

Excerpts from a previously published dissertation

NOW WHAT? TEACHER PERCEPTIONS OF THEIR INSTRUCTIONAL PRACTICES IN A POST-STANDARDIZED TESTED WORLD

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Abstract

House Bill 5 removed standardized testing from physics and chemistry classes throughout the state. This study followed two secondary science teachers as they transitioned from teaching a state-tested subject to a state non-tested subject. A thorough examination of their perceptions suggests that the teachers did not significantly alter their instructional practice although they had more autonomy in the classroom.

Keywords: standardized testing, assessment, science instruction

Introduction

The implementation of the No Child Left Behind Act of 2001 dramatically changed education in the United States. Although this legislation only requires state assessments to be administered in grades 3-8 in reading and mathematics, the majority of states utilized state testing for accountability purposes in social studies and science. With the integration of the Texas Assessment of Knowledge and Skills (TAKS) test in 2003, Texas adopted high stakes testing in four major areas: mathematics, English language arts, social studies, and science. The science TAKS was administered in grades 5, 8, 10, and 11. In 2011, the Texas legislature decided to “up the ante” with end-of-course (EOC) exams, causing the number of high school state exams to increase from eight to 12. The student anxiety generated from an increase in rigor and number of exams enraged parents. Due to the parental outrage, House Bill 5 was crafted, decreasing the number of state tests from 12 to five. With this action, grade 5, 8, and biology would be the only science courses with an accompanying state test. After eight years of state testing, chemistry and physics were finally free!

Significance of Study

Texas is one of the first states to decrease the number of standardized exams. Without the restrictions imposed by high-stakes testing, educators in subjects no longer state tested have the ability to foster a love of learning in their classrooms. To date, no studies have examined Texas high school science teachers’ perceptions of change or lack of change in their instruction during the transition from teaching a state tested subject to a state non-tested subject.

Research Questions

This research followed two secondary, alternatively certified science teachers, as they transitioned from a state tested subject to a state non-tested subject. The following question drove this research.

When high stakes testing ceases in high school science classes, what happens to teacher perceptions of their instructional practices?

Literature Review

Educational reform, with a focus on improvement through assessment and system evaluation, is universal. In response to global pressure to create and sustain an educated workforce, many countries including Canada, Great Britain, New Zealand, and the United States have implemented standardized testing to make schools, teachers, and students accountable for student learning (Te Riele, 2006). Although the history of standardized testing in the United States is vast, albeit unique to each state, the passing of No Child Left Behind (NCLB) in 2001 unified all states under an umbrella of accountability. This accountability impacted states with absentee standards and assessments.

Media coverage and searches in the literature associated with standardized testing typically emphasize negative effects of assessment on children and teachers; however, studies that have positive views and outcomes do exist. Proponents of standardized testing will argue that utilization of high stakes testing increases standards, holds public schools accountable, and enhances stakeholder's confidence in the public school system (Heubert & Hauser, 1999). In many states, implementation of standardized testing alone increases the quality and amount of professional development for educators (Cobb & Jackson, 2011; McMillan, 2005), leads to alignment of instruction with state content standards (Stecher, 2002; Yeh, 2005), increases student motivation to learn (Stecher, 2002), and provides more remediation opportunities for students (Barnes, 2005).

The negative effects of high-stakes testing are undeniably more prevalent in literature. High-stakes testing has received blame for anxiety among students and teachers resulting in lower teacher morale (Greenburg et al., 2016; Stauffer & Mason, 2013) and an increase in the student dropout rate among disadvantaged students (Groves, 2002; Nichols & Valenzuela, 2013). Due to the intense pressure, teachers may resort to narrowing the curriculum (Au, 2007; Nichols & Berliner, 2008; Madaus & Russell, 2011), focusing only on topics that are tested, and in rare cases, non-student "cheating" occurs (Starnes, 2011; Stecher, 2002). This research focused on the advantages and disadvantages of each situation by examining teachers that had experienced teaching the same subject during years of high stakes testing and years without a state exam.

Methodology

The "bounded context" (Miles & Huberman, 1994) for this case study occurred in an 18-month period in a large, urban high school in Texas. This research followed two teachers (Laura and Cris) that held a teaching certificate, worked in the same school environment, taught TAKS or EOC tested students in on-level physics or chemistry, taught the same course during the transition year, and were projected to teach the same course the following year. Multiple data sources were necessary to answer the research questions and to ensure accurate examination throughout this 18-month study.

Table 1

Data Sources Utilized Per Phase of the Study

Phase & Timeframe	Data Source
End of Year One	Interview 1
Year Two	Interviews 2, 3, 4, & 5 Field Notes from 14 Observations Post-observation Conferences from 13 Observations Artifacts from 14 Observations
Beginning of Year Three	Interview 6

Interviews, field notes, and post-observation conferences were transcribed and read multiple times. Utilizing open coding methodology (Corbin & Strauss, 2014) allowed for the identification and tentative naming of conceptual categories. The axial coding method allowed conceptual categories to be reexamined to determine if relationships existed between each category before they were collapsed into themes. This selective coding method served to further develop and refine concepts, establishing the bigger picture of the phenomenon.

Trustworthiness

Multiple methods including triangulation, prolonged engagement, member-checking, and peer debriefing were employed in this study to improve credibility since my experience as an educator was a potential source of bias. Yin (2009) posited that using multiple methods of data collection leads to more valid, reliable, and diverse construction of realities. To adhere to his principles, multiple data sources (interviews, observations, field notes, post-observation conferences, and artifacts) have been used in this research.

Results

Teaching subjects no longer state tested, Laura and Cris had less accountability and options to alter their instructional practices. Entering their educational careers during high-stakes testing, both teachers admitted that their instructional practices were greatly altered by the pressure of state testing and the influence of their colleagues. The emerging themes in this study are *mentor influence* and *the continuation of traditional instruction*.

Theme 1: Mentor Influence

In this high-stakes environment where uniformity was encouraged, teachers communicated and collaborated daily. As new teachers teaching a state tested subject, Laura and Cris reported that they looked to mentors and colleagues for test preparation and guidance on how to teach their subject. The significance of what their mentors taught them cannot be overlooked, since teachers learn through experience, often modeling the methods of their mentors. The following excerpts describe the teachers' experiences at Lincoln High with test preparation and the search for guidance from mentors regarding teaching methods.

I was still trying to learn the expectations because they [the State Board of Education] give you the standards, but you never know how they're going to ask it. There were some veterans that knew exactly what they were going to do, and I was still learning. (Laura, I1: 41)

Mary [my former teacher and mentor] made a huge impact on me, so I need to be like her. (Laura, I2: 498)

Like Laura, Cris also followed veteran teachers and looked to a mentor for guidance.

Cris: I went with what other teachers were using, so I can do what they were doing... it was a tried and true method that they had used, and I just adopted it as my own.

Researcher: Would you say that your teaching methods were actually modeled by whoever was helping you out?

Cris: Most definitely. When I came in, the test scores were great compared to the rest of the state. I was like, "I'm not going to mess with that. I'm going to do whatever they're doing." (Cris, I4: 253)

The other physics teacher would tell me certain things to cut out because she had a pacing system already that worked. (Cris, I1: 104)

The preceding quotes show that as teachers new to the profession, Cris and Laura often looked for guidance and help. While they came with ideas of what education should look like, those ideas were altered the second the pressure of the

state test became a reality. In fact, in many instances, teachers will follow their mentor's every move. When Cris transitioned into teaching physics, his mentor provided guidance and resources.

I did adopt Ms. Harrison's calendar... and followed it to the tee. I didn't mess with it or add anything because I didn't know what I was doing. (Cris, I4: 357)

Because Cris had never taught physics, he mirrored his mentor's instructional practices and pacing. Ms. Harrison had taught physics for many years; therefore, Cris believed that she was using best practices for teaching that subject.

Theme 2: Continuation of Traditional Instruction

During interviews, the teachers were asked to use five words that described themselves while teaching a state tested subject and five words to describe themselves once they were no longer state tested. Teaching a state tested course, Laura described herself as "structured, focused, rigid, demanding, and impersonal." After the removal of the state test, she described herself as "fun, understanding, flexible, compassionate, and engaging." Being a state tested teacher, Cris described himself as "stressed, anxious, and short-tempered." As a state non-tested teacher, he described himself as "reflective, carefree, collaborative, and creative." The 180-degree turn in the teachers' descriptions of themselves is due to a newfound freedom and subsequently, the ability to teach however they like. To understand how the teachers had altered their instruction, it is imperative to first understand their restricted teaching practices.

Restricted Teaching (Standardized Testing)

The TAKS for tenth and eleventh graders was an accumulation of biology, chemistry, and physics concepts. To ensure students were prepared for the test, the school had a system for science test preparation that all teachers were expected to follow. Every science teacher would spend approximately 15 minutes on topics that did not specifically pertain to their course. For instance, physics courses would review biology and chemistry, while chemistry courses would review biology and physics. These mini-lessons occurred four days a week with a quiz on Friday. The quiz scores would then be reported to the science department head. In the following passage, Laura describes the beginning of a typical day when teaching a state tested subject.

On a typical day, we would start with a 10- or 15-minute warm-up activity where the kids would go over some topic that would be tested on TAKS... It was always a little bit weird because the review would not usually have anything to do with what we were teaching that day [in chemistry]. We would go over phylums and kingdoms. Then, "Okay kids, now let's balance this chemical reaction." It was hard for me to switch my brain over, so I'm sure it was hard for the kids too. (Laura, I1: 7)

After test preparation, Laura would then begin the chemistry lesson.

Laura: Typically, I would teach them some kind of conceptual thing... Some days, I would teach them an equation and that would take all class... Then, there would probably be some kind of worksheet where they would practice the problems and we would go over it the next day.

Researcher: So, as far as labs go, what percentage do you think you did during those days [during state testing]?

Laura: Definitely not as much as I should have...Probably like 20 or 25%. It was at least one a week, but I was lucky if I got two in. (Laura, I1: 51)

Cris also adhered to the mandatory TAKS reviews every day during state tested years. The following exchange describes Cris's day when he was state tested. Like Laura, he also expressed a lack of exploration in his lessons.

Researcher: After the TAKS quick reviews, what kind of activities did you do in your lesson?

Cris: There were demos arranged, Foldables.... different strategies, kind of tying in those TEKS. That first year, I really didn't have a science classroom, so I didn't really [do any labs]. It was hard for me to do labs in general, but it was almost prepping for two lessons within the same class period. So I felt pressured to pay more attention to TAKS instead of the actual [physics] lesson itself. (Cris, I1: 44)

To adequately prepare their students to achieve passing (and preferably high) scores on the state exam, Cris and Laura focused an enormous amount of instructional time towards test preparation. The amount of time test preparation consumed during a class period significantly decreased the amount of instructional time actually spent on their specific subject.

Set Free (Post-standardized Testing)

No longer state tested or accountable to the district, both teachers felt the freedom to teach in any fashion they desired; however, only one proclaimed major changes in instructional practice. Laura had not changed her instructional practice and when asked the differences in lessons between state tested and state non-tested years, she admitted that the only change to her lesson was an increase in the amount of time to cover the topic. The lessons were the same.

They [the state] took away the EOC, but the TEKS didn't change, so... how I ran my class didn't change a whole ton. (Laura, I1: 331)

After an observation, when asked to describe a typical day teaching a state non-tested subject, Laura responded with the following.

Typically, I actually do a lot more direct teach than this. They hate direct teach, but it works for most of them because they're used to it... They prefer to watch me just fill them in [fill-in-the-blank notes] and work problems. So, that's how I probably teach 80% of the time. (Laura, I2: 122)

In fact, this description mirrors researcher notes from several observations. Laura would fill in notes on the document camera, and then the students would work problems on a worksheet. Other than occasional banter, the information was presented from teacher to student.

Although Laura had not altered her lessons or methods, she did report that she was more concerned with students gaining and retaining conceptual knowledge at the completion of her chemistry course. Hence, she started focusing on the big picture and omitted detailed information the average chemistry student may no longer need to know. This caused her to feel better about the job she was doing as an educator.

Researcher: So you feel better as a whole? Ethically?

Laura: Yes. Which may not necessarily be reflected in black and white test scores because sometimes that means that I cut out TEKS. Because I know that it's more important that they have a solid foundation. (Laura, I3: 169)

I can do my job more, honestly. I have less pressure rather than just keeping the bus trucking, while kids fall off left and right. (Laura, I2: 52)

The additional time in class given for gaining conceptual knowledge and doing homework often meant that students did not get the opportunity to engage in activities, labs, and projects. Laura focused more on teaching concepts to students in the form of notes and worksheets. The following passage describes Laura's irritation with crafting creative activities and labs that went unused.

I have labs planned and set up... that I've got the materials to do and set up in the back lab, and we can't do it because it's taking the kids a little bit longer to understand the concept. Yea, I'm wanting to do more labs, but can't necessarily get back there. (Laura, I1: 575)

Cris used his “newfound freedom” to alter his classroom significantly. By having an additional 75 minutes per week that was previously used for test preparation, Cris was able to go more in-depth with the material and incorporate more labs, games, discussions, and research projects. Observation notes often documented labs and games in his classes. The following excerpts describe how Cris changed his instructional practices after the removal of the state test.

The [TAKS] quick reviews went away. So, you have more labs, more time for labs and... a little bit more technology, so we can do more virtual labs. I can actually do a research project now. (Cris, I1: 316)

Because of that flexibility of not having that standardized test, you feel like you could do a lot more things. You can do more games. I feel like we do more discussions now than I did during TAKS because I feel like that without the pressure, I have more time, and I can manipulate the curriculum a little bit more. (Cris, I1: 487)

They [students] probably feel like they're more part of the lesson now than before, where I was very dogmatic and in your face [during state testing] and now it's kind of the holistic thing. (Cris, I3: 159)

In addition to allowing more time for labs, games, and projects, Cris also highlighted that the flexibility allowed for more note-taking that lead to more depth of content.

We're doing more notes... like they're writing it down. We go overall more in depth. Yes, the notes are longer, but the labs tie into the notes. A lab that we don't normally do. (Cris, I4: 619)

Observation notes documented that note-taking comprised a large portion of instructional time in Cris's classroom. This direct instruction rarely allowed for interactions among students. During observation two, Cris stated, “We'll stop notes here because I'm losing you guys. Falling asleep.” In fact, subsequent researcher notes cited that Cris would constantly ask students to keep their heads and eyes forward on the screen during notes on numerous occasions. The lack of engagement during notes was so apparent that Cris sarcastically stated how exciting the notes were and that they were having “just too much fun for one day” (Cris, OBS10).

Although the teachers reported they had freedom to instruct their courses however they deemed fit, the evidence suggests that many instructional strategies they used when teaching a state tested subject were still present in the classroom. *Traditional instruction* describes the majority of the observations; however, both teachers desired to make their classes more hands-on in the future. With little accountability and a passion to continuously improve, the teachers took responsibility to enhance their instruction.

Discussion

Teacher instructional practice is the dominant factor in student learning and retention (Wright et al., 1997), and mentors have tremendous influence on the instructional practices of novice teachers (Smylie, 1989). As an alternatively certified teacher in a very accelerated program, I can attest that my education about education was bare and impractical. My first-year teaching resembled my high school experience: lecture-based and teacher-centered. The transition into a larger school district resulted in the assignment of a well-seasoned mentor, who was kind enough to show me the ropes. Entering a high stakes testing environment and still unsure of my teaching identity, I followed her methods and instructional practices for teaching science. This narrative is often the reality for many new secondary teachers entering the public school system.

Out of the 345,373 educators in Texas in 2018-2019 school year, 124,681 (36.10%) were alternatively certified (Smith, 2020). Not all alternative certification programs are created equal. While many programs thoroughly prepare teachers for success in the classroom, others barely scratch the surface of the teaching profession and promise candidates rapid certification with little effort. In these cases, novice teachers are inclined to use veteran teachers as a resource to understand their role as a teacher in the public school system. Laura believed that she needed to teach like Mary. Cris looked to Ms. Harrison because he “didn't know what he was doing” (Cris, I4: 358). Unfortunately, mentor selection is often based on a person's desire to guide new teachers; thus, mentors may or may not use best teaching practices for the evolving student.

Contrary to research on best instructional practices for effective learning, many teachers abandon their beliefs about what constitutes an effective science classroom the moment they begin teaching a course attached to a standardized exam. Being a high stakes testing novice, Cris and Laura learned to “teach to the test” from their colleagues to maximize standardized exam results. Unfortunately, these strategies often mean changing teaching methods and behavior (Avdeniz & Southerland, 2012). Mirroring the findings of Jones et al. (1999), the teachers in this study engaged in 75 minutes per week of test preparation, which decreased the amount of available time for actual chemistry or physics instruction. Consequently, frustrations surfaced as Cris and Laura spent the majority of their time coaching students on test-taking skills and teaching a curriculum based on an assessment (Johnson et al., 2004; Sass et al., 2012; Tye & O’Brien, 2002). Laura exhibited this frustration as she struggled with her own teaching philosophy and covering all the tested material. Similar to the study by Taylor et al. (2002), the stress and focus placed on the test, rather than on educating youth, lowered her morale and caused her to question her own future in education. This should not be surprising since extreme changes in teaching methods due to high-stakes testing were found to be the primary reason for teacher attrition (Sass et al., 2012; Tye & O’Brien, 2002).

In the post-standardized tested world, freedom from the pressure and stress of state testing could result in an effective science classroom based on best teaching practices. Although both teachers reported that they were free to teach in any fashion, the evidence suggests that the teachers continued to teach the way they did when state tested. The new sense of freedom that each teacher experienced had merely translated to a less stressful environment with slower paced lessons that largely mirrored those implemented during state tested years.

Shulman (1986) stated that content knowledge is crucial to effective teaching, but it is not sufficient for excellent teaching. He suggests that pedagogical content knowledge is also needed. Laura and Cris had the content knowledge; however, the evidence suggests that they did not have or did not use pedagogical content knowledge necessary for exploratory learning. There was never mention or evidence of the 5E model (Bybee et al., 2006) being used in either classroom. The internal struggle of doing what was best for the students and what was required, suggests that these teachers were ethical and would go to measures far beyond standard practice for their students’ best interests. Both teachers consistently mentioned goals and adjustments they wanted to make to their instruction. Therefore, the lack of transformation in instructional practice for these teachers was not due to a lack of desire for improvement.

Initially, certification programs, mirroring traditional teaching methods, and testing pressure that ultimately changed instruction could be to blame for the lack of evidence of pedagogical content knowledge. Once chemistry became a state non-tested course, however, Laura continued the exact lessons and activities she did when she was state tested. The only difference mentioned by Laura and seen in observations was a prolonged period to cover each chemistry topic. Cris added more technology and labs into his lessons; nevertheless, he adhered to the teacher-directed notes that typically took the majority of the class period to complete. Therefore, the evidence in this study suggests that these teachers were unaware of best instructional practices for teaching science, and without quality professional development advocating these methods, many teachers in this situation will continue to lack the knowledge of inquiry-based classroom instruction.

Implications and Recommendations

Since many secondary science teachers entered the profession during high stakes testing and merely modeled “best practices for high test scores,” veteran and novice teachers are both in need of training on Bybee’s 5E model. In addition to implementing this inquiry-based approach, it is important that science coordinators communicate with ALL science teachers to understand their professional needs and interests when developing professional development. Differentiated instruction is encouraged in the classroom. Why is this not a reality when instructing teachers?

In the new post-standardized tested classroom, careful selection of mentors is imperative for pre-service and in-service teachers. Mentor selection should be intentional and strategic. Administrators should assign novice teachers to mentors with knowledge and practice of inquiry-based instruction, and new teachers should be allotted time to view master teachers perform.

To enhance science teaching on the entire campus, veteran and new teachers should be well-versed in inquiry and Bybee's 5E model. As mentioned previously, professional development would be an ideal time to ensure all teachers are cognizant of best practices in the science classroom. Teachers must realize that implementing these methods is not easy. It takes practice and devotion to transform their classroom. If financially feasible, instructional coaching can help with the implementation and consistent focus of inquiry-based learning, resulting in much greater utilization than just training alone (Poglinco & Bach, 2004).

Limitations

The researcher, first and foremost, limited this research. As someone with experience in an "under par" alternative certification program and a former educator who taught state tested subjects, I bring my own bias to the study. However, employing multiple data sources, an audit trail, peer debriefing, and member-checking alleviated as much subjectivity as possible.

Another limitation of this study was the uniformity of the participants and setting. In addition to working in the same school, Laura and Cris obtained their teaching certification through alternative certification means and entered their careers as teachers in state tested subjects. Although the setting allowed for consistency in the study, teacher perspectives may differ depending on their educational training, school rating, district teaching requirements, campus teaching expectations, school district location, local stress, demographics, and class scheduling system.

A larger population of teachers to examine would also have been more ideal for this research. However, with changing teaching schedules, it was only possible to follow two teachers in this school. Incorporating a larger sample of teachers would make the results more generalizable for educators and researchers throughout the country.

Recommendations for Future Research

Recommendations for future research include expanding this research to include more participants and more school districts. As mentioned in the limitations, teacher perspectives may differ depending on their certification program and many school factors, such as scheduling system, local stress, and district teaching requirements. A larger scale study of many physics and chemistry teachers would make the results more generalizable.

This study only examined science teachers' perspectives. House Bill 5 also removed state tests from other content areas, such as social studies, mathematics, and English. Investigating teacher perspectives from different subject areas where high-stakes testing has been removed to understand their experiences would also enhance the study. In addition, viewing areas that have never been state tested, such as the arts, would also lend findings important to this topic.

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