-1.449	22	.161
Belief	-0.259	0.828	-1.500	22	.148

Findings

Research Question 1 (Repeated Measures ANOVA)

- Multiple pairwise post-hoc comparisons such that $p < .05$ represents a significant difference
- Four points of measurement in the first and second years using the 12 schools/275 educator participants for which the full two years of data was available
- Analyses of five variables showed significant ANOVA and post-hoc tests while three variables were not significant.

To address improvements between the four points of measurement in the first and second years using the 12 schools with 275 educator participants for which the full two years of data was available, the researchers conducted repeated measures ANOVA with the weighted scores for the multiple pairwise post-hoc comparisons such that $p < .05$ represents a significant difference. All data met the assumption of sphericity according to

Mauchly's Test except Teacher Online Skills, where the more conservative Greenhouse-Geisser Test was used.



Findings

Research Question 1 (Repeated Measures ANOVA)

- **Teachers Use of the 4C's** between the time points ($F(3,33) = 24.17, p < .001$). Post-hoc comparisons showed differences between point 1 and all other points were significant at $p < .001$.
- **Teacher Foundational Skills** between the time points ($F(3,33) = 2.75, p < .05$). Post-hoc comparisons showed the difference between point 1 and 2 was the only significant difference ($p = .045$).

The repeated measures ANOVA showed a significant difference on Teachers Use of the 4C's between the time points ($F(3,33) = 24.17, p < .001$). The differences between point 1 (beginning of the first year of implementation) and all other points were significant at $p < .001$. All other differences, between points 2 (end of the first year), 3 (beginning of the second year), and 4 (end of the second year) were not significant. In other words, on the Teachers Use of the 4C's measure, the analysis showed improvements from the beginning to all subsequent measurement points. However, the differences between the intermediary points and subsequent points did not reflect significant improvement.

The repeated measures ANOVA showed a significant difference on Teacher Foundational Skills between the time points ($F(3,33) = 2.75, p < .05$). Post-hoc comparisons showed the difference between point 1 and 2 was the only significant

difference ($p = .045$). In other words, the Teacher Foundational Skills measure, the analysis showed improvements from the beginning of year one implementation to the end of year one implementation; however, no significant improvements were noted for any of the additional points in time.



Findings

Research Question 1 (Repeated Measures ANOVA)

- **Teacher Online Skills** between time points ($F(1.58, 17.34) = 5.40, p = .020$). Post-hoc comparisons showed the difference between points 1 and 2 to be significant ($p = .013$) as well as the difference between points 1 and 4 ($p = .014$).
- Used more conservative Greenhouse-Geisser Test

All data met the assumption of sphericity according to Mauchly's Test except on the Teacher Online Skills variable, where a more conservative Greenhouse-Geisser Test was used. Using the Greenhouse-Geisser Test, the repeated measures ANOVA showed a significant difference on Teacher Online Skills between time points ($F(1.58, 17.34) = 5.40, p = .020$). Post-hoc comparisons showed the difference between points 1 and 2 to be significant ($p = .013$) as well as the difference between points 1 and 4 ($p = .014$). In particular, on the Teacher Online Skills measure, the analysis showed improvements from the beginning of year one implementation to the end of year one implementation. Additionally, analysis showed improvements from the beginning of year one of implementation to the end of year two of implementation.



Findings

Research Question 1 (Repeated Measures ANOVA)

- **Teacher Multimedia Skills** between the time points ($F(3,33) = 9.62, p < .001$). Post-hoc comparisons showed differences between point 1 and all other points were significant at $p < .001$.
- ***Belief** variable between the time points ($F(3,33) = 4.48, p = .010$). Post-hoc comparisons showed the difference between points 2 and 4 to be significant ($p = .037$) as well as the difference between points 3 and 4 ($p = .017$).

The repeated measures ANOVA showed a significant difference on Teacher Multimedia Skills between the time points ($F(3,33) = 9.62, p < .001$). Post-hoc comparisons were similar to the Teacher Use of the 4C's variable showing that the differences between point 1 (beginning of the first year of implementation) and all other points were significant at $p < .05$. All other differences, between points 2, 3, and 4 were not significant. Specifically, on the Teacher Multimedia Skills measure, the analysis showed improvements from the beginning to all subsequent measurement points. However, again, the differences between the intermediary points and subsequent points did not reflect significant improvement.

Lastly, the repeated measures ANOVA showed a significant difference on the Belief variable between the time points ($F(3,33) = 4.48, p = .010$). Post-hoc comparisons showed the difference between points 2 and 4 to be significant ($p = .037$) as well as the difference between points 3 and 4 ($p = .017$). It is important to note that uniquely, on the Belief measure, the analysis showed a decrease in teacher belief from the end of year one

implementation to the end of year two implementation. This was the only variable to show decrease with professional development.



Findings

Research Question 1 (Bright Bytes Maturity Scale)

Data calculated using a numeric score which is aligned to the Maturity Scale

- Beginning (800–899)
- Emerging (900–999)
- Proficient (1000–1099)
- Advanced (1100–1199)
- Exemplary (1200–1300)

Seven of the eight variables had scores that fell in the same maturity range for each of the points in time

(Teacher Use of the 4C's, Teacher Foundational Skills, Teacher Multimedia Skills, Policies, Procedures and Practice, Support, Professional Learning and Beliefs)

While *t*-tests and ANOVA findings showed large, significant differences from initial to subsequent measurements, the maturity scale gives an indication of the practical level of these scores. Mean scores for each of the eight variables at each of the time points were also analyzed using the Bright Bytes Maturity Scale. The Maturity Scale is organized into five categories highlighting an organization's overall technology readiness and use of each the eight variables: Beginning, Emerging, Proficient, Advanced and Exemplary. Data is calculated using a numeric score (between 800-1300) which is aligned to the Maturity Scale.

 **Findings****Research Question 1 (Bright Bytes Maturity Scale)**

- Teacher Use of the 4C's
 - Mean scores for all points in time were **Emerging** on the Maturity Scale and ranged from 905.17-973.58.
- Teacher Foundational Skills
 - Mean scores for all points in time were **Exemplary** on Maturity Scale and ranged from 1205.92-1220.58
- Teacher Multimedia Skills
 - Mean scores for all points in time were **Advanced** and ranged from 1108.92-1150.25

 **Findings****Research Question 1 (Bright Bytes Maturity Scale)**

- Policies, Procedures and Practice
 - Mean scores for all points in time were **Advanced** and ranged from 1144.43-1168.42
- Support
 - Mean scores for all points in time were **Proficient** and ranged from 1053.17-1074.43.
- Professional Learning
 - Mean scores for all points in time were **Proficient** and ranged from 1040.42-1069.25.



Findings

Research Question 1 (Bright Bytes Maturity Scale)

- Beliefs
 - Mean scores for all points in time were **Advanced** and ranged from 1162.08-1175-58

For the variable Teacher Use of the 4C's, mean scores for all points in time were in the Emerging range of the Maturity Scale. In this case and for six of the subsequent variables (Teacher Foundational Skills, Teacher Multimedia Skills, Policies, Procedures and Practice, Support, Professional Learning and Beliefs) all scores fell in the same maturity range for each of the points in time (one year of implementation, second year of implementation and two years of implementation) meaning teachers scored similarly throughout the two years in practical terms. In other words, regardless of the point in time for majority of variables, the mean Maturity Scale scores did not change during implementation. Additionally, standard deviations for the different points in time were relatively small across the seven variables (i.e., 15.31 to 37.73) with the exception of Teacher Use of the 4C's (43.55), Professional Learning (45.98), and Support (37.73) at one point in time. In other words, most schools were similar to each other in terms of scores. Likewise, the standard deviations appeared similar at the different points of time for each variable.



Teacher Online Skills

<u>Time of Measurement</u>	<u>Mean</u>	<u>N</u>	<u>Std. Deviation</u>	<u>Std. Error</u>	<u>Maturity Scale</u>
BOY1	1103.09	23	23.775	4.957	Advanced
EOY1	1118.52	23	20.542	4.283	Advanced
BOY1	1094.58	12	23.043	6.652	Proficient
EOY1	1110.58	12	23.071	6.660	Advanced
BOY2	1115.25	12	28.823	8.320	Advanced
EOY2	1124.08	12	27.388	7.906	Advanced
BOY1	1094.58	12	23.043	6.652	Proficient
EOY2	1124.08	12	27.388	7.906	Advanced

Table 4 provides descriptive statistics on and Maturity Scale rating of the mean score for the variable Teacher Online Skills. This is the only variable in which the mean scores were not consistent within one score range on the Maturity Scale. For five of the points in time, mean scores were in the Advanced range; however when comparing the mean scores after two years of implementation, one of the mean scores dropped into the Proficient range.

Looking at the descriptive maturity ranges across this sample, educators generally measured in the emerging range for one scale (Teacher Use of the 4C's), the proficient range on two scales (Support and Professional Learning), advanced on four scales (Teacher Multimedia Skills, Policies, Procedures and Practice, Belief and Teacher Online Skills) and exemplary on one scale (Teacher Foundational Skills) and remained in or near those maturity ranges throughout the implementation periods. Likewise, there was fairly small variation between participants, meaning most teachers scored in the same range as other teachers.



Findings

Research Question 2 (Content Focused)

- **Intentionality to model specific tools within PD**

- “We find ways to make those connections for teachers by **connecting tools to content**. We try not to teach tools in isolation. We want them connected to the learning” (DI-3).
- “...so we hold ourselves accountable to stay up to date and be learners ourselves. If teachers are being encouraged to do this in their classrooms, they should see us **modeling** that in our sessions” (DI-1).
- “So we try to partner with them (Professional Learning) to **model some of the teaching strategies and processes** that we want to see in classroom” (DI-2).

When asked specifically about professional development provided from their department, two of the interview participants identified pedagogy as the main professional development content while the third identified technology integration and innovative instructional practices as the primary focus of professional development lead by members of their department. Respondent DI-1 discussed the importance of providing tangible examples to participants during professional development and the impact that has on content and addressing student need. Respondent DI-2 addressed how her department categorizes professional development and intentionally links content with resources to support successful classroom implementation for teachers. In contrast, Respondent DI-3 acknowledged technology integration as the foundational content provided via her department. Providing teachers training on Canvas, the District’s learning management system, training on Google Suite, and management of the 21st century classroom using digital citizenship were cited as foundational content

components of professional development provided from the Blended Learning department.

One main theme that resonates across all interviews was the departments' intentionality to model specific tools or strategies within professional development sessions that teachers could implement in the classroom.



Findings

Research Question 2 (Active Learning)

- **“Chunking” learning for processing and examination of practice**
 - 10:2 Rule (DI-1 and DI-2)
 - Sandbox time (DI-3)
- **Teacher Leaders/Mentors**
 - “I really believe in this idea of teacher led PD. So we find our teacher leaders and have them lead the PD and step forward and **share how this actually looks in their classroom.** I think there is power there” (DI-3).

When addressing the topic of active learning as a facet of professional development, all interview participants acknowledged engagement in discussion and practice as something that they intentionally plan for and incorporate into professional development experiences for teachers. Specifically, all respondents spoke to “chunking” or breaking down their sessions into specific time increments devoted to processing and examination of instructional practice. Both Respondent DI-1 and DI-2 noted the use of the “10:2 rule” when designing and implementing professional development. Respondent DI-2 stated, “10 minutes of delivery and 2 minutes of active processing. We chunk it. This portion they are sitting and listening, the next time they need to be

collaborating with a group or we need to build in some processing time.” Similarly, Respondent DI-3 addressed processing time and the need for teachers to have additional opportunities to explore the tools being integrated during professional development experiences

Another form of active learning that stood out particularly in one interview participant’s responses was related to teachers leading discussion on content topics and “going public with their work.” Respondent DI-3 spoke repeatedly about their departments use of classroom teachers as both mentors and presenters during professional development provided via their department.



Findings

Research Question 2 (Coherence)

- **Alignment a primary function of one department**
- **Support as a recurring theme**
 - “I am not the deliverer of what the curriculum standards are but it’s my responsibility to acknowledge that I realize they’re [teachers] responsible for standards so let’s **use our instructional tools wisely to accomplish that goal**” (DI-1).
 - “We take our direction from the Curriculum department and make sure our tools support that learning. Our job is to teach teachers to **take the right tool and match it to their standard**” (DI-3).

Interview participant responses reflected alignment to district and state standards for student learning as a primary function of the professional development delivered via the District Curriculum department. While each interview participant discussed specific alignment to a set of state or national standards which guided their individual departments’ work in planning and implementing professional development for teachers

within the District, professional development delivered via the Curriculum department was most clearly aligned to state standard for student learning.



Findings

Research Question 2 (Duration)

- **District provided 25 hours (6 required)**
 - Remaining hours site based
- **Variance by teacher**
 - Opportunities ongoing throughout the calendar year
 - Choice
 - Opt in

When asked specifically about how much time teachers spend in professional development delivered departmentally, most interview participants deferred to District requirements for documented professional learning hours. Respondent DI-1 and DI-2 acknowledged that certified teachers in the school district are to be provided 25 hours of professional development annually; however, only six of those hours are “required.” In other words, teachers attend curricular training twice a year in three hour sessions and the remaining professional development hours are all site driven (DI-1)

All participants acknowledged the wide variety of professional development opportunities that each of their departments offers to teachers throughout the school year that are optional to extend their learning. Respondent DI-1 highlighted the new teacher induction programming provided via their department. STEP UP is a two year program which includes personalized coaching and over 30 hours annually of professional

development to qualifying teachers. Respondent DI-2 described Summer Academy, a four day professional development opportunity open to all teachers, which includes sessions from all professional development departments, and is completely teacher choice. Lastly, Respondent DI-3 discussed quarterly, two hour, “Appy Hours” in which teacher choose their sessions and is open to all staff throughout the district. While a variety of optional professional development experiences exist with the district, interview participants noted teachers have to opt in and elect to participate in the majority.



Findings

Research Question 2 (Collective Participation)

- **Grouped by grade taught or role**
 - “...depending on what our design for the session is, we might group them [participants] by job alike roles or we might regroup them to sit with people who teach the same content that they teach or elementary versus secondary” (DI-1).
 - “There has been a” lot of really strong relationships built out of this program because it is grade level sessions but they [teacher] are from all over and it has connected a lot of people” (DI-2).
- **Grouped by choice or topic**
 - “...they get to choose the sessions that they would like to attend. We also level those so we have beginner, intermediate and advanced session and we color code those for participants” (DI-3).

Commonalities across all interview participant responses included scenarios in which professional development participants were grouped according to their grade level or specific roles within the District (i.e., 2nd grade teachers, site mentors, or building leaders). Respondent DI-2 stated, “We typically focus on grouping teachers by grade level like Kindergarten-5th grade; however at the secondary level it is organized by content area.” DI-2 also shared specifics on a program implemented via their department in which teachers meet on a half day schedule throughout the school year and received

specialized professional development around a content area. Sharing of effective practice and collaborating connected to newly acquired learning cited as central pieces to this segment of professional development.

Another consistent grouping technique that permeated across interviews was professional development grouping by choice or topic. Respondent DI-1 noted that teachers have ongoing opportunities to select professional development topics that are “follow ups” to learning that they might have done previously. These sessions are offered via their department throughout the summer and school year and build on learning that was obtained during professional development at an introductory session



Findings

Research Question 3 (Correlation)

- Assess the relationship between professional development (Duration) and shifts in teacher mindset and adaptive thinking skills
 - Teacher Foundational Skills and Belief variables
- Significant **negative association** between professional development (Duration) and teacher adaptive thinking skills (Teacher Foundational Skills), ($r(23) = -.444, p = .05$).

To address the third and final research question, the researchers created shift scores as the difference between the first and last measurement times. Next, the authors ran Pearson correlations to assess the relationship between two measures of professional development duration and shifts in teacher mindset and adaptive thinking skills, resulting

in four correlations. The percentage of teachers in a school who received high duration (above 33 hours) of school-sponsored professional development and the percentage of teachers who received low duration (under 16 hours) were the two duration measures. Two of the eight variables from the District's data management platform were analyzed specifically (Belief and Teacher Foundational Skills) to assess teacher mindset and adaptive thinking skills. For each of the 23 elementary sites participating in the research study during year one of implementation, the authors weighted variables according to the proportion of the 541 educator participants in each school. Similarly, the researchers weighted the data accordingly for the 12 elementary schools and 275 educator participants for which the full two years of implementation of data was available.

Results of the Pearson correlation indicated that there was a significant negative association between professional development (Duration) and teacher adaptive thinking skills (Teacher Foundational Skills), ($r(23) = -.444, p = .05$). In other words, professional development in low duration (16 hours or less per year) was correlated to an adverse shift in teacher adaptive thinking skills during blended learning implementation. All other correlations were not significant.



Summary of Findings

Research Question 1

- Significant increase in teachers technical skills and adaptive thinking skills domains
- Moderate increase in some facets of qualities domain
- Teacher mindset domain show no significant improvement on either measurement
 - Decrease from end of year one to end of year two in Belief
- No increase to Maturity scale score during implementation

The quantitative results of the study reveal significant increase in teacher's responses from the technical skills and adaptive thinking skills domains in four of the eight variables studied: Teacher Use of the 4C's, Teacher Foundational Skills, Teacher Online Skills, and Teacher Multimedia Skills after year one of blended learning implementation. The same four variables mentioned above also showed improvements between the four points in time spanning two years of blended learning implementation. These four variables specifically address teacher confidence, ease and frequency of use of digital tool for instructional practice. Additionally, teachers' perceptions of how they learn about technology and solve technology related issues in the classroom were also noted in these four variables.

While significance was noted in several variables studied, the Mindset domain showed no significant improvement in teacher responses on either measurement. Additionally, a decrease was noted from end of year one of implementation to end of year two of implementation on the Belief variable specifically. The Belief variable addresses

teacher's belief about technology use for learning and technology in education as a whole. Although the data supports teacher shifts in instructional practice, this is not correlated to a shift in teacher's mindset concerning blended learning implementation and its impact on student outcomes.



Summary of Findings

Research Question 2

- All core components of professional development were identified within interviews
 - District strengths in Content-focused, Active Learning and Collective Participation
 - Duration most difficult to measure
 - Varies by teacher
 - Opt in opportunities

Qualitative data collected during the study found professional development delivered during the implementation window did include all five core components discussed in Desimone's (2009) research: Content focused, Active Learning, Coherence, Duration and Collective Participation. Interview respondents clearly articulated intention to provide teaching and learnings strategies during professional development that supported teachers with practical classroom application. Interview respondents also acknowledged the importance of the design component of professional development and intentionally allowing teachers time to explore, reflect, and problem solve the use of

technological tools during trainings.



Recommendations

- Continue to implement and structure Professional Development that is Content focused and incorporates Collective Participation and Active Learning.
 - Teacher choice
 - Teacher led professional development
- Provide increased clarity around procedures for site-based Professional Development
 - Implementation of core features of Professional Development
- Additional site specific research on the Mindset domain
 - Post the three year implementation of the IGNITE initiative

The aim of the study was to examine the design and delivery of professional development on teacher mindset and adaptive thinking skills in a blended learning context. Based on the findings specific to the core features of professional development, the researchers recommend districts structure professional development that is Content focused and incorporates Active Learning and Collective Participation. Providing more opportunities for teacher choice in professional development and providing sessions that are teacher led were noted as most impactful to teacher learning and application of practice around technology integration. Additional clarity concerning procedures for site based professional development that is consistent with the core features of professional development is also a recommendation from the research. The layer of support for district leaders would allow more coherence in professional development for teachers throughout a school district; thus providing a greater impact on student learning holistically.

While significance was noted in several variables studied, the Mindset domain showed no significant changes or improvements in teacher responses on either measurement. Although the data supports teacher shifts in instructional practice, this is not correlated to a shift in teacher's mindset concerning blended learning implementation and its impact on student outcomes. Interviewees involved in the study also noted the need to better assist teachers with understanding the "why" behind certain professional development linked to technology and the benefit to student learning. Therefore, additional research at the district and site level on the Mindset domain could provide information on how to support teachers with developing a greater orientation to change.

SECTION FIVE:
CONTRIBUTION TO SCHOLARSHIP

Abstract

Although teacher support and professional development is cited as a central construct to successful blended learning program implementation, much of the research is underdeveloped in the current educational context. At the core of current professional development in blended learning environments has been technological skills-based trainings for teachers, which neglect the reflective and adaptive side of instructional practice. With this neglect in mind, this article seeks to address three under explored areas in the field of blended learning research: the elementary context, teacher perspectives, and professional development. Using an embedded, mixed methods convergent approach, the researchers offer insight about the design and delivery of professional development practices in a large, urban school district in Missouri. The findings reveal details about shifts in certified teachers' mindsets, qualities, adaptive thinking skills, and technical skills during implementation of a blended learning initiative. (137)

Keywords: Elementary Teacher Education, Online Teacher Learning, Professional Development, Technology

Professional Development Design in Elementary School Blended Learning Environments: Changes in Teacher Mindsets and Adaptive Thinking Skills

According to Christensen, Horn and Johnson (2008), just 45,000 students had access to online learning opportunities in the year 2000. However, by 2010, that statistic had grown to well over 4 million students participating in some degree of formalized online learning with more modest but continuing growth since then. Additionally, as of 2016, 33 states were implementing full-time virtual schools (Miron & Gulosino, 2016). As schools aim to improve performance, college readiness, and workforce preparedness, the addition of online programming across grades and systems appears essential to providing relevance to student learning in public education. While many schools have implemented some degree of digital-education programming within the last decade, the largest and fastest growing segment of online learning remains single and multi-district blended programs (Watson et al., 2014).

Blended learning is a fairly new concept to education; therefore, multiple meanings have been assigned to the term. The most widely accepted definition of blended learning comes from Horn and Staker (2015), who defined blended learning as:

a formal education program in which a student learns: at least in part through online learning, with some elements of student control over time, place, path, and/or pace; at least in part in a supervised brick and mortar location away from home; and the modalities along each student's learning path within a course or subject are connected to provide an integrated learning experience. (p. 34-35)

With variance in instructional delivery models in blended learning contexts, traditional teacher roles and responsibilities shift drastically. Teachers become content

experts, mentors, and learning coaches in their endeavors to personalize learning for students (Wise & Rothman, 2010). Darrow, Friend, and Powell (2013) agree that a shift in teacher practice is one of the key pieces to successful blended learning implementation. Therefore, teachers need exposure to professional development that addresses and provides understanding around how to navigate the change process related to newly assigned teaching roles (Darrow et al., 2013).

Although teacher support and professional development is cited as a central construct to successful blended learning program implementation, much of the research is underdeveloped in the current educational context. At the core of current professional development in blended learning environments are technological skills-based trainings for teachers which neglect the reflective and adaptive side of instructional practice. Research conducted by the International Association for K-12 Online Learning (iNACOL) continues to acknowledge the impact of direct instruction in blended learning settings, however, there remains less exploration of teacher perspectives aligned to effective practice in the context (Powell, Rabbit, & Kennedy, 2014). Additionally, to date, much of the scholarly discussions on blended learning have focused on student perspectives and learning approaches mainly at the middle and high school level. Although a large body of work addresses student outcomes and guidelines for teachers implementing blended learning models, there remains a much smaller body of work which investigates teacher perspectives in blended learning contexts or applies a model for studying teacher thinking in blended learning environments.

Research on Effective Components of Professional Development

Research literature on common components or features of effective professional development in the educational arena is expansive. According to Learning Forward (2015), high quality professional development involves systematic planned, intentional, and regularly scheduled efforts to embed teacher learning within the teacher's daily lives. This type of frequent professional development is described as job embedded and includes application, reflection, collaboration, and coaching to support instructional challenges faced by the learner (Wood & Killian, 1998; Sparks and Hirsh, 1997; Darling-Hammond and McLaughlin, 2011). Intensive professional development of this nature has a higher probability of influencing teacher practice and, in turn leading to gains in student learning and achievement (Garet, Porter, Desimone, Birman, & Yoon, 2001; Cohon & Hill, 2001). Moreover, Desimone (2009) suggested five core features of professional development for shifts in teacher knowledge and practice: content focus, active learning, coherence, duration, and collective participation.

Content Focused

Content focused professional development highlights both the academic content taught as well as the strategies for how students learn the subject matter. In a three year longitudinal study by Desimone, Porter, Garet, Yoon, and Birman (2002), the researchers examined key features of teachers' professional development. The study concluded when professional development focused on improving content understandings and was of extended duration, teachers were more likely to report changes to knowledge and practice in math and science. Similarly, a quasi-experimental study by Banilower, Heck, and Weiss (2007) on the impact of content based professional development on teacher

attitudes and classroom practice found that professional development activities which supported teachers with implementation of instructional materials was more transferable to classroom practice. An additional study by Heller, Daehler, Wong, Shinohara, and Miratrix (2012) further documented the importance of developing content knowledge through professional development specific to anticipating and addressing student thinking.

Active Learning

Active learning addresses teacher's active engagement in discussion, planning, or practice during professional development. Active learning can vary greatly in form and includes the following: observing teaching, giving and receiving feedback, reviewing student work, and leading discussions on content topics (Garet et al., 2001). Ball and Cohen (1999) acknowledged incorporation of active learning into professional development practice better enabled teachers to examine one another's instructional strategies and student learning, and provided an opportunity to discuss ideas for improvement. A two year in-depth study of the National Writing Project (NWP) conducted by Lieberman (2000) found techniques such as scaffolding, working in a collaborative group, writing for clarity and giving feedback and going public with work to be highly supportive of teacher growth and practice. Results from a national study conducted by Garet et al. (2001) also cited active learning as having a positive influence on enhanced teacher knowledge and skills.

Coherence

Coherence addresses the degree to which professional learning is aligned to district and state goals and standards for student learning. Garet et al.'s (2001) study on

effects of different characteristics of professional development on teacher practice noted “Teachers who experience professional development that is coherent-that is, connected to other professional development experiences, aligned with standards and assessments, and fosters professional communication-are more likely to change their practice” (p.

934). Penuel, Fishman, Gallagher, Korbak, and Lopez-Prado (2009) studied teachers' perceptions of curricular alignment and on curriculum implementation using empirical data from a statewide systemic inquiry science reform effort. Findings from this study emphasized coherence of professional development with district and state goals impacts teacher understanding and decisions to implement models and tools from professional development. In contrast, when there is disconnect between goals and designs for professional development and school or district level goals, teachers are faced with challenges that hinder improvement of classroom practice (Yamagata-Lynch & Haudenschild, 2009).

Duration

Duration addresses the time spent in professional development and includes both span of time in which the activity is spread and/or the number of hours spent in the activity. According to a national survey by Garet et al. (2001), teachers view in-service activities to be most effective when they are sustained over time. A study by Smith et al.(2007) found teachers who received at least two weeks of professional development in inquiry-oriented teaching reported changes to their practice consistent with creating a culture of inquiry in their classrooms. Similarly, teachers who were part of the Local Systemic Initiative that received extended professional development were more likely to

use student-centered instructional materials introduced in professional development in regular classroom practice (Banilower, Heck, & Weiss, 2007).

Collective Participation

Collective participation refers to teachers within the same school, grade, or department working together during professional development. In a five year study on secondary schools, McLaughlin and Talbert (1993) found that high school teachers involved in professional learning communities took more risk and invented new ways of collaborating with one another than teachers that tried to implement new learning independently. Newmann and Associates' (1995) national study on common characteristics of elementary schools' in the restructuring phase noted that professional development connected to the whole faculty or groups of teachers sharing effective practices was a characteristic of more successful schools. Additional studies of both the Community of Teacher Learners and QUASAR (Quantitative Understanding: Amplifying Student Achievement and Reasoning) projects also illustrated the need for interaction among adult learners in the professional development context and advocate for discourse as a powerful form of teacher learning (Borko, 2004).

Blended Learning Teacher Competency Framework

With many school districts implementing online and blended learning practices in recent years, creation of a system for observing instructional practices and organizing professional development was necessary. The International Association for K-12 Online Learning (iNACOL) Blended Learning Teacher Competency Framework developed out of a need to clearly determine critical characteristics of teachers in blended learning environments (Powell et al.,2014). The framework consists of 12 specific competencies

related to effective or superior teacher performance and is divided into four larger domains: mindsets, qualities, adaptive skills and technical skills. Werth et al. (2013) also noted that clear identification and inclusion of pedagogical strategies in comprehensive teacher training for blended learning environments assists teachers in engaging and embracing necessary change. Powell et al. (2014) suggest competencies in four areas: mindsets, qualities, adaptive skills, and technological skills.

Mindsets

Mindset competencies include the core values that guide thinking and actions. The mindset domain consists of two specific teaching competencies: new vision for teaching and learning and orientation toward change and improvement. The overarching goal of mastery in this competency in a blended learning environment is the teacher's ability to understand, adopt, and commit to a mindset that is receptive and open to new forms of teaching and learning (Powell et al., 2014).

Qualities

Quality competencies are personal characteristics that help academic staff develop new ways of teaching. The qualities domain consists of three specific teaching competencies: grit, transparency, and collaboration. Grit encompasses the teacher's ability to display persistence and optimism while pursuing goals and facing problems. Transparency addresses a teacher's capacity to discuss successes and failures and their ability to view data objectively. Collaboration includes a teacher's willingness to proactively seek opportunities to learn from others and their skill in balancing individual needs with team objectives. Competencies in the qualities domain require coaching and reinforcement to develop over time (Powell et al., 2014).

Adaptive Skills

Adaptive skills are more generalizable and have applicability across teacher roles and content areas. The adaptive skills domain also has three specific teacher competencies: reflection, continuous improvement and innovation, and communication. Like competencies in the qualities domain, adaptive skills are mastered through coaching, however, they also require modeling and reflective practice (Powell et al, 2014).

Technical Skills

The technical skill domain is the largest of the domains and includes the specific “know-how” and expertise to do the main aspects of their job. It has four key competencies: data practices, instructional strategies, management of blended learning experience and instructional tools. Data practice includes the teacher’s ability interpret a variety of data sets to personalize learning opportunities for students. Instructional strategies consist of the teacher’s capability to provide resources to students that are tailored and linked to mastery standards. Blended learning experience includes the teacher’s incorporation of online tools to support student learning experiences. Instructional tools address the teacher’s skill set to select and evaluate instructional materials to better develop and manage the learning environment. Technical skill acquisition is mastered through specific training, instruction and practical application (Powell et al, 2014).

Research on Professional Development to Support Blended Learning

While there is research literature on the use of blended learning for professional development, there are very few studies on professional development to support the

implementation of blended learning. One of the more comprehensive bodies of research specific to professional development for online teachers is the Going Virtual! Research series, which began in 2007 and concluded in 2010. Initially, a national sample of baseline data was collected on who was delivering professional development, who was receiving professional development, how it was delivered, as well as, what content and sequence of professional development was implemented (Rice, Dawley, Gasell, & Florez, 2008). Phases two and three of the Going Virtual! Series continued to describe the landscape of professional development for K-12 online teachers, but also sought to further identify the unique needs and challenges faced by these educators. While the synopsis of research studies collectively provided an adequate picture of various models of professional development for online teachers, it was not intended or designed for analysis and study of practice (Dawson & Dana, 2014). Therefore, more structured research approaches could support the body of work on blended learning professional development practices.

Similar research has been conducted on delivery and impact of blended professional development in the K-12 educational context. Holmes, Polhemus and Jennings (2005) analyzed a blended professional development program designed to assist K-6 teachers in the technology integration process. Study findings suggest that a blended approach to professional development was effective in increasing autonomous learning opportunities for teachers. Owston, Sinclair, Wideman (2008) examined a two year blended professional development approach of 68 math and 65 science middle school teachers in an urban district in Canada. Findings indicated professional development offered to teachers in a blended format positively influenced teachers attitudes and

knowledge, which also lead to transformation of classroom practice (Owston et al., 2008). While the initial findings of the study were positive, the researcher advocated that more controlled, experimental studies to support adoption of blended learning as a comprehensive professional development tool is needed.

A similar study by Berger, Eylon, and Bagno, (2008) examined blended professional development with high school physics teachers. The results of this research indicated the effectiveness of online professional development in complementing teacher learning and instructional practice. Additionally, study participants reported feeling more experienced with their content and displayed an increased willingness to share with peers post blended learning professional development implementation. However, the researchers acknowledged small sample size in the study could limit the reliability. Therefore, additional studies with larger sample size would be necessary to validate the finding across a broader context.

A 2013 national study on over of 28,000 teachers revealed 52% of teachers find it difficult to use online web tools to receive information and 66% of teachers never share content online (Swanson & Jakes, 2013). Similarly, Darling-Hammond, Wei, Andree, Richardson, and Orphanos (2009) reported great variance by state on the percent of teachers participating in professional development specific to the use of computers for instructional purposes. Today's students and teachers face a complex and changing educational landscape, which requires agility and new lines of thinking beyond previous practices and routines (Bailey, Hassel, Hassel, Schneider and Ark, 2013). Therefore, research and study on the design of learning opportunities and professional development practices in blended learning environments would support educational leaders in

identification of strategies for assisting teachers with the development of a 21st century skill set. The specific research reported here on understanding how teachers think about their learning and practice will fill three current gaps in the field of blended learning research: blended learning in the elementary school context, teacher perspectives in blended learning environments, and professional development for teachers in blended learning environment.

The purpose of this research is to study the design and delivery of professional learning practices in a large urban school district in Missouri during implementation of a blended learning initiative. This study will specifically explore the relationship between elements of professional development in blended learning contexts and changes in certified teacher mindsets and adaptive thinking skills. Additionally, the study will examine the degree in which core features of professional development (Desimone, 2009) are present in blended learning professional development. Close analysis of design and delivery of professional development during implementation of blended learning at the elementary level could provide insight into effective adult learning for blended learning research literature. The practices implemented at the elementary level would also provide a frame of reference for the less studied elementary context and may apply to secondary school sites in the looking to implement blended learning coaching models with teachers. Furthermore, the information gleaned from this study has the potential to benefit a variety of school districts that are looking to implement blended learning models in their various school contexts. Similarly, the study has the potential to provide feedback on what elements of professional development are effective in shifting teachers

thinking skills and change in instructional practice during blended learning implementation.

Research Questions

The following research questions guided the study:

1. To what degree does professional development affect teacher mindsets, qualities, adaptive thinking skills, and technical skills in an elementary blended learning environment?
2. In elementary school blended learning environments, how were Desimone's (2009) five core features of professional development (content focused, active learning, coherence, duration, and collective participation) present in professional development?

Methods

The researchers selected a mixed method convergent study to explore the impact of professional development practice on teacher thinking and problem solving in blended learning environments. The researchers involved in the study was primarily interested in gleaning specific information on professional development design in blended learning environments from the perspective of those most closely associated with the phenomenon: teachers. Due to the timing of the study coinciding with the roll out of blended learning training for teachers at specific sites, quantitative data was already being collected in the school district studied for the purpose of program evaluation.

Additionally, the lead researcher gathered qualitative data during the implementation window from curriculum and blended learning department leaders to accompany the preexisting data set from the district representing classroom teachers.

Setting

The researchers elected to conduct the mixed methods study in a large, fully accredited public school district in Missouri. This school district consists of approximately 36 elementary schools, nine middle schools, five high schools, and three early childhood centers. Additionally, the district serves a student population of nearly 25,000 students. Historically, the district has recruited and retained high quality teachers, and certificated staff in the district average nearly 13 years of teaching experience. Recent leadership changes resulted a shift in instructional focus district-wide. Blended learning and technology deployment has been at the forefront of discussions with building leadership and classroom teachers alike.

During the 2014-2015 school year, a new department focused specifically on innovation was created. One of the main goals of the department was to assist leaders with developing innovative learning opportunities for students across the system. In an effort to determine a way to scale their work, the department launched a “proof of concept” (pilot) for use with 13 classroom teachers at four different elementary buildings within the district. Quantitative and qualitative data was collected on participating teachers and administrators at the proof of concept sites using a pre and post survey. This data was utilized to assist with development of future teacher training and coaching models for use at 12 predetermined elementary sites set to implement blended learning during the 2015-2016 school year (Year One) and the 11 predetermined elementary sites set to implement blended learning during the 2016-2017 school year (Year Two).

Participants

Due to internal research already occurring within, the district, the researchers selected to conduct research on certified elementary teachers in 23 district-selected sites implementing blended learning during the 2015-2016 and 2016-2017 school years. The district utilized a criterion-based selection process to determine the 23 elementary sites which included leadership readiness, staff readiness, current level of technology usage within the site, and equity of resources. Of the 12 elementary sites selected Year One, six were Title One (more than 70% of student receiving free or reduced lunch) and six were not. Similarly, of the 11 elementary sites selected Year Two, six were Title One and five were not. Sites ranged in size from 180-540 students and certified teachers at each site range in size from 15-32 teachers. Certified classroom teachers at the 23 pre-determined sites were electronically surveyed. The total number of educator participants surveyed was 541. The researcher followed the district's procedures for obtaining access to secondary data for use in the study.

District level elementary demographic data provides a frame for further understanding of the sample as the data sets have little variance. There are 894 certified elementary teachers in the district that are dispersed across 36 elementary sites. Of the 894 teachers, 89% are female (799) and 11 % are male (95). Additionally, 97% of certified teachers at the elementary level are Caucasian (865), 14 are African American, seven are Hispanic, five are Pacific Islander, and three are multiracial. Certified teacher age is categorized into five ranges: 21-30 years (168), 31-40 years (281), 41-50 years (230), 51-60 years (175), and 61 years and older (36). Average years of teaching experience for teachers in the district is 12 years, and 65% of teachers within the district

have advanced degrees (Master's degree or higher). Additionally, the average total teacher salary for a teacher in the district is \$49, 597 annually.

A purposeful sampling technique was utilized for identifying interview participants. Merriam (2009) suggested researchers use a purposeful sampling when they want to identify those with special expertise and competence relative to the study topic or inquiry. Utilizing this strategy, the researcher selected three department leaders (Director of Blended Learning, Director of Learning Support and Director of Learner Development) for participation in the study due to their knowledge of professional development practices. The researcher followed established procedures for conducting research within the district.

Data Collection Tools

District level quantitative survey data was collected from survey participants two different times during the implementation windows for Year One and Two sites: prior to implementation for sites during their first year, at the beginning of the school year for site in their second year, and at the completion of the school year for both Year One and Two sites. The survey tool utilized by the district consisted of approximately 25, five-point Likert scale items in which respondents were asked how closely they agreed or disagreed with particular statements, how frequently a particular statement occurred, the quality of a particular statement and the ease of a particular statement. Additionally, all participant surveys were adaptive utilizing a questioning bank of over 300 questions personalized based on respondent answers. The survey platform also protects participant anonymity and utilized a bank grade encryption security. Although the district's tool addressed several components of technology integration, the researcher focused specifically on 27

items from each of the domains that which were most closely aligned to the scope of the study.

Interviewing as a data collection tool was tailored to department leaders currently providing blended learning professional development to classroom teachers at the 23 sites. The researchers employed semi-structured interviews as most appropriate for individual interviews with the Blended Learning and Learning Support directors. The researcher was careful to include several types of questions during the interviews to rouse rich participant responses. To ensure consistency across interviews, the researcher developed an interview protocol with a specific questioning route each lasting lasted between 30-40 minutes. To keep study participants' information confidential, participant signed informed consents and code identifiers were assigned prior to interviewing. Additionally, the lead researcher audio recorded and transcribed the interviews for accuracy and data analysis.

Data Analysis

The researchers employed a multi-step system to organize and analyze the quantitative and qualitative data collected during the study. First, quantitative data generated from the pre-existing data set on teachers from the 23 elementary sites was analyzed using the district's data management and research analysis platform, Bright Bytes. Researchers conducted paired samples *t*-tests using eight variables from the platform for each of the 23 elementary sites participating in the research study. The eight variables analyzed were Teachers Use of the 4C's (Communication, Collaboration, Critical Thinking and Creativity), Teacher Foundational Skills, Teacher Online Skills, Teacher Multimedia Skills, Policies, Procedures, and Practice, Support, Professional

Learning, and Belief. Due to variance in the number of teachers completing the sample at each site, the researchers weighted each data point according to the proportion of total certified teachers whom participated in the study ($N=541$). This process provided the researcher a more accurate measure of the effect of intervention as each school is treated as an individual proportion of the total sample rather than an equivalent. Next, the researchers also ran repeated measures ANOVAs on the weighted scores for the multiple pairwise post-hoc comparisons of the four points of measurement in the first and second years using the 12 schools with 275 educator participants for which the full two years of data was available.

Qualitative analysis began with an initial reacquainting of individual interview data sets. Common words and phrases that were evident in multiple interviews were highlighted and additional jottings were made in the margins. Following open coding, without regard for how ideas will ultimately be used or fit together (Emerson, Fretz & Shaw, 2011), the researcher utilized the core features of professional development (Desimone, 2009) as an additional layer of focused coding to refine and narrow ideas.

Merriam (2009) urged researchers to be keenly aware that categorizing data is only one step in the analysis process and linking themes together meaningfully provides researchers with more insight into the phenomena of study. With this strategy in mind, the researcher compared the representative themes highlighted within the interview data with the descriptive statistics generated from the existing teacher survey data to establish commonalities in both data sets regarding professional development practice and shifting teacher's mindset and adaptive skills in blended learning environments.

Findings

The findings are reported in light of the two research questions, concerning the affect of professional development in terms of teacher mindsets, teacher qualities, adaptive thinking, and technical skills, as well as the extent to which Desimone's (2009) five core elements were present in the professional development.

Influence of Professional Development

The researchers conducted paired samples *t*-tests using eight variables from the District's data management and research analysis platform, Bright Bytes, for each of the 23 elementary sites participating in the research study weighted according to the proportion of the 541 educator participants in each school (See Table 1). To account for Bonferoni corrections, $p < .00625$ was used to interpret significance. Average school scores on four of the eight variables showed significant increases using a Bonferoni adjusted significance of $p < .00625$. For the variables Teachers Use of the 4C's (Communication, Collaboration, Critical Thinking and Creativity) ($t(22) = -6.084, p < .001$), Teacher Foundation Skills ($t(22) = -3.611, p = .002$) Teacher Online Skills ($t(22) = -4.678, p < .001$), and Teacher Multimedia Skills ($t(22) = -5.242, p < .001$), there were significant changes in teachers' responses after one year of implementation. For the variables Policies, Procedures, and Practice ($t(22) = -2.005, p = .052$), Support ($t(22) = -2.148, p = .043$) Professional Learning ($t(22) = -1.449, p = .161$) and Belief ($t(22) = -1.500, p = .148$) the differences in scores were not significant.

To address improvements between the four points of measurement in the first and second years using the 12 schools with 275 educator participants for which the full two years of data was available, the researchers conducted repeated measures ANOVA with

the weighted scores for the multiple pairwise post-hoc comparisons such that $p < .05$ represents a significant difference. All data met the assumption of sphericity according to Mauchly's Test except Teacher Online Skills, where the more conservative Greenhouse-Geisser Test was used. Analyses of five variables showed significant ANOVA and post-hoc tests while three variables were not significant.

The repeated measures ANOVA showed a significant difference on Teachers Use of the 4C's between the time points ($F(3,33) = 24.17, p < .001$). See Table 2 for an example of the post-hoc comparisons. It shows that the differences between point 1 (beginning of the first year of implementation) and all other points were significant at $p < .001$. All other differences, between points 2 (end of the first year), 3 (beginning of the second year), and 4 (end of the second year) were not significant. In other words, on the Teachers Use of the 4C's measure, the analysis showed improvements from the beginning to all subsequent measurement points. However, the differences between the intermediary points and subsequent points did not reflect significant improvement.

The repeated measures ANOVA showed a significant difference on Teacher Foundational Skills between the time points ($F(3,33) = 2.75, p < .05$). Post-hoc comparisons showed the difference between point 1 and 2 was the only significant difference ($p = .045$). In other words, on the Teacher Foundational Skills measure, the analysis showed improvements from the beginning of year one implementation to the end of year one implementation; however, no significant improvements were noted for any of the additional points in time.

As previously mentioned, all data met the assumption of sphericity according to Mauchly's Test except on the Teacher Online Skills variable, where a more conservative

Greenhouse-Geisser Test was used. Using the Greenhouse-Geisser Test, the repeated measures ANOVA showed a significant difference on Teacher Online Skills between time points ($F(1.58, 17.34) = 5.40, p = .020$). Post-hoc comparisons showed the difference between points 1 and 2 to be significant ($p = .013$) as well as the difference between points 1 and 4 ($p = .014$). In particular, on the Teacher Online Skills measure, the analysis showed improvements from the beginning of year one implementation to the end of year one implementation. Additionally, analysis showed improvements from the beginning of year one of implementation to the end of year two of implementation.

The repeated measures ANOVA showed a significant difference on Teacher Multimedia Skills between the time points ($F(3,33) = 9.62, p < .001$). Post-hoc comparisons were similar to the Teacher Use of the 4C's variable showing that the differences between point 1 (beginning of the first year of implementation) and all other points were significant at $p < .05$. All other differences, between points 2, 3, and 4 were not significant. Specifically, on the Teacher Multimedia Skills measure, the analysis showed improvements from the beginning to all subsequent measurement points. However, again, the differences between the intermediary points and subsequent points did not reflect significant improvement.

In contrast to the other variables, the researchers found similar results without significance on the repeated measures ANOVA on the variables Policies, Procedures and Practice, Support, and Professional Learning. A significant difference was found on the Policies, Procedures and Practices variable between the time points ($F(3,33) = 2.92, p = .048$), the Support variable between the time points ($F(3,33) = 4.097, p = .014$) and the Professional Learning variable between the time points ($F(3, 33) = 3.371, p = .030$).

However, pairwise comparisons for all three variables were not significant for any of the four points in time.

Lastly, the repeated measures ANOVA showed a significant difference on the Belief variable between the time points ($F(3,33) = 4.48, p = .010$). Post-hoc comparisons showed the difference between points 2 and 4 to be significant ($p = .037$) as well as the difference between points 3 and 4 ($p = .017$). It is important to note that uniquely, on the Belief measure, the analysis showed a decrease in teacher belief from the end of year one implementation to the end of year two implementation. Similarly, analysis showed a decrease in teacher belief from the beginning of year two of implementation to the end of year two of implementation. This was the only variable to show decrease with professional development.

Core Elements of Professional Development

The researcher also conducted three interviews with department leaders responsible for providing professional development to classroom teachers at the 23 sites participating in the study. Following the open coding process, the researcher utilized the core features of professional development (Desimone, 2009) as an additional layer of focused coding for analysis. Additionally, trends and similarities in participant responses across all three interviews were noted.

Content focused. When asked specifically about professional development provided from their department, two of the interview participants identified pedagogy as the main professional development content while the third identified technology integration and innovative instructional practices as the primary focus of professional development lead by members of their department. Respondent DI-1 discussed the

importance of providing tangible examples to participants during professional development and the impact that has on content and addressing student need.

We hold ourselves accountable for looking at the names of participants who have enrolled and find out where and what they teach. So if I look at the list of people and I see that I have a PE teacher, a music teacher and a Kindergarten teacher, I am going to be sure that when I am teaching a Kagan Cooperative Learning structure, which is a strategy of instruction for the teacher, that I give a tangible example of what it would like for whatever area they teach. It makes it relevant.

Respondent DI-2 addressed how her department categorizes professional development and intentionally links content with resources to support successful classroom implementation for teachers. DI-2 stated, “We categorized it [professional development] into pedagogy, content knowledge and resources and we broke down our trainings into units instead of just providing a training on resources only.” In contrast, Respondent DI-3 acknowledged technology integration as the foundational content provided via her department. Providing teachers training on Canvas, the District’s learning management system, training on Google Suite, and management of the 21st century classroom using digital citizenship were cited as foundational content components of professional development provided from the Blended Learning department (DI-3).

While the content addressed within each interview participant’s professional development varied, similarities were noted in their responses specific to improving teachers’ content knowledge and supporting them with implementation of instructional materials. One main theme that resonated across all interviews was the departments’ intentionality to model specific tools or strategies within professional development

sessions that teachers could implement in the classroom. Respondent DI-3 stated, “We find ways to make those connections for teachers by connecting tools to content. We try not to teach tools in isolation. We want them connected to the learning.” Additionally, respondent DI-1 noted, “...so we hold ourselves accountable to stay up to date and be learners ourselves. If teachers are being encouraged to do this in their classrooms, they should see us modeling that in our sessions.” Similarly, Respondent DI-2 identified the importance of collaboration among departments when ensuring that content is aligned to teaching strategies during professional development:

We try to partner with the Professional Learning department because while I do feel that we are more content; they are more teaching strategies. So we try to partner with them to model some the teaching strategies and processes that we want to see in classroom.

Active learning. When addressing the topic of active learning as a facet of professional development, all interview participants acknowledged engagement in discussion and practice as something that they intentionally plan for and incorporate into professional development experiences for teachers. Specifically, all respondents spoke to “chunking” or breaking down their sessions into specific time increments devoted to processing and examination of instructional practice. Both Respondent DI-1 and DI-2 noted the use of the “10:2 rule” when designing and implementing professional development. Respondent DI-2 stated, “...10 minutes of delivery and 2 minutes of active processing. We chunk it. This portion they are sitting and listening, the next time they need to be collaborating with a group or we need to build in some processing time.”

Similarly, Respondent DI-3 addressed processing time and the need for teachers to have

additional opportunities to explore the tools being integrated during professional development experiences:

My rule is seven minutes of instruction to seven minutes of processing. The idea is that we give seven minutes of delivery and then seven minutes of sandbox time where we are actually going to get in the tool and try it. Or if it is not that kind of training, it might be seven minutes of delivery and then they are going to get up and move and talk to each other.

Another form of active learning that stood out particularly in one interview participant's responses was related to teachers leading discussion on content topics and "going public with their work." Respondent DI-3 spoke repeatedly about their departments use of classroom teachers as both mentors and presenters during professional development provided via their department:

I really believe in this idea of teacher led PD. So we find our teacher leaders and have them lead the PD and step forward and share how this actually looks in their classroom. I think there is power there. That is where the whole idea of 'Appy Hour' came from is teachers sharing what they are doing after they have learned it from one of our trainings.

Coherence. Interview participant responses reflected alignment to district and state standards for student learning as a primary function of the professional development delivered via the District Curriculum department. While each interview participant discussed specific alignment to a set of state or national standards which guided their individual departments' work in planning and implementing professional development for teachers within the District, professional development delivered via the Curriculum

department was most clearly aligned to state standard for student learning. However, both respondent DI-1 and DI-3 acknowledged their role in supporting alignment to standards in professional development delivered from their departments. Respondent DI-1 stated, “I am not the deliverer of what the curriculum standards are but it’s my responsibility to acknowledge that I realize they’re [teachers] responsible for standards so let’s use our instructional tools wisely to accomplish that goal.” Respondent DI-3 also shared “we take our direction from the Curriculum department and make sure our tools support that learning. Our job is to teach teachers to take the right tool and match it to their standard.” Additionally, Respondent DI-3 explained that at times teacher support to align, implement, or assess a standard does not include integration of a tool. DI-3 stated, “Our job is also to help teachers know when to use the tech and when not to use the tech tied to assessing or showing a specific standard.”

Duration. When asked specifically about how much time teachers spend in professional development delivered departmentally, most interview participants deferred to District requirements for documented professional learning hours. Respondent DI-1 and DI-2 acknowledged that certified teachers in the school district are to be provided 25 hours of professional development annually; however, only six of those hours are “required.” In other words, teachers attend curricular training twice a year in three hour sessions and the remaining professional development hours are all site driven (DI-1). Respondent DI-3 addressed how professional development from within her team supports the additional hours accumulated at school sites:

Our specialist meet with teachers weekly at sites for a minimum of 30 minutes.

We just keep the pattern of we are going to show you something that takes about

30 minutes and then we will see you soon and you are going to tell us how that went. Some do this learning in teams, some do it 1:1 and some do a combination of that.

Another common trend in participant responses related to duration of professional development was the variance from teacher to teacher. All participants acknowledged the wide variety of professional development opportunities that each of their departments offers to teachers throughout the school year that are optional to extend their learning. Respondent DI-1 highlighted the new teacher induction programming provided via their department. STEP UP is a two year program which includes personalized coaching and over 30 hours annually of professional development to qualifying teachers. Respondent DI-2 described Summer Academy, a four day professional development opportunity open to all teachers, which includes sessions from all professional development departments, and is completely teacher choice. Lastly, Respondent DI-3 discussed quarterly, two hour, “Appy Hours” in which teacher choose their sessions and is open to all staff throughout the district. While a variety of optional professional development experiences exist with the district, interview participants noted teachers have to opt in and elect to participate in the majority.

Collective participation. Commonalities across all interview participant responses included scenarios in which professional development participants were grouped according to their grade level or specific roles within the District (i.e., 2nd grade teachers, site mentors, or building leaders). Respondent DI-1 shared, “...depending on what our design for the session is, we might group them [participants] by job alike roles or we might regroup them to sit with people who teach the same content that they teach

or elementary versus secondary.” Similarly, Respondent DI-2 stated, “We typically focus on grouping teachers by grade level like Kindergarten-5th grade; however at the secondary level it is organized by content area.” DI-2 also shared specifics on a program implemented via their department in which teachers meet on a half day schedule throughout the school year and received specialized professional development around a content area. Sharing of effective practice and collaborating connected to newly acquired learning cited as central pieces to this segment of professional development. Respondent DI-2 noted, “There has been a lot of really strong relationships built out of this program because it is grade level sessions but they [teacher] are from all over and it has connected a lot of people.”

Another consistent grouping technique that permeated across interviews was professional development grouping by choice or topic. Respondent DI-3 discussed this format in detail:

Choice is another way that we group teachers for professional development. At ‘Appy Hour,’ they get to choose the sessions that they would like to attend. We also level those so we have beginner, intermediate and advanced session and we color code those for participants.

Similarly, Respondent DI-1 noted that teachers have ongoing opportunities to select professional development topics that are “follow ups” to learning that they might have done previously. These sessions are offered via their department throughout the summer and school year and build on learning that was obtained during professional development at an introductory session.

Discussion and Implications

The quantitative results of the study reveal significant increase in teachers responses from the technical skills and adaptive thinking skills domains in four of the eight variables studied: Teacher Use of the 4C's, Teacher Foundational Skills, Teacher Online Skills, and Teacher Multimedia Skills after year one of blended learning implementation. The same four variables mentioned above also showed improvements between the four points in time spanning two years of blended learning implementation. These four variables specifically address teacher confidence, ease, and frequency of use of digital tool for instructional practice. Additionally, teachers' perceptions of how they learn about technology and solve technology related issues in the classroom were also noted in these four variables.

Qualitative data collected during the study found professional development delivered during the implementation window did include all five core components discussed in Desimone's (2009) research: Content focused, Active Learning, Coherence, Duration and Collective Participation. Garet et al., (2001) acknowledged adult learning focused on multiple features of effective professional development simultaneously rendered greater instructional change. The layer of qualitative data provides a greater lens with which to view the quantitative findings. Areas of strength for the District were noted in the Content focused, Active Learning and Collective Participation components specifically. Darling-Hammond et al. (2009) suggested professional development is more valuable and more likely to shift practice when teachers study the material that they will eventually teach and experience the content as their students would. Interview respondents clearly articulated intention to provide teaching and learnings strategies

during professional development that supported teachers with practical classroom application. Powell et al., 2014 asserts technical skill acquisition is mastered through specific training, instruction and practical application. Interview respondents also acknowledged the importance of the design component of professional development and intentionally allowing teachers time to explore, reflect, and problem solve the use of a technological tools during trainings. Powell et al., 2014 noted adaptive skills are mastered through coaching, however, they also require modeling and reflective practice. Discussion on the Content focused, Active Learning and Collective Participation components of professional development were clearly observable in the shifts to teacher responses in the technical and adaptive domain data.

The aim of the study was to examine the design and delivery of professional development on teacher mindset and adaptive thinking skills in a blended learning context. Based on the findings specific to the core features of professional development, the researchers recommend districts structure professional development that is Content focused and incorporates Active Learning and Collective Participation. Providing more opportunities for teacher choice in professional development and providing sessions that are teacher led were noted as most impactful to teacher learning and application of practice around technology integration. Additional clarity concerning procedures for site based professional development that is consistent with the core features of professional development is also a recommendation from the research. The layer of support for district leaders would allow more coherence in professional development for teachers throughout a school district; thus providing a greater impact on student learning holistically.

While significance was noted in several variables studied, the Mindset domain showed no significant improvements in teacher responses on either measurement. Additionally, a decrease was noted from end of year one of implementation to end of year two of implementation on the Belief variable specifically. The Belief variable addresses teacher's belief about technology use for learning and technology in education as a whole. Powell et al., 2014 advocates that the overarching goal of mastery in the mindset competency in a blended learning environment is the teacher's ability to understand, adopt, and commit to a mindset that is receptive and open to new forms of teaching and learning. Although the data supports teacher shifts in instructional practice, this is not correlated to a shift in teacher's mindset concerning blended learning implementation and its impact on student outcomes. Interviewees involved in the study also noted the need to better assist teachers with understanding the "why" behind certain professional development linked to technology and the benefit to student learning. Therefore, additional research at the district and site level on the Mindset domain could provide information on how to support teachers with developing a greater orientation to change.

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Table 1

Paired Samples T-Tests Comparing Difference in the First Year of Implementation within Schools weighted by proportion of teacher participants

	<u>Mean</u>	<u>SD</u>	<u>t</u>	<u>df</u>	<u>Significance</u>
	<u>Difference</u>				
Teacher Use of the 4C's	-1.655	1.305	-6.084	22	<.001
Teacher Foundational Skills	-0.284	0.378	-.3.611	22	.002
Teacher Online Skills	-0.627	0.643	-4.678	22	<.001
Teacher Multimedia Skills	-0.863	0.789	-5.242	22	<.001
Policies, Procedures, and Practice	-0.482	1.126	-2.055	22	.052
Support	-0.797	1.781	-2.148	22	.043
Professional Learning	-0.313	1.038	-1.449	22	.161
Belief	-0.259	0.828	-1.500	22	.148

Table 2

Post-hoc pairwise comparisons for Teacher Use of the 4C's at the four points of measurement (Example Table)

<u>Time of Measurement</u>	<u>Comparison Points</u>	<u>Mean Difference</u>	<u>Std. Error</u>	<u>Significance</u>
1	2	-2.135*	.359	.001
	3	-2.291*	.347	.000
	4	-2.780*	.358	.000
2	1	2.135*	.359	.001
	3	-.156	.404	1.000
	4	-.645	.381	.715
3	1	2.291*	.347	.000
	2	.156	.404	1.000
	4	-.489	.260	.522
4	1	2.780*	.358	.000
	2	.645	.381	.715
	3	.489	.260	.522

Based on estimated marginal means.

*. The mean difference is significant at the .05 level.

SECTION SIX:
SCHOLARLY PRACTITIONER REFLECTION

The selection of the Educational Leadership program at the University of Missouri for completion of my doctoral degree was very intentional. My initial draw to the program came from discussions with previous cohort members whom I greatly respect as educational leaders. They spoke to the program's design and purpose in building capacity in current leaders for solving problems of practice in their instructional settings. Further investigation revealed the unique facets of the EdD program that differed from a more traditional PhD, including the completion of a dissertation-in-practice. The reputation for rigorous learning linked to reflective practice, in addition to the cohort structure propelled the EdD program at the University of Missouri to the top of the list. Progression through the program has provided numerous opportunities for risk-taking and personal growth. However, the dissertation process specifically has been critical in framing my approach to educational scholarship and practice. As I reflect on how the dissertation process has influenced my development as an educational leader and scholar, I am able to identify three clear components aligned to practice: the continued importance of collaboration, the importance of research based decision making and the importance of reflection.

Collaboration

In my current role as a building principal and doctoral student, collaboration is something that I participate in regularly as both a leader and a learner. It is not atypical for me to work with other educational leaders inside and outside the district on various project teams or lead grade level meetings with teachers at my individual site. However, the dissertation process has encouraged me to reexamine how I approach collaborative opportunities. Prior to the dissertation process, it was rare that I would rely on others to

complete tasks or support me fully with my work in either learning context. According to Gallup StrengthsFinder (2007), one of my top strengths is Achiever and it was not abnormal for me to think that I could solve or work through most things independently. The dissertation process, specifically the quantitative data analysis portion, really challenged me to rely on others with greater means to support me with my work. Dr. Cornelius-White and Dr. MacGregor were instrumental in assisting me through this phase of my dissertation and teaching me to how to humbly ask for help and become more transparent with my areas of weakness. As a result, I more intentionally look at collaborative partnerships as opportunities for building connections with others versus mere task completion. Additionally, I now more actively use collaborative times to better frame my understanding of things that do not come as easily to me.

The dissertation process has also influenced how I structure collaborative time for teachers. Scholarly research on the topic of professional development for my literature review provided insights into effective components of professional development and adult learning theory. The qualitative data analysis phase of my research study revealed teacher choice in professional development and teacher led professional development powerful in changes to instructional practice. The knowledge provided during my time of study on my dissertation topic and the analysis of my data set both assisted me with further examining what professional development opportunities I offer teachers at my site. Providing additional time for teachers to mentor one another, share best practice with their peers, and have choice in their learning are all components that I plan to implement more frequently based on research and findings from my study.

My experiences with the dissertation process have also given me an additional avenue for exercising mentorship and guidance to others looking to pursue a doctoral degree and write a dissertation. Presently, I have a few staff members and colleagues that are starting a doctoral journey whom might benefit from conversations about how to organize and prepare for their dissertation. The knowledge that I gained specifically related to the literature review phase could be useful in supporting the work of my colleagues when they enter that stage in their program. Pointing them to resources such as the use of an Information Literacy Librarian, could be key in organizing resources on their topic. My meetings with one of the Information Literacy Librarians at Missouri State were crucial in not only securing additional sources around my dissertation topic, but taught me more efficient ways to search for research that I had not considered prior. Sharing that wisdom would not only save my colleagues time but assist them with developing a scholarly research skill set to use in the future.

Similarly, sharing my experiences with the data collection process of the dissertation could also be a mentorship opportunity. My only experiences with preparing for and collecting qualitative research occurred in my doctoral program. Therefore, when it came time to prepare data collection tools for my research, I needed support to ensure consistency and credibility. One of the resources that I relied heavily upon during my research study was *Qualitative Research: A Guide to Design and Implementation* by Sharan Merriam. Specifically, I used this resource to determine what participants to include in my sample and selection of appropriate interview question types. Pointing my colleagues to this resource and discussing how I incorporated some components to

support my research could be beneficial to those looking to include qualitative data collection in their work.

Research Based Decision Making

Prior to the EdD program and dissertation process, my experiences with scholarly research were limited. Additionally, my understanding of how to interpret scholarly works lacked the critical eye needed to quickly and efficiently glean relevant information as a researcher. Immersion into the research component of my study, forced me to become more proficient at deciphering scholarly research to determine its value in the context of my dissertation. There were several times during the drafting phase of my literature review that I received edits from my advisor encouraging me to go back to the topic and find additional items to support my work. This process required me to look more intentionally at my sources, and examine the Methods section of articles specifically, to find similarities or differences that could situate my research in the larger body of work on the topic. Similarly, the investigation portion of the dissertation process further supported my understanding and identification of “quality” research. As a result, I now have a robust list of preferred journals that I look to when investigating educational practice.

As an educational leader, I am continuously bombarded with the latest intervention or “quick fix” for supporting students or working with teachers. My heightened understanding of scholarly research has helped me to navigate these continual changes in instructional practice and leadership. Prior to the dissertation process, I may have implemented a technique or strategy when working with teachers and not thoroughly explored the research on its effectiveness. However, I am much more

intentional now to evaluate interventions against scholarly research and let that guide improvements in practice. Additionally, when teachers approach wanting to implement new learning in their classroom space, I encourage them to consider current research on their topic as well. Not only can I assist them with examining their topic through the lens of scholarly research, but I can also now point them to reputable journals and sources to support what they apply to student learning.

Moving forward, I anticipate being able to implement my scholarly research skills when evaluating programming for students at both the site and potentially district level. The strategic plan in our district currently advocates for additional open enrollment and blended approaches to student learning as a means to stay relevant in educational market. The knowledge gained during my research study on blended approaches to student learning closely aligns to the district's vision and I predict there will be opportunities for me to research additional layers of programming that might be implemented at my school site. Awareness to the key components of effective research and experience in conducting research in the current educational context will prepare me to more easily identify programming that is supportive of student learning outcomes. Additionally, there are several steering committees within the district that intentionally address programming for students and consistently evaluate best practice for instruction. My work with research data during the dissertation could also support me in serving in a position on any of those leadership committees in the future.

Reflection

The word reflection is one that is used frequently in the educational context. Throughout the EdD program, cohort members were asked to not only reflect on their

learning in relationship to practice but to think personally about their individual growth. Central to my thinking upon selection of a topic for my dissertation was applicability to my specific leadership role in education at the time. The topic of blended learning and exploration of its impact on teachers and students was a natural fit. As I began to research the effectiveness of blended learning and professional development to support teachers in this context, I wrestled with my personal beliefs based on my experiences in both the classroom and in leadership. Gaining insight from scholarly research caused me to further reflect and question my assumptions about instructional leadership in a blended learning setting. Situating my study in the school district that I am employed provided heightened opportunities for reflection and ease in applicable to my specific school site.

Scholarly research and findings from my study further confirm reflection as a useful tool for changing teacher practice as well. As a principal, professional development has always been something that I am passionate about. Including opportunities for teachers to reflect on their learning and instruction is typically a part of training that I provide at the site level. However, findings from my research study assert that teacher mindsets are not easily shifted even when core components of professional development are present. Kreber (2004) concluded that when engaging in development experiences related to teaching practice, teachers should begin with premise reflection to make learning more meaningful. Therefore, in order to truly support and orient my teachers to change initiatives, I have to model and intentionally incorporate reflective practice more frequently during professional development.

The dissertation process truly changes and shapes individuals as both learners and leaders. Throughout my EdD program and the dissertation process, I have gleaned

valuable personal and professional insights that will shape the ways in which I approach both scholarship and practice in the future. Collaboration, research-based decision making and reflection were all central to my experiences while writing my dissertation and will remain applicable to my leadership practice moving forward. I am confident that I will encounter numerous opportunities to use the vast array of research and leadership skills obtained through my program to impact student learning and instruction.

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Appendix A

Bright Bytes Alignment to Conceptual and Theoretical Frameworks

iNACOL Blended Learning Teacher Competency Framework (Conceptual Framework)

Mindsets

- Environment-Beliefs-Teacher Belief about Technology Use for Learning
 - Technology use in class can enhance student learning (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree)
 - My school encourages technology use for teaching and learning (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree)
 - I want to learn more about technology use for teaching and learning (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree)
 - I think that computers and technology enhance my daily life (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree)
 - I think that learning is more engaging when using technology (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree)

Qualities

- Environment-The 3 PS: Policies, Procedures, and Practices-Teacher Frequency of Technology Discussions
 - Teachers discuss technology during department or grade level team meetings (Always, More than half the time, Less than half the time, Rarely, Never)

- Teachers discuss technology during evaluations (Always, More than half the time, Less than half the time, Rarely, Never)
- Teachers discuss technology during classroom observations/visits (Always, More than half the time, Less than half the time, Rarely, Never)
- Teachers feel rewarded for integrating technology into their teaching (Always, More than half the time, Less than half the time, Rarely, Never)
- Environment-Support-Quality of Technology Support Services at School
 - Teachers report the quality of support for problems disrupting instruction is (Excellent, Above Average, Average, Below Average, Poor, None)
 - Teachers report the quality of support for answers to routine questions is (Excellent, Above Average, Average, Below Average, Poor, None)
 - Teachers report the quality of support for technology planning is (Excellent, Above Average, Average, Below Average, Poor, None)

Adaptive Skills

- Skills-Teacher Foundational Skills-Teacher Foundational Skills Perceptions
 - When faced with a technology related problem, I usually find a good solution? (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree)
 - I can learn technology easily? (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree)
- Environment-Beliefs-Teacher Belief about Technology in Education
 - I feel confident managing a classroom where students are using technology (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree)

- I easily find new technologies to meet my teaching goals (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree)

Technical Skills

- Classroom-Teacher use of the 4C's-Teacher Communication-Use of Digital Tools
 - All questions focused on what the teacher asks student to do with technology and collaboration
- Skills-Teacher Foundational Skills-Teacher Foundational Skill Confidence and Frequency
 - Teachers report ease of sending an email (Very Easy, Easy, Moderately Difficult, Difficult, Impossible)
 - Teachers report ease of attaching to a printer (Very Easy, Easy, Moderately Difficult, Difficult, Impossible)
 - Teachers report ease of creating a spreadsheet (Very Easy, Easy, Moderately Difficult, Difficult, Impossible)
- Skills-Teacher Online Skills-Teacher Online Skill Confidence and Frequency of Use
 - Teacher reported ease of downloading and installing software (Very Easy, Easy, Moderately Difficult, Difficult, Impossible)
 - Teachers report ease of collaborating using online documents (Very Easy, Easy, Moderately Difficult, Difficult, Impossible)
 - Teachers report ease of using web tools to receive information (Very Easy, Easy, Moderately Difficult, Difficult, Impossible)

- Skills-Teacher Multimedia Skills-Teacher Multimedia Skill Confidence and Frequency
 - Teacher reported ease of editing a photo (Very Easy, Easy, Moderately Difficult, Difficult, Impossible)
 - Teachers report ease of recording and editing audio (Very Easy, Easy, Moderately Difficult, Difficult, Impossible)
 - Teachers report ease of recording and editing a video (Very Easy, Easy, Moderately Difficult, Difficult, Impossible)

Components of Effective Professional Development alignment to Transformative Learning Theory (Theoretical Framework)

Content focused

- Environment-Professional Learning-Teacher Interest in Educational Technology PD topics
 - Listed out what areas are of interest per school/district

Active Learning

Coherence

Duration

- Environment-Professional Learning-Teacher Ed Tech Professional Development
 - Teacher reported time spent per year participating in school sponsored PD (Over 33 hours, 17-32 hours, 9-16 hours, 1-8 hours, None)
 - Of which the quality is (Excellent, Above Average, Average, Below Average, Poor, None)

Teacher reported time spent per year participating in non-school formal sponsored PD (Over 33 hours, 17-32 hours, 9-16 hours, 1-8 hours, None)

- Of which the quality is (Excellent, Above Average, Average, Below Average, Poor, None)

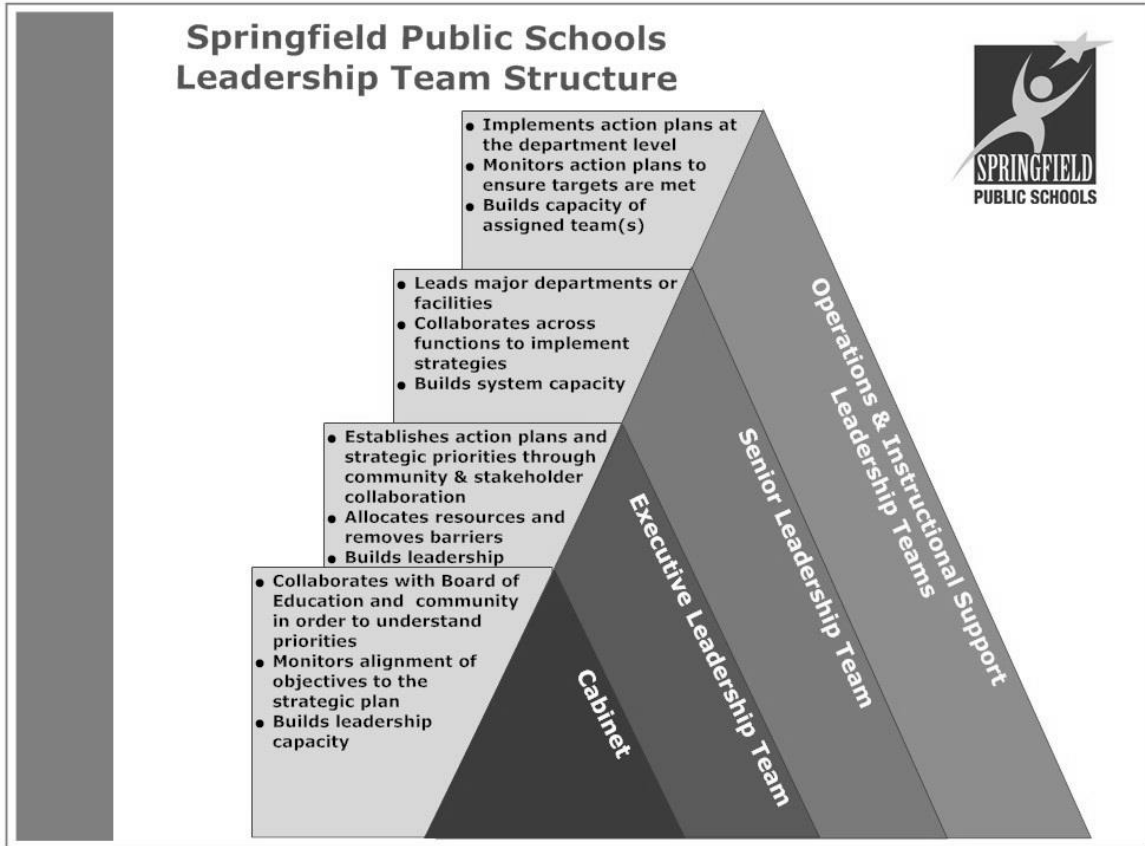
Teacher reported time spent per year participating in non-school informal sponsored PD (Over 33 hours, 17-32 hours, 9-16 hours, 1-8 hours, None)

- Of which the quality is (Excellent, Above Average, Average, Below Average, Poor, None)

Collective Participation

Appendix B

Springfield Public Schools Leadership Team Structure



Appendix C

Informed Consent for Interview with Directors of Professional Development

Research Study's Title: Professional Development Design in Elementary School Blended Learning Environments: Changes in Teacher Mindsets and Adaptive Thinking Skills

Purpose of this study: This study is a mixed methods study focused on the design and delivery of professional learning practices in a large urban school district in Southwest Missouri during implementation of a blended learning initiative. This study will specifically explore the relationship between professional development in blended learning contexts and changes in certified teacher mindsets and adaptive thinking skills. This is a research study to meet the requirements for a University of Missouri doctoral degree.

Participant selection: You are invited to participate in this study because of your role related to professional development design and delivery your district. The goal of this study is to gather information from leaders who have designed and delivered professional development to elementary teachers in the respective district during the blended learning initiative (the 2015 and 2016 school years). Your participation in this research is voluntary, should you decide to participate.

What can you expect during participation?

If you agree to be in the study, you will be asked to complete an interview which consists of 12 questions and will last approximately 30-45 minutes. Individual interviews will be audio recorded. Please note your participation is completely voluntary and you can stop answering questions at any time during the interview process. You may withdraw or refuse to participate in the research study without any penalty or loss of benefit to which you are otherwise entitled.

Are there benefits or risks for participating in this study?

There are no intended benefits or risks for participants in this interview. The research aims to benefit the school district who participate during the dissemination of information phase following the completion of the study.

How will responses be collected and shared?

Your responses to the interview will be confidential. Data will be collected and shared using pseudonyms to protect each participant.

Consent signature:

I have read the description of the interview above and I understand what is being asked of me as a participant. I have read and understand the informed consent and agree to participate in the study.

(Signature of Participant)

(Date)

(Printed Name of Participant)

(Date)

Questions:

If you have questions, please contact A. Nicole Holt at 417-861-3558 at aholt@spsmail.org or Dr. Jeffrey Cornelius-White at 417-836-6517 at jcornelius-white@missouristate.edu. The IRB Contact is 573-882-9585 or irb@missouri.edu.

Appendix D

Questioning Route for Interview with Directors of Professional Learning

Introductory Question

1. What comes to mind when you hear the phrase “Professional Development?”

Transition Questions

2. Tell me about a professional development experience that you really enjoyed.

Key Questions

3. What type of professional development does your department deliver?
4. What does the planning process for professional development look like in your department?
5. In what ways does your department incorporate academic content as well as strategies for how students learn into professional development for teachers?
6. In what ways do you incorporate active learning into professional development delivered via your department?
7. How do you align professional development to district and state standards for student learning?
8. How much time do teachers typically spend in professional development delivered via your department?
9. How are teachers organized or grouped for professional development offered via your department?
10. Can you describe a successful professional development experience you planned and implemented this school year?

11. Can you describe a professional development experience you planned and implemented that did not go well this school year? What would you do differently next time?

Closing Questions

12. Is there anything else that I need to know about your experiences with professional development that we did not discuss?

VITA

Nicole Holt is a native of Springfield, Missouri and that is where she began her educational career. She obtained a Bachelor's Degree in Early Childhood and Elementary Education from Evangel University followed by a Master's Degree in Administration from Missouri State University. After spending five years at Robberson Elementary as a classroom teacher, Nicole expanded her leadership pursuits and accepted an Elementary Principal position at Holland Elementary. She served the Holland community for six years. Currently, Nicole is the Elementary principal at Sherwood Elementary where she has served for three years. She is passionate about teacher growth and development and enjoys creating learning opportunities for teachers that are engaging, relevant and personal. She and her husband live with their two sons in Ozark, Missouri.