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The Texas Forum of Teacher Education

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The Texas Forum of Teacher Education, a publication of the Texas Association of Teacher Educators (TxATE), is a refereed journal published once annually. Articles in the journal are directed to both campus-based and field-based Texas teacher educators. TxATE members, including graduate students, are encouraged to submit manuscripts. Authors must be active members as a condition for publication.

Views expressed in the articles are not necessarily those of the Texas Association of Teacher Educators.

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EDITOR'S INTRODUCTION

Sharon R. Woodall

In 2011, the *Texas Forum of Teacher Education* launched as an online journal. This broadened its readership while maintaining the high standard of research-based articles pertaining to teacher preparation. In this issue, we will feature an op-ed piece on a literacy topic that may prompt dialog among teacher educators. We encourage readers to visit the link to respond.

The 2012 issue of *Texas Forum for Teacher Education* reflects expanding areas of interest relevant to the field of education. Rollins, Brown, Alford, Waxman, and Stillisano explore accountability and the P-16 vertical alignment. Hamman, Coward, and Zaier focus on contextual variables of science education to retain engineering students. Miller, Berg, & Petrón looks at ways teacher candidates modify work for English Language Learners. McAdams studies the effects of Master Reading Teacher methods on student learning. Shifting into technology, Ward, Pilgrim, & Bledsoe evaluated challenge based learning in a middle school initiating a 1:1 program. On the professional side, Laidlaw-Almaguer shares a process for unpacking the standards. Galow and Hammonds demonstrate that new principals need ongoing professional development support. And, Pinkerton, Indelicato, Postan, Ellis, Silveira, & DeJonge share the benefits of early field-based experiences on preservice teachers.

The 2013 Call for Papers is at the end of the journal. Dr. Amanda Rudolph, as managing editor, will work with her editorial team to develop the next issue. I would like to extend my thanks to my own editorial team who worked tirelessly this summer, on vacation, from conferences, and while out of the country. Their insights and collaboration enhanced this journal. I appreciate the support and the opportunity given to us by the board of the Texas Association of Teacher Education. Specifically, thanks for the assistance of Past President Elda Martinez, webmaster Kay Guenther, and our outside reviewer Kim Williams. Thanks to our authors who entrusted us with their work, for their dedication to the process and the quality of their efforts. Without the authors, there could not be a journal. If you have any comments about the journal, you may contact me via email at swoodall@umhb.edu.

Sharon Woodall, Managing Editor

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Feature: Op-Ed Article discussion link: http://literacyblogtxate.blogspot.com/

THE STANDARDIZED TEST: A LITERACY SPONSOR THAT AFFECTS STUDENT WRITING

Jennifer Collar
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A common concern voiced in academia is that students lack the necessary writing skills required to demonstrate proficient writing at the college level (Williams, 2003, p.41). When students enter college, educators discover a substantial amount of students are ill-equipped for true academic writing and fall short of the composition standards instructors expect. In *Why School* (2009), Rose documented a case study of a former student, Kevin. In describing Kevin's first experience with college writing, Rose stated:

> Kevin's first piece of college writing – the placement exam – was peppered with grammatical errors, and the writing was disorganized and vague. This is the kind of writing we see in media accounts of remedial students, and it is the kind of writing that academics and politicians cite as an example of how higher education is being compromised. And such writing is troubling. If Kevin's writing remained like this, he would probably not make it through college (p. 127-28).

Kevin's experience may prompt educators to wonder why it is so many students share similar stories, arriving to university not yet prepared for college-level writing. Students arriving under prepared for first-year composition courses have not attained what Dunbar-Odom (2007) has termed, "higher literacy" (p. 3). In other words, students may be able to read and write, but

they cannot successfully process and compose academic writing; they struggle to "make critical judgments about a variety of texts and then to communicate those judgments in writing" (p. 3).

Literacy Narrative Sponsors

In *Literacy and Learning: Reflections on Writing, Reading, and Society*, Brandt (2009) introduced the concepts of "literacy narrative" and "sponsors of literacy." A literacy narrative is the story of how one acquires literacy, the story behind how an individual learns to read and write. This "story," Brandt explained, is influenced by "sponsors of literacy." Brandt defined a literacy sponsor as those "who turned up most typically in people's memories of literacy learning: older relatives, teachers, priests, supervisors, military officers, editors, influential authors" (p. 26). These sponsors affect not only how a person learns to read and write but the motivations behind engaging in those processes (p. 27). Clearly, sponsors of literacies are powerful influences who affect learning by controlling access to and acquisition of literacy. Bearing in mind the tremendous weight of influence held by a literacy sponsor, one must consider that a literacy sponsor does not always take the form of a person but can likely present itself through or exist as another medium. For example, the daily newspaper was one of the primary means by which renowned slave narrative author, Frederick Douglass, acquired literacy; the newspaper thereby served as a sponsor in his literacy endeavors.

One major item that profoundly affects the way in which public school students learn to write in Texas is the state required standardized test. State assessments ultimately dictate how educators teach and how students learn reading and *particularly* writing. These effects of instruction geared towards mastery of the state test are lasting and establish the knowledge base from which students draw to approach the writing assignments they encounter in college. Many secondary and first-year composition students arguably write the way they do because of this test and because of the way they are taught to approach composition in order to succeed on the exam. In preparation for the exam, certain test-taking writing strategies are developed;

these writing tactics are aimed at helping students succeed on the essay, and in consequence become the literacy practices students acquire in their approaches to writing. Therefore, a conclusion may be reached that the standardized writing test functions as a literacy sponsor for students in Texas, a major sponsor impacting the literacy skills for students beyond the high school years as they enter college. Assessing this standardized writing test and its role as influential sponsor of literacy is an important step in identifying why college freshmen are not prepared for college-level writing, an activity that requires "higher literacy."

Testing as a Literacy Sponsor

Texas implemented standardized testing years before the national No Child Left Behind (NCLB) Act (2001) that mandated standardized assessment; however, this federal legislation further intensified the importance of testing and placed high stakes on the outcome of all assessment exams. There are some benefits of standardized testing that, in all fairness, should be acknowledged. One such advantage is using accountability measures that encourage schools and educators to fully strive in student exam mastery. For instance, students in Texas must meet certain standards on the state test in order to graduate from high school, which increases the accountability pressure on all parties to succeed. This truly promotes the democratic philosophy that no child will be left behind, which fosters a worthy principle that every student has learning potential (Rose, 2009, p. 45).

In this context, the standardized test is a positive tool, developing in students an approach to composition that considers the aspects of accountability. Students may be more likely to take a careful, cognizant approach to composition because they have been taught that their writing performance matters. In addition to promoted accountability, the standardized test also provide a way for the Texas Education Agency (TEA) to measure this "hoped-for accountability." Despite these positives attributes of standardized testing, the prevalence of the state exam may in fact lower literacy standards rather than raise them.

George Hillocks (2003) argued in his evaluation of standardized tests that “the writing assessments in Texas and Illinois were the most grievous examples of poorly considered choices for assessment at every turn” (p. 65). In addition, according to Texas Education Agency (TEA) reports, Texas falls distantly behind other states in the nation in college academic readiness, hence the need for the College and Career Readiness Standards (Texas College and Career Readiness Standards, 2009, pg. iii). Texas, accordingly, seems a perfect place to begin an exploration of how the standardized writing test has historically functioned as a literacy sponsor and impacted the development of student writing.

Composition instruction is often dictated by state curriculum but arguably more forcefully steered by the state test. When students reach high school, writing instruction is focused on preparing students to meet the demands of the exam. Shannon Carter (2008) described her experience with the standardized writing test in secondary education:

> Rather than spending our time developing innovative curricula that required our students to think critically and ‘write to learn,’ we wasted hour after hour of our planning period sitting at the dining room table of the home economics department and poring over charters that were to shape into “proof” that our curriculum was aligned with the requisite TAAS objectives – or suffer the wrath of the upper administration who were no less victims of these same standardized tests and the state laws that held them “accountable” for the results (4).

By the time students reach a first-year composition course, many students are prepared for the writing task (which changes with each version of the test) demanded by the state exam, but weak in the more analytical skills deemed necessary for proficient academic writing. Again, literacy sponsors impact “what, why, and how people write and read” (Brandt, 2009, pg.27). This is how the standardized test comes to serve as a stringent literacy sponsor, by affecting the mindset and knowledge base by which students approach college composition, resulting in negative consequences. This point is clearly illustrated by Bernstein (2004) who presented the

frustrated thoughts of one of her basic writing students who had not qualified for college-credit composition.

> English 1300 was given to me
> because a cycle that started in elementary
> I wanted to learn and I was taught
> but when I look back all I see is one big plot
> They pushed a style oh so lame
> It makes me look back at the school with blame
> now I can barely refrain from sayin
> all they wanted was a good grade, on the TAAS
> that way they could please their boss
> but when you look at the students who lost
> because of the TAAS style just won't make it
> and the accuplacer just wouldn't take it
> so I got thrown down to take it
> but I wouldn't brake in English 1300 (p. 129)

This young man learned how to write specifically for the standardized test, which is why he logically attributed blame to the test for breeding weak writing skills that ultimately resulted in his placement in basic writing courses.

Major Concerns Regarding Standardized Testing as a Sponsor

In "Fighting Back: Assessing the Assessments," Hillocks (2003) claimed that a dire problem exists when the writing prompts of state mandated exams do not result in the production of quality student writing (p. 65). So, what is it about the Texas standardized writing test that produces such effects?

One way in which this state assessment acts as a negative literacy sponsor can be observed in the formulaic approaches acquired by students to address composition prompts during exam preparation. How do Texas educators go about teaching targeted standards to ensure students' success on the writing portion of the state test? Many teachers likely take the advice of Baldwin (2004), director of the Writing and Performance Assessment Group at Educational Testing Service, who proposes that students will best succeed on standardized tests by studying the exams rubrics. Baldwin commented that, "With standardized testing here to stay, educators would do well to learn how their students' writing will be scored and how they apply assessment techniques in their own classroom" (p.72). Baldwin has highlighted an important fact here; standardized tests will continue to exist (p.72), despite any amount of concerns or complaints from educators. With the test positioned as the central measure of student learning, it inevitably transforms into a literacy sponsor as it becomes the primary means by which students are motivated and learn to compose. This type of test/writing preparation might not prove problematic if the end result truly fostered growth in student writing skills; however, in "teaching to the test," educators may promote higher success rates on the exam, but with regards to writing, they tend to teach the formula for exam success rather than actually teaching students to write in a manner than promotes "higher literacy" practices. If students can practice the formula enough, they will likely increase their chances of success on the exam.

Years ago, Moss (2002) complained about the ill effects of the five paragraph essay fostered by the state exam.

> In the educational reform of the nineties, one model became the only writing model for Texas students…Little did they [her students] realize that passing the TAAS would not guarantee them success in college, where writing standards included multiple models of writing to communicate critical thinking, something that does not seem to result from standardized testing that standardizes teaching practices (p. 24-25).

The state test included multiple modes of writing, but encouraged, though not directly in prompt instructions, the five-paragraph essay. Unfortunately, in all this time spent practicing to master the formula, those valuable writing opportunities mandated by curriculum standards may be lost. Those opportunities that are more likely serve as stronger sponsors of literacy that promote critical thinking and analytical composition, unlike the "skill and drill-like" practice that is associated with the standardized test, may be neglected in test preparation.

Another manner in which state assessment can serve as a negative sponsor of literacy is by limiting the writing modes from which students learn to approach composition. These exams present high stakes for both students and educators; therefore, educators are more apt to emphasize the genres of writing observed most often on test day. In districts where student performance is particularly low, English teachers may be forced to largely ignore other curriculum writing standards in their efforts to assure students will pass the exam and graduate from high school. Simply put, standardized tests are limiting because they narrow the scope of education and the literacy sponsors that form students' writing foundations. Rose (2009) explained, "Standardized measures can limit the development of competence by driving curricula towards the narrow demands of test preparation instead of allowing teachers to immerse students in complex problem solving and rich use of language" (p. 103). Although a strong curriculum may be in place, this does not guarantee all instructors have the liberty to teach what they should be teaching beyond the exam requirement. This seems to be the case in Texas where the Texas Essential Knowledge and Skills (TEKS) provide ample opportunity for students to write in a variety of modes, including literary, expository, persuasive, research argumentation, and technical writing (Texas Education Agency). In addition, a few years ago Texas also implemented the Texas College and Career Readiness Standards (CCRS) in an effort to ensure that high school graduates are prepared upon graduation to enter college courses without having to complete remedial course work prior to college-level classes (Texas College and Career Readiness Standards, 2009 pg. iii). In theory, the TEKS and CCRS should

guarantee most high school graduates will embark on their college/career journey adequately prepared, but with the number of first-time college students identified as “basic writers” on the rise, even the strong curriculum and standards promoted by the state are not sufficient to counter the effects of standardized writing assessment. The state writing exam drives education towards the aims of the test, thereby harnessing instruction and stifling the best intentions of good teachers.

If we can bypass these limitations by demanding students write in more thought-provoking ways and under a variety of contexts, we will begin to see progress in students’ writing skills. Although the issue of “teaching to the test” is a paramount concern with any standardized test, the new STAAR exam holds much promise in amending some of the weaknesses of state assessment. The new state test, unlike TAKS, requires students write over a two-day period and address two separate prompts that target two different modes of writing. Several modes of writing are being tested from grades 9-11 including: expository, analytic, literary, and persuasive (*A Comparison of Assessment Attributes*, 2010). By measuring various composition modes, the new test falls more in line with the Texas College and Career Readiness Standards than previously because it requires students to write “a variety of texts” (*CCRS*, 2009, p. 3). Confronting different genres will widen students’ literary repertoires, leaving them more prepared to meet the rigorous demands of college-level composition.

What Can Be Done?

Educators at all levels question why students’ writing skills have significantly declined over the years. The root cause of perceived poor student writing seems to lie with the approaches to composition instruction that are driven by the demands of mandatory state testing. The official state curriculum may bolster ambitious goals fostering college preparedness, but these may not be attained if educators allow the standardized test to dictate

instruction. How can educators move beyond the limitations imposed by the standardized test to ensure students are better prepared for the demands of college writing? This effort likely entails teaching *in spite* of the test rather than "teaching to the test," which undeniably is a risk for educators, but one that will yield positive results. The state exam is in no danger of disappearing. In addition, the exam will continue to change, becoming debatably better or worse with each evolution. What will not be altered is the need for students to learn how to compose effectively; this need remains constant no matter which state assessment is currently in place. So, how can educators anchor their instruction in ways that do not cater to such a high-stakes exam? An effective way to accomplish this goal is for secondary composition teachers to approach writing as a process and not as a final product, which is in direct contrast to state writing assessment. Viewing writing as a final product to be assessed may result in a passing exam grade on the state test, but this practice will not promote the development of rich academic writing skills that are expected at the college level. The state exam measures a sample of writing a student composes in one sitting. This is not the way composition really works in academia or in the workforce, and students should have this understanding. It should be acknowledged that the writing completed for the exam is a first draft, not a final product.

It may be necessary to share with students the "formula for success" on the state exam, but this should be the only focus of instruction. Students should learn this format is merely one way to approach writing. Also, even in working towards formulas needed for success on the writing exam, students should still treat the writing task as a process, working through multiple drafts and revisions to arrive at a "final draft." This type of writing practice and approach will better equip students with the writing skills they will need to succeed in the college composition classroom. Although the final draft quality writing may not be exactly how students compose on test day, students will leave high school with a strong grasp of the writing process involved in academic writing, and will in addition be better prepared to meet the demands of state assessment. While we cannot forever rid our society of the standardized test that becomes such

a strong literacy sponsor of students, we can teach students to write by connecting the writing aims of high schools and university. State assessment does not have to act as a negative force on student writing. Educators can prepare students for the state test, which obviously cannot be ignored, while still helping students to become effective writers who are prepared for the writing tasks awaiting them at university and eventually, the “real world.” By doing so, educators become potent sponsors of literacy, influencing students as they form the literacy narratives that will guide them through a life-time of writing experiences.

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INTEGRATING CCRS INTO A POST-BACCALAUREATE TEACHER PREPARATION PROGRAM

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Introduction

According to the National Center on Education and the Economy (2007), fewer than 20% of students who enter high school in the United States eventually earn a post-secondary degree of any sort. Specifically in Texas, the number of students enrolled in institutions of higher education is declining, and a large gap exists among racial/ethnic groups in both enrollment at and graduation from Texas colleges and universities. The educational challenges facing Texas schools are great; and a concerted, integrated, multidisciplinary effort is needed to address the problems.

In addition to declining higher education enrollment, a disconnect exists between high school preparation and college and career readiness. According to Spence (2007), more than 60% of high school seniors taking the ACT are not well prepared for college study, and only about 50% of the students who enroll in college will actually earn a degree or certificate. In addition, the focus of current curricula, often deficient in application-related materials, does not adequately prepare students for success in the workplace (Spence, 2007). The delineation between the skills necessary for success in college and those needed when entering the workforce immediately after high school is no longer definitive (Achieve and The Education Trust, 2008; Cohen, Lingenfelter, Meredith, & Ward, 2006). Furthermore, more than 80% of 21st

century jobs require some sort of post-secondary training (Texas Higher Education Coordinating Board [THECB], 2008).

Several states, including Texas, have recognized the need for the development and implementation of standards specifically designed to prepare students for success in college or for direct entry into the workforce. In Texas, low success rates in preparing and sending students to college resulted in legislation requiring Texas Education Agency (TEA) and the THECB to develop the College and Career Readiness Standards (CCRS) for the four content areas of English/language arts, mathematics, science, and social studies. Additionally, interdisciplinary standards were developed. The idea behind the conception of the CCRS focused on fostering foundational knowledge and skills needed for either entry-level college courses or for entry into a wide variety of careers, thereby equally preparing those students who are college bound as well as those students who are entering the workforce directly out of high school (THECB, 2008).

Project Design

Designed and initially implemented in fall 2009, the purpose of the Educator Preparation Collaborative was to address the state's P-16 Action Plan on preparing education professionals in public and higher education to assist students in meeting college and career readiness and skilled workforce expectations and standards. Additionally, the project attempted to address the gap that exists between high school preparation in Texas and students' college and career readiness.

The Educator Preparation Collaborative developed a model for preparing P-16 educators based on best practices in teacher preparation. The project works primarily with a secondary graduate certification program, which is a post-baccalaureate teacher preparation program. The program's curriculum and pedagogical framework utilizes a research-based, multi-faceted approach. According to Cochran-Smith (2005), development of teacher education programs should optimally be based on research and evidence and be driven by outcomes.

Current research-based best practices in teacher preparation are "aimed at practice and centered in content" (Ball, Sleep, Boerst, & Bass, 2009, p. 548), geared towards making the connection between research and practice (Baumfield & Butterworth, 2007; Darling-Hammond, 2006; Gallimore, Ermeling, Saunders, & Goldenberg, 2009) and focused on developing a shared, coherent curriculum in teacher education programs at institutions of higher education (Ball et al., 2009; Davis & Krajcik, 2005; Morris & Hiebert, 2009; Stigler & Thompson, 2009). The structure of the post-baccalaureate teacher preparation program fosters a direct correlation between attainment of content knowledge and practice in the classroom. The lecture courses, with built-in, required observations and time spent in full-time internships, provide a bridge between content, theory, and practice.

The Educator Preparation Collaborative project builds upon the existing structure of the secondary graduate certification program to integrate the CCRS and provides opportunities for preservice teachers to (a) create and teach CCRS-based lessons,(b) plan with colleagues/fellow students, and (c) observe other teachers. Faculty members involved in the Educator Preparation Collaborative work to foster a direct correlation between the attainment of content knowledge and classroom practice, while monitoring preservice teachers' growth in implementing CCRS.

The purpose of the present study was to evaluate the impact of the Educator Preparation Collaborative project on preservice teachers' knowledge of state standards and confidence in preparing K-12 students to meet CCRS. For the purpose of this study, researchers utilized data from the first cohort of preservice teachers who participated in the project. The present study addressed the following research questions:

1. To what extent did the Educator Preparation Collaborative project increase participants' awareness of state standards?
2. To what extent did the Educator Preparation Collaborative project increase participants' confidence in their ability to implement an effective learning

environment?

3. To what extent did the Educator Preparation Collaborative project increase participants' confidence in their ability to implement CCRS?
4. Were there changes in participants' perceptions of the CCRS across the duration of the Educator Preparation Collaborative project?

Methods

Participants

Participants in the current study were preservice teachers and members of a secondary graduate certification program cohort (*n*=56). This program is a university-based alternative certification program that allows participants to simultaneously obtain teacher certification and earn college credits for a Master's of Education degree. The largest percentage (36%) of students was seeking certification in reading/language arts; while the smallest percentage (8%) was seeking certification in a science-related field. During the 2010-11 academic year, 63% of the students enrolled in the program completed an internship in which they were employed full-time by a public school district in Texas. The remaining 37% completed student teaching to fulfill certification requirements. Table 1 displays demographics of students participating in the Secondary Graduate Certification Program.

Table 1

Participant Demographics

	n	%
Sex		
Male	12	21
Female	44	79
Ethnicity		
African American	1	2
Asian/Pacific Islander	1	2
Latino(a)	7	13
White, not of Hispanic descent	46	82
Certification area		
Mathematics	6	11
Science composite	3	5
Life science	2	4
Reading/language arts	20	36
Foreign language	7	13
Social studies composite	18	32
Teaching status		
Full-time teacher	35	63
Student teacher	21	38
Grade level taught		
Grade 8	24	43
Grade 9	36	64
Grade 10	34	61
Grade 11	30	54
Grade 12	28	50

Data Collection

Researchers developed a survey that included both Likert-type and open-ended questions and administered it to program participants four times over the course of the certification program: (a) prior to participants beginning the summer certification courses; (b) at

the conclusion of the summer certification courses; (c) in the middle of participants' probationary teaching year; and (d) at the end of participants' probationary teaching year. The purpose of the survey was to determine the impact of the program on participants' level of confidence in establishing an effective learning environment and in integrating the CCRS. Likert-type items for the survey were adapted from other similar surveys (Boyd et al., 2008), the state standards (Texas Education Agency, 2010), the CCRS (THECB, 2008), and widely accepted best practices (Boyd et al., 2008; California Formative Assessment and Support System for Teachers [CFASST], 2010; Coady, Harper, & de Jong, 2011; Dean & Lauer, 2003; Dean, Lauer, & Urquhart, 2005).

With the exception of two questions referring to participants' awareness of the state standards and the CCRS, the Likert-type questions (which composed the bulk of the survey) remained the same for all four administrations. Different open-ended questions, however, were included on the first, third and fourth administration to reflect and capture students' successive CCRS-related experiences in the program. The first administration of the survey questioned participants regarding how they would assist all students in becoming college and career ready. In the third survey (administered in the middle of their probationary year), participants were asked to describe any discussions they might have had with other teachers regarding the CCRS. Finally, at the end of the certification program (the fourth administration), participants were asked to discuss ways in which they had seen or heard the CCRS being integrated into the lesson planning process, as well as their personal thoughts regarding the CCRS.

Data Analysis

Descriptive statistics were reported to ascertain participants' confidence level regarding awareness of state standards, creating an effective learning environment, and implementing the interdisciplinary CCRS. A *t*-test was used to determine if the participants were more aware of the standards after the summer certification courses than at the beginning. The survey questions regarding creating an effective learning environment and implementation of the CCRS

were analyzed using multivariate analysis of variance (MANOVA) to determine if significant differences existed on the items across the four time periods.

Analysis of the open-ended responses occurred in three distinct, but overlapping, phases. First, researchers became familiar with the data by reading and re-reading responses, marking any phrases deemed relevant and/or important. Researchers relied on their judgment regarding which phrases to select. In the second phase of qualitative analysis, researchers began by reducing the text in order to identify what was of most relevance to the current study, utilizing a constant comparative method of coding phrases. Through an inductive analysis of the data, researchers identified common themes.

Findings

Student Awareness of State Standards

In regard to students' awareness of the TEKS and CCRS, a *t*-test was used to determine if the participants were more aware of the standards after the summer certification courses than at the beginning. The two items were scored on a 4-point Likert-type measure: *Not at all aware* (1), *Somewhat aware* (2), *Aware* (3), and *Extremely aware* (4). With regard to both sets of standards, participants were significantly more aware at the conclusion of the summer certification courses than they had been prior to the courses. Table 2 displays the results from the *t*-tests.

Table 2

t-Test Results for Awareness of Standards

	Interval 1		Interval 2		
Standards	*M*	*SD*	*M*	*SD*	*p*
State standards	2.66	0.7	3.53	0.6	.000***
CCRS	1.55	0.6	3.09	0.7	.000***

**** p<.001.*

Participant Confidence in Ability to Create an Effective Learning Environment

Survey questions related to creating an effective learning environment were analyzed using a MANOVA to determine if significant differences existed on the items across the four time periods (prior to summer certification courses, at the conclusion of summer certification courses, in the middle of the probationary teaching year, and at the end of the probationary teaching year). All items were scored on a 4-point Likert-type measure: *Not Confident* (1), *Somewhat confident* (2), *Confident* (3), and *Extremely confident* (4). Table 3 displays the results of the MANOVA, which revealed a significant difference among the four time periods (*Wilks' lambda*=.513, $F(3, 210)=3.20$, p<.000).

Table 3

Summary Statistics for MANOVA Results for Confidence in Creating an Effective Learning Environment by Time

Effect	*Wilks' lambda*	*F*	*Df*	*p*
Time	.513	3.20	3, 210	.000

In the follow up MANOVA, 9 of the 15 items related to creating an effective learning environment were statistically significant at the $p<.05$ level. The Tukey post hoc results are reported in Table 4. For the item, *employ effective instructional strategies for students from a variety of cultural backgrounds,* post hoc results did not reveal where differences existed. In regard to item, *maintain effective classroom management,* the level of participant confidence was significantly higher at the end of the probationary teaching year than prior to the summer certification courses and at the mid-point in the probationary teaching year. Participants felt significantly more confident *creating a lesson plan* after the summer certification courses, mid-point in the probationary teaching year, and at the end of the probationary teaching year than prior to the summer certification courses. After the summer certification courses and at the mid-point in probationary teaching year, participants felt significantly more confident in *developing*

strategies for working with parents and families than at the end of the probationary teaching year. Similarly, participants felt more confident after the summer certification courses in regard to *maintaining ongoing parent communication,* than at the mid-point or end of the probationary teaching year. Regarding the items, *employ effective instructional strategies for students with special needs* and *differentiating instruction for all students,* participants felt significantly more confident after the summer certification courses than prior to the summer certification courses; however, their confidence did not differ significantly during their probationary teaching year from prior to or after the certification courses. In relation to the item, *employ effective instructional strategies for students who speak a second language,* participants felt significantly more confident after the summer certification courses but did not demonstrate any significant gains in confidence over the probationary teaching year. Finally, participants indicated they felt significantly more confident to *integrate technology in the delivery of instructional content* at the end of their probationary teaching year than they had prior to the summer certification courses. Overall, results indicated that participants felt the most confident after completing the summer certification courses. This confidence, however, decreased as participants started their teaching career. Despite this decrease, confidence did increase as the year progressed (See Table A1 in Appendix A).

Participant Confidence in Ability to Implement CCRS

Survey questions pertaining to participants' confidence in implementing the CCRS were also analyzed using a MANOVA to determine if significant differences existed on the items across the four time periods. All items were scored on a 4-point Likert-type measure: *Not confident* (1), *Somewhat confident* (2), *Confident* (3), and *Extremely confident* (4). The results of the MANOVA revealed a significant difference among the four time periods (*Wilks' lambda*=.746, $F(3, 203)=1.808$, $p<.004$). Table 4 displays the MANOVA summary statistics.

Table 4

Summary Statistics for MANOVA Results for Confidence in Ability to Implement CCRS by Time

Effect	*Wilks' lambda*	*F*	*Df*	*p*
Time	.746	1.808	3, 203	.004

In the follow up MANOVA, participants' confidence in implementing 5 of the 11 interdisciplinary CCRS items were statistically significant at the $p<.05$ level. The Tukey post hoc results are reported in Table 6. With regard to the items, *Promote students' reasoning* and *Teach reading across the curriculum,* participants felt significantly more confident after the summer certification courses than prior to the summer certification courses; however, their confidence did not differ significantly during their probationary teaching year from prior to or after the certification courses. For the items, *Promote successful student academic behaviors*, *Foster effective student work habits,* and *Teach research across the curriculum,* participants were significantly more confident after the summer certification courses than at the mid-point in the probationary teaching year; however, the participants' level of confidence prior to summer certification course and at the end of the probationary teaching year did not significantly differ from after the summer certification courses or the mid-point in the probationary teaching year. In conclusion, similar to the previous results, participants were most confident after completing the summer certification courses and experienced a decrease in confidence once they started teaching. At the end of the year, however, their confidence in implementing these standards increased (See Table A2 in Appendix B).

Participant Perceptions of the CCRS

Open-ended responses related to the CCRS from the first survey demonstrated that participants felt as though the implementation of the interdisciplinary standards was key to preparing students to be college or career ready. For example, one participant stated, "I would help students develop critical thinking skills and appropriate reading, writing, speaking skills."

Another participant commented, “I need to set high expectations in the classroom and do activities that promote critical thinking, reading, and writing.”

When participants were asked to describe any discussions they may have had with other teachers regarding the CCRS, the majority of participants indicated that they had not engaged in discussions with colleagues about the CCRS. Additionally, a large percentage indicated that they had tried to engage other teachers in discussions, but their colleagues were unfamiliar with the CCRS. One participant stated, “Most of the teachers I have talked to have heard about of the CCRS but don’t know what they are. Many of the teachers agree that not all students will go to college and that they need to be prepared to enter the work environment.”

At the end of the year, participants were asked to discuss ways in which the CCRS were integrated into the lesson planning process. Similar to previous comments, participants indicated that the CCRS were not being used in their district. Some participants indicated that as long as the state standardized test is based on the current state standards (TEKS), there would not be much of an emphasis on the CCRS. A few participants, however, did provide comments on how these standards were being integrated. A participant commented, “We are required to provide CCRS in our scope and sequence for the six-weeks, but there is no accountability.” Another participant stated, “My department head emphasizes the importance of the CCRS and seeks to use them.”

Finally, participants were asked to provide their own thoughts on the CCR Standards. The majority of participants indicated that the standards were “*good in theory*”. One commented, “They have good intentions, however, I don’t feel they are encouraged enough to be effective.” Another participant stated, “They sound beneficial, however, I don’t see much of a difference between the CCRS and the [state standards].” Finally, participants commented on the beneficial aspects of how these standards are geared towards both college and career. One commented, “Since most of the students at my school will not go to college, it is important to teach them skills that will enable them to function and be successful in the real world.”

Conclusions

The results of the study suggest that the project was successful in increasing preservice teachers' confidence in their ability to implement the CCRS. The participants demonstrated an understanding of the need for these standards and felt confident in implementing the standards in their lesson plans. The project design for educating the preservice teachers on these standards could be replicated in other teacher preparation programs across the state to ensure all preservice teachers have this knowledge and could potentially assist in educating in-service teachers.

Over the course of the project, participants informed researchers the CCRS were not being implemented in the schools. Even though the teachers in the program had an understanding of the standards, they felt bound by district policies. Only those participants in districts that supported the implementation of the CCRS implemented them over the course of their first year of teaching. The others continued to gain more knowledge as participants in the program but were unable to implement what they had learned. Additionally, participants indicated that while these standards are important, if high-stakes testing continues to focus on the state standards, districts would continue to disregard these standards and maintain their current focus. Although the sample size for the study is relatively small, the participants in the 2010 cohort were located in over 25 districts across the state of Texas. The results of the study, therefore, demonstrate the need for widespread implementation of the CCRS. Additionally, district personnel, administrators, and current in-service teachers need professional development related to the importance of the CCRS and how to effectively incorporate them into their instruction.

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Appendix A: MANOVA Results-Effective Learning Environment

Table A1

Follow-up MANOVA Results for Confidence in Creating an Effective Learning Environment by Time

	Time Interval				
	1	2	3	4	
Creating an Effective Learning Environment	*M*	*M*	*M*	*M*	*F*
Maintain effective classroom management	2.79[c]	3.24[ab]	2.94[bc]	3.32[a]	7.88***
Create a lesson plan	2.58[b]	3.28[a]	3.15[a]	3.38[a]	13.43***
Develop strategies for working with parents and families	2.87[ab]	3.09[a]	2.93[a]	2.68[b]	3.01*
Recognize and respect individual family differences	3.44	3.44	3.37	3.44	0.19
Maintain ongoing parent communication	2.92[ab]	3.22[a]	2.72[b]	2.66[b]	6.78***
Integrate multiple subject areas	2.92	3.19	3.00	3.08	1.08
Employ effective instructional strategies for students with special needs	2.44[b]	2.87[a]	2.78[ab]	2.72[ab]	3.17*
Differentiate instruction for all students	2.77[b]	3.19[a]	2.85[ab]	2.84[ab]	3.37*
Employ effective instructional strategies for students from a variety of cultural backgrounds	2.94	3.30	3.15	3.26	2.83*
Employ effective instructional strategies for students from a varying socioeconomic backgrounds	3.04	3.31	3.22	3.28	1.87
Employ effective instructional strategies for students who speak a second language	2.15[b]	3.00[a]	2.69[a]	2.84[a]	12.01***
Create a learning environment that encourages students to appreciate cultural diversity	3.31	3.41	3.30	3.34	0.32
Integrate technology in the delivery of instructional content	3.19[b]	3.41[ab]	3.11[ab]	3.56[a]	4.34**
Create an authentic learning environment via the use of real-life tools/experiences	3.38	3.33	3.11	3.38	2.15
Your level of confidence in preparing high school students to be academically successful in college courses	3.25	3.37	3.30	3.16	0.96

Notes. Means with the same letter are not statistically different as determined by the *Tukey* post hoc test.
* $p<.05$, ** $p<.01$, *** $p<.001$

Appendix B: MANOVA Results-Ability to Implement CCRS

Table A2

Follow-up MANOVA Results for Confidence in Ability to Implement CCRS by Time

	Time Interval				
	1	2	3	4	
Interdisciplinary CCR Standards	*M*	*M*	*M*	*M*	*F*
Promote students' intellectual curiosity	3.13	3.35	3.17	3.13	2.00
Promote students' reasoning	2.92[b]	3.31[a]	3.06[ab]	3.19[ab]	4.34**
Facilitate problem-solving	3.11	3.21	3.09	3.25	0.73
Promote successful student academic behaviors	3.25[ab]	3.42[a]	3.07[b]	3.31[ab]	3.08*
Foster effective student work habits	3.17[ab]	3.44[a]	3.06[b]	3.16[ab]	4.04**
Promote students' academic integrity	3.38	3.37	3.17	3.15	2.13
Teach reading across the curriculum	3.02[b]	3.44[a]	3.22[ab]	3.15[ab]	3.31*
Teach writing across the curriculum	2.98	3.35	3.24	3.21	2.17
Teach research across the curriculum	2.89[ab]	3.32[a]	2.85[b]	2.94[ab]	3.93**
Teach the use of data	3.08	3.17	2.85	2.96	2.32
Teach the use of technology	3.06	3.27	3.02	3.19	1.42

Notes. Means with the same letter are not statistically different as determined by the *Tukey* post hoc test.
* $p<.05$, ** $p<$.

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WHAT TO EXPECT WHEN YOU ARE EXPECTING TO TEACH: REFLECTIONS ABOUT FIELD-BASED PROGRAMS AND THE EFFECTS ON TEACHER CANDIDATES

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Introduction

"Focus groups are valuable for gathering important information and insights on a Phenomenon" (Franz, 2011, p.1387). In teacher education program research, the focus group can reveal themes related to best practices and recommendations for improvements in programs (Aldrich, 2001). However, focus groups can be weakened by issues with member participation, unprepared leaders, and inaccurate discussion analysis (Franz, 2011). When the focus group is allowed to develop the themes that emerged from the discussions, analyze those themes, and then share them with other professionals in the field, the data collected can be strengthened (Franz, 2011).

The purpose of this article is to corroborate the necessity of early field-based teacher education experiences with detailed accounts from teacher candidates. The teacher candidates met in a focus group to discuss best practices for field-based training that occurs prior to student teaching. They then worked with the professor who led the focus group to determine the themes emerging from the discussions and write about their analysis using their own voices, as opposed to only relying on the voice of the focus group leader. We, one professor and five teacher candidates, discussed the benefits of one semester of field-based teaching regarding

real-world learning, talked about the limitations of the experiences, and provided suggestions about the implications of such field-based training.

Review of Field-based Teacher Education Literature

The History of Developing Highly Qualified Teachers through Field-based Education

The history of teacher education programs with field-based coursework occurring prior to student teaching is rather young, with a burgeoning of university/school partnerships coming to fruition only as recently as the mid 90's. Starting in the 1980s, Goodlad (1991) and The Holmes Group (1995) noted the relative nonexistence of university/school partnerships that promoted field-based learning experiences and began to call on reforms in teacher education programs. Prior to the 1980s, only a few teacher education programs had begun such partnerships and the programs were in various states of evolution (Rockwood & Indiana University, 1976).

In the 1980s, Goodlad (1991) began urging teacher education programs to engage in the use of "clinical or 'teaching schools'" through school/university partnerships (p. 9). In 1986, The Holmes Group, a consortium focused on teacher education reform, "invented the idea of the Professional Development School (PDS)" (1995, p. 94). The PDS had not "existed in American education" and was seen as key to teacher preparation reform (The Holmes Group, 1995, p. 94). "It [the PDS] allows for educational theory to be examined under the strains and tensions of practice and readily discards those practices that don't bring improved results. Functionally, the PDS demands a close interplay of education faculties in higher education and in public schools" (The Holmes Group, 1995, p.95). Administered the way that The Holmes Group intended, students are more engaged and have greater understandings of the teaching process. Up to the 1990s, research related to these partnerships had not been extensively conducted.

In the 1990s, a greater state and national-level legislative focus was being placed on teacher education improvement and school/university partnerships that could foster field-based

learning experiences for teacher candidates. In 1991, the Texas Legislature began to provide funding to universities that developed these partnerships between their teacher education programs and school districts (Sid W. Richardson Foundation, 2001). The No Child Left Behind Act of 2001 requirements called for states to have highly qualified teachers in the classrooms by the year 2006 (2002). If it had not been clear before, the first decade of the 2000s highlighted the importance of improved teacher education, and in the state of Texas, the route proposed by the legislature was clearly one that involved school/university partnerships and field-based learning experiences.

Field-based Program Effectiveness

For the past two decades, many have studied the effects of field-based teacher education. Much of the research points to positive learning experiences for teacher candidates when they are allowed to engage in field-based learning. Gentry (2008) found that "teacher preparation [is] at its best when classroom learning and field experiences come together" (p. 21). Hayes (2002) assessed field-based education and found continued support for cohort grouping and extensive field-based experiences. Finally, in Teitel's (2004) review of 10 years of PDS research, it was found that the idea was not a passing educational fad and that it had gone from "informal, person-to-person experiences" to highly developed, sophisticated programs for teacher preparation (p. 402). The past 20 years have shown that field-based learning in teacher preparation programs has become highly developed and has been overwhelmingly positive.

Developing Self-efficacy

Teacher education programs are designed to prepare teacher candidates to become effective teachers by developing teacher self-efficacy, identity, and content knowledge (Pendergast, Garvis, & Keogh, 2011; Arenz & Appel, 1994). In the field of education, the sooner a university program begins its clinical experiences in the classroom, the more likely the teacher candidate will be prepared to lead a classroom. Tschannen-Moran and Woolfolk Hoy (2001), through their studies of self-efficacy evaluation, note the need for teacher education

programs to attend to self-efficacy through “apprenticeships,” as “it could provoke significant changes in the way teachers were prepared and supported in their early years in the profession. There would be a gradual withdrawing of scaffolding and supports rather than the sink-or-swim practicum experiences many novice teachers now experience” (p. 802-803).

Conclusion

The research referenced in this review shows that teacher education institutions have learned how to effectively implement relationships with public schools and they have made commitments to expand these programs from a one-course, field-based experience to more developed, multi-semester experiences. In addition, the research shows that teacher candidates overwhelmingly find that field-based learning is positive. What is still needed is further understanding about what leads these teacher candidates to feel positively about their experiences. By engaging focus group members as article authors, this article authentically shows themes that contributed to a positive field-based training experience, shares limitations regarding that experience, and offers implications for practice.

Field-based Setting and Structure

Teacher candidates at our university are required to enroll in a field-based professional development block series. This series consists of three blocks spanning the three semesters prior to graduation from the program. Block I included three university courses taught on an elementary school campus and 60 hours of experiences in a mentor’s classroom at that same elementary school campus, while under the guidance of a Block supervisor. Block II consists of the same format, with a change in the three classes that the students must take. Block III is a traditional student teaching experience.

In Block I, the teacher candidates met at the same elementary school campus five days per week for one semester. Two of these meetings were devoted to working in a mentor’s classroom on the campus. Teacher candidates observed, assisted the teacher in all aspects of

classroom learning and management, and taught two lessons for observation by the Block supervisor. Three of these meetings were devoted to university coursework, which consisted of an educational psychology course, a reading methods course (taught by the professor author), and a math methods course.

Collaborative Explorations

Focus Group Formation

At the close of the Block I semester, 5 teacher candidates desired to engage in further discourse about their field-based learning experience, so they met as a focus group with the professor author. During this meeting, the teacher candidates were asked a series of questions that led to the discussion of their teaching experiences, including benefits and limitations. From these discussions, a list detailing what worked and what did not work in their field-based learning experiences emerged. They then developed themes that they believed highlighted best practices for field-based teacher education. Research was reviewed to support or refute what themes were identified as the most influential of the program. It was found that these five themes of field-based learning had the greatest impact on these teacher candidates' teaching experiences.

Emerged Themes for Best Practices for Field-based Teacher Education

1. Start early, well before student teaching, with field-based experiences to extend time to gradually release teacher candidates into the responsibilities of teaching.
2. University course immersion in the field-based experiences allows for heightened understandings of how theory becomes practice.
3. Engagement in mentor classroom experiences, whether they are positive or negative, are equally essential.
4. Utilize cohort grouping to reduce cognitive dissonance between theory and practice in a long term field-based program through continued discourse and thought.

5. Involvement with school events, routines, and policies takes teacher candidates from being just college students to becoming professionals.

Theme 1: Starting Field-based Instruction Early

Testing Compatibility with the Field of Education

Early field-based courses can act like a filter, sifting out those who are not passionately sure that teaching is their calling. It allows extra time for teacher candidates to change their career choice after being a part of a school and experiencing what it's really like being in a classroom.

One author recalled when her major was business, and she had the opportunity to assist on a field trip at the local elementary school. Going on that field trip allowed the author to talk with the teacher about careers in education, which opened an opportunity to return to the classroom and help by either working with small groups or with individual students. After being a part of a classroom, she realized that a degree in business was not for her, and she switched her major to education.

After progressing into the field-based program, her experiences in her mentor's classroom confirmed that teaching was the perfect career choice. The students excitedly shouted her name, hugged her, and eagerly shared their daily work with her. While in the mentor's classroom, there was one student who the author would always try to help. This student struggled to learn certain reading skills. The author shared "Whenever this student was confused about the question or just needed help reading the question, she would always ask me for help and further explanation. She always said I would make a great teacher."

This student provided a personal challenge to the author. When she saw academic growth from the student, her heart swelled with emotion, and the author knew that teaching was the career for her. These perceptions support other studies that have shown that early field-

based programs give teacher candidates the chance to test out the career and test out how to put theory into practice (O'Brian, Stoner, Appel, & House, 2007).

Building Self-efficacy in a Safe Environment

A benefit of early field-based learning is that teacher candidates are able to practice theoretical methods learned in the university field-based classroom. This practice takes place both inside the university class and the mentor's classroom; and both provide safe learning environments.

One author felt that it was important for him to "jump right in" and take every moment to learn as much as possible. His mentor teacher, also a graduate of the teacher education program at this university, gave him the freedom to be a part of her classroom as if he was already a professional teacher and not a teacher candidate. She listened to him and allowed him to try many of his lesson ideas and techniques. This experience helped him to gain confidence and reduce some of the dissonance that he may have been feeling about his future efficacy in the classroom.

All the teacher candidates found that they could make mistakes, and learn from those mistakes with the support of the classroom teachers and the university faculty member. One author mentioned the support of the experienced mentor teacher who "was there to guide me in the right direction and pick up where I was lacking due to inexperience." Another author reflected on learning from her own mistakes, "One positive thing I gained from my time in the classroom is that it is crucial to know the students' levels of knowledge. I created and executed a reading and a math lesson, both of which I thought were acceptable and developmentally appropriate; however, it was not appropriate for the specific class. Although my experience was not a great one, I did gain the knowledge to be careful about how I execute a lesson."

The onus of the student during the program is to allow oneself to be formed. It can be argued that even a negative experience can provide equally rich insight into the profession. An affective program yields unique experiences for candidates as well as springboards the

experiences into classroom preparedness. Therefore, the earlier the teaching experiences start, the better for the teacher candidate, as more can be learned about teaching while scaffolding is available.

Theme 2: University Course Immersion in the Field-based Experiences

Since the college-level courses were being held at an elementary school, the professor author was able to utilize the materials from the elementary school in her reading methods course, including elementary students. The teacher candidates then worked with one kindergarten student all semester, beginning with assessment and then allowing that assessment to drive individualized literacy lesson plans. All of these one-to-one sessions were conducted under the guidance of the professor author. Each session ended with a debriefing, in which the professor shared her anecdotal records of the teacher candidates' learning.

The experience of working one-to-one with elementary students yielded a deeper understanding of developmental stages of literacy learning. It also allowed for us to attain a more complete understanding of assessment-driven instruction. It was a critical learning experience that empowered and prepared the teacher candidates for relevant curriculum practice. The following categories of thought emerged from their Teaching Report Reflections, a course assignment, that were part of the work with the young children:

Deeper Understandings of Reading Processes

"The more sessions we had, the more comfortable [my student] was in sharing his thoughts relative to what we were reading. This demonstrated to me that he had a natural inclination to want to 'make sense' of what he was reading. Every so often he might ask, 'what is she doing?' or 'why is she smiling?' Questioning while reading was a good indicator about how he likes to comprehend what he is reading."

Awareness of the Importance of Assessment-driven Instruction

"The initial assessments I performed helped me to gain an understanding of the skills my student needed in order to become a successful reader. I feel that these initial assessments were a vital part of the learning process. If these assessments had not been administered, there would have been a significant amount of time wasted on trying to find the correct beginning point."

"The number one thing I definitely learned is that I must always allow my assessment to drive my instruction. Because each student is different and because they will undoubtedly come to me at various reading levels, their instruction will have to be carefully planned in a dynamic fashion in order to meet their unique and special needs."

Reflective Teaching Exemplification

"Throughout this case study, I will admit I was scared, not knowing what and how to do the reading lessons. Then after a while, I started to understand the different assessments and the different ways to teach reading to young children. I became more confident about teaching my student different reading strategies."

Fostering Self-efficacy Growth

"All in all, as I reflect back on this experience, I am touched at how rewarding it can feel to be a teacher who is effective and can impact a student and help him learn how to read."

"There is no comparison to the feeling of pride and accomplishment when a self-prepared lesson has proven effective."

It seems that housing university courses in a field-based setting is a highly successful way to foster foundational concepts. One author said it best when she said the following: "Knowing all this now will help me perform better when I have my own classroom, where I will strive to give extra needed attention and encouragement to those who are struggling. It was an unforgettable experience."

Theme 3: Engagement in Mentor Classroom Experiences is Essential

We seemed to gain invaluable knowledge and experience during our time in the mentor classrooms. We worked for approximately 6 hours per week with a campus-based teacher referred to as a mentor teacher. A mentor is someone who acts as a guide, an advisor, and someone who is "a wise and trusted teacher" (Mentor, 2012).

Loizou (2011) has shown that having a mentor teacher ". . . provides the foundation to build a teacher ['s] identity, as it facilitates their ability to observe, suggest, negotiate, and act within a community of learners" (p. 373). This can be very powerful for a teacher candidate because teaching identities and confidence can be built during time spent in the mentor's classroom, as opposed to starting out as a teacher of record with doubt and lack of experience about teaching performance.

An important concept learned through the mentor experience was that teaching is not solely a student-teacher interaction. The interaction of a teacher extends to colleagues and parents. Teacher candidates were able to observe the hours a teacher must put into creating lessons, grading papers, conferencing with parents and staff, and setting up centers for the room, which are hours that generally cannot be completed in a regular workday. It was also reinforced that being a teacher means being a role model at all times, not only during school hours but as well as outside of the school and even online. One author noted that "this experience has taught me that being a teacher is a difficult job that carries with it the best reward of helping students and families."

There is certainly no textbook that could have adequately explained the joy of executing a successful lesson plan. Somewhere there is a balance between what is planned and what actually occurs in the classrooms. One author said, "Sometimes things will not go your way and even the most well-thought-out lesson plans need room for improvisation. The textbooks can't prepare you for being able to think on your feet or how to stay rooted while you're teaching."

Theme 4: Utilizing Cohort Grouping to Reduce Cognitive Dissonance

Theory vs. Practice

In Block I, we were divided into groups of 20 and assigned to one of the participating districts. These groups, also referred to as cohorts, remained together for the first two of three training blocks or until student teaching. We felt that the success of the cohort grouping proved highly dependent upon the development of a level of trust.

The revelation about the importance of the cohort was evident for us at the first Block orientation where we learned who would be in our cohort. Orientation revealed to us the level of cohesiveness that Block II students had, and it was evident we too would have that at the end of Block I.

When first entering the university classroom held at the elementary school, we felt that it was important to gauge personalities so that we could really know and understand where each person was coming from. Collectively, we understood that we were all a bit unsure of each other, the professors, the mentors, and the whole Block I situation. These statements reflect how we felt on that first day at the elementary school: “There was an aura of excitement among the members because of being in the actual school and not in a university setting. The energy of the cohort was infectious.” Another said, “This select group of people who had earned this level of teacher education brought a degree of professionalism that had not been felt before.”

By the end of the Block, as a cohort, we all felt as if we were one, cohesive unit. Our cohort had specific roles within the group itself, and these roles were based on the strengths of the members. These roles, supported by the group as a whole, provided what was needed for our cohort’s success. We felt that: “If one of us fails, then we all have failed.” Another wrote, “The comfort comes from being able to lean on each other.”

In addition to the teacher candidates, we felt that the professors and school personnel were also a part of the cohort. This combined cohort engaged in much discourse about theory vs. practice, which helped to resolve some dissonance that we may have been having about our

teaching. We observed each other in the process of teaching in our mentor classrooms, we discussed ideas for lessons, and we even referenced each other's work inside and outside of the university classroom. We learned so much from these observations and conversations, and these were affirmations about what we knew about theory and how it applies to practice.

Theme 5: Field-based Experiences Develop Teaching Professionalism

This field-based interaction is duly useful in that it could serve as a tool for the school's administrator in their selection process for hiring. For example, some of us volunteered to go to a family literacy night. We read to the students and their parents, allowing school personnel to view our performance.

Not only is there opportunity to develop professional relationships with school staff, but also with our own identity as future teachers. Jones (2008) indicates that the discussions about teaching that can ensue during field-based experiences can give teacher candidates a voice, it can help them to develop ideas about who they are as teachers, and it can compel them to feel like professionals, as opposed to students. For example, one author had the opportunity to share with his mentor strategies he used with one student. He found that his mentor teacher was appreciative of his contribution and continued to use his strategy with her student after the teacher candidate had left the classroom, validating his voice as a professional.

Routines are important for children. Being a part of field-based learning also allowed us an insight into how and why routines are set and what they consist of; for example, escorting students through the hallways by walking quietly in a straight line to various locations throughout the school, allowing children to go through the hallways by themselves; lunch and recess routines, as well as other various school-related routines. "Routines are thought to be critical in establishing a feeling of predictability and enhancing feelings of security, trust and independence in young children" (Wildenger, McIntyre, Fiese, & Eckert, 2008. p 69).

One author shared, “From the time I stepped into the classroom, to the last day, I realized that every day I was stepping into a classroom as a future teacher. Yet, every reminder to ‘write your name’ and ‘go wash your hands’ and ‘yes, you will use long division in life’ was an echo of past phrases from time in memorial, of the voice of every previous elementary teacher I have had. My voice, my behavior, my decisions and my heart almost, as it were, became one with theirs in unending praises of ‘ good job’ and ‘well done!’ The seamless process of going from student to professional can be forged from positive efforts within a passionately driven program to form future educators.”

Limitations

As a part of the focus group discourse, we expressed some limitations to the effectiveness of our Block I experience. It is important to share these perceptions so that present and future field-based teacher preparation programs can deliberate about best practices.

Primarily, we felt that there needed to be a more effective form of mentor recruitment and training available for prospective mentors. Among the authors, there seemed to be varied levels of preparedness on the part of the mentors. One mentor had been a student in the field-based teacher preparation program at this university; therefore, she seemed quite eager and knowledgeable about the mentor process. Another, who felt that she had no choice in becoming a mentor, appeared to feel less comfortable with having a teacher candidate in her classroom and did not provide the author with as much responsibility as others were given. Gentry (2008) recommends that teacher candidates work with only the “best and most qualified cooperating teachers” (p. 19). Therefore, field-based teacher education programs should carefully select and adequately train mentor teachers so that a common goal between the university and school-based professionals can be established.

In addition, we felt that there needed to be more collaboration from the professors across the three field-based courses in Block I, and those professors needed to all have greater knowledge about the procedures and policies involved in the Block I experience. We felt that the course professors were fully invested in their content and not equally invested in the complete Block I experience. We found frustration in referring to varied sources with no common answer.

In a 2002 survey of professors and teacher candidates in a program similar to the one at this university, Hayes found that the items on the survey that generated the most negative feedback were those related to communication, "particularly the communication of expectations to [teacher candidates] from university faculty and getting helpful feedback…" (p. 703). The survey revealed that university faculty were helpful in terms of talking to the teacher candidates about teaching practices but were not helpful in talking about field-based procedures and policies. Therefore, field-based teacher preparation programs should make a greater effort to encourage collaboration among field-based professors and provide those professors with training and guidance about the field-based procedures and policies.

Finally, we suggest that more information sessions were needed at various points throughout the semester. While we did receive an extensive orientation that explained the Block I experience and policies, we felt overwhelmed with information that perhaps needed to be broken down into multiple sessions. This will reduce the feelings of disorientation about the program and will allow teacher candidates to absorb and process information throughout the training.

Implications

First and foremost, teacher educators have to listen to the voices of teacher candidates in order to create effective teacher preparation programs. Teacher educators have to ask their students what works and what is not working in terms of their learning. This will break the

understood divide that says student opinion might not be valued. Field-based learning can create a two-way street that gives teacher candidates the empowerment to guide their own learning and guide the program. As authors, we were allowed to freely discuss and analyze the field-based learning experience, and our professor listened and validated our voices. Teacher education programs can take down the one-way street sign by allowing student voice to be heard during field-based program development meetings, to be heard through focus group discussions, to be heard at professional conferences, and to be heard in publications such as this one. The student voice is key to the success of field-based teacher education programs.

Second, our positive experiences with field-based learning emphasize the importance of the continuation of this model for teacher education. The current trend is that teacher education programs are being given less funding for such field-based learning experiences and are being streamlined to a business model, which promotes students as university customers as opposed to partners in the learning process. Consequently, it is now greatly important that the value of field-based education must be retained and praised. Field-based learning is modeling what good teaching is. How do we know how to be a good model for our students if it is not first modeled for us? Field-based learning cannot be lost no matter what the financial or political trends may be.

Conclusions

It is clear that this early field-based experience was beneficial. The power of our testimonies provides evidence of what should be included in teacher education programs. Giving teacher candidates an early start in applying theory, allowing them time to practice theory under the guidance of the professors and mentors, creating opportunities for them to build self-efficacy, establishing cohesive cohort groups, and treating teacher candidates like professionals proved so very important for us. The following author's anecdote summarizes the power of field-based teacher education:

“When I entered my mentor’s classroom, I somehow felt like I was treading on holy ground. There, encircled by her students preparing for a science lesson, was my mentor, eyes smiling, arms open wide saying, ‘Hi. We’re happy you’re here.’ Desperately trying to recall hundreds of notes taken on classroom management and information read (and reread) in child psychology textbooks, my mind feverishly worked in vain. Yet, after some warm introductions, all in the context of stacks of writing journals, boxes of school supplies, overflowing word walls, and warmed overhead projectors, that feeling of being in paradise sunk in and it never left.”

What keeps generation after generation of new teachers entering the field are the students. We all have a desire to be in the classroom, to be there when a student is frustrated by double digit subtraction, to prepare all year for standardized tests with mnemonic song and dance, and to propel the next generation of teachers, doctors, nurses and presidents into a very bright and promising future. Somehow, words cannot contain the moments experienced inside the walls of a field- based program, because some moments are worth experiencing on their own.

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THE TEXAS MASTER READING TEACHER (MRT): EXPLORING THE EFFECT OF MRT KNOWLEDGE AND APPLICATION ON STUDENTS' EDUCATIONAL OUTCOMES

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Abstract

The Master Reading Teacher (MRT) Grant Program in Texas provided annual stipends to MRTs at eligible school districts identified as "high-need." MRTs assisted with teaching reading to students and mentoring colleagues at the school campus. No known research with MRTs or the MRT Grant program existed at the time of this study. This study explored the amount of daily time MRTs apply knowledge for each of the six MRT Standards. MRTs' perceptions of importance for each of the standards were also explored. Additional data was gathered concerning other campus responsibilities for MRTs, which included aministrative functions, teaching duties, committee memberships, and support duties. Finally, Pearson *r* correlations explored the relationship between employment of MRTs and students' educational outcomes on the state standardized reading assessments adminstered during the 2009-2010 and 2010-2011 school years. Statistical significance was reported in Grades 3, 5, 9, and 10.

In 1999, the Texas state legislature passed House Bill 2307, which required the creation of the Master Reading Teacher (MRT) certificate program (Texas Education Agency [TEA], 2006). The purpose of the MRT certificate was to ensure every Texas student reads on grade level by the end of the third grade and that students' reading knowledge and skills will continually develop throughout their education. An individual that possessed a MRT certificate maintained two responsibilities at their school campus: (a) MRTs teach reading to students, and (b) MRTs mentor other teachers at their campus in the area of reading.

An individual earned a MRT certificate in one of two ways:

1. The applicant held a valid Texas teaching certificate, completed three or more years of teaching experience, and completed a MRT preparation program approved by the State Board for Educator Certification (SBEC).
2. The applicant held a valid Texas Reading Specialist Certificate and completed a MRT preparation program approved by SBEC.

No matter which scenario the applicant utilized to earn a MRT Certificate, the applicant was also required to pass the MRT Texas Examination for Master Teachers (TEA, 2010).

As part of the Reading First Initiative, the state of Texas offered a MRT Grant Program, which allocated an annual stipend of $5,000 for each MRT who taught at a school campus identified as “high-need.” The distinction of “high-need” was based upon students’ educational outcomes data from the Texas state standardized assessments, and identified schools were eligible to apply for the MRT stipend grant for up to three consecutive years. Eligible school districts completed and submitted an Application of Intent to Participate and qualified to place up to three MRTs at an eligible campus (TEA, 2011a). Placement of a MRT, as well as supervision of the MRT, was the responsibility of the school district. Although some MRTs taught on campuses that were not designated as “high-need,” the MRT Grant Program provided a financial incentive for only the MRTs who served students on campuses with the greatest needs (TEA, 2010).

The standards for the MRT Certificate were developed in January 2000 and specified six required knowledge and skills a MRT mastered:

Standard I - The Master Reading Teacher applies knowledge of the interrelated components of reading across all developmental stages, including oral language, phonological and phonemic awareness, the alphabetic principle, word analysis, fluency, comprehension, vocabulary, written language, and concepts of print, and has expertise in reading instruction at the primary, intermediate/middle, or high school level.

Standard II - The Master Reading Teacher selects and administers appropriate reading assessments on an ongoing basis and uses the results to design, inform, and adjust instruction to promote literacy.

Standard III - The Master Reading Teacher designs and implements reading instruction that reflects state content and performance standards and addresses the varied learning needs of all students.

Standard IV - The Master Reading Teacher applies knowledge of primary and second language acquisition, including the relationship between the development of these languages, to facilitate and promote literacy.

Standard V - The Master Reading Teacher applies knowledge of reading difficulties, dyslexia, and reading disabilities to facilitate and promote literacy.

Standard VI - The Master Reading Teacher facilitates appropriate, research-based reading instruction by communicating and collaborating with educational stakeholders; mentoring, coaching, and consulting with colleagues; providing professional development for faculty; and making decisions based on converging evidence from research (TEA, 2006).

Johnson and Christensen (2012) purported the importance of forming decisions regarding educational practices through “the examination and conduct of research” (p. 3). During the past five years, 134 school districts in Texas have applied for the MRT Grant Program and received the annual stipend to employ 1,317 MRTs. At the time of this study, literature regarding the Texas MRT Certificate Program and how MRTs were utilized on school campuses was limited and no known studies had been conducted or were currently in progress. The purpose of this study was to explore the following research questions:

- To what extent do MRTs apply their knowledge for each of the six MRT Standards at their school campus?
- How do MRTs rank the importance of each of the six MRT standards?
- What additional campus duties or responsibilities do MRTs have?

- What is the relationship between employment of MRTs on school campuses and students' educational outcomes in reading?

The results of this study will add to the limited knowledge base concerning the MRT program and provide quantitative data for MRTs' application of the six MRT standards. This study will also provide quantitative data concerning the relationship between employment of MRTs and students' educational outcomes.

Methods

Participants

A Public Information Request (PIR) was submitted and requested a list of school campuses that applied for and received a MRT stipend for at least one MRT during the past five years. Participants were state-certified MRTs that worked at campuses designated by the Texas Education Agency as "high-need." Permission to conduct research was sought from these school districts. Out of 132 eligible school districts, 25% of school districts granted permission to conduct research; 21% of school districts denied permission or were unresponsive, and 52% indicated they no longer have MRTs at the school campus that was identified as eligible.

Instrumentation

MRTs knowledge and application of the six MRT Standards were measured through a researcher-created cross-sectional survey. The survey was available to participants as an electronic PDF document and consisted of four sections:

1. Demographic data: Six closed-ended questions required participants to provide data regarding grade levels taught, number of classes taught per day, gender, number of years of classroom teaching experience, and the number of years of MRT employment.
2. MRT Application of Knowledge: Twenty-four closed-ended questions required participants to report the amount of daily time spent engaged in application of MRT

knowledge at their school campus. Response categories were N/A, less than 1 hour, 1-2 hours, 3-4 hours, and 5 or more hours.

3. Additional Responsibilities: One open-ended question provided participants with an opportunity to list any additional duties or responsibilities at their school campus.
4. Importance of Each of the Six MRT Standards: Participants ranked the importance of the six MRT standards.

The survey was pilot-tested with public school reading teachers in order to ensure statements on the survey, as well as survey directions, were clear, unbiased, and understandable (McMillan, 2008).

Research Design

This ex post facto study utilized a quantitative methodology and did not manipulate any variables or conditions. For the purposes of this study, the six MRT Standards were operationalized into constructs and became the independent variables of Reading Components, Reading Assessments, Reading Instruction, Language Acquisition, Reading Difficulties, and Professional Development. The dependent variables were educational outcomes for students in Grades 3-11 and were measured by students' performance on the Texas state standardized assessments (see Figure 1).

Once data were collected, Predictive Analytics SoftWare's Statistics 18was used to perform several data analyses (International Business Machines Corp., 2009). The first analysis provided demographic information for participants and reported data regarding gender, grade levels taught, number of classes taught per day, number of years of classroom teaching experience, and number of years of MRT employment. A second analysis provided data related to the amount of daily time MRTs apply each of the six MRT Standards. A third analysis was conducted with rankings participants assigned to each of the six MRT Standards according to perception of importance. The six standards were listed, and participants used numbers to indicate their perception of the level of importance. Lower numbers indicated greater importance

(i.e., 1 = Most important). Frequencies and percentages were reported for demographic information, amount of daily time MRTs apply their knowledge of each of the six MRT Standards, and the MRTs ranked importance for each of the six MRT Standards.

Completed surveys also provided information regarding additional roles and duties for MRTs on school campuses. Participants' responses to this open-ended question were categorized according to the nature of responsibility.

The last analysis performed explored the relationship between employment of MRTs and students' educational outcomes. Data from the Texas state standardized reading assessments were obtained through the PearsonAccess website for testing conducted during the 2009-2010 and 2010- 2011 school years (Pearson Education, 2011). Pearson *r* correlations were used to determine significant relationships. As recommended by Johnson and Christensen (2012), the level of significance was established at the 0.05 level.

Results

Demographic Information

Thirty-three school districts in Texas approved the research study and granted permission to distribute the MRT survey. Surveys were distributed electronically to school district personnel and campus administrators, who then forwarded the electronic surveys to MRTs. Many school district personnel shared challenges they encountered when attempting to locate MRTs. Reasons included some MRTs moved within or outside of the school district and were difficult to track, and MRTs were no longer at a school campus once the stipend grant ceased. Survey responses were received from 33 MRTs.

Frequency of Application of MRT Standards

Standard I. Standard I of the MRT Standards stated:

> Master Reading Teacher applies knowledge of the interrelated components of reading across all developmental stages, including oral language, phonological and phonemic

awareness, the alphabetic principle, word analysis, fluency, comprehension, vocabulary, written language, and concepts of print, and has expertise in reading instruction at the primary, intermediate/middle, or high school level. (TEA, 2006)

The results of how MRTs reported daily application for each of the components of reading were shown in Appendix Table 1. The components listed in MRT Standard 1 were operationalized into the following categories: oral language, phonological and phonemic awareness, alphabetic principle, word analysis, fluency, comprehension, vocabulary, written language, and concepts of print. MRTs responses within each category shared similarities. For oral language, the majority of MRTs indicated they spent 1-2 hours a day applying this knowledge, *n* = 14 (42%). For phonological and phonemic awareness, the majority of MRTs also reported they spent 1-2 hours a day applying this knowledge, *n* = 11 (33%); however, 10 MRTs indicated they spent less than 1 hour applying knowledge of phonological and phonemic awareness (30%). For alphabetic principle, nine MRTs reported they did not apply this knowledge at all (27%), and an equal number of MRTs indicated they applied knowledge of the alphabetic principle 1-2 hours per day. For word analysis, almost half of the MRTs reported they applied this knowledge between 1-2 hours per day, *n* = 16 (49%). Data for fluency, comprehension, vocabulary, and written language were all the same; the majority of MRTs reported between 1-2 hours a day was spent applying knowledge for each of those reading components, *n* = 10 (30%). MRTs also reported 1-2 hours of the school day was spent applying knowledge regarding concepts of print, *n* = 9, (27%).

Standard II. Standard II of the MRT Standards stated, “The Master Reading Teacher selects and administers appropriate reading assessments on an ongoing basis and uses the results to design, inform, and adjust instruction to promote literacy” (TEA, 2006). As shown in Appendix Table 2, almost two-thirds of the MRTs reported they spent either less than 1 hour, *n* = 12 (36%) or between 1-2 hours per day applying knowledge of assessments, *n* = 14 (42%).

Standard III. Standard III of the MRT Standards stated, “The Master Reading Teacher designs and implements reading instruction that reflects state content and performance standards and addresses the varied learning needs of all students” (TEA, 2006). MRT’s knowledge and application of instructional strategies was divided into two categories: student grouping strategies and individual strategies. Appendix Table 3 showed respondents were almost equally divided in their responses to student grouping strategies. The data revealed nine MRTs spent less than one hour a day (27%), eight MRTs spent 3-4 hours a day (24%), and seven MRTs spent 1-2 hours a day applying this knowledge (21%). For application of knowledge regarding individual strategies, over one-third of the MRTs reported they applied this knowledge between 1-2 hours per day, *n* = 12 (36%).

Standard IV. Standard IV of the MRT Standards stated, “The Master Reading Teacher applies knowledge of primary and second language acquisition, including the relationship between the development of these languages, to facilitate and promote literacy” (TEA, 2006). As shown in Appendix Table 4, this standard was divided into two categories: development of academic language for English language learners and development of primary and second language development. The majority of MRTs indicated they spent between 1-2 hours a day developing academic language in English language learners, *n* = 11 (33%), and an equal number of respondents reported they spent 3-4 hours a day with second language development.

Standard V. Standard V of the MRT Standards stated, “The Master Reading Teacher applies knowledge of reading difficulties, dyslexia, and reading disabilities to facilitate and promote literacy” (TEA, 2006). Appendix Table 5 showed almost half of the MRTs reported they spent less than one hour conducting assessments to plan for instruction, *n* = 15 (46%). With regards to conducting screening assessments to identify possible interventions, data revealed the majority of MRTs applied this knowledge between 1-2 hours per day, *n* = 13 (39%).

Standard VI. Standard VI of the MRT Standards stated, “The Master Reading Teacher facilitates appropriate, research-based reading instruction by communicating and collaborating with educational stakeholders; mentoring, coaching, and consulting with colleagues; providing professional development for faculty; and making decisions based on converging evidence from research (TEA, 2006). As shown in Appendix Table 6, this standard was divided into four categories: communication with educational stakeholders, mentoring colleagues, planning and executing professional development for campus faculty, and making decisions based upon research. For communication with educational stakeholders, MRTs were almost evenly divided in their responses. Thirteen reported they spent less than 1 hour applying this knowledge each day (39%), and 12 MRTs indicated between 1-2 hours a day was spent applying knowledge about communication (36%). There was an equal number of MRTs that indicated they applied knowledge of mentoring colleagues either less than 1 hour or between 1-2 hours a day, *n* = 13 (39%). Over half of the MRTs reported either they did not apply knowledge of professional development for campus faculty, *n* = 11 (33%), or they spent less than 1 hour of their day applying this knowledge, *n* = 10 (30%). With regards to making decisions based upon research, the data was mixed. Ten MRTs reported they spent between 1-2 hours applying this knowledge (30%), and nine MRTs indicated they did not apply this knowledge at all (27%).

Importance of Each of the Six MRT Standards

MRTs were asked to rank the importance of each of the six MRT standards. The majority of MRTs ranked MRT Standard I as the most important, *n* = 15 (46%). MRT Standard II was ranked as the second most important standard, *n* = 12 (36%). MRT Standards IV and VI were ranked equally as the third most important standard, *n* = 11 (33%). MRT Standard III was ranked as the fourth most important standard, *n* = 10 (30%). MRT Standard V was ranked as the least important standard, *n* = 7 (21%).

Additional Roles and Duties of MRTs

Out of 33 respondents, 22 MRTs responded to the following open-ended question on the survey: *Do you have any additional duties or responsibilities at your campus?* Responses were analyzed and grouped into the following categories: administrative duties, teaching duties, committee membership, and campus support duties. Although some of these responsibilities were delineated in the MRT standards, the MRTs perceived them as additional duties.

Administrative roles. Respondents' responses for administrative roles were subdivided into the following two categories: administrative roles and administrative paperwork. With regards to administrative roles, two MRTs reported they were required to serve as the campus testing coordinator or Response to Intervention (RTI) coordinator. With regards to administrative paperwork, one MRT was responsible for Student Success Initiative (SSI) documentation, and another MRT was charged with rewriting the district policy for dyslexia.

Teaching roles. Seven respondents listed additional teaching responsibilities. One MRT was also the campus English as a Second Language (ESL) teacher, and two MRTs indicated they also taught classes in a bilingual classroom. Another MRT was also the campus math coach. One MRT reported the MRT duties involved working as a reading interventionist with students in Grades 4 and 5 who were unsuccessful on state standardized reading assessments; however, this MRT was later placed in a Grade 5 class "due to unforeseen circumstances." Finally, two MRTs reported they were required to hold extended tutorials after school and on Saturdays.

Committee membership. MRTs revealed seven different types of campus committee memberships: RTI committee, Language Proficiency Assessment Committee (LPAC), budget committee, curriculum committee, school organization committee, grant committee, and Campus Education Instructional Committee (CEIC). On these committees, MRTs were either members or served as the chairperson. One MRT also indicated they were the campus dyslexia designee, and another MRT reported they were part of the professional learning community on

campus. Although the scope and nature for each committee was unique, membership required additional time and effort from the MRT.

Support duties. Respondents revealed five different types of support duties required on their campus. These included cafeteria duty, morning hall duty, afternoon hall duty, University Interscholastic League (UIL) coach, and spelling bee sponsor.

Relationship between Employment of MRTs and Student Educational Outcomes

In order to meet new legislative mandates, TEA implemented the use of vertical scales in 2009 when reporting student performance on state standardized assessments (TEA, 2011b). Vertical scales allow for comparisons with students' scores across grade levels, so long as assessments being compared were administered in the same language and subject area. Vertical scales changed how students' educational outcomes on state standardized assessments were reported. Therefore, for the purposes of this study, students' educational outcomes from the 2010 administration of the state standardized assessment for reading was compared to students' educational outcomes on the 2011 administration. Scores from "high-need" school campuses that employed one or more MRTs as part of the MRT Grant Program were analyzed.

During the 2009-2010 school year, 52 MRTs were employed in 15 Texas school districts. Students' educational outcomes for the state standardized reading assessment after employment of one or more MRTs for one year were compared to students' educational outcomes after employment of the MRTs for two years using Pearson's *r* correlations (see Table 7). As recommended by Johnson and Christensen (2012), the level of significance was established at the .05 level ($p = .05$). As shown in Appendix Table 7, students' educational outcomes were statistically significant in Grades 3, 5, 9, and 10.

Discussion

Interpretation of Frequency of Application of MRT Standards

MRT Standard I defined the knowledge MRTs must know and apply towards the components of reading: oral language, phonological and phonemic awareness, alphabetic principle, word analysis, fluency, comprehension, vocabulary, written language, and concepts of print. Although the number of respondents in each component varied, analysis of data revealed the majority of MRTs reported they spent between 1-2 hours a day applying knowledge for each component. Several MRTs reported they spent less than hour applying knowledge of phonological and phonemic awareness, and many of the MRTs reported they did not apply any knowledge related to alphabetic principle on a daily basis. Based upon these findings, it can be assumed MRTs applied knowledge regarding the components of reading differently, depending upon the individual needs of the students. MRTs application of knowledge also depends upon how a school campus utilized the expertise of MRTs.

MRT Standard II defined the knowledge MRTs must know and apply with reading assessments. More than two-thirds of the respondents indicated they spent 2 hours or less applying this knowledge each day. The importance of planning reading instruction upon the analysis of data was clear in MRT Standard II; however, most of the MRTs reported application of knowledge regarding assessments was not a large part of their daily responsibility.

MRT Standard III defined the knowledge MRTs must know and apply towards reading instruction. This standard was divided into two categories: grouping strategies for small group and individual strategies for reading instruction. Over 70% of MRTs spent up to 2 hours of the day applying knowledge of grouping strategies for reading instruction, while over 50% of MRTs spent the same amount of time each day applying knowledge of strategies for individual reading instruction. The data showed use of groups during reading instruction was favored by MRTs.

MRT Standard IV defined the knowledge MRTs must know and apply towards development of primary and secondary language acquisition. A little over one-third of MRTs

indicated they spent between 1-2 hours a day applying knowledge of academic language development in second language learners. However one-third of MRTs reported they spent between 3-4 hours of the day with second language development. These data revealed a larger part of a MRT's day (almost half) was devoted to second language development.

MRT Standard V defined the knowledge MRTs must know and apply towards reading difficulties and reading disabilities, such as dyslexia. Almost half of MRTs reported less than one hour was spent with assessments geared towards planning instruction for students with reading difficulties and disabilities. About one-third of MRTs indicated they spent 1-2 hours a day with screening assessments to identify and plan interventions for students with reading difficulties and disabilities. These data showed MRTs were more involved with the use of assessments as a means for identification and screening, rather than using assessments for instructional purposes when working with students with reading difficulties or disabilities.

MRT Standard VI defined the knowledge MRTs must know and apply towards communication with educational stakeholders, mentoring colleagues, planning and executing professional development for campus faculty, and making decision based upon research. The majority of MRTs reported 2 hours or less was spent in communication with educational stakeholders and mentoring colleagues. The majority of MRTs reported they spent one hour or less developing and implementing professional development experiences for their campus. With regards to using research to inform decision-making, about one-third reported they spent 1-2 a day applying this knowledge, but a little less than one-third of MRTs indicated they spent no time applying this knowledge. These data revealed more MRTs applied knowledge of communication with educational stakeholders and mentoring colleagues, but little time was spent with professional development for the school campus. MRT Standard VI was clear about the importance of MRTs using research to guide decision-making, and the datum showed almost one-third of MRTs indicated they did not use research to guide decision-making during the school day.

Interpretation of Importance of Each of the Six MRT Standards

MRTs ranked MRT Standard I as the most important standard. This datum correlated with the data MRTs reported regarding the amount of time spent applying knowledge of components related to reading. Within each of the nine categories, the majority of MRTs indicated they spent between 1-2 hours each day applying knowledge concerning oral language, phonological and phonemic awareness, alphabetic principle, word analysis, fluency, comprehension, vocabulary, written language, and concepts of print.

MRTs ranked MRT Standard II as the second most important standard; however, more than one-third of MRTs reported they spent less than 1 hour applying knowledge of reading assessments, and over 40% only spent 1-2 hours a day applying this knowledge. These data presented a discrepancy between what MRTs valued as important and how MRTs were able to handle their daily responsibilities.

MRTs equally ranked MRT Standards IV and VI as the third most important standards. The data for MRT Standard VI also presented a discrepancy because almost one-third of MRTs reported they spent no time applying knowledge of research during the day. Since MRTs indicated this standard was as important as development of language with second language learners, then MRTs should have time during the day to apply this knowledge.

MRTs ranked MRT Standard V as the least important standard. Applying knowledge of reading difficulties and reading disabilities may have been the responsibility of a reading specialist on campus. However, almost half of the MRTs reported they did not possess reading specialist certification. Therefore, MRTs may have shared responsibilities when working with students with reading difficulties and disabilities with another professional on campus. This may have affected how MRTs viewed the importance of this standard.

Interpretation of Additional Roles and Duties of MRTs

More than half of the MRTs reported additional roles and duties they held on campus that was perceived as beyond the scope of requirements for MRTs. These duties included: (a) administrative functions, such as rewriting district policies and completing SSI paperwork; (b) teaching duties that included additional classes during the day, as well as responsibilities after school and on weekends; (c) committee memberships; and (d) campus support duties, such as lunch duty and faculty representation for extracurricular activities.

Although additional roles and duties for MRTs may have been an aspect of educational professionalism and necessary to create an effective school campus, time was a critical factor for MRTs to fulfill requirements associated with their employment. Analysis of data from the MRTs concerning the amount of daily time spent applying knowledge of MRT Standards clearly indicated MRTs have extremely busy days in which they applied knowledge for all six MRT Standards. According to TEA (2011a), placement and supervision of MRTs was the responsibility of the school district. However, TEA (2006) also maintained that the responsibilities of MRTs were to teach reading to students and mentor other teachers on their school campus. More clearly defined responsibilities for MRTs may be necessary in order for school campuses to receive the greatest benefit from employment of these reading professionals.

Interpretation of Relationship between Employment of MRTs and Student Educational Outcomes

Pearson *r* correlations were used to compare employment of MRTs and students' educational outcomes on the state standardized reading assessments administered during the 2009-2010 and 2010-2011 school years. Statistical significance was shown with students in Grades 3, 5, 9, and 10. This presented surprising findings because two of the grade levels were

on the elementary level and the other two were high school. More information would be needed from MRTs of these grade levels to determine how they were utilized at their school campuses.

Since no known research exists for the Texas MRT program, this study provided data to begin exploring how MRTs applied daily knowledge of the MRT Standards at their school campuses. This study also provided data that demonstrated the relationship between employment of MRTs and students' educational outcomes on state standardized reading assessments. More research will be needed because decisions regarding educational practices should be based upon research (Johnson & Christensen, 2012), and the Texas MRT program has been utilized by hundreds of school districts to employ MRTs at high-need campuses.

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Appendix A: Framework

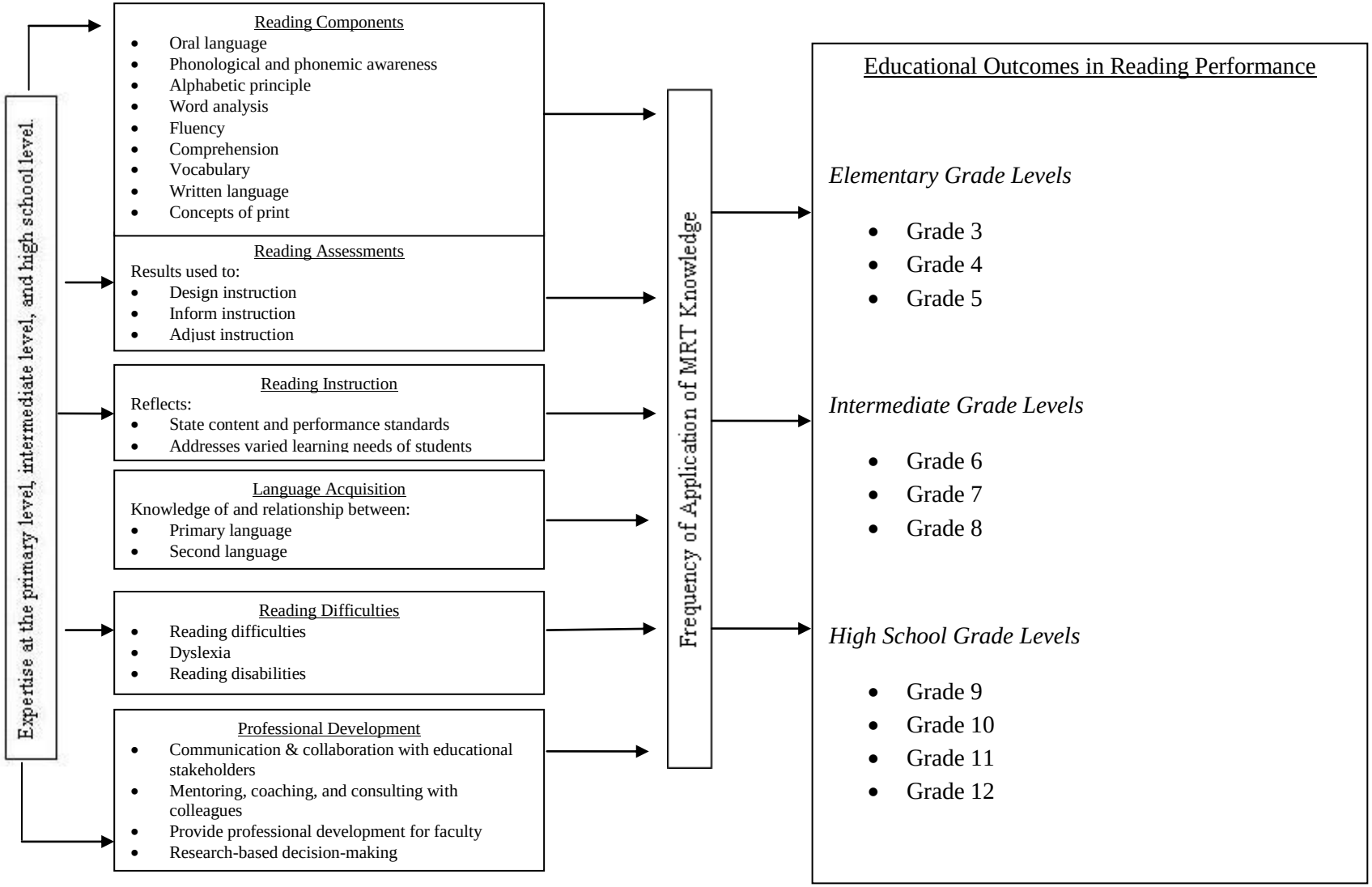

Figure A1. Theoretical framework to explore the relationship between MRT knowledge and frequency of application of knowledge on students' educational outcomes in reading performance measured on Texas state standardized assessments.

Appendix B: Application of MRT Standards

Table A1

Daily Application of MRT Standard I

	Oral Language		Phonological & Phonemic Awareness		Alphabetic Principle		Word Analysis		Fluency		Comprehension		Vocabulary		Written Language		Concepts of Print	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
N/A	2	6.1	7	21.2	9	27.3	3	9.1	2	6.1	3	9.1	2	6.1	2	6.1	6	18.2
> 1 Hour	5	15.2	10	30.3	7	21.2	3	9.1	8	24.2	6	18.2	5	15.2	5	15.2	6	18.2
1-2 Hours	14	42.4	11	33.3	9	27.3	16	48.5	10	30.3	10	30.3	10	30.3	10	30.3	9	27.3
3-4 Hours	4	12.1	2	6.1	3	9.1	4	12.1	7	21.2	6	18.2	8	24.2	8	24.2	6	18.2
5+ Hours	8	24.2	3	9.1	4	12.1	6	18.2	5	15.2	7	21.2	7	21.2	7	21.2	5	15.2

Table A2

Daily Application of MRT Standard II

	n	%
N/A	2	6.1
> 1 Hour	12	36.4
2-3 Hours	14	42.4
4-5 Hours	2	6.1
5+ Hours	1	3.0

Table A3

Daily Application of MRT Standard III

	Grouping Strategies		Individual Strategies	
	n	%	*n*	%
N/A	2	6.1	1	3.0
> 1 Hour	9	27.3	6	18.2
1-2 Hours	7	21.2	12	36.4
3-4 Hours	8	24.2	8	24.2
5+ Hours	5	15.2	5	15.2

Table A4

Daily Application of MRT Standard IV

	Academic Language		Second Language Development	
	n	%	*n*	%
N/A	2	6.1	3	9.1
> 1 Hour	5	15.2	8	24.2
1-2 Hours	11	33.3	6	18.2
3-4 Hours	6	18.2	11	33.3
5+ Hours	7	21.2	4	12.1

Table A5

Daily Application of MRT Standard V

	Assessment for Instruction		Assessment for Intervention	
	n	%	*n*	%
N/A	5	15.2	4	12.1
> 1 Hour	15	45.5	10	30.3
1-2 Hours	6	18.2	13	39.4
3-4 Hours	4	12.1	3	9.1
5+ Hours	2	6.1	2	6.1

Table A6

Daily Application of MRT Standard VI

	Communication		Mentoring		Professional Development		Decision-making	
	N	%	*n*	%	*n*	%	*n*	%
N/A	2	6.1	2	6.1	11	33.3	9	27.3
> 1 Hour	13	39.4	13	39.4	10	30.3	6	18.2
1-2 Hours	12	36.4	13	39.4	8	24.2	10	30.3
3-4 Hours	2	6.1	2	6.1	1	3.0	3	9.1
5+ Hours	2	6.1	1	3.0	1	3.0	3	9.1

Appendix C: Pearson r Correlations

Table A7

Pearson r Correlations for Students' Educational Outcomes on 2009-2010 and 2010-2011 State Standardized Reading Assessments

	n	*r*	Sig. (2-tailed)
Grade 3	33	.47	.01
Grade 4	33	.44	.14
Grade 5	33	.47	.01
Grade 6	7	.62	.19
Grade 7	8	.67	.07
Grade 8	8	.63	.10
Grade 9	8	.80	.02
Grade 10	8	.80	.02
Grade 11	7	.54	.21

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PROFESSIONAL GROWTH FOR SCHOOL PRINCIPALS

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Abstract

The purpose of this study was to investigate the professional development experiences of principals in a select region of Central Texas. The study addressed the overall training that principals receive for professional development, as well as specific supports they receive at both the district and school level. The data gleaned and the corresponding results from this study contribute to existing knowledge of what principals need in professional preparation, as well as identify areas for needed additional professional development. This study yielded information that will allow educational leaders to create a quality developmental plan to grow and sustain leaders for the future. The data collected and analyzed from this study yield key information to guide school districts, college programs, and providers of principal professional development on how best to meet the needs of campus leaders.

Introduction

The role of the public school principal has become increasingly comprehensive and complex. Due to the increased demand and focus on student outcomes and accountability, the school leaders of today face ever-increasing expectations. While once primarily responsible for managing processes and change, administrators now face the expectation of possessing quality leadership skills to motivate high levels of sustained performance in both their students and staff (Busch, O'Brien, & Spangler, 2005). From counselor, attorney, cheerleader, referee, and surrogate parent, the list of tasks, responsibilities, and requirements are daunting. In most cases, administrators have received professional training and development in preparation for their days of campus leadership. However, once they assume the role of campus leader, they can be often overwhelmed with reacting to the myriad responsibilities of the principalship while

the on-going development of leadership skills and abilities become secondary. In a recent survey of principals, only 60% of respondents agreed that there is an appropriate amount of time provided for principals to experience professional development activities (Hammonds, 2011). According to Bloom (1999), an increased need for professional development support of new principals is widely recognized, as they often assume the principal role with limited practical preparation. Many principals across the country receive only limited access to the focused professional development they need to meet the modern expectations of a campus principal (Aarons, 2010a).

Professional Development of Principals

In the world of public school teachers, campus and district based professional development is standard in order to improve teacher quality (Smith, 2010). Career teachers grow in experience and ability from beginners, to established, and finally to veteran educators. However, many educators move into administration and the principal position with limited preparation (Bloom & Krovetz, 2001). A 2011 research study in Central Texas indicated that only 50% of principals believe they get support to deal with top-down initiatives (Hammonds, 2011). Due to poor preparation, principals are frequently ill equipped to face the challenges of the accountability era (Kelly & Hess, 2005).

> While most school districts expect principals to carry out the functions of an instructional leader, they fail to provide staff development programs for them. Moreover, few universities offer classroom observation, diagnosis of instructional problems, or teacher evaluation in their principal certification programs (Krajewski, 2002 p. 88).

As Daniel Domenech, the executive director of the American Association of School Administrators states, “There’s been a lot of emphasis on teacher quality and teacher development, but not nearly enough in the area of leadership development, and specifically principal development” (Aarons, 2010b, p. 1). The specific problem is many school districts have no systemic plan for ongoing professional growth and leadership development for their

principals.

The need for ongoing systemic professional development for principals has never been greater. The United States is experiencing an overall shortage of quality school leaders to fill principal positions. In 1999, the National Bureau of Labor Statistics (NBLS) predicted an increase of needed school administrators of between 10-20% (Bloom, 1999). A recent survey conducted by the National Association of Elementary and Secondary Principals (NAESP) echoed the increased need for school administrators (Bloom, 1999). A shortage of qualified principal candidates has received attention nation-wide, as student enrollments grow and veteran administrators retire (Bloom & Krovetz, 2001). This shortage has even affected President Obama's plan for transforming America's worst schools as "there simply were not enough qualified principals-in-waiting to take over" (Dillon, 2011 p. 1).

There is increasing reason to believe that in the wave of reform beginning with the passage of No Child Left Behind (NCLB), many principals, have in fact, been left behind (Kelly & Hess, 2005). Traditionally, principals move through the educational ranks of teacher, assistant principal, and after a few years of substantial work and learning, they often move into the principalship. However, due to a pressing need and ever-increasing shortage of qualified candidates, many aspiring leaders are assuming the role of the principal with only minimal time and training for the position (Bloom & Krovetz, 2001).

This premature promotion into such a public leadership position, compounded by insufficient preparation by principal development programs and institutes of higher learning, is becoming cause for alarm during this age of accountability (Kelly & Hess, 2005). As a result, the level and types of preparatory structures to support principals have become increasingly more scrutinized. Kelly and Hess (2005) agree that preparatory programs are not meeting the developmental needs of new principals and assert a primary reason for this shortcoming is instructional development has been based on traditional principal roles. Such activities, while well intentioned, too often leave the new principal unprepared for the true realities of the position

in the 21st century. Adding to this, and seeming to confirm the assertions of Kelly and Hess (2005), are recent study results analyzing the collective rating of principals by the teachers they serve. In this study published in the *American Journal of Education*, a strong correlation showed that principals who received professional development through collegiate course work received lower ratings than those receiving developmental support from other areas (Grissom, 2010).

This shortfall compounds itself when considering the volume of new to position principals in education today. While campus principals of all experience and backgrounds may encounter challenges in a new position, these struggles become exponential among new to position administrators. As Bloom (1999) states, “New administrators struggle in their positions. The multiple demands placed upon them are daunting. They are in even more public and vulnerable positions than new teachers” (p. 2). In a recent principal survey, 85% of respondents agreed that it is ideal for districts to have a process to assist a principal’s entry to a new school but only 31% agreed that this practice is actually occurring (Hammonds, 2011). This same study revealed that only 22% of principals reported having an entry process focused on helping them understand the new context during their first year on the job.

With the variety and complexity of the principalship constantly expanding, improved developmental structures and activities for the 21st century leader are paramount. These are areas where the developmental picture is murky at best. In her work, research, and study, McCay (2001) attempted identifying the core critical components needed for improving support for principals. The author identified conditions that both stimulate principal growth and provide opportunity to model strategies to staff (McCay, 2001). These conditions included the following: information that challenges thinking, interactions with colleagues outside of the district, and opportunities to teach others. Additionally, she concluded with recommendations for leadership approaches and an increased focus on developing active learning, reflection, and pre-service programs (McCay 2001).

An additional leadership component for discussion deals with the instructional leader as

a scholar, researcher, and practitioner. Due to high expectations and accountability in the form of standardized test results, leaders must be able to analyze, disaggregate, and explain data as well as its impact on students. The concurrent demands of parental expectations and social accountability in our school systems, have given rise to a paradigm shift in education administration as a whole. Administrators must guide their respective campuses with proven practices designed to deliver maximum achievement and student mastery in the least amount of time. This approach is reliant on quality research and findings. It is imperative that administrators are well versed in the nuances of using quantitative educational data to effectively design both short and long term instructional strategies to reap the greatest gains in student mastery. In one of his prominent leadership works, Fullan (2005) tackled the constraints of short-term focused change and outlined specific measures and examples of the need for, as well as the ability to create, organizational sustainability. The impetus of change is a focus on systems thinking, using data to make decisions and build capacity among those in the organization. In order for business and education organizations to succeed at the maximum level, there is a critical need for the creation of a system that nurtures, grows, and empowers those who lead so they and the organizations they lead may achieve far reaching sustainable results.

Purpose of the Study

The purpose of this study was to investigate the professional development experiences of principals in a select region of Central Texas. Specifically, the researchers identified the professional development support principals receive from the districts in which they serve. Additionally, the researchers identified the extent to which principals benefit from professional development, as well as any additional areas of professional development needed. Limited sustained leadership development is a detriment to both the administrator and the respective schools they lead. As Wong (2011) states, “The more effective the principal, the greater the

achievement levels at the school" (p. 25). To improve the skills, traits, and concepts of the leader is to enhance the abilities of organization.

Method

This quantitative cross sectional survey study investigated the professional development experiences of principals in a select region of Central Texas. The quantitative cross sectional survey study explored the problem that many school districts have no systemic plan for ongoing professional growth and leadership development for their principals. Limitations of this study included the timeframe of selecting only participants who currently assume principal positions, as well as geographical restriction of studying participants from one state region as opposed to a state wide or national study. The following research questions were addressed through this study: (1) What professional development support do principals receive from the districts in which they serve? (2) To what extent does current professional development benefit the principal?

Participants

The participants for this study consisted of campus principals. In Education Service Center (ESC) Region 12, there are 250 principals with an email address in the AskTED (Texas Education Directory) database. These respective principals preside over districts from UIL classification 5A with student populations over 38,000 students, down to UIL classification 1A districts with less than 100 students. The survey instrument was emailed via Zoomerang™, the online survey software, to all ESC greater central Texas area principals with an email address in the AskTED database. Of the 250 surveys distributed, 144 (58%) participants responded to at least one part of the study. Of these, 132 (53%) completed the survey in its entirety. These 132 form the population from which the data collection and analysis was conducted.

Research Instrument

The research instrument for this study was a principal leadership survey entitled Learning from Leadership (Appendix A). This survey, commissioned by The Wallace Foundation, was created and administered by the University of Minnesota. The University of Minnesota survey instrument consists of six specific sections titled state level, district level, school level, stakeholders, professional development, and demographics. Within five of the six sections, responses are measured on a Likert-like scale that include responses ranging from strongly disagree through strongly agree, poor through outstanding, and very little through very great. The only exception to Likert-like responses are included in the section titled demographics. This section includes open questions such as number of years of experience, as well as mark all that apply questions.

Findings

The purpose of Research Question 1 was to determine the district level professional development support principals received from the districts in which they serve. This research question analyzed data collected from 10 survey items specific to this research question.

Table 1 presents the frequency distribution data for the Likert-like response categories for the item “My district’s leaders in the central office” – Research Question 1.

Table 1

Research Question 1 Responses

Survey Question	Strongly Disagree	Moderately Disagree	Slightly Disagree	Slightly Agree	Moderately Agree	Strongly Agree	Total Responses
1	1	4	8	19	38	62	132
2	3	8	12	18	45	46	132
3	1	8	5	27	41	50	132
4	5	5	15	20	35	52	132
5	3	4	9	25	57	34	132
6	3	3	10	29	42	45	132
7	2	9	11	40	45	25	132
8	2	9	13	25	47	36	132
9	4	7	9	30	33	49	132
10	2	5	12	26	47	40	132

Research Question 2 explored the extent to which current principal professional development benefits the principal. This research question analyzed data collected from 10 survey items.

Table 2 shows the frequency distribution of all participant responses to survey questions 1-5 relating to research question 2. Each of the 132 participants was asked to rate the extent to which the professional development support they receive benefits them on a scale ranging from strongly disagree to strongly agree. Their cumulative responses are reflected for each of the five questions.

Table 2

Research Question 2 – My Professional Development

Survey Question	Strongly Disagree	Moderately Disagree	Slightly Disagree	Slightly Agree	Moderately Agree	Strongly Agree	Total Responses
1	0	2	10	34	57	29	132
2	0	2	8	28	53	41	132
3	3	14	26	43	32	14	132
4	0	4	5	33	61	29	132
5	2	5	20	34	51	20	132

Table 3 represents the frequency distribution of all participant responses to survey questions 6-10 relating to Research Question 2. Each of the 132 participants were asked to rate the value of the professional learning experiences from five sources that included district colleagues, professional associations, state professional development, private providers of in-service, and on the job experiences.

Table 3

Research Question 2 – Professional Learning Experience

Survey Question	N/A	Poor	Fair	Good	Very Good	Outstanding	Total Responses
6	2	12	17	27	52	22	132
7	2	10	24	44	43	9	132
8	6	7	34	43	37	5	132
9	6	7	26	50	37	6	132
10	0	2	3	16	66	45	132

Discussion

The purpose of this quantitative cross sectional survey study was to investigate the professional development experiences of principals in a select region of Central Texas. This quantitative cross sectional survey study explored the problem that many school districts have no systemic plan for ongoing professional growth and leadership development for their principals. Two research questions were addressed through this study: (1) What professional development support do principals receive from the districts in which they serve? (2) To what extent does current professional development benefit the principal?

The purpose of Research Question 1 was to determine the district level professional development support principals receive from the districts in which they serve. Research Question 1 was descriptive, and contained no related hypothesis. This research question analyzed data collected from 10 survey items specific to this research question. These items were numbered 1-10 on the survey and were contained under the heading of district level. Data collected from each survey question were analyzed as descriptive statistics and presented in table and narrative format.

Research Question 2 explored the extent to which current principal professional development benefits the principal. The question is descriptive and contains no related hypothesis. This research question analyzed data collected from 10 survey items. These items were numbered 1-10 on the survey and were contained under the heading of professional development. Data collected from each survey question were analyzed as descriptive statistics and presented in table and narrative format.

The primary finding of this study addresses the principal as the instructional leader of the campus. A critical role of the campus principal is that of the instructional leader. Hughes (2010) stated, “Never before has the bar been set so high for America’s public education system in efforts to ensure that every child achieves success. The ultimate responsibility for student achievement rests with the school leadership” (p. 37). As such, it is crucial that principals have a

strong grasp of both effectively using data, as well as understanding how to make significant curricular decisions. The data from this study indicate that 29% or almost one-third of respondents either only slightly agreed, or in fact disagreed that their professional development has helped them to use data more effectively. A similar study found that almost half of leadership development is focused on good management rather than leading learning for students (Hammonds, 2011). This is even more disconcerting when combined with the resulting data indicating that 35% of respondents either only slightly agree, or in fact disagree that their professional development is significant in helping them make decisions about curriculum. Finally, 32% of respondents either only slightly agreed, or in fact disagreed that their professional development has helped them develop their skills as an instructional leader.

Implications

As a result of this data, it is recommended that school districts make data analysis and resulting curricular decisions a key component of their local professional development offerings. The following recommendations from the study are secondary recommendations, and are outlined below. There is a shortage of qualified principals, and consequently, a large number of new to position principals with limited experience are in the principal position. This shortage of qualified principal candidates has received nationwide attention, as student enrollments grow and veteran administrators retire (Bloom & Krovetz, 2001). This reality is confirmed through the demographic study data indicating, that of the 132 principals who participated in the study, 42% had a principal tenure of 3 years or less. Additionally, 52% of respondents reported 3 years or less in their current principal position. As a result of this data, it is recommended that current school leaders be intentional in identifying and recruiting future leaders. It is also recommended for principal preparatory programs and private providers of professional development to recognize this reality and design corresponding professional development offerings that correspond to the specific needs of principals with limited experience.

A critical yet often neglected component of principal development is that of community relations. Principal interactions and relationship development with parents and community members at school events, public assemblies, and committee functions are critical to the position. According to Foxman (2010), success hinges on the quality of the relationship, and the forging of trust and honesty in the process. The data gleaned from the study reinforce the lack of principal preparation for dealing with the community. Thirty-three percent of principal respondents disagreed with the statement that their professional development helps them work with community groups. Due to this data, it is recommended that attention be given to this component at both the university level, as well as at the school district level. Aspiring administrators must be instilled with the importance of developing community relation skills, and these skills should be exercised as assistant principals at the school district level. Principals can influence a campus culture and learning environment either positively or negatively. The ability of the principal to maintain a positive school climate is significant for the success of the organization (Larson, 2009). An individual assuming the role of principal ideally should have a full understanding of the need and benefits of community relationships and rapport, as well as be confident through intentional practice in addressing such groups as an assistant principal, so that they are fully prepared for the task.

Another recommendation of this study involves the learning experiences of current principals. When asked to rate the value of their professional learning experiences from five sources including colleagues, professional associations, state professional development, private in-service providers, or on-the-job experiences, the results were as follows: Of the principal respondents, 84% rated their on the job experiences as either very good or outstanding. The following sources, rated in order, were colleagues-56%, professional associations-39%, private providers-32.5%, and state-31.8%. Based on this data, there is a value to on-the-job experiences as principal development. It is, therefore, recommended that on-the-job experiences be programmatically incorporated into all principal professional development

programs, regardless of the location or provider. Browne-Ferrigno and Muth (2004) supported the approach of learning from practical grounded experiences as they recommend accentuating collegiate preparatory programs through authentic administrative experiences.

The final recommendation is for school districts to provide colleague mentors or coaches to principals so they may have a qualified peer with whom to interact, problem solve, and plan. This recommendation is viewed as a prominent training approach utilized by many school districts. This strategy is a highly recognized strategy for developing and sustaining leaders in a wide variety of fields including education (Robinson, 2009). This valuable practice is often underutilized. In a survey of principals, 87% of respondents agreed that the expertise of experienced principals should be used to assist less experienced colleagues but only 49% of respondents agreed that this actually occurs (Hammonds, 2011).

Conclusion

The importance of the principal position has become more complicated and critical than ever before. The role has become more complex with greater accountability and a more difficult social climate (Goodwin, Cunningham, & Childress, 2003). As the role evolves in its complexity and accountability, the need for ongoing systemic professional development for principals evolves as well. It is highly possible the students of today spend more quality time on a school campus with teachers and administrators than with their families. It is then of critical importance that educational leaders begin and maintain their roles with an appropriate level of leadership growth, and opportunity for continued learning. It is this development of skills and talents, combined with an unwavering commitment to student success, which can guide our schools and students into a positive and high achieving future.

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Appendix A: Learning from Leadership

Learning from Leadership ● Principal Survey - Modified

Note to Principals:

- Please check the box that most closely represents your response.
- Your responses are completely confidential. Project reports will not identify schools or districts.

Thank you for contributing to this important work!

A. District Level

To what extent do you agree or disagree with the following statements about your district's leaders in the central office?						
My district's leaders in the central office…	**Strongly Disagree**	**Moderately Disagree**	**Slightly Disagree**	**Slightly Agree**	**Moderately Agree**	**Strongly Agree**
1. Help clarify the reasons for my district's improvement initiatives.						
2. Give me individual support to help me improve my administrative practices						
3. Encourage me to consider new ideas for my work.						
4. Encourage collaborative work among schools.						

To what extent do you agree or disagree with the following statements about your district's policies and practices?						
	Strongly Disagree	**Moderately Disagree**	**Slightly Disagree**	**Slightly Agree**	**Moderately Agree**	**Strongly Agree**
5. In our district, continuous improvement is viewed by most staff as a necessary part of every job.						
6. Our district improvement efforts are based on clear goals and plans.						
7. Our district helps develop teachers as instructional leaders for non-administrative, professional roles in schools.						
8. Our district ensures that principals receive training in school improvement strategies that support principals in their instructional leadership roles.						
9. Our district provides opportunities for principals to share knowledge about school improvement directions, progress, and concerns.						
10. Our district provides multiple opportunities for principal and teacher collaboration in district efforts to improve student achievement.						

B. School Level

In your current role as principal, to what extent do you feel able to do the following?					
	Very Little	**Little**	**Somewhat**	**Great**	**Very Great**
1. Motivate teachers.					
2. Generate enthusiasm for a shared vision for the school.					
3. Manage change in your school.					
4. Create a positive learning environment in your school.					
5. Facilitate student learning in your school.					
6. Raise student achievement on standardized tests.					

C. Professional Development

To what extent do you agree or disagree with the following statements about your professional development?						
My professional development…	**Strongly Disagree**	**Moderately Disagree**	**Slightly Disagree**	**Slightly Agree**	**Moderately Agree**	**Strongly Agree**
1. Has a significant role in helping me make decisions about curriculum.						
2. Has helped me to use data more effectively.						
3. Has helped me to work with community groups.						
4. Has helped me to develop my instructional leadership skills.						
5. Has been focused primarily on district goals.						

Rate the value of your professional learning experiences from the following sources:						
	N/A	**Poor**	**Fair**	**Good**	**Very Good**	**Out-standing**
6. District colleagues						
7. Professional associations						
8. State professional development						
9. Private providers of in-service						
10. On-the-job experiences						

D. Demographics

1. How many years have you worked as a principal?	_____ years
2. How many years have you worked in *this school* as a principal?	_____ years
3. How many students are enrolled in your school?	_____ students
4. How many students are enrolled in your school district?	_____ students
5. Your gender?	Female ☐ Male ☐

Thank you for taking the time to complete this survey!

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EVALUATING STATEWIDE PROFESSIONAL DEVELOPMENT FOR TEACHER EDUCATORS ON THE IMPLEMENTATION OF COLLEGE AND CAREER READINESS STANDARDS

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Introduction

It has become clear that a college education is crucial in helping students secure well-paying jobs, or to assist them in gaining skills necessary for employment. In a recent Metlife (2010) survey, 77% of Fortune 1000 executives strongly agreed students who did not complete some form of post-secondary education have few or no career opportunities. The Metlife survey also showed that more students expected to attend college. In 1988, 57% of middle and high school students reported it was very likely they would attend college; however, in the most recent Metlife survey, 75% of students indicated they expected to enroll in college (Metlife, 2010).

Despite these high expectations of college attendance, a high school diploma does not automatically equate to college readiness. Strong American Schools (2008) reported that 95% of students in remedial courses indicated they did all or most of the work asked of them in high school. Most of the students surveyed earned good grades in high school and reported they had taken the most challenging courses offered; and close to 80% thought they were ready for college when they graduated from high school (Perkins-Gough, 2008). According to the National Center for Public Policy and Higher Education and the Southern Regional Education Board (SREB) (2010), nearly 60% of first-year college students in the United States who met the

requirements for high school graduation were not academically ready for post-secondary studies.

The College and Career Readiness Standards (CCRS) were created to address what students must know and be able to do to succeed in entry-level courses offered at institutions of higher education in Texas as well as in a wide-range of careers (THECB & TEA, 2008). In January 2009, the College and Career Readiness Initiative (CCRI) Faculty Collaboratives were established around four content areas (English/language arts, mathematics, science, and social studies) and were asked to provide the latest research and resources regarding the implementation of the CCRS to faculty at institutions of higher education who prepare pre-service teachers (The Texas Faculty Collaboratives, 2011). The goal of the CCRI Faculty Collaboratives was to design activities to ensure pre-service teachers received preparation closely aligned with the CCRS so future educators would be better able to prepare their pre-secondary students for college or career paths.

The purpose of this present evaluation study is to examine the effectiveness of the CCRI Faculty Collaboratives. A mixed-methods study was conducted in order to examine the impact of the four CCRI Faculty Collaboratives. The current evaluation focused on the professional development sessions for faculty, the integration of CCRS into teacher preparation programs, and the overall strengths and weaknesses of the collaboratives.

Theoretical Framework

Due to concerns associated with a poor alignment of high school requirements and skills necessary for success in college, a great need exists for creating a seamless education system spanning preschool through college graduation (Harris, Cobb, Pooler, & Perry, 2008). Therefore, P-16 initiatives are essential. Typically, P-12 schools and post-secondary institutions set expectations for college readiness independent of each other. In order to create a more continuous system, a solution often cited is for P-12 education and post-secondary institutions

to work collaboratively at the state level to adopt specific college readiness standards for students. The development of such standards can assist in establishing a critical link between high school exit expectations and the challenges graduates will encounter within college-level courses (Achieve, 2004; Conley, 2007; Perkins-Gough, 2008; SREB, 2010).

Pre-service teachers need the knowledge and skills necessary to inherently integrate the CCRS into their lessons from pre-kindergarten through Grade 12. Additionally, they require assistance to "construct and adapt courses to address the standards; relate their materials, lessons, and assignments to the standards; design course assessments to ensure shared performance expectations; and identify instructional strategies that are effective in teaching the standards" (SREB, 2010, p. 9).

Research has found professional development focusing on collective participation promotes widespread implementation (Darling-Hammond & McLaughlin, 1995; Knapp, 2003). When entire grade levels, schools, and/or departments participate, a collaborative and collegial learning environment is established allowing for inquiry, reflection, and risk-taking among participants (Ball & Cohen, 1999; Bryk, Camburn, & Louis, 1999). Additionally, when professional development is linked to curriculum, assessment, and standards, teachers are more likely to implement what they learn (Penuel, Fishman, Yamaguchi, & Gallagher, 2007; Supovitz, Mayer, & Kahle, 2000). To further the implementation of the CCRS, as well as to provide professional development to faculty at institutions of higher education that prepare pre-service teachers, the THECB funded four content-area collaboratives.

This study was based off the conceptual model proposed by Frank, Zhao, Penuel, Ellefson, and Porter (2011) and is divided into these three stages: *focus, fiddle,* and *friends* . These authors suggest that as someone's level of implementation of new innovations changes and increases, the type of professional development most useful to that individual also changes. These authors hypothesized someone at the initial implementation stage of an innovation requires *focused* professional development, while someone at an intermediate implementation

stage needs professional development that allows the participant to *fiddle* (i.e., hands-on activities). Finally, when a high level of implementation of a specified innovation is reached, it is hypothesized the most effective professional development allows the participant to access and incorporate the knowledge of others or *friends* (collegiality).

The CCRI Faculty Collaboratives were initially designed to hold *focused* professional development seminars to expose faculty participants to the CCRS. As faculty participants became more knowledgeable and aware of the CCRS, the collaboratives moved toward more of a hands-on approach, *fiddling*, by having faculty members develop lesson plans addressing the CCRS and providing opportunities for faculty members to receive mini-grants to explore their own CCRS projects. In the last stage, the collaboratives were trying to develop a community of scholars, *friends*, in order to disseminate the resources being developed, as well as, build capacity within institutions of higher education.

Methods

Participants

Participants in this evaluation study included higher education faculty who participated in the professional development seminars, as well as, the CCRI Faculty Collaboratives leadership team members of the four content-area collaboratives. At the time of the evaluation, 962 individuals attended at least one symposium sponsored by the collaboratives. These individuals included education and content-specific tenure-track faculty, clinical faculty, instructors, deans, associate deans, and department heads from institutions of higher education throughout Texas. CCRI Faculty Collaborative leadership team members were all faculty and staff at public universities in Texas. These individuals were principal or co-principal investigators for the CCRI Faculty Collaboratives.

Data Collection and Analysis

Researchers employed a mixed-methods research design. Data were collected from the following sources: participant interviews (*n*=15), leadership team member interviews (*n*=8), faculty participant surveys (*n*=510), end-of-year academy status reports, and observations of professional development seminars (*n*= 17). For the purpose of this article, only results from the CCRI Faculty Participant Survey will be discussed.

Researchers developed and distributed the CCRI Faculty Collaboratives Participant Survey to all faculty members who had attended at least one seminar hosted by one of the four collaboratives (*n*=962). The purpose of the survey was to gather feedback from the CCRI Faculty Collaboratives participants' experiences surrounding the professional development seminars. Specifically, the survey sought to discover how participants felt about and their confidence in implementing the CCRS into their courses. In addition, general demographic information about participants was gathered. Finally, open-ended questions gave participants the opportunity to elaborate on strengths and weaknesses of the professional development seminars, as well as provide specific examples of CCRS implementation.

Participants from the CCRI Faculty Collaboratives professional development seminars were invited (via e-mail) to take part in an online, voluntary survey regarding the professional development seminar(s) they attended. A web link for the CCRI Faculty Collaboratives Participant Survey was distributed to all participants. The e-mail informed participants the survey would take approximately 10 minutes to complete. At the beginning of the survey, participants were informed about the intent of the research, and assured of the confidential nature of their responses. Consent to participate in the study was therefore assumed by participants' willingness to proceed with the survey. The survey was distributed using online survey software, which allowed researchers to download survey data directly. Descriptive statistics are reported to ascertain participants' experiences and perspectives related to the collaborations, as well as CCRS implementation after participation.

Results

The CCRI Faculty Collaboratives Participant Survey was distributed to 962 seminar participants from the four collaboratives. The purpose of the online follow-up survey was to gather feedback regarding participants' seminar experiences and their implementation of the CCRS. A total of 510 surveys were completed, for an overall response rate of 53%.

Of the 510 respondents, the majority (62%) was female. In terms of ethnicity, the overwhelming majority (76%) was Caucasian. The next highest ethnicity group represented was Hispanic/Latino(a) (10%). Additionally, the majority (67%) of individuals who attended the seminars held an Ed. D. or a Ph.D. degree, and 10% were working towards a doctoral degree. Participants were also asked to indicate their years of teaching experience at both the K-12 level and in higher education, to include the 2010-2011 academic year. The overwhelming majority (79%) of participants reported having 10 or fewer years of teaching experience at the K-12 level. In contrast, the majority (57%) of individuals had greater than 11 years of experience in higher education. (See Appendix A for information on the participant demographics.)

Furthermore, participants were asked to indicate their positions at their respective colleges/universities. The largest percentage (45%) of respondents indicated that they were tenure-track faculty. Individuals who indicated they were clinical faculty members made up the smallest group of participants (3%). Participants were also asked about their roles at their colleges/universities. The largest percentage (20%) of participants indicated that they held a position other than the choices listed on the survey. Overall, the CCRI Faculty Collaboratives served a wide range of individuals. Table 1 displays the seminar participants' positions and roles at their respective colleges/universities.

Table 1

Seminar Participant Position and Role at College/University

Position at college/university	
Tenure-track faculty	44.5%
Other	19.0%
Dean, associate dean, or department head	16.1%
Instructor	17.1%
Clinical faculty member	3.3%
Role at college/university	
Other	20.4%
Mathematics faculty member	16.1%
Science faculty member	12.9%
Education faculty member – English/Language Arts	11.6%
Education faculty member – Science	10.0%
Education faculty member – Social Studies	8.4%
Education faculty member – Mathematics	8.0%
Social Studies faculty member	7.5%
English/Language Arts faculty member	5.1%

Note. n=510.

In addition to the demographics of the participants, the survey measured the number of participants who attended the seminars. The largest percentage (24%) of participants attended multiple seminars in different content areas. Table 2 displays the number of participants by content area of seminar attended.

Table 2

Number of Participants by Content Area of Seminar Attended

Content area	***n***	**%**
Attended multiple seminars in various content areas	124	24.3%
Mathematics	115	22.5%
Science	91	17.8%
Social Studies	91	17.8%
English/Language Arts	89	17.5%
All content areas	**510**	**100%**

Note. n=510.

Faculty participants also indicated the number of seminars that they had attended. The average number of seminars attended ranged from 1.58 to 3.07 seminars, with a mean value of 2.13 seminars. The participants who attended multiple seminars in different content areas had the highest seminar attendance mean score (*M*=3.07). The participants who attended the science symposia had the lowest seminar attendance mean score (*M*=1.58). Table 3 displays the mean scores of seminars attended by content area.

Table 3

Average Number of Seminars Participants Attended by Content Area

Content area	
Attended multiple seminars in different content areas	3.07
English/Language Arts	2.20
Mathematics	2.09
Social Studies	1.61
Science	1.58
All content areas	**2.13**

Note. n=510.

Finally, the participants were asked to indicate their roles at the CCRI Faculty Collaboratives seminars. Overall, almost all of the respondents (97%) held the role of participant

at the seminars. Only a small percentage of survey respondents indicated that they had presented at a seminar to a small or large group (12% and 7%, respectively). Table 4 displays the survey respondents' roles at the CCRI Faculty Collaboratives seminars by content area.

Table 4

Roles at CCRI Faculty Collaborative Seminar by Content Area

Role	**English/ Language Arts**	**Math**	**Science**	**Social Studies**	**Multiple Content Areas**	**Total**
Participant	98.9%	97.4%	96.6%	94.4%	98.3%	**97.2%**
Presenter (small group)	9.2%	20.2%	8.8%	5.6%	13.2%	**12.0%**
Presenter (large group)	1.1%	8.8%	6.6%	5.6%	10.7%	**7.0%**
Session facilitator	4.6%	1.8%	4.4%	2.2%	9.1%	**4.6%**
Panel member	1.1%	1.8%	1.1%	3.4%	5.8%	**2.8%**

Note. n=510.

All participants were asked a series of 24 questions related to the seminars. Items were scored using a four-point, Likert-type measure: 1=s*trongly disagree*, 2=d*isagree*, 3=*agree*, and 4=s*trongly agree*. The survey items (see Appendix B, Table 2) shows the 24 items and the percentage of participants that selected either *agree* or *strongly agree* when responding to each statement. The items with the highest percentages included: the presenters at the professional development seminars were knowledgeable about the topics presented (96%); the presenters at the professional development seminars were well prepared (94%); and I am interested in collaborating with community college partners/other higher education faculty in my region in efforts related to the implementation of the CCRS/TEKS (93%). Additional findings showed the majority of respondents (89%) agreed implementation of the CCRS/TEKS would improve professional development for pre-service teachers, and 88% perceived the CCRS/TEKS would improve professional development for in-service teachers in Texas. Furthermore, 86% of survey

respondents agreed that implementation of the CCRS/TEKS would improve EC-12 student learning in Texas schools. Additionally, 91% of respondents felt the seminars improved their understanding of the CCRS/TEKS; 89% believed that the seminars supported improved instruction; and 81% indicated that they learned new ideas and/or skills as a result of attending CCRI Faculty Collaborative seminars.

The survey also gathered information regarding participants' implementation of the CCRS/TEKS, subsequent to attending the CCRI Faculty Collaboratives seminars. When asked about CCRS/TEKS implementation, 60% of respondents indicated that they had integrated the CCRS/TEKS into the courses they teach, and 51% of the survey respondents noted that they had helped lead efforts to implement the CCRS/TEKS at their universities/colleges. Moreover, since attending the seminars, approximately 34% of respondents had met with community college educators/higher education faculty, as well as EC-12 educators (39%), in their content areas for the purpose of discussing implementation of the CCRS/TEKS. Table 5 displays participant activities, by content area, after having attended the CCRI Faculty Collaborative seminars.

Table 5

Participant Activities After Attending CCRI Faculty Collaborative Seminar by Content Area

Activity	ELA	Math	Science	Social Studies	Multiple content areas	Total
Implemented the CCRS/TEKS into the courses I teach	77.9%	50.0%	46.0%	53.5%	73.0%	**60.4%**
Met with faculty within my department to discuss implementation of the CCRS/TEKS into courses	60.5%	51.8%	32.6%	40.9%	68.6%	**52.0%**
Lead efforts to implement CCRS/TEKS at my university/college	58.6%	50.9%	39.8%	31.8%	65.6%	**50.5%**
Met with faculty in other disciplines at my university or college to discuss implementation of the CCRS/TEKS into courses	36.5%	43.2%	35.2%	31.8%	54.9%	**41.5%**
Met with EC-12 educators in my area to discuss implementation of CCRS/TEKS	48.9%	42.3%	32.6%	26.1%	44.6%	**39.4%**
Met with community college educators or higher education faculty in my area to discuss implementation of the CCRS/TEKS into courses	27. 9%	32.7%	28.4%	27.3%	47.5%	**33.8%**

Notes. n=510. % represents participants that selected “yes” when responding to each statement.

Conclusions

Overall, the CCRI Faculty Collaboratives professional development seminars have provided higher education faculty with opportunities to network with professional colleagues, access to research-based presentations, meaningful interactions in the fields of English/language arts, mathematics, science, and social studies, and increased knowledge of the CCRS. To date, content from the professional development seminars has directly impacted courses being taught in the state. For example, one symposia participant said:

> After the seminar on [specific seminar name] I was able to re-evaluate the way I taught my classes. I used the explicit instruction with modeling [and] systematic instruction with scaffolding. I now use multiple opportunities to respond and practice more than I did before the seminar. My students love the immediate and corrective feedback, I love it too.

Another professional development seminar participant commented:

> Before the workshop I was already using TEKS objectives in student assignments; now I have restructured those assignments around the larger CCRS objectives that I learned about in the literature. They are more appropriate for college-level work and give students more intellectual flexibility.

The seminars encouraged collaboration among educators at all levels. Since attending the symposia, one attendee noted that there have been “collaborations between my university and the high school teachers in surrounding areas.” Based on feedback from CCRI Faculty Collaborative participants, the primary recommendation was to include P-12 educators. Future faculty collaboration efforts should consider more joint discussions with public school teachers, yielding effective P-16 alignment. Additionally, participants suggested a need for follow-up sessions to ensure implementation. Follow-up sessions allow for additional discussion about how the implementation is working. Furthermore, participants noted the importance of having a

stronger emphasis on CCRS implementation; specifically, how such implementation would look in higher education classroom settings. Participants also suggested the need for more content specific seminars. Finally, participants wanted more information and a better understanding of the long-term goals of the CCRI Faculty Collaboratives and the CCRS.

In summary, the CCRI Faculty Collaboratives project appears to be having a major impact on promoting awareness of CCRS and developing skills to implementation for teacher preparation programs. Through continued seminars and collaborative efforts, higher education faculty members are gaining knowledge and skills about the purpose and value of the CCRS. Furthermore, implementation of the CCRS appears to be gaining momentum in teacher education programs. Finally, and perhaps most importantly, efforts are being made to translate this knowledge throughout EC-16 education.

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Appendix A: Demographics

Table A1
Seminar Participant Demographics

Sex	
Female	61.6%
Male	38.0%
Ethnicity	
Caucasian	75.9%
Hispanic/Latino(a)	9.6%
African American	5.9%
Asian	5.3%
Other	2.7%
American Indian/Alaskan Native	0.6%
Highest degree earned	
Ed. D./Ph.D.	66.9%
M.A./M.Ed./M.S.	21.3%
M.A./M.Ed./M.S. and working towards doctorate	10.2%
B.A./B.S.	1.6%
Years of K-12 experience	
None	24.1%
1-3	22.4%
4-5	11.0%
6-10	21.2%
11-15	8.2%
16-20	5.3%
21+	7.8%
Years of higher education experience	
None	1.8%
1-3	8.0%
4-5	10.4%
6-10	23.1%
11-15	20.6%
16-20	12.9%
21+	23.1%

Note. n=510.

Appendix B: Professional Development Seminars

Table A2

CCRI Faculty Collaboratives Professional Development Seminars

The presenters at the professional development seminars were knowledgeable about the topics presented.	96.0%
The presenters at the professional development seminars were well prepared.	93.8%
I am interested in collaborating with community college partners/other higher education faculty in my region in efforts related to the implementation of the CCRS/TEKS.	93.2%
Administrators from my college support implementation of CCRS/TEKS.	91.0%
Active participation was encouraged at the professional development seminars.	91.0%
The professional development seminars improved my understanding of the CCRS/TEKS.	90.9%
The professional development seminars created a sense of collegiality among participants.	90.9%
The implementation of the CCRS/TEKS will improve professional development for pre-service teachers.	89.2%
The materials provided at the professional development seminars were useful in learning about CCRS/TEKS.	88.9%
The professional development seminars supported improved instruction.	88.5%
I would like to attend future events to further my knowledge about how to integrate the CCRS/TEKS into the courses I teach.	88.4%
The implementation of the CCRS/TEKS will improve professional development for in-service teachers.	88.3%
The presenters incorporated discussion of the CCRS/TEKS into the professional development seminars.	87.8%
The implementation of the CCRS/TEKS will improve EC-12 students' learning.	86.1%
The presenters at the professional development seminars applied pedagogically sound teaching practices.	85.7%
The materials provided at the professional development seminars were appropriate for higher education faculty.	85.4%
The materials provided at the professional development seminars helped me to develop conceptual understanding of CCRS/TEKS.	83.1%
I learned new ideas and/or skills by attending the professional development seminars.	81.4%
I feel confident that I can integrate the cross-disciplinary standards, including the cognitive skills and the foundational skills of reading and writing, with my courses.	80.6%
I would feel comfortable sharing successful practices that I use to implement the CCRS/TEKS with other faculty within my discipline.	80.5%
The goals and expectations of the professional development seminars were clear.	79.2%
The materials provided at the professional development seminars were useful in learning about cross-disciplinary practices.	76.6%
I have the necessary resources to help lead efforts to make faculty at my university aware of the importance of the CCRS/TEKS.	65.6%

Notes. n=510. % represents participants that selected "agree" or "strongly agree" when responding to each statement.

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UNPACKING THE STANDARDS: TRANSLATING STANDARDS INTO OBJECTIVES FOR CLASSROOM INSTRUCTION

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Introduction

Few, if any, teachers enter the profession due to a burning desire to teach the standards. Once employed in a school, however, the Texas Essential Knowledge and Skills (TEKS) are the barometer by which Texas teachers' performances and those of their students are assessed. Teachers must learn to use the TEKS to provide essential structure to the passion they have for their content.

Many of the TEKS are broad statements, encompassing a range of skills, content knowledge, and cognitive levels. For example, United States History standard 3(B) states students are expected to "analyze economic issues such as industrialization, the growth of railroads, the growth of labor unions, farm issues, the cattle industry boom, the rise of entrepreneurship, free enterprise, and the pros and cons of big business" (Texas Education Agency [TEA], 2011c). Embedded in this one standard are content and skills that must be taught or reviewed before students can analyze at the cognitive level suggested in the standard. Although educators express frustration with the degree to which the TEKS are broad, this breadth stems from a well-intentioned source; from what is now seen as the early days of the current performance-based accountability movement, the ideal was standards would be "clear and usable—sufficiently clear so that parents, teachers, and students can understand what the standards mean and what the standards require of them," but also "adaptable" and "reflective of

broad state consensus-building" (Goals 3 and 4 Technical Planning Group on the Review of Education Standards, 1993, p. iii-iv). The breadth of many of the standards likely reflects the contradictions inherent in those guiding ideals. Unpacking a standard to uncover its implied, specific learning objectives makes it "clear and usable" according to the original vision for standards-based instruction.

Implied in standards-based reform is that teachers will respond by adapting their curriculum and instruction to align with the standards and assessment (Hannaway & Hamilton, 2008, p.2). Given the breadth of the TEKS and the need for their curriculum to reflect them, teachers need planning tools that help them work with the standards in a meaningful way. This article presents a rationale for teaching teacher candidates to begin their planning with an analysis of their content standards. Then, it outlines in broad strokes an overall curriculum design process that includes "unpacking standards," and presents a model of the process of unpacking content standards.

Rationale

"Mastery objectives" can be defined as a statement of the new knowledge or skills students will acquire within one lesson cycle. A particular standard from the TEKS implies different mastery objectives depending on the level of a particular group of students, and the pacing required to teach the implied objectives.

According to Saphier, Haley-Speca, and Gower (2008):

> It is easy to lose track of where you're going if you don't think or write objectives in terms of student mastery. A teacher can get tied to materials and activities and have students involved and liking their classes, but be achieving uncertain, erratic, and unpredictable results (p.372).

The possible reasons for this connection between mastery objectives and consistent results are many. In the context of explicit instruction, the relationship is clear. Archer and Hughes (2011)

articulated that explicit instruction requires the "…body of knowledge or set of skills…has been sufficiently well organized and analyzed so that it can be presented systematically" (p.14), and Hattie (2009) summarized that the meta-analyses of research on effective curriculum development found effective learning strategies must be "…planned, deliberate, and explicit…" (p.36). Clear, defined learning objectives help teachers strategically differentiate instruction for various subgroups of students, by giving teachers a context within which to prioritize and clarify prerequisites. For example, the use of clear content objectives has been identified as an essential element in sheltered instruction for English Language Learners in a general education setting (Echevarria, Vogt, & Short, 2004, p.23). Finally, when instruction is aligned to clear learning objectives, teachers can then use those objectives to design classroom assessments. This would likely lead to assessment that is both more accurate (likely to measure what students have learned) and more fair (likely to reflect the kinds of activities and scope of learning to which students are accustomed).

The process of unpacking broad standards into specific mastery objectives contributes to making teaching and learning transparent for teachers and students alike. In the process of developing learning objectives, teachers must deconstruct their own understanding of a content area that likely comes easily to them. Students, as well, benefit from the opportunity to recognize and commit to those clear learning objectives (Hattie, 2009, p. 23, 110). Teachers identifying gaps in their own content knowledge is an important by-product of this process. They also learn what additional resources they might need to secure in order to lead their students to mastery of the standard. Clear, focused objectives can also help teachers balance the creative tension between constructivist approaches and direct instruction (Hattie, 2009, p.26). For example, an English/Language Arts (ELA) teacher who primarily frames class through a constructivist reading- or writing-workshop approach can overlay structure by infusing the workshop with targeted mini-lessons. For example, the teacher can ensure students choose

their readings from the range of genres specified in the standards, or they receive mini-lessons in the specific grammatical structures tested at their grade level.

An additional consideration for today's teachers is the increased rigor of the newly revised TEKS, and, consequently, of the new State of Texas Assessment of Academic Readiness (STAAR) exams. Teachers trained under the former assessment system might have expectations that the tests assess at a relatively low cognitive level. A 2009 analysis of standardized state exams nationwide showed a disconnect between the level of rigor implied in state standards and the level of rigor in test items on state assessments (National Academy of Education, 2009, p.6). The new STAAR exam, however, which was gradually phased in beginning in 2010, is intended to show increased alignment in the level of rigor, with "a greater number of items that have a higher cognitive complexity level" (TEA, 2010, p.I-27). In order for students to reach those higher levels of cognitive processing, teachers must deliberately teach those thinking skills (Jetton and Dole, 2004, p.445). In the process of distilling a broad standard down to its essential component skills, teachers must consider the skills at various levels of Bloom's taxonomy (Anderson & Krathwohl, 2001), and sort out for themselves exactly what those skills mean within the context of both the standard and their content area in general. For example, a math teacher must grapple with exactly what the verb "analyze" means in a standard such as "analyze situations involving linear functions and formulate linear equations or inequalities to solve problems" (TEA, 2011b). A social studies teacher would likely find different implications of the same verb in a standard such as "analyze social issues affecting women, minorities, children, immigrants, urbanization, the Social Gospel, and philanthropy of industrialists" (TEA, 2011c).

Unpacking the standards can also help teachers best manage instructional time. Teachers frequently express that there is not enough time to teach all of the standards at the cognitive level required. An analysis of beliefs of teachers participating in the America's Choice standards-based school reform effort (Rogusky, 2006) identified a pervasive perception that

limited time is a challenge to student achievement. One teacher expressed: “We try to cover all the standards with all the kids, but there isn’t enough time in a day or year to do it—even with the [gifted] students” (Harris, 2012, p.139). Distinguishing specific mastery objectives from the standards allows teachers to be more strategic in the use of their time, using the mastery objective as a screen through which to filter texts, activities, or projects. Teachers must devote more time to teaching concepts or skills that might be classified as “deeper learning,” versus the acquisition of knowledge (Hattie, 2009, 163), so the identification of the “deeper learning” suggested within a standard is essential for successful time management. This is a particularly essential activity for ELA teachers, who must address a relatively large set of standards. There are approximately 85 discrete statements of skills or knowledge in the English I TEKS (TEA, 2011a), compared with approximately 39 in the Algebra I TEKS (TEA, 2011b).

Unpacking the Standard

The process of unpacking the TEKS and developing mastery objectives that can guide lesson planning is aided by the fact that the TEKS have been prioritized as either “Readiness” or “Supporting” standards. According to TEA, readiness standards are those most closely aligned with indicators of college and career readiness, and are deemed most necessary for success in the particular grade and content. Supporting standards are distinguished primarily by the fact they are emphasized at either a lower or higher grade level (Figure 1) (TEA, 2010, p.I, 25-I-26). For example, English I standard 1(B) is a readiness standard: “…analyze textual context (within a sentence and in larger sections of text) to distinguish between the denotative and connotative meanings of words.” On the other hand, standard 1(D) is designated as a supporting standard: “…describe the origins and meanings of foreign words or phrases used frequently in written English (e.g., *caveat emptor, carte blanche, tete a tete, pas de deux, bon appetit, quid pro quo*)” (TEA, 2011a).

Comparison of Readiness and Supporting Standards

From House Bill 3, Section 1, Chapter 2

Readiness Standards	Supporting Standards
General characteristics:	
• are essential for success in the current grade or course • are important for preparedness for the next grade or course • support college and career readiness • necessitate in-depth instruction • address significant content and concepts	• introduced in the current grade or course but may be emphasized in a subsequent year • reinforced in the current grade or course but may be emphasized in a previous year • play a role in preparing students for the next grade or course but not a central role • address more narrowly defined content and concepts
Subject-specific characteristics:	
Reading, Writing, and English Language Arts: • focus on specific reading genres (fiction and expository) and on writing for particular purposes **Mathematics:** • emphasize the integration and application of mathematical skills **Science:** • emphasize the integration and application of major scientific concepts **Social Studies:** • emphasize landmark historical events and foundational geographic concepts • emphasize unifying historical and geographical themes	**Reading, Writing, and English Language Arts:** • may apply to other reading genres (poetry, drama, literary nonfiction, and persuasive) **Mathematics:** • focus on skills that underlie more significant mathematical concepts **Science:** • focus on content that supports fundamental scientific principles **Social Studies:** • focus on discrete historical facts, events, or individual people, as well as more detail-oriented geographical facts and concepts

Retrieved May 4, 2012 from: *www.tea.state.tx.us/student.assessment/hb3plan/HB3-Sec1Ch2.pdf*

Figure 1

It is outside the scope of this article to present a detailed process for backwards design (Wiggins & McTighe, 2012), or the process of designing curricula around specific learning objectives, but it is important to understand where the process of unpacking the standards would fall in at least one model of the larger picture. Ainsworth (2010) describes the process of curriculum design at the district level, using a similar model. In this model, an early step of the curriculum design process would be grouping the standards into units of study. The next step would be to design unit assessments that reflect the level of rigor and scope of the broad standards. Next, teachers would need to unpack the standards to identify specific mastery objectives for lessons, and plot the objectives on a calendar based on how much time is

reasonable for their group of students to master each objective. At this point, the teacher would design lessons and activities aligned to the objectives.

To illustrate the process of unpacking a standard to create mastery objectives, consider this standard from the English I TEKS: “Students are expected to…write an analytical essay that includes a controlling idea or thesis” (TEA, 2011a, standard 15(A)(iii)). A useful place for teachers to begin deconstructing a standard is by identifying the key terms, and articulating an objective for defining them. In this example, students would need to define “analytical essay,” “controlling idea,” and “thesis.” Using Bloom’s taxonomy as a reference, a teacher might determine that an essential step in the progression toward writing an essay that contains a thesis would be to identify the thesis in a model analytical essay. Another skill at the lower level of Bloom’s would be to list the characteristics of an effective thesis.

It is essential teachers continue unpacking until the level of the original standard is reached. In our example, related higher-order skills might include: developing a thesis from a writing prompt (which in itself suggests the ability to read and understand a writing prompt); drafting an essay that contains a thesis; evaluating the thesis of a peer’s essay; and so forth. A concept map is a useful way to represent the relationships among these different objectives (Appendix A, Figure 1).

As teachers uncover learning objectives at various levels of rigor, they check their own understanding of the terms and skills embedded in the standard, weigh the relative importance of each, identify connections among different standards, and determine essential prerequisites and opportunities for differentiation.

It is natural at this stage—especially for experienced teachers—to associate favored activities or projects with the objectives they are uncovering. However, teachers should avoid jumping to activities that relate to the skills. Teachers might want to keep a separate list or add another shape to their concept map to record these ideas, while keeping them differentiated from the objectives, because the focus at this stage should be on uncovering mastery

objectives. At this point, teachers should be dissuaded from basing such planning components as allotment of time on activities. In other words, the decision about how much time to spend on an objective should be based first on the relative importance of the objective to the overall standard, the relative importance of that standard to the curriculum as a whole, and the level of readiness of the students. Later, once a schedule of time has been established, a teacher can choose an activity that both addresses the objective and fits within the already-established time limitations. This caution is important because activity-based planning can both cloud the importance of the individual objectives and the cognitive level of instruction.

Phrasing each mastery objective in terms of a verb suggested by Bloom's taxonomy helps teachers focus on objectives and helps ensure they are reaching the higher order thinking skills expected in the TEKS. Teachers must ensure that the learning objectives they define for their curricula progress as far up Bloom's taxonomy as the level of the standard suggests. Note: while this process inevitably leads to greater clarity regarding scope and content of the standard, teachers' knowledge and experience and their understanding of students will influence the end result.

The teacher now has a detailed list of what needs to be taught in order for students to master the larger objective, can arrange the objectives in a logical order, and can allocate class time and resources accordingly (Appendix B, Figure 2).

Conclusion

The nationwide conversation around performance-based accountability systems is multi-faceted, and frequently contentious. Policy-makers and practitioners are engaged in debate about aspects of the systems being implemented, and the relative merits or disadvantages of different variations of those systems. However, as the rigor rises on Texas's standardized tests and school systems increasingly move toward accountability systems that reflect the results of those tests, teachers can be encouraged to view the standards as a useful tool for structuring

their planning, rather than a barrier to overcome or work around. Unpacking the standards helps teachers deeply understand the range of content and the cognitive levels indicated in their subject area standards, on which their students will ultimately be assessed. It also provides a context in which teachers can evaluate the levels of their students, and then prioritize and differentiate instruction accordingly. Perhaps most importantly, clearly defining learning objectives provides an important guiding framework for the passion that leads teachers toward the profession, a needed structure that helps teachers select from the breadth of knowledge and activities in the subject area they love.

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Appendix A: Concept Map

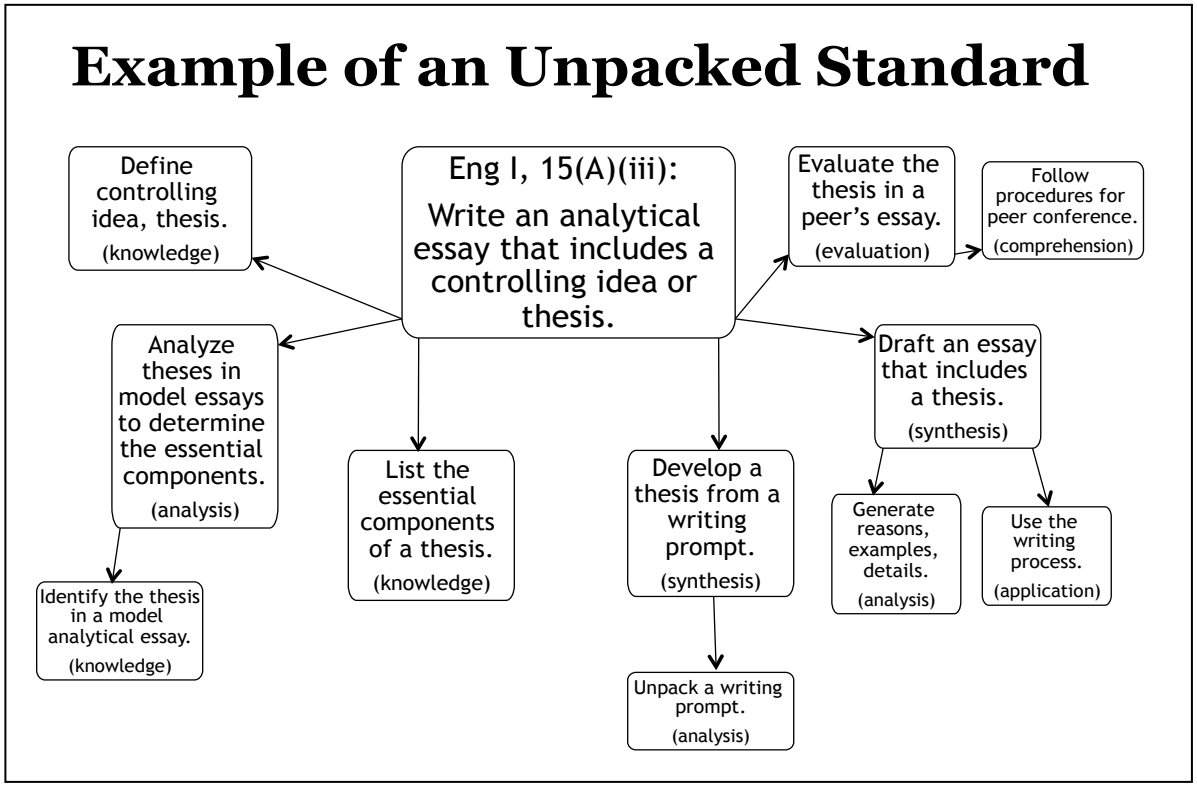

Figure A 1

Appendix B: Learning Objectives

Learning Objective	Order	Instructional time needed	Dates Taught
Define controlling idea/thesis	1	5 minutes	November 1
Identify the thesis in a model analytical essay.	2	20 minutes	November 1
Analyze the thesis in a model analytical essay to determine the essential components.	3	30 minutes	November 1
List the essential components of a thesis	4	5 minutes	November 2
Unpack a writing prompt.	5	1 class	November 2
Develop a thesis from a writing prompt.	6	15 minutes	November 3
Generate reasons, examples, details.	7	1 class + HW	November 4
Draft an essay that includes a thesis.	8	2 classes + HW	November 5, 8

Figure A 2

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CHALLENGE BASED LEARNING IN THE CLASSROOM

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Introduction

According to the *NMC Horizon Report* (New Media Consortium, 2012), mobile apps and tablet computing are major contenders to change the face of classroom learning. In fact, mobile apps and tablet computing are expected to enter mainstream education within a year or less, and many teachers are already utilizing such technologies. More than 1,000 one-to-one projects exist in the United States involving Apple devices in which each student has access to a laptop or iPad (Apple Events, 2012). How is technology changing the face of classroom learning? Adding technology to the classroom does not change instruction. However, by considering systematic methods of technology implementation into classrooms, teachers can integrate technology and pedagogy to enhance student learning. As teacher educators, we believe the nature of classroom instruction must change in order for new technologies to be utilized effectively. Given the profound paradigm shift taking place in schools, teacher educators must prepare future teachers with instructional strategies to teach in a technological world. Educators must focus on "what and how they teach to match what people need to know and how they learn" (U.S. Department of Education, 2010, p. 1). A new emphasis in education is Challenge Based Learning and similar methods that foster more active learning experiences (New Media Consortium, 2012), The purpose of this article is to describe how preservice teachers explored the practice of Challenge Based Learning through participating in the process.

Challenge Based Learning

The U.S. Department of Education developed the National Educational Technology Plan (U.S. Department of Education, 2010), titled *Transforming American Education: Learning Powered by Technology*. According to this plan, the challenge for the American education system is to integrate technology to "create relevant learning experiences that mirror students' daily lives and the reality of their futures" (p. 9). In addition, "we must bring 21st-century technology into learning in meaningful ways to engage, motivate, and inspire learners of all ages to achieve" (p. 10). Traditionally, teachers have used a direct instruction model whereby teachers deliver the content and guide learning in the classroom. However, a student-centered pedagogy is effective for preparing students to interact in the 21st century, as online activities tend to use an inquiry-based model of learning. Problem-solving, which is the foundation of Challenge Based Learning, plays an important role in the learning process (Leu, Leu, & Coiro, 2004).

Challenge Based Learning incorporates a multidisciplinary approach to teaching and learning, encourages students to leverage the technology they use in their daily lives, and engages students in solving relevant, real-world problems (Apple, 2012). This instructional approach was developed by Apple and is similar to problem-based learning, where collaboration and hands-on learning are key elements in the process (Larmer, Ross, & Mergendoller, 2009). The Challenge Based Learning approach includes six components, presented in Table 1, to train students how to engage in research to develop deeper knowledge of the subjects to enter and advance global discussions about relevant issues. First, teachers provide students with a big idea to research. Students then form research teams and begin to develop essential questions about the big idea. These essential questions produce a challenge through which the students develop a product reflecting contextual research with a real world solution. Once the challenge has been identified, students collaborate with teachers to write guiding questions and select instructional activities to respond to the challenge. Finally, students assume work roles to

document and present, or publish, their findings. Reflection is also an important aspect of the process (Apple, 2012).

Table 1

Components of Challenge Based Learning

Component	Description
Big Idea	The big idea is a broad topic that is relevant to students.
Essential Questions	Students develop questions, related to the big idea, regarding their own interests.
The Challenge	Research teams of students establish a challenge, which leads to a real-world solution/product.
Guiding Questions and Activities	Guiding questions narrow the topic and help students meet their challenge. Teachers and students work together to identify activities address these questions.
Guiding Resources	Students use resources including websites, podcasts, apps, and audiobooks to answer guiding questions and develop solutions.
Solutions, Implementations, and Reflections	After researching, students choose one solution to develop. Often students implement an approved solution in a real-world setting, reflect, and adapt the solution. Solutions often include digital videos and other media.

Research teams involved in creating challenges often have the latitude to direct their own learning by choosing topics or products that meet the interests or learning styles of the

group members. The Challenge Based Learning model incorporates student-centered approaches within a relevant context of active, reflective learning and student collaboration, which aligns with the *NCM Horizon Report.* When students channel their learning through problem-based, contextually appropriate challenges in a multidisciplinary environment, they may connect subject matter with their own lives in a meaningful way. The opportunity for self-directed learning can build excitement and motivate learners (New Media Consortium, 2012).

Challenge Based Learning in a Middle School

Educators are working to change classroom instruction. As university professors, we collaborated with middle school teachers in Central Texas during the first year of a one-to-one iPad initiative implementation where each student was issued an iPad for school and home use. The district leaders recognized a need for an intentional instructional model to enhance learning in conjunction with the iPad initiative. This middle school implemented Challenge Based Learning as an instructional model to embrace a more student-centered approach with emphasis on teaching 21st century skills. The rationale was to engage students in learning opportunities that allowed students to interact with the core curriculum by exploring real-world problems and developing meaningful solutions (Belton Middle School, 2012).

In order to understand the benefits and hindrances of the one-to-one iPad initiative and Challenge Based Learning, university professors interviewed six of the 30 middle school teachers participating in focus groups. The focus groups met at the end of each semester and included a special education math teacher, a science teacher, an elective teacher, and three English teachers. All six teachers indicated that implementing a new instructional model was difficult, but student engagement and motivation improved as students enjoyed the technology-rich environment. Five of the six teachers reported that they had grown professionally and did not want to revert to teaching without the technology access. These insights from middle school

teachers have implications for teacher education, as new teachers must be prepared for success in a technology rich, student-centered environment.

Challenge Based Learning with Preservice Teachers

Classroom instruction must change in order to utilize new technologies effectively. In order to help preservice teachers understand Challenge Based Learning, a professor at the University of Mary Hardin-Baylor implemented the model in an undergraduate education course with nine students. Project participants were preservice teachers who experienced Challenge Based Learning as learners in this college course. As a preliminary assignment, the preservice teachers examined Apple's website describing the process of Challenge Based Learning, and it was important for the students to recognize the continuous progression of the research process. Another goal was for preservice teachers to develop an innovative informational tool for practical use by special educators. Therefore, preservice teachers familiarized themselves with the process of Challenge Based Learning to prepare for their roles as future teachers. During these initial tasks, the preservice teachers struggled with the in-depth critical thinking required by this process.

The course assignments included Challenge Based Learning projects so preservice teachers could be active participants using this learning method. The big idea of one project was *Learning Disabilities in the Public School*. Preservice teachers had to use the big idea and progress through each of the six components in the Challenge Based Learning process. This involved reflecting on personal interests regarding the big idea, identifying a challenge, and developing guiding questions that would further group knowledge. An appropriate solution would be a relevant, real-world product that would be implemented for practicing and future teachers to use. Learners determined the products, but products could include presentations, websites, or other media.

The preservice teachers worked in research teams of four or five and progressed through Challenge Based Learning to create appropriate products. When faced with the big idea, *Learning Disabilities in the Public School,* one research team pursued Response to Intervention (RtI) as a challenge. RtI involves identifying struggling students and attempting to provide more research-based, intense instruction to these students as a form of intervention prior to testing (National Center on Response to Intervention, n.d.). The research team developed guiding questions to direct their quest for relevant information. They recognized students previously diagnosed with learning disabilities would not be involved in RtI; however, students with undiagnosed learning disabilities would be included in the population. The team researched characteristics of learning disabilities that RtI instructors might encounter and discovered specific teaching strategies targeting each characteristic. Preservice teachers accessed information from several traditional sources such as textbooks, journal articles, and web sites. They also sought information through technological resources such as iTunesU (http://itunes.apple.com/us/app/itunes-u/id490217893?mt=8), an online source for educational learning. In their solution and implementation, they documented findings by publishing a blog of research-based strategies to address specific learning disabilities. The blog is a live site wherein users, including practicing future teachers, can contribute new ideas.

A second research team identified a different area of Learning Disabilities during the essential questions step. They developed guiding questions to research visually impaired learners in the classroom. After extensive online investigations, this research team presented the solution through a teacher's classroom handbook for prekindergarten students with visual impairments. Information in the handbook included types and causes of visual impairments, socialization and academic needs, and specific strategies/activities to address those needs. The two research teams addressed the big idea through different topics with different products. The solutions and implementations enabled learners to choose technology applications to demonstrate their learning.

Throughout the process, the professor served as a facilitator for the research teams and redirected them through small group conferences to ensure the solutions satisfied project expectations. The preservice teachers struggled with the research approach as they tended to think about the solution before developing initial guiding questions and refining those questions, which is an important step in this learning process. Since Challenge Based Learning allows students to expand knowledge through extensive research, the research process is inherent in the pedagogy.

Implications

In this setting, Challenge Based Learning was a valuable tool for both the professor and the preservice teachers. The professor had to relinquish control of the learning to enable students to engage with the content in meaningful, self-directed ways, and the outcomes exceeded expectations. Traditionally, the professor/teacher determines the skills to be taught according to course objectives and state-mandated curriculum. Challenge Based Learning includes the flexibility to incorporate required curriculum/objectives, while allowing students to expand and personalize basic curricular knowledge through research, communication, and cooperation of individuals and all team members. In a climate of high-stakes testing, allowing students this type of freedom contributes to the pressures teachers face related to a mandated curriculum with vast content. To address this dilemma, the professor and the preservice teachers discussed the expectations and objectives of the project. In the examples with preservice teachers, the goal was to explore the characteristics of learning disabilities and ways teachers might address those needs in the classroom. Throughout the process, the professor reminded students of the goal with weekly conferences to assess the progress of each research team. The professor redirected learners back to the big idea to refocus and realign with the activities and products with the goal. It was evident that the big idea had to be broad enough to

allow the students freedom to explore and think critically but contain specific parameters to ensure the students mastered objectives.

As Challenge Based Learning offers students choices in educational activities and products, this project illuminated the need for individualized instruction. Students had the latitude to select challenges and products, which allowed them to demonstrate their strengths and build skills according to their interests. This approach was effective at the university and middle school in this setting, but teachers can implement multiple methods such as direct instruction and inquiry. Instruction in the classroom can, and should, incorporate various techniques to meet the unique needs of individual students.

Preservice teachers kept journals throughout the project to reflect on the effectiveness of Challenge Based Learning at the conclusion of the semester. All nine students agreed that the learning process was very difficult and required them to think in ways they had not previously encountered in their educational experiences. However, the students were excited about learning a new teaching method and intended to implement Challenge Based Learning in their future classrooms. As learners, they reported discovering more about the given topics (Learning Disabilities) through collaboration, the research process, and the Internet resources than they would have expected to learn had the professor delivered instruction in a traditional lecture model. One student commented, “I learned things about learning disabilities that go beyond what is in the textbook. I learned what it really looks like to teach students with learning disabilities.”

Discussion

When comparing Challenge Based Learning experiences of preservice teachers and those of middle school students as described by the middle school teachers in the focus group sampled, there are some interesting connections. The middle school teachers reported that Challenge Based Learning was difficult for their students because they are accustomed to being

directed step-by-step during the learning process. Students struggled with making a plan for a final product, as the open-ended aspect of Challenge Based Learning was a new concept for students. Both preservice participants and middle school teachers reported the research process was difficult, yet beneficial. When the preservice teachers developed essential questions, learners tended to overlook the guiding questions and focus on the solution or product. The process that occurs between the development of an essential question and the solution is critical to the problem-solving component of Challenge Based Learning. Through guided questions and research, students gain knowledge and build skills. The preservice teachers learned the process of Challenge Based Learning by participating as a learner.

A second comparison was evident through the solutions learners proposed. Although Challenge Based Learning facilitates technology applications, the final product did not have to be a digital presentation. In both instructional settings (middle school and university), learners had to be reminded that the use of technology did not require a digital product. Learners, not the teacher, determine the solutions, which must be a result of research and planning. For example, a middle school history class that was studying ecology and water conservation used hands-on research at the lake to investigate the effects of the severe drought that occurred during the year. The research involved technology but the activities and final products did not. In both undergraduate examples, preservice teachers demonstrated learning resulting in a real-world product. The blog and the handbook, potentially useful references for teachers, incorporated deeper learning than direct lecture and a Power Point presentation. In Challenge Based Learning the emphasis is on the research process while integrating 21st century technology skills, and the products demonstrate that learning.

Finally, in both settings, the products submitted by the middle school students and preservice participants exceeded teacher and instructor expectations. In other words, the teachers were pleased with the information students covered and with the products students selected to present/apply their work. When provided an opportunity to research and create,

learners in the Challenge Based Learning environment achieved more than the basic knowledge. They applied the knowledge in the context of real-world problems. Middle school students received hands-on experience using technology to research problems. One of the middle school English teachers compared her direct instruction approach to teach personal narratives and memoirs to the Challenge Based Learning approach. Essential questions included questions like *What is a memoire?* or *What is a personal narrative?* Students read samples of each. Final products were evaluated to assess whether or not students knew the difference between the genres. Many students made iMovies on their iPads. Some students created a news station scenario in which they were interviewing people who would tell a story as a memoire and then as an autobiography. The teacher felt her class understood the content better than they did through past instruction where she direct taught the difference.

Preservice teachers connected all of the pieces and applied knowledge as it related to a classroom setting. When given freedom to explore interests within the parameters of required objectives, they were able to extend their knowledge to think critically using observation, analysis, and synthesis. This was accomplished through active, meaningful engagement that extended beyond typical textbook learning.

While technology is integral to Challenge Based Learning, technology requires skills that need to be identified and taught, as new technologies will continue to affect literacy. The middle school teachers in the focus groups appreciated the availability of technology in the classroom as a tool for research and learning. In addition, focus group teachers confirmed middle school students enjoyed using iPads for other tasks such as reading. Each of the six teachers interviewed stated middle school students preferred to read text on the iPad as opposed to a book. However, teachers shared concerns that students may not be reading critically as they examine information online, as middle school students seemed to skim the text and look at pictures, sometimes jumping to conclusions without mounting supporting evidence. This

concern is consistent with current research on digital literacy. Kymes (2005) described a “snatch and grab” (p. 494) strategy in which readers skimmed and scanned online information due to the sheer volume of information they searched to find the information they needed. Online information is linked in more ways than traditional text. Information is interconnected through links and visuals in multiple ways, and understanding online text can be a very complex process (Coiro & Dobler, 2007). According to Jetson and Shanahan (2012), intertextuality and text navigation become critical variables in constructing meaning. Further research is needed to examine reading strategies students use as they research using multiple digital sources, which is required in Challenge Based Learning.

Summary

While schools are adopting technologies such as the iPad, educators are struggling to keep pace with the speed of technological development and demand (Blanchard & Farstrup, 2011). Means (2010) noted that “we are urging schools and teachers to implement technology with little or no empirical based guidance on how to do so in ways that enhances student learning” (p. 288). The addition of technology to today’s classrooms does not necessarily improve learning, because "these technologies must be used in new, creative ways in combination with proven instructional approaches and practices and not simply to mimic or emulate existing, more traditional approaches to instruction" (Blanchard & Farstrup, 2011, p. 306). Therefore, teachers at all levels must be trained to incorporate such student-centered learning opportunities where students use technology as a tool for research or collaboration.

The best pedagogy in colleges of education includes faculty members who consciously model good teaching practices for their undergraduate students (Reading Instruction Institute, 2007). The preservice teachers participated in Challenge Based Learning to investigate learning disabilities, but simultaneously acquired a new method for teaching. At the university level, teacher education programs need to be proactive in researching and modeling

instructional practices that utilize technology and promote critical thinking. Challenge Based Learning, as described in this article, is an instructional model that integrates technology and research while promoting real-world learning. We encourage teacher educators to implement methods, like Challenge Based Learning, that prepare teachers to be effective in a technology-dominated world.

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TEACHER CANDIDATES' MODIFICATIONS FOR ENGLISH LANGUAGE LEARNERS AS SEEN ON THE TEACHER WORK SAMPLE

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Introduction

One in five students in the nation comes from a home in which a language other than English is spoken. The number of school children whose first language is not English grew by 51 percent from 1997-98 to 2007-08 school year (National Clearinghouse for English Language Acquisition, 2011). This is the fastest growing segment of the P-12 population (National Center for Education Statistics, 2006). Research suggests teachers lack sufficient training in second language acquisition and English as a Second Language (ESL) strategies. Only 12 % of general education teachers nationwide with English Language Learners (ELLs) in the classroom have had at least eight hours of professional development in the area of teaching ELLs (National Center for Education Statistics, 2002). In Texas, the academic performance of ELLs is troubling. Texas Education Agency (TEA) data shows poor overall achievement rates for Hispanic ELLs and low graduation rates (TEA, 2007). It is imperative that teacher preparation programs prepare the next generation of teachers to recognize and meet the needs of second language learners (Lin, Denner, & Luckey, 2010).

At Sam Houston State University (SHSU), all students in the certification area of Early Childhood to Grade 6 (EC-6) must seek ESL certification. Six hours of coursework in second language acquisition and ESL methodology is required. An additional three hours in multicultural

education are mandatory; ELLs represent one of eight types of diversity examined in the course. According to Texas State English Language Proficiency Standards (ELPS) the education of ELLs is a required component of all of EC-6 education coursework from special education to content methods.

In efforts to address teacher candidates' preparation to teach ELLs, it is important students have the opportunity to demonstrate this knowledge through their university coursework. This study focuses on preservice teachers' modifications for ELLs on the Teacher Work Sample (TWS), the capstone assignment in the teacher preparation program at SHSU.

Teacher Work Sample

Since the education of ELLs is an important focus of the EC-6 teacher preparation, it should also be a significant portion of the program's assessment system. Like many universities, SHSU requires teacher candidates to prepare a TWS as a culminating activity of the teacher preparation program. At SHSU, teacher candidates develop a TWS based upon the Renaissance model (Renaissance Partnership Project, 2004) that focuses on a one-week unit of study and is completed during the first placement of their student teaching semester.

The TWS is a teacher candidate evaluation based upon research on effective teaching (Danielson & McGreal, 2000) and is the product of standards-based curriculum for teacher education programs (Girod, 2002; Foster, Kohn, McGuire, Miller, & Miller, 2010). It is designed to connect teaching and learning in meaningful ways, while serving as systematic documentation of the teacher candidate and unit work. Schalock (2002) asserted that the "TWS presumes that teaching will lead to learning and that the knowledge and skills needed to help all children accomplish designated learning outcomes of importance are in place" (p. 51). The framework for the TWS is built upon the idea that teacher candidates are responsible for the learning of their students (Brodsky, 2002). In fact, the TWS provides evidence a teacher candidate has the ability to design and implement a unit of study based upon assessment, to

assess student success on the unit, and to reflect upon the strengths and weaknesses of the unit (Renaissance Partnership Project, 2004).

In addition to exhibiting the candidates' strengths, it is helpful in identifying teacher candidates who are not qualified for certification (Haefele, 1993). Driven by pre-, post-, and formative assessment the TWS displays the progress made by P-12 students (Schmoker, 1999). It measures the extent to which teacher candidates have gained the necessary knowledge and skills identified by NCATE from the teacher education program in order to promote student learning (Foster, Kohn, McGuire, Miller, & Miller, 2010). The TWS provides evidence that a teacher candidate is able to take contextual factors of the school and students into consideration and plan lessons that meet the needs of diverse learners (Glasgow & Hicks, 2003).

Each TWS is based on information gathered about the individual teacher candidate's school placement and is aligned with the following teaching processes:

Contextual factors: a specific discussion addressing community, district, school, classroom factors, student characteristics and instructional implications. Factors include geographic location, community and school populations, physical features of the classroom, technology and grouping patterns within the classroom, and students' attributes, such as age, gender, *language,* culture, and special needs.

Learning Objectives: a discussion addressing the learning objectives and aligning them with state standards. It describes types and levels of learning objectives, and explains how they are appropriate in terms of development.

Assessment Plan: an overview of the assessment plan, including how pre- and post-assessment plans are aligned with learning objectives and how formative assessment will help determine students' progress during the unit.

Design for Instruction: a discussion of the results of pre-assessment and how it will guide instruction or modifications of the learning objectives, a unit overview, what activities will be used and how will technology be integrated.

Instructional Decision Making: a discussion of two examples of when a student's learning or response caused a modification of a portion of original design for instruction.

Analysis of Student Learning: a complete analysis of data that explains progress and achievement for the whole class, two subgroups and two individual students.

Reflection and Self-Evaluation: A discussion of possible reasons students' success and non-success and a description of two professional learning objectives that emerged from insights and experiences with TWS (Renaissance Partnership Project, 2004).

Contextual factors drive the TWS and affect each of the other teaching areas. Therefore, the contextual factors should be a thread throughout the entire TWS, thus influencing learning goals, assessment of student learning, design for instruction, instructional decision-making, analysis of student learning, and reflection and self-evaluation. Candidates are expected to use contextual information as they plan, implement, and reflect upon their lesson.

The TWS are scored by faculty members, mentor teachers, and university supervisors who participate in training and calibration sessions to insure inter-rater reliability. The TWS are given a score of 1, 2, or 3 for each section and an overall holistic score of 1, 2, or 3. Three is high passing, 2 is passing, and 1 is failing. Candidates must pass the TWS in order to successfully complete student teaching. This culminating assessment serves as the cornerstone of the assessment system and shows that candidates are able to orchestrate the pedagogy learned throughout the teacher preparation program and successfully plan and implement a unit of study driven by assessment and contextual factors.

Purpose

The purpose of this study was to explore the extent to which EC-6 teacher candidates considered ELLs in their assessments and lessons and to examine the specific modifications made by EC-6 teacher candidates to address the linguistic needs of ELLs during their student teaching semester.

The researchers investigated the following question:

> How do EC-6 teacher candidates employ contextual factor information related to ELLs to plan, deliver, and assess instruction?

Methodology

In this qualitative study, six TWS documents were analyzed. For the purpose of this study the only TWSs considered were from the certification area of EC-6 because teacher candidates in this field are required to seek ESL certification. A purposeful sampling procedure (Patton, 2002) was used to select TWSs for analysis. Criteria for selection were a score of 3 in each of the six teaching performance standards; subsequently an overall score of 3. The researchers believed choosing TWS's that achieved a score of 3 would guarantee they would be examining the work of candidates who had mastered or excelled at all the standards. In theory, candidates who met all standards had studied the contextual factors and catered their assessments and instruction to the needs of all students, thus indicating success with English Language Learners. Candidates scoring a 2 did not necessarily succeed at addressing the needs of all students. The total number of teacher candidate TWS's that met the criteria for inclusion was distributed across grade levels in the following manner: K, 1st, 2nd, 3rd, 4th, and 5th. At each grade level, one TWS with a score of 3 was randomly selected. Thus, a total of six TWS were analyzed in this study. TWSs that received exemplary scores were chosen because the focus was on how students who met the highest standards of the TWS addressed the issue of ELLs. Of all of the TWSs that received a 3, six were randomly selected for analysis. The six

TWSs were examined utilizing content analysis. While originally content analysis involved a form of quantitative analysis in which the frequency of particular items in texts were counted, content analysis has changed to include “describing and interpreting the artifacts” (Marshall and Rossman, 2006, p.108).

Findings

As the researchers analyzed the data and grouped it into categories, four findings emerged: deficit model perspective, invisible child, failure to apply knowledge, and inappropriate modifications.

Deficit Model Perspective

Five out of six candidates’ comments on the TWS indicated they viewed ELLs in terms of a deficit. These candidates seemed to believe to be an ELL meant problems for the child and teacher, as well as the students’ future success. A few of the candidates’ comments are included here, to illustrate the deficit perspective of the teacher candidates. One candidate stated, “Many students (ELL) in this class are economically disadvantaged; therefore, academics are not always the highest priority for families.” It is troubling this teacher candidate would make a leap from ELL and low socioeconomic status to parents’ lack of interest in schooling. Another teacher candidate stated, “many ELLs did not receive any education prior to Kindergarten.” This teacher candidate was working in a kindergarten classroom and essentially already saw ELLs as academically behind when they *began* a grade that is not mandatory in Texas. Another candidate in a first grade classroom said, “ELLs read very limited amounts of text in English.” This teacher candidate, like the one before, alluded to the negative aspect of ELLs beginning to read in English while even native speakers of the language are also just beginning to read texts. Furthermore, the candidate did not consider the ELLs may have had additional reading ability in their first language. Thus, rather than viewing ELLs in a manner that

emphasizes the positive nature of learning a second language, the candidates in our study saw ELLs as having a deficit.

Invisible Child

Two of the candidates in the study initially mentioned in the contextual factors section they had ELLs in their classroom. However, the ELL presence was wholly absent from the rest of the TWS. The candidates had made no accommodations; ELLs were not taken into consideration as the candidates planned the lessons or the assessments. ELLs had disappeared from the unit planning and classroom. Unfortunately, this situation mirrors the reality of too many ELLs in the classroom.

Failure to Apply Knowledge

Most teacher candidates were able to identify contextual factors at a basic level. This means that they were able to identify the basic characteristics of the community, district, school, classroom and students. At this basic level, teacher candidates were able to formulate instructional implications regarding the ELLs in the classroom. They had knowledge of ESL strategies. However, they had difficulty using that knowledge in other sections of the TWS, including learning objectives, design for instruction and assessment. One candidate stated that she would utilize “extended wait time when asking questions to allow ELLs to translate and formulate answers.” While this is a good strategy to use with ELLs, the teacher candidate did not include it as part of a modification for her lesson. Another candidate wrote, “Using lots of modeling, visuals, and hands-on activities would benefit ELL students.” Still another candidate said that she would “scaffold instruction” and engage in “vocabulary building.” These candidates seemed to know the strategies to implement, but they did not apply the strategies to individual ELLs that needed modification.

Inappropriate Modifications

A one-size-fits-all approach or vague misconceptions of modifications were also noted by a few candidates who actually accommodated instruction for ELLs. They made blanket

statements when describing their modifications for ELLs. One candidate said that she would let the ELLs “take work home,” while another expressed that she would tell her ELLs to “try their best.” The teacher candidates did not elaborate on the specific language needs of the ELL. They just opted for using the same modification in all sections of the lesson. It is worth mentioning that in all cases, teacher candidates had more than one ELL in the classroom. No effort was made to individualize and tailor the accommodations to particular students or specific proficiency levels. Other candidates’ modifications included they would “make it obvious” or “say instructions clearly” for the ELLs. It is not evident what the teacher candidate meant by “make it obvious” for the ELLs, nor how she would accomplish that in the classroom. Furthermore, “saying instructions clearly” is a given in all classrooms with or without ELL students, not a specific modification for ELLs. These are examples of students who knew they needed to make modifications, but they were unclear about what the modifications should be, or even what it means to make a modification. Thus, it is critical that we address how our teacher candidates employ contextual factors as they plan, deliver and assess instruction to address the language proficiency needs of ELLs.

As a whole, the answers to our research questions were not encouraging. We found that overall these EC-6 teacher candidates did not employ the contextual information about ELLs to plan, deliver, or assess instruction. Furthermore, they failed to consider the ELL contextual factor in their reflections.

Implications

Conducting this study has allowed us to identify weaknesses in our efforts to prepare EC-6 preservice teachers to work with ELLs. When examining our findings and reflecting on our program, we identified several implications. We need to better instruct candidates to recognize and value contextual factors as critical information to plan assessment and instruction. In particular, we must emphasize the need to make accommodations for ELLs. We believe that it

is detrimental EC-6 teacher candidates complete their ESL specific coursework one year prior to student teaching. Therefore, we must double our efforts to infuse these strategies into all our coursework, not just within the ESL courses. In addition candidates should receive diverse field experience placements throughout their preparation, which provide them with opportunities to work with ELLs in multiple settings.

Finally, we are disturbed by the fact that these teacher candidates received exemplary scores on their TWS while failing to adequately address the needs of ELLs. This reinforces the fact that it may be necessary for ESL faculty to educate other faculty members, supervisors and mentors about ELLs and to redesign the TWS evaluation process to include ELL adaptation as an integral component to completing a quality product.

Conclusion

Given the diversity of students in our schools today and the growing number of English Language Learners, faculty and teacher education programs must find new strategies and opportunities for teacher candidates to gain a deep understanding of their students' needs and the impact those needs have on student learning. Plans are currently being made to evaluate the TWS rubric and scoring procedures to ensure candidates focus on accommodations for ELLs. It is our hope teacher candidates will graduate from our institution knowing how to plan lessons and assessments based upon contextual information for ELLs and all learners. The success of all students depends upon the teacher's willingness to make accommodations based upon an individual's needs.

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EXPLORING THE RELATION AMONG TEACHERS, SCHOOL EXPERIENCES AND ADOLESCENTS' EFFICACY FOR ENGINEERING STUDIES

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Abstract

Recent reports criticize the state of science, technology, engineering and mathematics (STEM) education in the United States, and identify changes to K-12 schools and teaching as key strategies for improvement. Social Cognitive Career Theory (Lent, Brown & Hacket, 1994) was used to examine the extent to which schools and teachers function as "contextual variables" influencing engineering self-efficacy. School experiences of secondary and two groups of post-secondary students were compared, but few differences were found. Compared with college-level students, however, secondary students were more likely to cite teachers as agents providing information about their engineering capabilities. These findings suggest that school and teacher influences alone may not be sufficient to sustain students' commitment to engineering studies upon entering university.

"Rising above the gathering storm" and the two-year follow up report written by the National Academy of Sciences Committee on Prospering in the Global Economy of the 21st Century (CPGE) (2007, 2009) described the deteriorating status of, and challenges facing, the U.S. economy and the workforce in the arenas of science, technologies and innovation. Although the causes for these challenges are complex, it is clear that improvements in K-16 education represent one of the central strategies for meeting the challenges described in the report. A recent story about increased funding for teacher education in science and mathematics reported in the *Washington Post* (Anderson, 2010) made it clear that the Obama administration also sees better-prepared teachers as an important step toward improving STEM outcomes for students and the nation.

The identification of this policy direction suggests that schools and teachers can and should play a central role in creating interest, building knowledge, and skill needed to prepare students for post-secondary studies in STEM areas. “In particular, a better understanding of what actions can be taken to excite children about science, mathematics, and technology would be useful in designing future educational programs” (CPGE, 2007, p. 115). The committee members highlighted teacher education programs aimed at increasing the number of qualified math and science teachers because out-of-content teachers “tend to rely heavily on textbooks and avoid the open-ended explorations that are the most effective way to learn science and math” (CPGE, 2009, p. 10). In this report, however, there were few suggestions about strategies for generating student interest in these fields. Given this situation, the authors feel it is important for teacher educators to further their understanding on this issue, so that the teacher education programs can equip a 21st century teacher workforce that effectively draws future students to all 4 STEM areas.

Promising Curricular and Instructional Strategies

Although improvement of K-12 education is seen as a pivotal strategy for addressing the causes of the “gathering storm,” little is known about the real impact of proposed initiatives in the long-term, and even less is known about what curricular, instructional and organizational strategies schools might use to bring about favorable outcomes in the various STEM disciplines (Cavanagh, 2008; Labov, Singer, George, Schweingruber & Hilton, 2009). At present there is limited longitudinal research concerning school-based strategies for improving students’ STEM-related outcomes and interests.

There are, however, some promising developments that appear to be providing direction in the near-term. For example, one general instructional strategy that continues to capture the attention of STEM educators is the project method (Wolk, 1994). Since the early 1900s, (Kilpatrick, 1918), science educators have championed a specific form of this teaching strategy called problem-based instruction (Penuel & Means, 2004). Early evaluations of this instructional

approach suggest that it may have positive impacts on students' achievement (Shymansky, Hedges, & Woodworth, 1990).

Another emerging curricular and instructional strategy involves the use of engineering design (Katehi, Peason & Feder, 2009; Tran & Nathan, 2010). In many ways, this approach is similar to problem-based approaches emphasizing, in a K-12 setting, integration of multiple disciplines and requiring fairly sophisticated analytic and problem-solving skills (Douglas, Iversen & Kalyandurg, 2004; Project Lead the Way, 2008), but typically extending projects to the development of a product or process intended to address a problem (Sheppard, Macatangay, Colby, & Sullivan, 2008).

Another strategy advocated by Dewey (1902 / 1976) is the use of career and technical education (CTE) as a vehicle for instruction aimed at content application. Stone, Alfeld and Pearson (2008) described a large-scale, experimental intervention study where high school CTE instructors integrated and explicitly taught the mathematics concepts associated with their courses (e.g., agriculture, auto technology, information technology). Students in the intervention CTE courses exhibited an equal degree of technical skill, and a greater degree of mathematics ability compared to students in non-enhanced CTE courses, which showed that the integrated approach to teaching/learning may give the best results.

These studies and practices point to promising directions for influencing students' interests and achievement in the present, but a key component missing from most discussions is how to sustain student gains overtime (Labov et al., 2009). That is, what are the longitudinal effects of these school and instructional experiences? For example, do experiences in middle and high school influence students' decisions to enter into and engage in post-secondary STEM studies?

In the absence of such information, the current project was undertaken. The authors were attempting to better understand whether schools and teachers are able to carry out their charge of stimulating interest and fostering requisite knowledge students would need to

successfully pursue STEM studies in a post-secondary setting. This study is set in the context of engineering studies, but the findings are likely to also have some relevance to the other STEM fields.

Social Cognitive Career Theory

Recent reports abound with recommendations for better curricula, teachers and instruction, but fall short in terms of providing a resource to help educators get a better handle on how teachers should instruct, how schools should be structured, and why these actions are likely to be effective in the longer term. This study draws upon the social cognitive career theory (SCCT; Lenz, Brown & Hackett, 1994) to understand better the potential links between early school experiences and later interest in STEM studies.

Social cognitive career theory (SCCT) has emerged as a prominent framework for describing career interest and career choice in a variety of professional domains (Lent, 2005; Tang, Pan & Newmeyer, 2008) and has been widely used in research in STEM education (Lent, Lopez, Lopez, & Sheu, 2008). According to the SCCT model, self-efficacy is the most prominent predictor of career interest and goals. Furthermore, outcome expectancy and contextual variables such as support and barriers are related indirectly to career choice through efficacy.

This theory has also been helpful in understanding the factors responsible for the underrepresentation of women, first generation students, and racial ethnic minority groups in STEM education (Lent, Brown, Brenner, Gloster, Wilkins, Schmidt, Lyons & Treistman, 2005). In its current form, however, the theory is limited by the fact that it captures only the relations among the variables at a specific moment in time. Given this limitation, then, there remains a need to understand better the role that environmental supports and barriers in schools might have on efficacy for STEM studies over time.

Methods

Research Questions

Findings from research examining predictors of STEM careers clearly show that there are associations among efficacy, interest and contextual variables related to support and resources to overcome barriers (e.g., Lent, Brown & Hackett, 2000). From the perspective of identifying strategies schools might use to improve students' STEM-related outcomes and interests, the SCCT model is of limited utility in that it has not, to date, clearly identified schools as contextual support variables, nor has it been used to show cumulative effects of contextual variables over time. The research questions addressed by this study are:

1) How do efficacy and interest in engineering studies relate to school-based variables, like teachers and school activities?
2) Are there differences in students' self-report of these variables based on their temporal proximity to educational experiences in secondary schools?

Results from this study may begin to round out our understanding of the SCCT, and although the current study focuses on engineering alone, doing so may provide further direction concerning actions schools might take to improve STEM outcomes for students.

Participants

Participants for this exploratory, cross-sectional study (n = 97) were drawn from three distinct school populations (see Table 1). Although there were many differences among the groups, they were similar in the respect that individuals within the groups all expressed some level of interest or commitment to engineering studies. Investigating this aspect and the associated differences that might exist among the groups was the basis for our study.

Table 1
Participant Demographics by Groups

Variable	Under-graduate (n = 32)	Pre-College (n = 31)	Secondary (n = 34)	Total (n = 97)
Gender				
Female	6	4	14	24
Male	26	27	20	73
Race / ethnicity				
Asian or Pacific Islander	0	2	1	3
Black	0	5	1	6
Hispanic	9	3	15	27
Native American	1	2	0	3
White	22	19	17	58
Mother's education				
College degree	21	17	15	53
Attended college	7	8	9	24
Never attended college	4	6	10	20
Father's education				
College degree	17	22	8	47
Attended college	6	5	8	19
Never attended college	9	4	18	31

Participants in the first group were drawn from a volunteer sample of college-level freshmen and sophomore engineering majors at a large university in the Southwest. These *undergraduate students* were completing their first introductory engineering course (n = 32), Engineering Design, during the spring semester. Participants in the second group were *pre-college freshman* (n = 31) who were enrolled in an industry-sponsored summer "bridge" program intended to help high school graduates interested in Engineering to successfully transition into Calculus courses during their first semester at university. Although enrolled at university, these students had not yet taken college-level engineering courses.

Participants in the third group were drawn from a sample of *secondary students* (n = 34) participating in a fee-based, summer camp experience focusing on wind engineering.

Participants at the camp were entering Grade 9 in the following school year. The camp, *Run on the Wind*, was a weeklong residential experience set among the wind engineering research facilities of a major university. The camp was taught by university faculty members in the field of wind engineering as part of an outreach feature of a National Science Foundation grant, and was facilitated by a high-school teacher of physics.

Subscale Measures

Quantitative and some qualitative data were used in the present study. In terms of quantitative data, four different scales were utilized in this study. The first two scales were developed by the authors in order to gather information about participants' school experiences related to engineering. Two other scales were developed by Lent and Brown (2008) to examine relations among factors associated with social-cognitive career theory.

School experiences. The first scale was constructed by the authors intending to measure the frequency with which students experienced school-based activities and interactions with their teachers that might have some bearing on their knowledge about engineering as a career option. This four-item, 5-point frequency scale (1 = Never or almost never occurred; 5 = Always or almost always occurred) consisted of items concerned with fieldtrips, influential teachers, instructional experiences, and after-school activities. Scores derived with these items exhibited adequate internal consistency with the current sample (α = .77).

Sources of information about engineering. The second scale was constructed by the authors intending to measure the frequency with which students received information about engineering from their teachers. This 5-point Likert-type scale (1 = Not at all true of me; 5 = Very much true of me) was developed for this study to capture information related to the sources from which students obtained information about the field of engineering. For the present study, the researchers used only the items pertaining to sources that were related to teachers. Scores

derived with these items exhibited adequate internal consistency with the current sample (α = .76).

Efficacy for engineering studies. This 10-point Likert-type scale (0 = No confidence at all; 9 = Complete confidence) was originally developed by Lent and Brown (2008) to capture information related to students' confidence in being able to successfully accomplish tasks required for earning an undergraduate degree in an engineering field. Scores derived with these items exhibited good internal consistency with the current sample (α = .84).

Interest in engineering activity. This 5-point Likert-type scale (0 = Very unimportant; 9 = Very important) was also originally developed by Lent and Brown (2008) to capture information related to students' interest in activities typically associated with engineering (e.g., Working on a project involving engineering principles). Scores derived with these items exhibited adequate internal consistency with the current sample (α = .76).

Recommendations for school strategies. Qualitative data was gathered via an open-ended prompt at the end of the questionnaire described above (What advice would you offer to high schools or teachers that might help more students consider choosing engineering as a major course of studies?).

Procedures

Undergraduate engineering students. Students in the undergraduate engineering course were approached by one of the researchers during a regular class meeting prior to the mid-term and asked to participate in a study concerned with how schools might influence pupils to pursue engineering studies. The instructor of record was not present while students were recruited and the survey was administered. Participants did not receive extra credit for participating. The 32 undergraduate participants represent 91% of students in the course section. Participants took approximately 15 minutes to complete the survey packet.

Pre-college freshmen engineering majors. Students in this group were approached by one of the researchers during an initial, whole-group orientation session one day prior to beginning classes. These participants were also asked to participate in a study about how schools might influence pupils to pursue engineering studies. The program coordinator was not present, but older peer mentor students where present while students were recruited and the survey administered. The 31 incoming freshmen engineering majors represented 62% of students in this group. Approximately 20 students did not complete the survey due to arriving late to the orientation session, not having the orientation packet in which the survey was enclosed, or simply choosing not to participate. Participants completed the survey packet in approximately 15 minutes.

Secondary-level summer camp attendees. Early adolescents (76% entering 7th or 8th grade) attending a summer-time, wind engineering camp at university completed pretest and posttest evaluation measures designed for program evaluation purposes. At the time of administration, these individuals were not expected to be included in the sample, but subsequent analysis of evaluation data indicated their responses were suitable for inclusion in this study. It is not known how much time these individuals required to complete the pretest evaluation survey.

Plans for Analysis

The research question concerning the relations among SCCT variables and school-based and teacher variables was examined using a simple correlation analysis. The second question concerning differences in these variables among student groups was addressed using multivariate and univariate group means procedures. The findings presented below are cross-sectional due to logistical constraints and limited resources of the researchers. Although our ultimate interest is longitudinal, our analytic approach is cross-sectional. It is intended only to determine whether differences in the study variables may exist among groups. Therefore, the analysis of the personal and contextual variables involved examining correlations among the

variables across all three samples of students. Then, analyses of group means were conducted to determine if there were any statistically significant differences.

Results

Relations Between Personal and Environmental Variables

Table 2 contains the correlation coefficients and descriptive statistics for personal and contextual variables included in this study. Results from this analysis revealed a moderate relation between students' efficacy for engineering studies and their interest in engineering studies ($r = .54$, $p < .01$). A small, but statistically significant, association was found between efficacy for engineering studies and the extent to which students considered a teacher to be a source of efficacy information about engineering ($r = .32$, $p < .01$). A small, but statistically significant coefficient was also revealed between efficacy and school experiences involving a teacher or classroom instruction ($r = .21$, $p < .05$).

Table 2

Correlation Coefficients and Descriptive Statistics for Personal and Contextual Factors

	Variables	**1**	**2**	**3**	**4**	**5**
1	Engineering efficacy	1.000	.540**	.214*	.137	.324**
2	Engineering interest [1]		1.000	.260*	.171	.322**
3	School experiences - teacher & instruction			1.000	.527**	.227*
4	School experiences - after-school programs				1.000	.239*
5	Teacher as source of efficacy about engineering					1.000
	M	6.95	3.66	2.61	1.99	2.52
	SD	1.46	.68	.88	1.10	1.09

Note. [1] Engineering efficacy was rated on a 9-point scale; Engineering interest was rated on a 5-point scale.

* < .05; **< .01.

The results from this correlation analysis are interesting for three reasons. First, the findings suggest that the relation between efficacy for engineering studies and interest in engineering studies are consistent with previous findings even when the sample includes students at the middle-school level. Second, the small, but significant correlation coefficients between efficacy and school and teacher influences suggest that these school variables could be contextual variables related to social barriers and support. Third, the relation, albeit small, between engineering efficacy and school and teacher influences is also found, even when the sample includes students who are somewhat removed from these pre-college experiences. These findings could indicate that schooling experiences continue to influence efficacy and interest during post-secondary studies, though a more thorough investigation of this issue is clearly needed. Given the uniform scarcity of school and teacher-related experiences reported by this sample of students, these findings seem to point to opportunities missed that might have further contributed to students' beliefs about their capabilities related to engineering studies.

Differences Among Groups

Next, a series of three analyses were undertaken in order to examine possible differences that might exist among student groups. First, a 3 X 1 MANOVA was conducted with student group as the independent variable, and personal variables (i.e., efficacy and interest) as the dependent variables (see Table 3). Results from this analysis revealed no statistically significant effect at the multivariate level [Wilks' $\lambda = .971$, F (4, 184) = .68, $p = .60$] (see Figure 1). Interestingly, this result suggests that across the respective groups, efficacy for engineering studies and interest in engineering studies is uniform. This lack of difference is noteworthy given the age differences among the groups.

Table 3

Descriptive Statistics for Personal Variables by Student Group

Variable	Group	Mean	SD
Engineering efficacy	Undergraduate	6.67	1.183
	Pre-College	6.95	1.34
	Secondary	7.22	1.77
Engineering interest	Undergraduate	3.54	.58
	Pre-College	3.66	.60
	Secondary	3.78	.83

Note. [1] Engineering efficacy was rated on a 9-point scale; Engineering interest was rated on a 5-point scale.

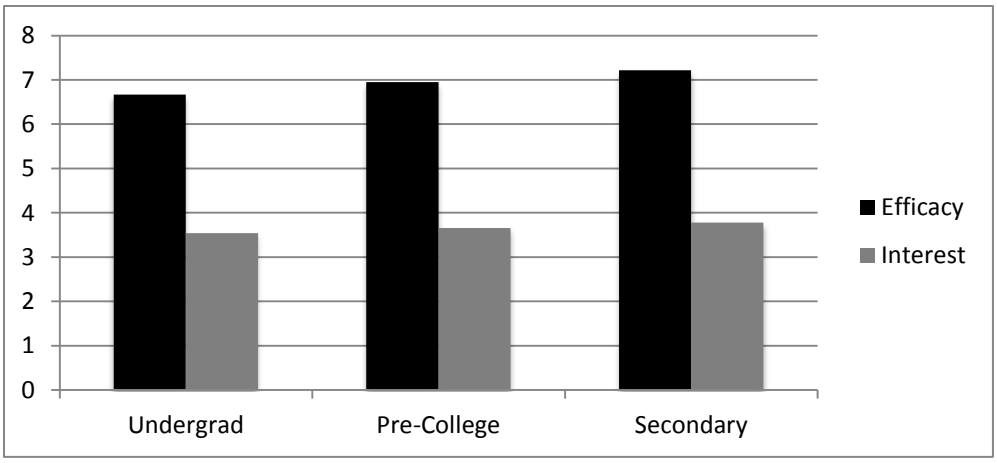

Figure 1. Comparison of engineering efficacy and interest across student groups.

Second, another 3 X 1 MANOVA was conducted with student group as the independent variable, and school-related experiences (i.e., teacher-instructional experiences, and after-school experiences) as the dependent variable (see Table 4). As in the previous analysis, these results likewise revealed no statistically significant differences at the multivariate level [Wilks' λ = .987, F (4, 186) = .29, p = .88]. This lack of differences indicates that participants' recollection of school-related experiences is strikingly similar, which in the context of traditional,

comprehensive schools, is not surprising. Students across all groups reported low frequencies of teachers or instruction that affected their thinking about engineering, and even fewer after-school opportunities to learn about engineering.

Table 4

Descriptive Statistics for Contextual Variables by Student Group

Variables	Group	Mean	SD
School Experiences - Teacher & Instruction	Undergraduate	2.60	.90
	Pre-College	2.53	.74
	Secondary	2.69	1.00
School Experiences - After-school programs	Undergraduate	2.09	.98
	Pre-College	1.93	1.15
	Secondary	1.95	1.19

Finally, a 3 X 1 ANOVA was conducted with student group as the independent variable, and extent to which a teacher was a source of information about students' engineering capabilities as the dependent variable (see Table 5). Results from this analysis revealed a statistically significant univariate effect for the extent to which teachers were seen as a source of efficacy information related to students' capabilities in engineering [F (2, 94) = 3.41, p = .03]. Post-hoc analysis revealed that differences between college undergraduate majors and secondary-level students accounted for this univariate result [p = .01]. These results may be attributed to two possible reasons. First, the undergraduate majors actually experienced fewer instances in high school where teachers provided efficacy information about engineering. Second, students' perceptions of the extent to which teachers provided information about their capability to succeed in engineering may be recalled differently across age groups. Given the similarities among the student groups with regard to the other study variables, it seems possible that the second explanation may be more likely. If that were true, this finding may point to

differences in the way secondary-level exposure and experiences function over time.

Table 5

Group Differences Concerning Teacher as a Source of Efficacy Information

Variable	N	Mean	SD	Min	Max
Undergraduate	32	2.18	.79	1.00	4.00
Pre-College	31	2.49	1.25	1.00	5.00
Secondary	34	2.87	1.10	1.00	4.67
Total	97	2.52	1.09	1.00	5.00

Suggestions for Improving School and Teacher Effect

At the end of the study questionnaire, undergraduate engineering students also provided some suggestions to high school teachers that might increase students' likelihood of choosing engineering as a major course of study at university. From these responses, three themes emerged. These themes included (a) providing students with more information about engineering, (b) changing qualities of instruction so that learning is fun, and (c) aligning high-school courses with post-secondary engineering studies in order to provide adequate prior knowledge.

In terms of providing more information about engineering, undergraduate engineering students most often (52%) suggested that high school students would benefit from exposure to industry speakers who highlight features of their work and personal qualities associated with success in engineering (e.g., "Have speakers come to interest students. Tell them why it is interesting and the lucrative value of these jobs;" "It would help to have guest speakers come to the schools;" "Truly show the work of real engineers. Many engineering students I've talked to still aren't entirely sure what engineers do;" and "Tell them if you like being creative, working on a team and like solving problems, then engineering is right for you").

To a lesser extent (30%), participants also recommended changes to instruction that involved more hands-on activity and better integration of engineering principles into specific content areas (e.g., “Make the classes fun and interesting, not cut and dry. I promise you, grades will go up if you make them more enjoyable;” and “Teach kids to ask ‘why’ and build things;”). Finally, a few students (18%) recommended ways of aligning high school course work with post-secondary engineering studies (e.g., “Apply engineering in high school math and science;” “Introduce them to basic principles of engineering;” and “Take calculus and be very strong in that subject”).

These recommendations from undergraduate engineering majors are strikingly similar to the strategies identified by Gottfredson (2005). Recommendations such as enlisting engineers as guest speakers and learning more about the actual jobs of engineers are consistent with school strategies such as career-focused field trips, career days, and contact with workers. Recommendations related to improving instruction and aligning course work, on the other hand, are more consistent with the education reform directions achieved through instructional change (e.g., Gourgey et al., 2009). As a whole, these recommendations seem to indicate that the structure of schools and the actions of teachers can be contexts for social support that may influence students’ efficacy for and interest in engineering studies.

Discussion

The students participating in this study had very few school experiences that contributed to their efficacy or interest in engineering. In fact, the responses across the three student groups are striking in the uniform lack of instructional exposure, after-school activity and even teachers who provided information about students’ engineering capabilities. These results suggest that recent national-level reports have identified an important leverage point for affecting change, and that at this point there is considerable opportunity for improvement.

To answer the first research question, efficacy for and interest in engineering studies appeared to be unrelated to students' recollections of either the instructional actions of their teachers, nor the experiences they had in extra-curricular or after-school programs related to engineering. Efficacy and interest, however, were related to students' reports that a teacher was a source of information about engineering. The fact that the average responses of participants concerning questions about instructional and especially after-school experiences were uniformly low may have influenced this statistical result. Although school experiences occurred infrequently, and appeared to be unrelated to efficacy and interest, in our sample, a small but positive association was found between students' efficacy and interest, and the extent to which they reported that a teacher had provided them with information about their capabilities to be successful as an engineer.

To answer the second research question, no differences were found in efficacy, interest or school experiences based on students' proximity to educational experiences in secondary schools. A statistically significant difference was found, however, in the extent to which participants reported that a teacher had provided them with information pertaining to their capability to be successful in engineering studies. This difference is particularly intriguing given the similarities of participants on all other demographic and study variables. This difference may indicate that the relation between undergraduate students' efficacy for engineering and the information previously provided by secondary-level teachers about engineering capabilities may diminish over time. Put another way, it may be that the influence of secondary teachers may not be robust enough to influence the efficacy and interest of students in the early phases of engineering studies. This finding, in particular, has important implications for the direction and emphasis of current efforts to improve development of academic pipelines for engineering studies, and indeed, all the disciplines within STEM.

Overall, the findings from this study provide promising, but preliminary evidence that it is appropriate to consider schools and teachers as contextual influences providing social support

that affects students' efficacy and interest for engineering studies. Our findings also raise questions about the robustness of early influences as students undertake the early phases of post-secondary studies in the engineering field.

As with most studies, there are a number of methodological limitations, including sample size, lack of experimental conditions, and contexts of the study, but one limitation should be noted in particular. Like our criticism of other researchers capturing relations among variables at one point in time, we have done the same. We did introduce a time dimension to our study by asking older students (i.e., undergraduate and pre-college freshmen) to retrospectively report on teacher influence, but the fact remains that this does not constitute a longitudinal approach. As such, our findings hint that the longer-term effects of schools and teachers on students' decision to pursue engineering studies and careers is an important issue, but further research is obviously necessary.

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