EXPLORING TEACHERS' INTENTION TO USE DATA TO INFORM INSTRUCTION

by

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(Under the Direction of Karen Bryant)

ABSTRACT

The push to use data to inform instructional practices led to this action research (AR) study to explore teachers' perceptions of data use. The AR team approached this problem by evaluating the data analysis process used at Thomas High. During this time, action researchers developed three questions that guided the study:

1. In what ways can the data talk process impact instructional practices at Thomas High?
2. How does the action research team describe what was learned about teachers' perceptions of instructional effectiveness in using data to inform instructional planning and practices at Thomas High?
3. What perceived barriers exist in teachers' use of data for instructional purposes at Thomas High?

Through the lens of the theory of planned behavior, the action research team explored teacher beliefs surrounding data informed instructional practices and examined how those perceptions impacted the data talks process. The findings of this action research study suggest that teachers' perceptions of the data talks process are improved when the data analysis process occurs during content focused collaborative planning sessions.

Keywords: action research, data talks, data-informed instructional practices

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DEDICATION

To My God

This process helped me to truly learn how to lean and depend on You. Without my faith in Christ Jesus this would not have been possible.

and

Anthony B. Johnson

My husband and love

Thank you for making sure I did not give up or give in. You never complained. Your patience with me helped me to learn how to have patience with myself. You believed in me when I didn't.

and

Sheila Jasper

My awesome mother

Thank you for giving me space when I needed it and pushing me when you know I needed it. You have shown me that my story is not over and that there is no obstacle to great to overcome.

and

Kailey Bryan

My very talented daughter

You have taught me a lot about focusing on my goals. I hope that my experience motivates you not to give up on yours and to believe that your dreams will come true.

and

Leona B. Jackson

You're the best grandmother a girl could have. Your zest for life and insatiable thirst for accomplishing the 'next thing' is and always will be inspiring.

and

John Thomas

My thought-provoking father

You have always challenged me to question the status-quo and think independently. Thank you for fostering in me the desire to understand the big picture in everything I do.

and

to my extended family and friends

Thank you for understanding when I couldn't be there. Know that I was with you in spirit even when I couldn't be there physically. Also, thanks for the pep talks, they really helped see me through.

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CHAPTER 1

INTRODUCTION

Educating students in the manner most conducive to learning is not always easy, especially when effective structural and systemic supports to facilitate teacher learning and development are not in place. Such has been the case at Thomas High[1]. In response to low student achievement and the lack of innovative instruction, administrators have sought to use Data Talks as a tool for improving student achievement. The rationale is that through data disaggregation teachers will be able to isolate and address student weaknesses. To date, this traditionally effective method has not yielded the desired student gains or advances in teacher innovation in the area of mathematics at Thomas High.

This exploration of a determined team of teachers' intentions and abilities to effectively use data begins at Thomas High School and chronicles their attempts to improve their instructional practices and work environment. As the lead researcher, I have been a math teacher at Thomas High for over 15 years, serving as the department chair for two years and as an Instructional Support Specialist for one. My experiences with district officials, school administrators, and fellow teachers have been positive. My colleagues have shown themselves to be a group of educators committed to professional growth and the development of sound instructional practices. The research that follows is an example of one team of researchers' efforts to improve teaching and learning.

[1] Pseudonyms were used for the school and the school system.

Thomas High School

On a typical fall day, one can hear the faint sounds of cheerleaders roaring and giggling down the hallway and a momentary break in the melodious tunes wafting through windows and walls when the drumline and brass sections join the rest of the band in a neighboring field. Nearly two hours after the bell has rung to dismiss students, the school is still abuzz with activity. As study hall wraps up for the athletes, football players rush to the locker room to change for practice and basketball players head to the gym and impatiently wait for competing volleyball players to clear the floor. Teachers working late find it difficult to navigate the cars of the band and athletic boosters that clog the parking lot. This rich tapestry of activity defines Thomas High school.

Located outside of a large southeastern U.S. city, Thomas High is located in a community that has a median household income of $36,444 according to the 2014 U.S. census bureau report. Situated on a 20-acre campus, Thomas is one of 25 high schools in the Jasper County School System. The student population in the Jasper County school system, while predominantly African-American, is diverse. With over 100,000 students, it has a racial composition of 67% African-American, 11% White, 14% Hispanic, 6% Asian and 2% other. Each year Thomas welcomes around 1,450 students. The student body of Thomas is almost entirely African-American.

The racial demographics of the Thomas staff mirror those of the students. Thomas High students are served by a predominantly African-American staff of roughly 120 educators, including those in administrative and support positions. However, there is a high level of cultural and generational diversity among staff members. Despite the seemingly racial

singularity, teachers at this Title I school hail from countries in Europe, the Caribbean, Central and South America, Africa, and India and from various parts of the United States.

Thomas High students can choose from a variety of courses in academics, the arts, business, technology, and engineering. The math courses offered include General and Advanced Placement Calculus, Pre-Calculus, Advanced Algebra, Analytic Geometry, and Coordinate Algebra. With fourteen teachers responsible for providing instruction in these courses, the math department is the largest in the school. This close-knit group of teachers can often be seen wearing matching t-shirts on Friday spirit days and possess a camaraderie envied by other departments. The four special education teachers who are also considered members of the math department work hard to support students with disabilities.

With only three members having taught less than 5 years and the remainder seasoned veterans, the department is teeming with experience and expertise. This action research study focuses specifically on the data analysis experiences during the data talks process of the Coordinate Algebra and Analytic Geometry general education teachers. With over 25 years of teaching experience, I served as the lead researcher for this case study.

The Problem

Thomas High boasts a vibrant offering of student clubs and sports teams that perform well in competitions. However, the academic data paints a less than bright picture. In the math department, students have made small gains on the state issued End of Course assessment but trail both the county and state. Data talks have been the primary mode used at Thomas High for helping teachers identify student deficiencies and encouraging them to utilize innovative instructional practices.

Data talks are a process used to perform basic analyses of results of common assessments given to students at the end of each unit. The protocols include teachers completing a document, which helps them to identify student strengths and weaknesses based on student data. Teachers are required to reflect on ways to address these deficiencies. Finally, they are asked give suggestions for ways they can be supported by department chairs and the administration in the improvement process.

The expectation is that teachers will initially analyze the progress of their students and identify scholars in need of remediation and then depending upon levels of proficiency, develop plans for individual remediation or general reteaching of the information, after which implementing those selected instructional strategies.

While the reasons that this procedure has struggled to become part of the Thomas High routines and rituals vary by person and department, it was clear that faculty members were generally disinterested in the data talks process. The problem this study addressed were the aspects of the data talks process that were perceived as barriers to teachers' intentions to improve instructional innovation through data usage. It was believed that improving instructional practices would result in more engaged students who learn at higher levels. These improvements would then play a role in improving student achievement on state assessments.

Many teachers in the math department viewed the process as a compliance activity. They submitted the report results to the department chair or administrator and moved on to the next topic on their syllabus, considering the process as "just another thing they want us to do" and "something that they (the administrators) are not even going to look at". There was a lack of personal and group knowledge in the effective use of data talks to create deep instructional changes that transform student learning (Marsh, Bertrand, & Huguet, 2015). The root cause of

the lack of effectiveness of data talks was unclear at the beginning of this study. Initially it was speculated that inadequacies in data analysis training and lack of knowledge in effective remediation techniques could be to blame. Personal feelings of despondency, apathy, and lack of ownership of both teachers and students were also thought to play a role. The purpose of this action research project was to identify, analyze, and address issues concerning teachers' beliefs regarding and intentions to use data to inform instructional practices.

Background

The problem that I am most passionate about using the action research paradigm to address is the lack of intention among math teachers at Thomas High school to use data in instructional planning. Table 1 shows that in the past four years Thomas High students have not been successful on the math Georgia Milestones assessment. Students taking the EOC are considered to be in one of the following mastery levels: Beginning, Developing, Proficient, or Distinguished. The table shows that the majority of Thomas High students struggle to meet the state standard of excellence. This indicates that there is a need to improve teacher responses to student assessment data. This improvement may begin with changing the way teachers work with and perceive student achievement data in their instructional planning.

Data found in Table 1 reveal that there is an upward trend in student performance for both subjects. However, this slow improvement does little to address the learning needs of the average of 43.65% of Coordinate Algebra and 40.45% of Analytic Geometry students who perform below grade level. This is one indication that students' learning needs are not being adequately addressed at Thomas High.

Table 1

Thomas High Schools' Georgia Milestones Student Performance Levels in Math by Percent

	Year	Beginning	Developing	Proficient	Distinguished
Coordinate	2014 – 2015	49.5	39.1	11	0.4
Algebra	2015 – 2016	43.6	43.4	12.3	0.4
	2016 – 2017	44.7	39.8	14.8	0.6
	2017 - 2018	36.7	45.3	15.8	2.2
Analytic	2014 – 2015	43.3	38.7	16.5	1.5
Geometry	2015 – 2016	37.2	46.8	14.8	1.3
	2016 – 2017	40.3	39.2	19.2	1.3
	2017 - 2018	41	37	20	2

Unfortunately, this trend of poor performance in mathematics plagues other Jasper County schools. With an average of only of 22.7% of the Coordinate Algebra students and 24.6% of the Analytic Geometry students in the county achieving at the Proficient or Distinguished levels during the same time frame (GOSA, 2019), district leaders have expressed concern over student learning outcomes. Stakeholders within the system agreed that measures need to be taken to address the low student achievement in mathematics.

The Problem in Context

Data talks have been implemented at Thomas High but without fidelity as indicated by initial data collection. An integral component of this process is the completion of a common assessment data analysis form (Appendix B). This document is the basis for the data talk presentations given by teachers. Data collected from the school's filing system revealed that only 7% of the math teachers in the school completed this component of the process. Although it

is possible to complete the data talk presentation without completing the form, the schools' administrative team expects that it be completed for every common assessment cycle. Lack of compliance in this step of the data talks process suggested that teachers failed to consistently prepare lessons based on student assessment data.

Concerns over inadequate use of student data for instructional purposes are not unique to Thomas High. Means, Gallagher, and Padilla (2007) conducted a study based on a national survey of K-12 teachers regarding data usage. The results indicate that 43% of math teachers reported using data to identify student skill gaps and 33% reported using data to identify promising practices (Means et al., 2007). When compared to these rates, math teachers at Thomas High were using data at a rate far below the national average of more than 10 years ago.

Conversations with the school's leadership and teachers provided further evidence of lack of data usage among Thomas High teachers. Both the school's data coach and principal have met with department chairs individually to discuss the need for improvement in this area. Through these conversations it was disclosed that teachers throughout the school are not completing the common assessment data analysis form. Conversations with teachers indicated that they consider the data talks process to be a waste of time. These discussions suggested that failure to analyze data using the data talks model is not isolated to the math department.

Theoretical Framing

Identified by the administrative team and teachers, challenges surrounding the data talks process needed to be address if improvements were to be made. The decision to investigate the problem of poor implementation of the data talks method began with the search for a deeper understanding of the problem. Successfully addressing the deficiencies in the process was of

interest to Thomas High's administration and teachers. The action research method was ideal for this purpose.

Methodology

Using the action research methodology to address the issues surrounding the perceived lack of relevance of the data talks process was purposeful. Inherent in the action research model is the sense of ownership that was developed among the participants who studied the problem (Sagor, 2010; Creswell, Hanson, Clark Plano, & Morales, 2007). The reflective nature of the action research methodology allowed for a comprehensive understanding of the case study participants' perspectives. Additionally, empowering teachers to make changes on their terms added to the improvement of collective and self-efficacy which frames this project.

Purpose and Research Questions

It was clear from school performance data that Thomas High needs interventions to improve student achievement. The research reviewed in this paper indicates that data-informed instruction is a promising approach, if teachers can be enticed to act on student assessment data. According to the theory of planned behavior, this action will only occur once teachers' beliefs are aligned in such a way that they intend to act on available data to modify instruction. Therefore, the purpose of this study was to address the effectiveness, or lack thereof, of the data talks process to impact teacher instructional changes.

The initial research questions that were used to guide the action research teams' inquiry were:

- What barriers exist in teachers' use of data for instructional purposes at Thomas High?
- How can the data talk process help teachers at Thomas High increase innovative instructional practices?

- What is learned by the action research team as they explore teachers' perceptions of instructional effectiveness in using data to inform instructional planning and practices at Thomas High?

Theoretical Significance

In the theory of planned behavior, which will be discussed further in Chapter 2, social psychologist Icek Ajzen posits that actions are determined by intentions and intentions by beliefs. Using this theoretical framework, this action research case study focused on exploring the beliefs surrounding the data talks process of the study participants.

This is important for several reasons. First, gaining a deeper understanding into the perceptions of this group may assist in developing strategies to improve the data talks process and improve teacher learning outcomes. Additionally, using the action research process to study how teachers' perceptions impact their intentions and actions helped to achieve a goal set by the school's principal - namely to increase the use of student data in instructional planning.

This study helps to provide insight into why teachers who understand the importance of data-driven instructional practices and who have the necessary tools at their disposal fail to consistently use this method for improving instruction. Although, research has found that data-informed instructional practices in teachers are shaped by many factors (Jimerson, 2014; Ingram et al., 2004; Datnow & Hubbard, 2015; Young, 2006), it is the connection between perceived relevancy, self and collective efficacy, and the willingness of a teacher to navigate structural barriers that form their intention to innovate based on student assessments that warrants further exploration. This suggests that action research is an effective model for studying this topic. The action research paradigm addresses relevance because the team of educators who participate in the process are interested in the exploration of the issue of data-informed instruction. As the

team works together, self and collective efficacy may be strengthened. And finally, the action research process will help to empower the team to identify and suggest creative solutions to the structural barriers involved in data-informed instruction.

CHAPTER 2

LITERATURE REVIEW

Data-informed instructional models for school improvement have ushered in changes to the way district and school-level administrators expect teachers to make instructional decisions (Jimerson & Wayman, 2015). This chapter reviews the research that has been done in the field of teacher data use. Particular attention has been given to studies that focus on professional learning efforts to improve this educational practice. The key words used for this research include data-informed instructional practices, data talks, professional learning communities, and professional development.

Schildkamp and Kuiper (2010) defined data-informed instruction as "systematically analyzing existing data sources within the school applying outcomes of analyses to innovate teaching, curricula, and school performance, and, implementing and evaluating these innovations" (Schildkamp and Kuiper, 2010, p. 483). In this study data-informed instruction refers to a teacher's use of assessment data to teach and/or reteach concepts in a manner that addresses the specific learning needs of the students. At Thomas High the data used for this purpose can be formative or summative. Furthermore, it can be generated by teacher created assignments or accessed from standardized tests. By expecting teachers to use data-informed instructional techniques, Thomas High school leaders hope that student learning outcomes will improve. Consequently, it was important to investigate the components of the data talks process that influence teacher data usage to inform instruction.

It is important to understand the relationship between the data talks process used at Thomas High and data-informed instructional practices. As previously mentioned, the Thomas High administrative team used data talks to motivate teachers to make instructional changes based on student achievement data. The data talks document submitted by teachers and used to prepare for the data talk presentation is shown in Appendix B. The purpose of this template was to have teachers analyze student assessment data. The rationale behind the presentation was for teachers to demonstrate their understanding of the data and explain how they would respond to students' learning needs. Therefore, at Thomas High the data talks process is a data-informed instructional preparation activity performed on a specific student assessment artifact. Throughout the literature, similar data-analysis processes were referred to using terms such as data-carousels and data protocols.

This literature review synthesizes the empirical research conducted regarding three key aspects of data-driven instructional practices and professional development. A range of studies were referenced to gain insight into what is known about the factors that shape teacher perceptions of data and elements that impact teacher data-usage. Finally, gaps in knowledge surrounding teachers' intention to use data have been identified.

Theoretical Framework Foundation

While there are many aspects involved in a teacher's ability to use data with fidelity, the theory of planned behavior conceived by Icek Ajzen (2002) suggests that teachers' use of data to change instructional practices will be determined by their intentions. According to this theory, these intentions are determined by three factors: behavioral, normative, and control beliefs. Figure 1 illustrates how these beliefs inform intention and behavior. Therefore, understanding

the factors that contribute to teachers' use of data to improve instructional practices may prove valuable in assisting school leaders in developing effective professional learning opportunities.

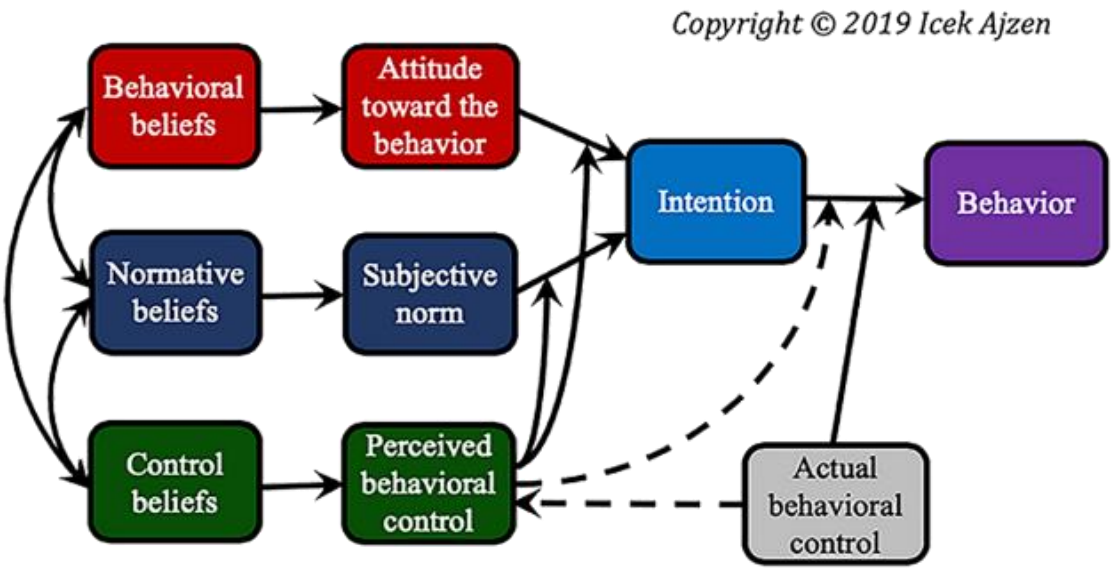

Figure 1. Model of the Theory of Planned Behavior

Permission to use is found in Appendix E

Factors that Shape Teachers' Data Perceptions

When the theory of planned behavior is applied to the phenomena of teacher data usage, three facets emerge: the teachers' attitude toward data-informed instruction practices, their perception of group beliefs regarding data-informed instruction usage, and their level of self-efficacy in implementing data-informed instruction techniques. Recent research into these aspects of teacher data usage has been studied through different lenses. Therefore, one of the purposes of this literature review is to determine if and how the results of these studies align with the theory of planned behavior (Ajzen, 2002).

Teachers' Personal Beliefs. The perceived lack of connectivity between data and instruction in the minds of teachers is evident in research. Teachers often struggle to see the instructional usefulness of data analysis of standardized test scores (Young, 2006), especially when standardized test scores were focused on certain data points while other data was pushed to the periphery (Jimerson, 2014; Ingram et al., 2004). Teachers also report feelings of inadequacy in their ability to use data to inform instruction (Datnow & Hubbard, 2015). This suggests that teachers may benefit from learning opportunities which allow them to incorporate data analysis results with instructional planning.

School leaders can affect the way teachers view data-informed instructional practices. When school administrators effectively model data usage and emphasize its importance, teachers are positively influenced (Jimerson, 2014; Young, 2006; Means, Padilla, & Gallagher, 2010). However, Jimerson's (2014) study suggests a need to balance the pressure placed on teachers to use data in order to avoid "rigid response". The term rigid response refers to low productivity in response to teachers being overly concerned with potential sanctions. This perceived threat of punishment contributes to teachers' negative views of the data analysis process (Means et al., 2010).

Moreover, the way school administrators frame the use of data for teachers plays an important role in how educators view data use. Both Young (2006) and Jimerson (2014) suggest that school leaders set the agenda for teacher data use by effectively communicating their vision for data use. In doing so common understandings and consistency in instructional practices have a better chance of being achieved (Young 2006, Jimerson, 2014). Principals who are not vested in the data analysis process can pass their compliance orientation onto their teachers (Marsh et al., 2015) and typically fail to convey a clear data policy to teachers (Hoogland et al., 2016).

This contributes to teacher perceptions of data analysis as a compliance activity instead of a meaningful tool to be used to address student achievement (Young, 2006; Jimerson, 2014).

When Ingram et al. (2004) conducted a study of nine school districts in the United States that were attempting to implement continuous improvement practices they found that teachers tended not to trust data. This mistrust was traced to teacher's experiences with seeing data used to hide or distort the truth (Ingram et al., 2004). They also found that teachers often held the belief that data collection "competed with their real job of working with students" (Ingram et al., 2004). Many of these teachers also expressed the belief that their jobs are to teach the curriculum while students' job is to learn. It was unclear in this study how teachers held these two beliefs at the same time without seeing a conflict. What is clear from this research is that the concept of data-driven instructional practices is perceived as a challenge to the teaching culture.

Teachers' Perceived Group Beliefs. According to the theory of planned behavior a person's normative beliefs also influence his or her intentions. The concept of normative beliefs involves individuals' perceptions of group pressures and group beliefs (Armitage & Conner, 2001). This is evident in local school cultures. Ingram et al. (2004) found that teachers and administrators are more likely to rely on experience and anecdotal information than systematically collected data to judge teacher effectiveness. Furthermore, they found that many of those who did value data use for this purpose also considered other factors to evaluate effectiveness. This suggests that one reason teachers may resist using data to inform instruction is because it is the culture of the profession to dismiss student achievement data as a valid measure of teacher and school effectiveness.

In the context of data-informed decision making, normative beliefs are shaped by teachers' perceptions of content or grade level team pressure to use data and by school culture.

Schildkamp and Poortman (2015) studied nine teams and found that negative attitudes of team members, lack of ownership of the problem, and inadequate access to data were factors that consistently hindered the effectiveness of a data team. One of their case study teams was rendered inoperable due primarily to attitude and ownership issues of the team members. The small scale of this study suggests that a larger study into to the relationship between attitudes of team members and instructional practices informed by data is imperative.

The importance of normative beliefs is further supported by a study done by Young (2006). The four case studies in Young's research led her to conclude that "grade-level team norms legitimize – or squelch-teachers' requests for help, joint analysis of student work and assessment data, and war story swapping" (p.543). Research also suggests that school districts that invest in developing data-driven cultures can expect better data-informed instructional outcomes (Kerr, Marsh, Ikemoto, Darilek, & Barney, 2006). Both studies found important contributing factors to an individual teacher's perception of data usage were grade level and departmental norms, the strength of school leadership, and school culture (Young, 2006; Kerr et al, 2006).

The type of data available to teachers and the conversations surrounding the data also play an important role in shaping normative beliefs according to Horn, Kane, and Wilson (2015). These researchers conducted a comparative case study analysis of two groups of middle school math teachers. When these teachers were presented with access to the same data, Horn et al. (2015) found that conversational and activity structures during workgroup meeting times laid the foundation for how the data was used.

Ironically, the group in the Horn et al. (2015) study that had the support of an instructional coach and school principal failed to use the data provided for teacher learning

opportunities that impacted instruction. Instead this group focused primarily on administrative tasks, identification of students with low achievement and developing ways to motivate those students during the time that they met. In contrast, the team that was comprised of teachers only, sought to understand why the students were not performing well. Unfortunately, this group faced time constraint obstacles which resulted in this new knowledge not being used to impact future instruction. In this example, positive group dynamics enhanced by group members with strong self and collective efficacy perspectives strengthened the quality of data teams, yet still failed to have the desired effect of connecting data analysis of student assessments to instructional innovations.

Both self and collective efficacy theories guided some of the other available literature on teacher data usage. Goodard, Hoy, & Hoy (2000) define collective teacher efficacy as, "the perception of teachers in a school that the efforts of the faculty as a whole will have a positive effect of students" (p. 503). Their research shows that these perceptions shape the normative environment of the school, and if the sense of collective efficacy is high, school teachers are more likely to act purposefully to enhance student learning, which in turn has a positive impact on student achievement (Moolenaar, Sleegers, & Daly, 2012; Goodard et al., 2000). The study by Ingram, Louis, and Schroeder, (2004) supports these findings. This team found that teachers were more likely to discuss data when they participated in groups which were looking at school improvement processes.

Teachers' Perception of Control Beliefs. The final variable that informs intention according to theory of planned behavior is control beliefs. Control beliefs are thought to be closely linked to feelings of self-efficacy (Amitage & Conner, 2001). These beliefs also include the concerns that teachers have regarding factors that they feel may hinder or assist them in using

data-informed instructional strategies. Common concerns that teachers and administrators expressed were the lack of time to effectively implement the strategies, the inability to access relevant and timely data, and curriculum constraints (Kerr et al., 2006; Horn et al., 2015; Jimerson, 2014; Means et al., 2010; Lachat & Smith, 2005; Ingram et al., 2004).

Ingram et al. (2004) found that teachers often view data-driven instructional efforts as a trade-off between data collection and teaching. They also found that school systems have not adequately restructured teacher workdays to support the time needed to gather and interpret data. However, research conducted by Means et al. (2010) suggests that the perception of lack of time may not be substantiated. The Means et al. (2010) study found that 83% of the visited sites had designated time set aside for data analysis activities. It is unclear if inclusion in the study prompted sites in the sample to alter the workday schedule. Thus, further research is needed in order to generalize this finding. Nevertheless, because teachers perceive time as a constraint to using data to determine instructional methods, there is an impact on their intention to use data and their behavior according to the theory of planned behavior.

Teachers view measurement issues as another structural barrier in implementing data-driven instructional practices. Educators in the Ingram et al. (2004) study reported not having the appropriate data to change their instructional practices. Horn et al. (2015) findings support this assertion, citing the need for specific types of data that shape teacher learning. Together these studies suggest that experience working with appropriate data is needed to encourage teachers to continue to use data. Ingram et al. (2004) cited the lack of recent experience working with data to improve specific classroom practices as the major reason for teachers' reluctance to use data.

Professional Learning for Data Informed Instruction

Much of the research indicates that the primary avenue used to address the need for teachers to use student data to drive instruction has been traditional professional learning sessions. Viewed through the lens of the theory of planned behavior, professional learning courses alone may not be the most effective way to create the change in teacher data use.

Professional Learning for Data Use

A teacher's sense of self-efficacy helps to inform the way he or she perceives the schools' collective efficacy (Goodard et al., 2000). This knowledge strengthens the argument of those who call for increased professional development opportunities for teachers. Although professional learning opportunities come in many forms, supports that aide in the implementation of data-informed instructional practices through effective professional development, professional learning communities and/or knowledgeable data or instructional coaches are promising. Supports such as these proved to be effective and were identified as significant findings in many research studies (Marsh et al., 2015; Horn et al., 2015; Schildkamp & Poortman, 2015, Kerr et al., 2006).

In the absence of adequate support and training in the data analysis process, teachers were not likely to use data to inform their instructional practices (Horn, B., et al., 2015; Schildkamp & Poortman, 2015). Moreover, lack of successful personal and group experiences played an important role in teachers' failure to use data to change their instructional behavior. Conversely, many data team participants in these studies simply complied with administrative directives to complete the data analysis without using the process to find ways to develop effective, innovative teaching practices that were informed by student assessments.

Professional Learning Quality

The quality of professional learning activities may also affect data-informed instructional practices. Schnellert, Butler, and Higginson (2008) found that a professional development model predicated on the "assess – goal set – plan – enact – monitor - assess" collaborative model is best suited for helping teachers make new and responsive instructional decisions (p.745). Their study of six Canadian teachers from four urban multi-cultural schools in one district also found that "supporting teachers to generate, interpret, and act upon assessment data within instructional change cycles assisted them in monitoring student performance, grounding instructional decisions in data, and enacting changes to practice" (Schnellert et al., 2008, p.725). This suggests that teacher learning and data usage might increase when teachers are involved holistically in the data cycle.

Consequently, professional learning engineered to prepare teachers for the data-informed instruction practices paradigm shift may be necessary. Young (2016) asserts that structures should be in place to support the adaptive practices of teachers when faced with new aspects of their job. Thus, capacity building must not only focus on the teacher, but should seek to address aspects of school routines and cultural norms that support teacher data usage. Jimerson and Wayman (2015) suggest that this should be done through purposefully embedding professional learning in ongoing organizational routines. These researchers posit that an educator's capacity for data use can be improved when it is designed in a manner that improves the organization as well as the teacher (Jimerson & Wayman, 2015).

These researchers suggest that quality professional learning opportunities embedded in the routines and rituals of instructors are necessary to support and sustain lasting changes in data informed instructional decision making.

Professional Learning and Data Quality

As mentioned earlier, the type of data that teachers are presented with shapes the way teachers learn how to use data (Horn et al., 2015). Training teachers with data that they deem inadequate or irrelevant could have the unintended effect of reinforcing the belief that data analysis is a waste of time. Kerr et al. (2006) found that teachers had different types of data needs depending on their job function. They also concluded that teachers showed improvement in their data analysis skills when they were involved with an iterative data design process.

Research conducted by Horn et al. (2015) found similar results. In their mixed methods case study, they found that while the focus of professional learning is most often on training teachers in techniques for using data to improve instruction, teachers were rarely given opportunities to affect the content of the assessments (Horn et al., 2015). This resulted in a lack of cohesion between the relevance of the diagnostic information and instructional usefulness (Horn et al., 2015). Lachat and Smith (2005), in their case study of five low performing urban schools, noted that "Focusing on a set of key student performance questions not only builds staff skills to analyze data, but also increases their motivation to use the data." (p. 343).

The research clearly indicates that training is needed in the areas addressing the belief system of teachers related to data-informed instruction, presenting quality, relevant data to teachers, and helping teachers to incorporate data-based decisions into their daily classroom routines. This action research study adds to this knowledge by informing the notion of teacher motivation with respect to intention to use data when barriers such as these are considered. It is needed to help fill gaps in knowledge regarding teachers' intentions to use data. The empirical table that follows highlights the relevant research done regarding on this topic.

Evaluating the Potential Impact of Professional Development to Create Change.

Using data to inform instructional decisions presents a fundamental change in the way some Thomas High teachers prepare for instruction. Zepeda (2014) refers to this "modification in the nature of the work being done" (p. 26) as systematic change that is often met with resistance. A root cause of this difficulty may be that a change of this type requires participants to alter their beliefs (Zepeda, 2014). Aligning this assertion with the theory of planned behavior and the research on professional learning suggests that exploring the behavioral, normative, and control beliefs of the case study participants during data-driven professional learning activities would aid in developing a data talks instrument that teachers would more readily implement with fidelity.

Table 2 *Empirical Findings Table*

Author(s), Date	**Title**	**Purpose**	**Method(s)**	**Sample**	**Result(s)**	**Conclusion(s)**	**Implication(s)**
Jimerson, J.B. & Wayman, J. (2015)	*Professional Learning for Using Data: Examining Teacher Needs and Supports*	To identify the elements necessary to train teachers to effectively use data and the designs of professional learning opportunities to improve teacher data usage.	This is a qualitative study that used a priori coding to analyze documents as well as interview and focus group data to study this topic from the perspective of knowledge-based organizational learning.	Researchers chose three diverse school districts from those who volunteered to be part of this 3 year study focusing on improving data usage. They collected interview and group data from 110 teachers, school leaders, and district support staff within these central Texas districts.	Six areas of need for professional learning were identified by educators. These identified needs focused on access, relevance, the interpretation process, collaboration, and knowledge codification.	District training of teachers in data use focus on using the computer to access data and was insufficient for building teacher capacity to use data.	Professional learning should be designed that builds teacher capacity and embeds data use in teachers' daily routines. A gap exists in studies that focus on relationship between PL and teacher data use.
Schnellert, L., Butler, D., Higginson, S. (2008)	*Co-constructors of data, co-constructors of meaning: Teacher professional development*	The study had a two-fold purpose: (1) To develop assessments that teachers could use to inform	Researchers used cross-case analysis techniques to code the conversational interviews of related to teachers'	Researchers chose 6 Canadian teachers from four urban multi-cultural schools in one district to participate in the study which focused on	Findings suggested that professional development that supports teachers' skills with working with assessment	While it is difficult for teachers to make and continue implementing instructional changes, PL that engages	PL for teacher data usage should be an on-going, holistic, job embedded activity. A gap in the ways in which

	in an age of accountability	instruction. (2) To investigate the method of using teacher collaboration around assessment data as a form of PL.	professional development. These interviews which were conducted by 2 researchers where then analyzed the themes for patterns.	adolescent literacy.	data in all stages aids in improving pedagogical practices.	teachers in the data decision making process from inception in a cyclic manner may be more effective than current popular PL activities.	collaborative inquiry influences the ways teachers learn & change their knowledge, beliefs, & practices.
Horn, B, Kane, B. & Wilson, J. (2015)	*Making Sense of Student Performance Data: Data Use Logics and Mathematics Teachers' Learning Opportunities*	The purpose of this study was to use the construct of group dynamics theory to identify the learning opportunities that are created when teachers talk about data.	Researchers used a mixed methods comparative case study in the analysis of inductively coded recorded meetings, documented classroom instruction and interviewed teachers, school leaders, and district personnel.	Researchers sampled four workgroup meetings from one school year from schools in a mid-sized urban school district with a mixed ethnic and socio-economic population.	Factors such as administrative directives, type of data and time constraints were taken into account and found to be important in how teacher groups use this information.	The data itself shaped teachers' learning opportunities. Teacher work groups need to be trained to diagnose areas of student weakness and be given the time to design and track effective teacher instructional strategies that address these weaknesses.	This study reveals that there is still work to be done regarding the improvement of teacher learning opportunities to use data in the PL format. Gap in the knowledge connecting teaching learning opportunities independent of PL.

Kerr, K., Marsh, J., Ikemmoto, G., Darilek, H., Barney, H. (2006)	*Strategies to Promote Data Use for Instructional Improvement: Actions, Outcomes, and Lessons from Three Urban Districts*	To examine the district level strategies used to promote data use for instructional improvement and their effect on the practices of educators. .	Researchers used a comparative case study design and mixed methods to analyze both quantitative and qualitative data. The interview and survey generated data was based on the responses from participating professionals.	Participants in this study included teachers, principals, instructional specialists, district-level leaders, and school board members from three similar school districts. Data based on 72 school visits in which 118 teacher focus groups and 73 principal, 30 assistant principal, and 50 instructional specialist interviews were conducted.	Factors that affect data use are staff buy-in, perceived usefulness and validity of data, the timeliness of data, flexibility to alter instruction, and staff capacity and support. (pp. 511- 512)	Data type needs may differ depending on job function. Teachers need to be part of an iterative data design process to ensure the usefulness of the data.	This study suggests that the availability of human and technological resources is important in promoting district wide decision making strategies. A gap in knowledge that links data analysis, teacher practices and student performance.
Young, V. (2006)	*Teachers' Use of Data: Loose Coupling, Agenda Setting, and Team Norms*	To determine how teachers identify the types of data they need and determine the usefulness of data.	Four embedded case studies were conducted that focused on literacy. Interviews and observational data were analyzed.	Upper primary grade level teachers from two high performing schools and two low performing schools in a district that had a data initiative	Strong leadership that focuses on clear expectations surrounding data usage is important. (p. 25)	This study suggests that structures need to be in place to support the adaptive practices of teachers when faced with new aspects of their	The act of changing how teachers incorporate new systems and information into their daily routines is

				were chosen by the researcher.		job. Capacity building must not only be focused on the teacher but must also address aspects of school routines and cultural norms.	extremely complex.
Jimerson, J.B. (2014)	*Thinking about data: Exploring the development of mental models for ‘‘data use’’ among teachers and school leaders*	To understand how educators conceptualize data.	Researchers used survey and interview data.	Thirty-on educators from a small Texas school district made up this sample.	The factors identified as influencing the development of mental models for data use: formal training, leader modeling, collegial interactions, and experience (p.9).	Work still needs to be done to ensure that all stakeholders share a common understanding of what it means to use data. This may help to improve teaching and learning efforts.	Teachers are less productive if they feel overwhelmed by potential punishment. There is a gap in ways to ensure common understandings around data use.

The empirical table indicates that issues surrounded teachers' ability to implement data-informed instructional practices is complex. The gaps in research suggest that a better understanding of the belief system of teachers surrounding student data usage will support changes in the design and implementation of traditional professional learning models.

Gap in Literature

While efficacy models, opportunities for teachers to learn, and access to quality information all play a role in a teachers' willingness and ability to adapt their instructional practices (Balkar, 2015; Zuljan & Vogrinc, 2010; Horn, et al., 2015; Schildkamp & Poortman, 2015), what influences teachers' intentions to take the action step? In this study we theorize that inadequate data-informed instructional planning may impact teachers' intentions to use data. Additionally, a review of the research indicates that more can be learned about specific types of support structures made available to teachers through the data-informed instructional planning process. Understanding the impact of teachers' perceptions related to these intentions is the gap in knowledge that was studied using the action research paradigm.

Chapter Summary

This literature review began by discussing the factors that shape teachers' perceptions of data through the lens of the theory of planned behavior. In this section, research that informs the ways in which teachers' personal beliefs, group beliefs, and control beliefs impact the fidelity and fervor with which they use information gleaned from data talks was put forward. The findings of the studies presented support the need for gaining a better understanding of teacher data perceptions.

Attention was then given to data-driven professional learning activities. Understanding the types of professional development that have been used to facilitate this change in

instructional preparation is important to this study. Importantly, the studies selected for this aspect of the literary review were primarily qualitative case studies. This research methodology supports the work done during this study.

Lastly, the results of this literature review were summarized so that a clear understanding of what is known and what remains to be studied can be fully realized. The response to the gaps in knowledge identified in this literature review will be detailed in Chapter 3.

CHAPTER 3

METHODOLOGY

The action research methodology aligns well with this case study which is designed to explore the impact of the data talks instrument on math teachers' intentions to use data for instructional innovation. Based on interviews, observations, and survey results, the action research team adjusted the data talks process so that its design influences teachers to use data to inform instruction. As mentioned before, this study has the potential to influence the design, training, and support structures associated with data-informed instructional planning. Improvement in the instructional practices of math teachers may serve to increase the student achievement on the state mandated coordinate algebra and analytic geometry End of Course tests. Historically, Thomas High students have failed to achieve a passing rate higher than 60%.

Purpose and Research Questions Revisited. This action research study explored teacher instructional innovation using the data talks instrument as a vehicle to drive changes in teacher motivation to use data to inform instruction.

The initial research questions that guided the action research team's inquiry are:

- What perceived barriers exist in teachers' use of data for instructional purposes at Thomas High School?
- How can the data talk process help teachers at Thomas High School increase the use of innovative instructional practices?

- What does the action research team learn as they explore teachers' perceptions of instructional effectiveness in using data to inform instructional planning and practices at Thomas High School?

The Action Research Approach

The overarching methodology for this study was action research. Using a mixed methods approach, both qualitative and quantitative data were collected by the action research team to explore teachers' intentions to use data to alter instruction. According to Baxter and Jack (2008), "Qualitative case study is an approach to research that facilitates exploration of a phenomenon within its context using a variety of data sources" (p. 544). The work of the action research team and the purpose of this study align with this definition. In the Thomas High school context, we explored the phenomenon of teachers' intentions to use data through observations and interviews.

The qualitative data collected during this study were supplemented with survey data. This was necessary to help develop the interview questions. The survey also helped to capture information related to the theoretical underpinning of this research. The theoretical focus was based on three key themes: the personal, peer, and control perceptions of the participants' data beliefs. The action research inquiry method was valuable in understanding the intersection between context, concept, and practice of these themes.

For example, to arrive at a shared understanding of a teacher's personal belief related to the data talks process and instructional practices, the action research team discussed the results from participants collaborative planning observations. In this context, the analysis of the data revealed "teacher reflection" to be a major theme. Analysis of subsequent interviews helped the

action research team understand how teachers understand the reflection process and put the results of their reflections into practice.

Interviews also aided in the understanding of a teacher's perception of data usage to guide instruction and their perception of potential barriers to data usage. Additionally, data collected during action research team meetings were used to document the processes that the team used to arrive at the findings. These data collection methods shed light on what role teachers see structural barriers playing in their intentions to use data as an instructional tool.

The creation of the documentation mentioned above was driven by the pre-survey data analysis. Preliminary results indicated that teachers feel that the data talks process is helpful as a guide for reflecting on data and helps to identify those topics that students still need help. This provided actionable information for the determination of appropriate, responsive interventions.

Methodology Summary. Surveys, interviews, and observations were the primary sources of data for this study. More specifically, transcripts of focus groups and action research team meetings provided the initial qualitative data. Action research team member reflections, teacher collaborative planning team meetings, and individual teacher interviews data were collected. Content data analysis methods were used to gather the qualitative data. This act of coding data aided in the development of conversational themes. Due to the small sample size and inability to assume normality of the data distribution for the survey questions, a nonparametric test was conducted to analyze the survey data.

Intellectual Framework of the Action Research Study

To maintain the research integrity of this study, the conceptual framework was used to set the parameters for the inquiry process. Blichfeldt and Andersen (2006) posit establishing theoretical frameworks at the beginning of a research project is crucial in establishing action

research as a reasonable research methodology. The conceptual framework is also important to the action research methodology because it helps researchers define the participants of the study, identify the relationships between the variables to be studied, and plan for the compartmentalization for the data that is to be gathered (Baxter & Jack, 2008). Important to this study was the development of a conceptual framework that was informed by the theory of planned behavior.

Conceptual Framework

Teachers at Thomas High school have received no formal training or support in the techniques needed to effectively develop data-informed instructional practices. For teacher data usage to improve at Thomas, there was a need for professional learning opportunities that simultaneously help teachers develop the skills necessary to effectively implement data-informed instructional practices and improve their perceptions of the data analysis process.

The conceptual framework in Figure 2 outlines the conceptual design of this study. It describes the actions that the research team took to explore this problem. Following this conceptual model allowed the action research team to stay within the parameters of this case study. Importantly, the assessment, adjustment, and evaluation of the data talks process is detailed in the input, process, and output elements of the conceptual model. When the theory of planned behavior is applied to the phenomena of teacher data usage, three factors emerge: (a) the teachers' attitude toward data-informed instructional practices, (b) their perception of group beliefs regarding data-informed instructional practices usage, and (c) their level of self-efficacy in implementing data-informed instructional practices.

Conceptual Framework

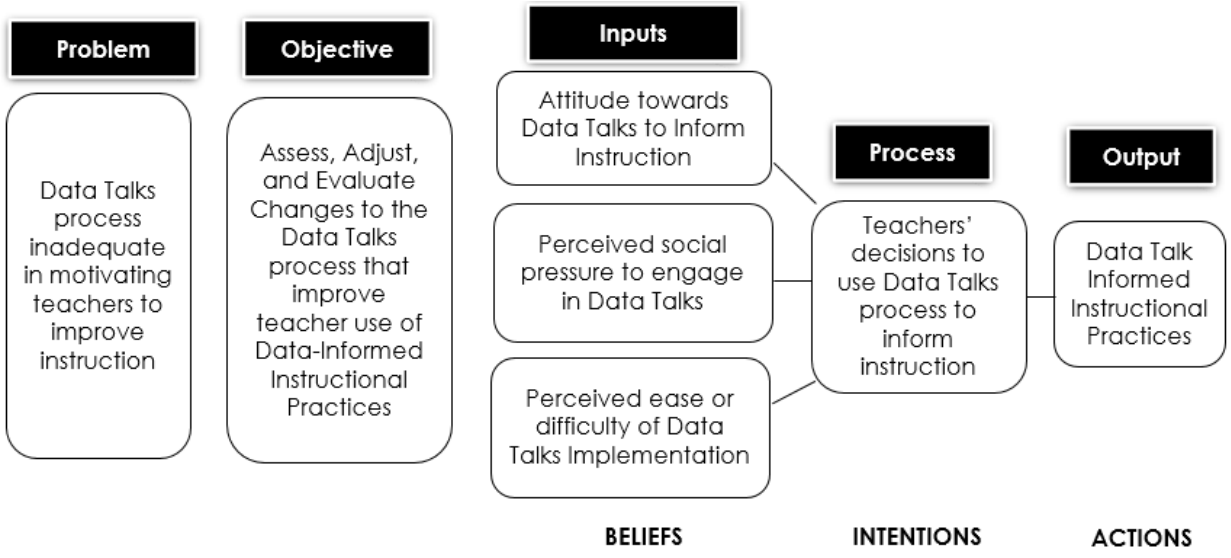

Figure 2. Conceptual framework for improving teachers' intention to use data to inform instruction blended with the theory of planned behavior (Adapted from Ajzen 2006)

Explanation of Conceptual Model. The five components of the conceptual model in Figure 2 illustrate the way that the action research team systematically approached improving the data talks process while addressing the belief system of teachers as outlined in the theory of planned behavior. Each component is explained in more detail to provide a full picture of the work that was done.

The Problem. The process of clearly defining the problem began in early October 2017 when a focus group of teachers met to discuss issues surrounding data-informed instructional practices at Thomas High. The goal was to clearly identify the problems associated with the data talks process. Salient themes that emerged were issues involving time, relevancy, and emotional strain. More specifically, members of the group expressed the view that the data talks process is an activity that conflicts with what they consider actual teaching or more important teaching activities. Members felt that their time could be better spent engaged in other activities.

Some members of the focus group felt that the process lacked relevance. They shared that they learned more from talking to or getting written feedback from their students than they did from the data talks process. Expressing this view did not imply that these educators were opposed to presenting their student data to administrators, they just failed to see how the practice could help their students. This perceived lack of relevancy suggested that this was an area of opportunity for the action research team to impact teachers' perceptions of the data talks process.

The last major theme that was uncovered during the discussion involved the emotional impact of the data talks process on educators. Teachers reported that the process evoked feelings of shame, and unfair comparisons of teachers while promoting negative and unhelpful competition. It was clear that many of the focus group members did not view the data talks process as an opportunity to learn more about their instructional practices. The common sentiment was that the data talks did not meet teachers' needs as a tool for instructional improvement. We speculated that the negative emotions associated with the process may have created a barrier to developing a culture of data informed instructional planning and practices. This preliminary discussion helped guide the conceptual framework for this study (Figure 2).

Objective. As part of this action research process, the team considered adjusting and/or changing the data talks instrument entirely to help teachers bring about the instructional changes needed to adequately impact student achievement. The goal was to assess, adjust, and to evaluate the effectiveness of the changes made on the instructional planning of teachers. This was done while carefully documenting and monitoring the impact that the changes have on teachers' motivation to use data to inform instruction. The decision then had to be made whether to change the data talks instrument, process, or both.

Redesigning the data talks process to help teachers to improve their instructional practices began with analysis of the data talks instrument. The action research team assessed the alignment between the data talks instrument and the research on effective data analysis techniques in schools. Team members read research articles and discussed the findings with the group. Figures 3 through 5 show how the data talks instrument aligns with the findings forwarded by the research identified in the chapter 3 literature review.

It was determined that the data talks instrument design begins well. It targets relevancy, focuses on student achievement, and encourages a timely review of the information. These are a few of the elements that research has shown to be helpful to teachers in the data analysis process. Further, these characteristics are necessary for effectively using data to inform instructional practices. Figure 3 shows identifies these key features.

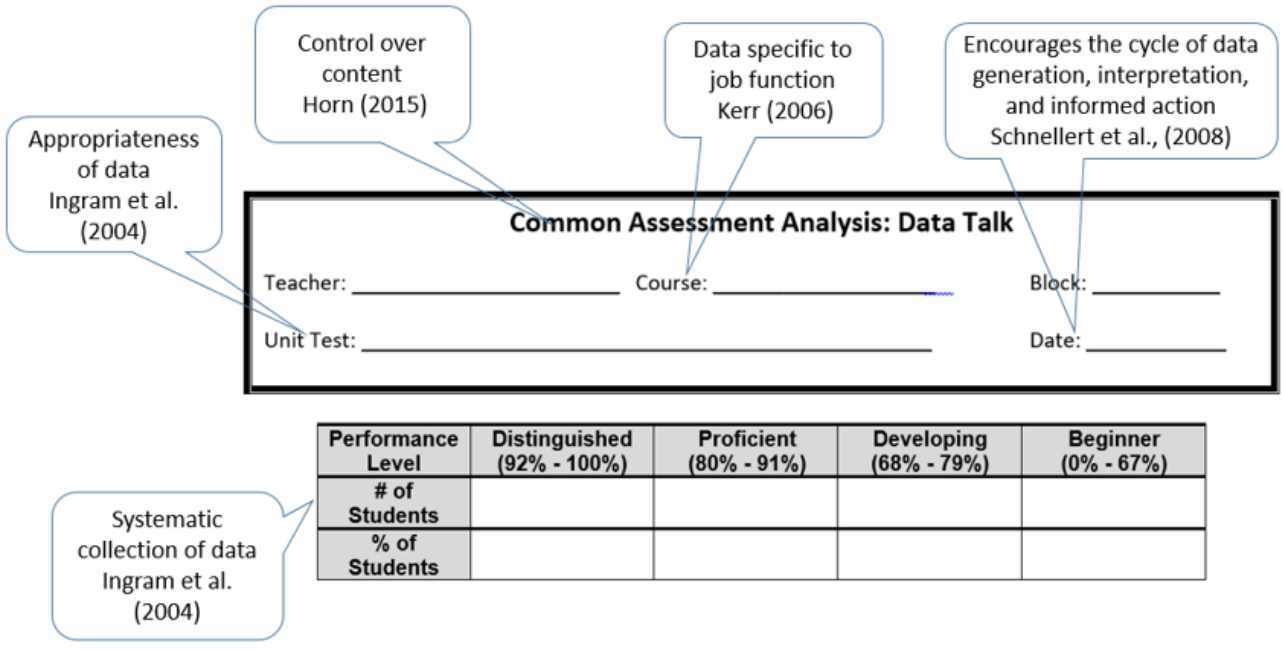

Figure 3. Literature Alignment of the First Section of the Data Talks Instrument

A review of the second section of the data talks instrument reveals that while well intentioned, there was a lack of depth and connection needed to foster instructional changes. The

importance of teachers reflecting on student learning has been mentioned. The action research team determined that this part of the data talks instrument could be an area of adjustment.

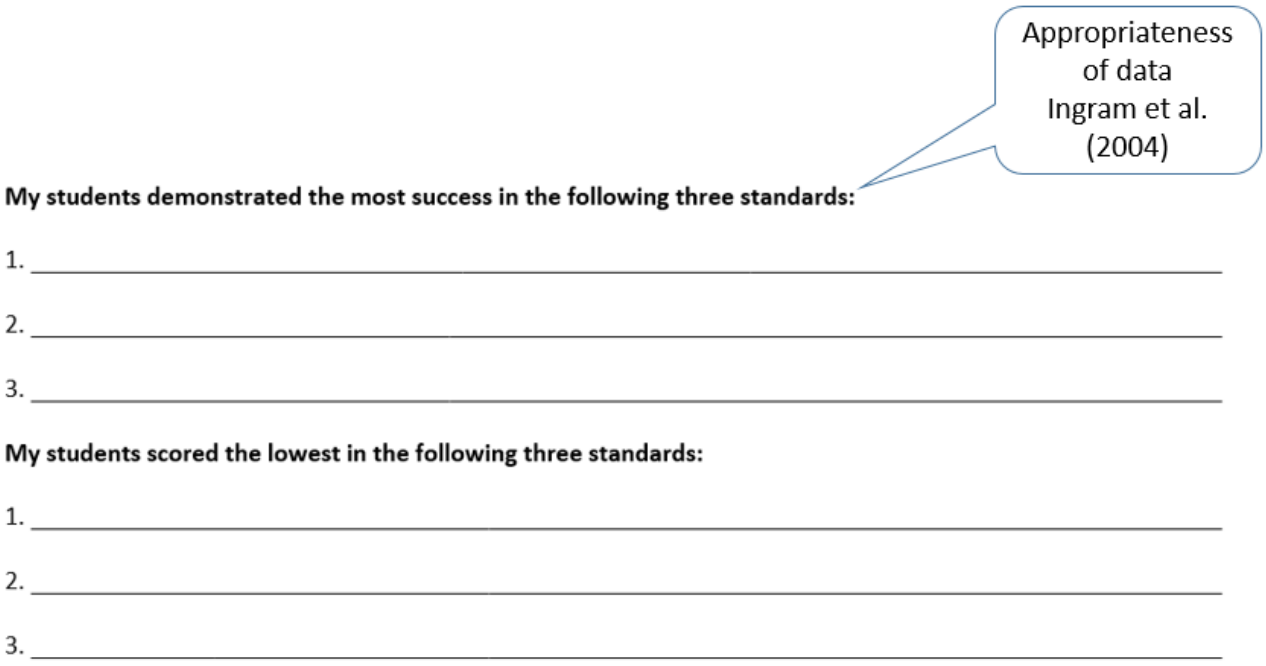

Figure 4. Literature Alignment of the Second Section of the Data Talks Instrument

A review of the final section of the document revealed that it met more criteria for best practices than the middle section. The section shown in figure 5 provided teachers with an opportunity to connect instruction with the identified student deficiencies. In this section, teachers also had an opportunity to consider any deficits in content or pedagogical knowledge and request help.

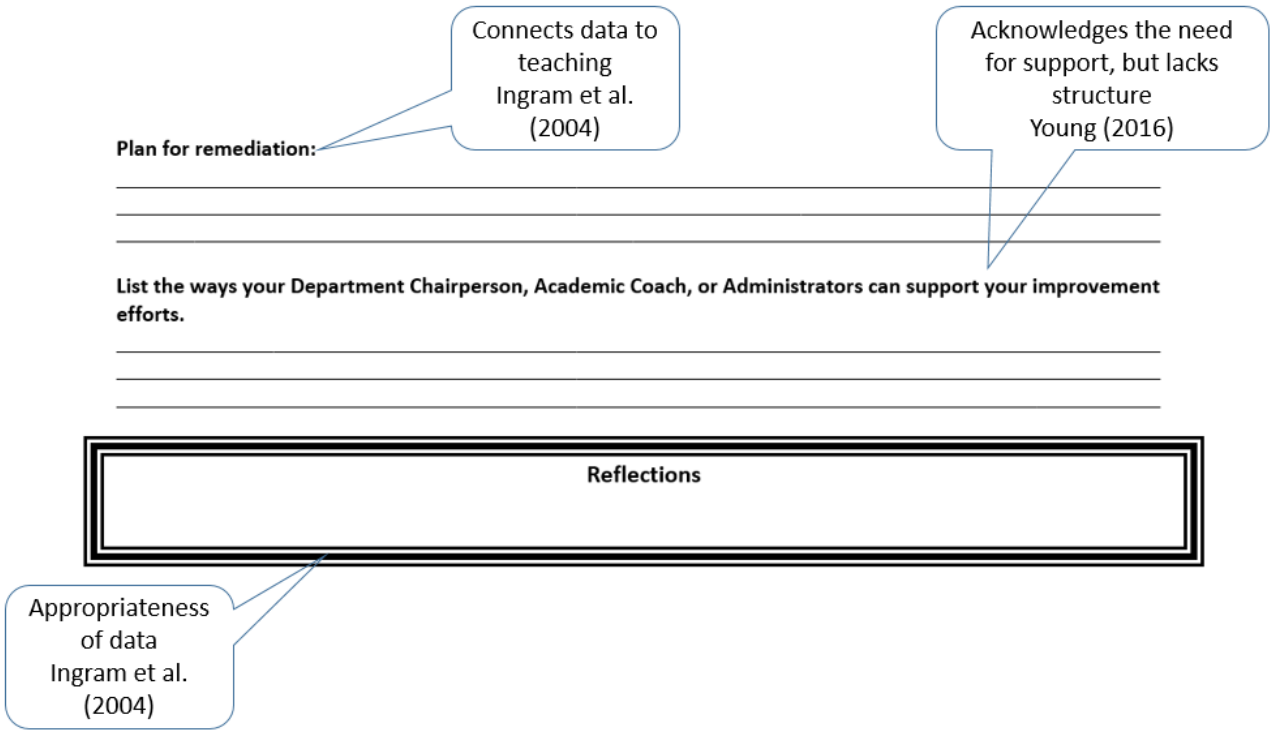

Figure 5. Literature alignment of the third section of the data talks instrument

The team determined that the data talks process helps teachers to reflect upon their instructional practices, consider the areas where students continue to need support, and identify possible areas in which teachers may need additional support. Additional information was still needed to determine the direction of the study.

This information was taken from focus group discussions and survey responses. The data talks instrument used at Thomas High School required teachers to reflect on the cause(s) of poor student performance, but it didn't explicitly require teachers to consider ways to improve the quality of their instruction. Young (2006), found that teachers rarely use data to reflect upon their instructional practices because they fail to see its usefulness. However, survey results and focus group conversation analysis indicate that Thomas High teachers did use the data talks process as an opportunity to reflect on their instructional practices, but did not complete this task unless required to by administration.

The team also discussed the results of studies conducted by Young (2006) and Jimerson (2014) which suggest that teachers often perceive data analysis as a compliance activity. There was a need to establish the data talks process as a valuable exercise for improving student learning outcomes. Analysis of the focus group transcript revealed that Thomas High School teachers believe that data analysis can be used to improve student achievement. However, adjustments needed to be made to the data talks process if it was to be more effective in helping teachers bridge the gap between identifying student deficiencies and addressing them.

The final strength of Thomas High School's data talks process, as determined by the action research team, was in its ability to help teachers identify areas in which they may need additional support. Some members of the focus group reported seeking assistance from colleagues to help them improve their teaching practices in specific content areas as identified by the data. It is important to note that this strength may be rendered ineffective if teachers are concerned about potential penalties for their lack of acumen and fail to seek support. A more detailed evaluation of the effectiveness of the implemented interventions will be discussed in chapter 4.

Inputs. The conceptual framework (Figure 2) illustrates the importance of understanding the beliefs that the members of this case held related to data-informed instructional practices. During both the input and the output stages of the study, the team documented the beliefs of Thomas High School coordinate algebra and analytic geometry teachers. This focus on teachers' beliefs is directly linked to the theory of planned behavior which is the theoretical cornerstone of this study. In the theory of planned behavior, Ajzen (2002) postulates that beliefs determine our intentions and in turn govern our actions. Therefore, the conceptual model (Figure 2) was designed to embed the tenets of the theory of planned behavior related to teachers' intention to

use data to inform instruction by focusing on its three elements throughout the process. Using surveys, interviews, and observations the following characteristics were documented: personal attitudes, perceived departmental and school-wide attitudes toward data-informed instructional planning, and perceived obstacles in the effective implementation of data-informed instructional practices of teachers.

Process. To address the goals of this study the action research team researched adult learning theory principles and professional development strategies for data-informed instructional practices that are geared to meet the needs of the math teachers at Thomas High. The process that the action research team used to determine the necessary interventions were informed by two factors, namely the objective of the study and the input of teachers' beliefs as indicated from the pre-study survey (Appendix F). The study's objective and what is known about teacher beliefs surrounding data-informed instructional practices guided the research and drove the type of intervention that implemented.

More specifically, during the process stage, the team identified intervention designs that hold the potential for influencing the instructional practices of teachers. The goal was to conceptualize the data talks process using actionable theory of planned behavior elements.

The process began with the action research team using research-based strategies to determine which professional learning activities would address individual teacher beliefs, team beliefs, and beliefs regarding control barriers in its design. This was followed by a review of teachers' intentions to use the data talks process to use data to improve instruction through collaborative planning observations.

Outputs. The changes in teacher data use, teacher data perception, and the data talks process were documented and serve as the output in this study. The aspects of the data talks

process that influence teachers' intentions to change their instructional practices based on student assessment data was determined. The conceptual framework (Figure 2) illustrates the structure of the study, which allowed these aspects to be identified**.** By using the theory of planned behavior as the theoretical framework for this case study, the action research team identified interventions and strategies that are key in addressing the behavioral, normative, and control beliefs of teachers. Based on our findings we are also able to offer strategies that may result in an increase in data-informed instructional planning and practices among teachers.

Significance

Understanding what motivates teachers to change instructional behavior based on data will help researchers, professional development presenters, and school leaders to make better decisions about how to build teacher capacity for using data to inform instructional practices. Educational leaders throughout the country are concerned with improving student learning outcomes. Data-informed instructional practices have the potential to significantly improve student achievement, when teachers are planning with fidelity. The results of this study offer educational leaders a method for evaluating the effectiveness of data-informed instructional planning and practices. Professional development personnel will gain insight on how to improve the design of training models and improve supports surrounding teacher data usage.

Preparing for Action

The action research team worked to identify effective interventions to address the problem of inconsistent use of data-informed instructional practices by teachers at Thomas High School. Interventions initially considered were data teams, professional development, and mentoring. The advantages and disadvantages of each of these actions were researched and discussed by the team. The methodological literature review that follows reveals the knowledge

regarding each intervention model. This information was used to decide the interventions that would be most effective in the Thomas High setting.

Table 3 outlines the pertinent information about each potential intervention. The action research team discussed the advantages and disadvantages of the proposed interventions, researched potential professional learning opportunities, and created a plan for implementation. After building consensus around the type of intervention used in this study, a timeline for implementation was created.

Table 3.

Proposed Interventions for Data Talks Action Research

Proposed Intervention	Action Research Team Activities	Anticipated Outcomes/ Connection to the problem, theoretical framework	What data will be collected on the intervention?
Data Teams	Research professional development plans and/or redeliver	a) Teachers will become more efficacious in data usage b) Teachers will learn new instructional techniques c) Organizational learning will take place d) Processes will be developed to overcome barriers to data usage e) Teachers will perceive data use as an important part of their job	Observations Interviews
Learning Communities	Research learning community plans, attend professional development training and/or redeliver	a) Teachers will become more knowledgeable on data usage through peer interaction b) Teachers will learn strategies for effective data use. c) The foundation for a data-driven-decision making school culture will be laid.	Observations Interviews Surveys
Mentoring/ Coaching	Research mentoring programs, and/or take classes in data team mentoring.	a) Teachers will feel supported in using data b) Teachers will have a resource to support their use of data.	Observations Interviews Surveys

Table 3 was used to determine the best direction for this study. It was important for understanding if and how the proposed interventions could help us better understand teacher data perspectives. The responsibilities for the action research team members had to be feasible. Members had to be willing and able to complete the assigned tasks. The anticipated outcomes had to be relevant to the scope of the inquiry. Lastly, there needed to be away to capture the data generated from the intervention we selected.

Research on Proposed Interventions

The teams' work to this point led to a need for more information regarding the potential interventions. Importantly, the selected intervention had to be cost effective, feasible, and applicable within the context of Thomas High School. The following information describes what was learned during this part of the process.

Data Teams. The assistant principal of instruction at Thomas High School has worked diligently to create opportunities for teachers to work collaboratively. However, little had been done during this time to improve data literacy among teachers. There was still work to be done at Thomas for data-informed instructional practices to become embedded in the school culture for several reasons: Thomas High educators have had little training on data usage, the data warehousing system did not always meet the data needs of teachers, and there was a lack of clear norms and expectations surrounding data use, (Mandinach & Jackson, 2012; Lachat & Smith, 2005; Schwanenberger & Ahearn, 2013).

Data teams were thought to be one way to remedy some of these issues. In general, a data team refers to a group of educators who meet to strategically and systematically analyze a variety of student data to meet their academic needs. The professional literature revealed varied opinions concerning who should be a member of the data team. Lachat, Williams, and Smith

(2006) suggest that a wide range of educators serve on the data team, including teachers, administrators, counselors and professional support staff. Schwanenberger and Ahearn (2013) studied teams comprised of only teachers who taught the same "content, course, or students" and found them to be effective (p. 151). They suggest that these teacher teams have support from a school-wide data team. Mandinach and Jackson (2012) are more flexible in their labeling of a data team, which includes teachers with any combination of educators, but they do make clear that a data coach should lead the team.

The role of the data coach is very important. Mandinach and Jackson (2012) describe this person as a facilitator and mentor. Lachat et. al (2006) offer a more detailed description of the data coach role; according to these researchers, a data coach is a mentor who should, "model data use, and use data to examine instructional strategies" (p. 19). They identified using a data team and a data coach as one of three important strategies for improving data literacy in schools (Lachat et al., 2006).

Researchers discovered that data teams function most effectively when meeting time is "scheduled, prioritized, and protected" (Schwanenberger & Ahearn, 2013, p. 151). With the proper training, collaborative planning time at Thomas High could be used to transform these groups into data teams. Mandinach and Jackson (2012) suggest that this time be structured and used to focus on instructional strategies that address student deficiencies.

The capacity to use data to inform instruction needs to be developed in teachers. The action research team realized that those needs had to be identified so that they could be properly addressed. We discussed the importance of being strategic and systematic when selecting an effective tool for training Thomas High School teachers to use data for instructional purposes. It was decided that the parameters that guided the data team process should be explicitly shared

with teachers during training (Schwanenberger & Ahearn, 2013). These guidelines helped to establish consistent, effective implementation of the data-informed instructional practices.

Learning Communities. Another intervention that the action research considered was the formation of a learning community to support data-informed instruction. Zepeda (2014) makes it clear that the effective implementation of a learning community relies heavily on the school principal. In fact, she posits, "the principal must possess a strong resolve to create and sustain the conditions and culture needed to build capacity in the individual and organization" (Zepada, 2013, p. 83). This fundamental component of creating a learning community was mentioned by members of the action research team. One member, Ms. Bridgemont, also expressed the desire for the school's administrative team be invited to join the action research team. This suggestion was met with a mixed response.

The inclusion of the school's administration as part of the action research team was considered at the beginning of the study. At that time, I thought that having building leaders involved in the process would influence the perspectives of the teachers. Furthermore, it was thought that this might lead to administrative directives being issued to address the lack of using data to improve instruction rather than change occurring through a collaborative effort. Marks and Printy (2003) found that a principal must possess transformational leadership skills to work with teachers in matters of instruction. In fact, they found that teachers provided the instructional leadership in schools where the principal had poor transformational leadership skills (Mark and Pinty, 2003). While one benefit of including the Thomas High School administrators was that it would provide an opportunity to further develop shared leadership skills, this was not within the scope of the study.

Mentors/Coaching. Lachat and Smith (2005) advocate for schools to use data coaches in data-informed instruction improvement efforts. One way they note that data coaches can be used is by building the capacity to use data among the staff through modeling data use (Lachat & Smith, 2005). Using a data coach or mentor to help teachers develop stronger data analysis skills at Thomas High posed a challenge. Since this study began, the data coach became the academic coach. While some of the job functions have remained the same, the academic coach has less time to devote to data analysis and helping teachers develop the expertise needed to adequately incorporate these techniques into their instructional routine. Therefore, we acknowledged that it would be difficult to implement at Thomas because of staffing issues, although it was discussed in the action research meetings.

Methods of Inquiry

Blichfeldt and Andersen (2006) contend that the action research method is "especially suited to study the change process in social contexts" (Blichfeldt & Andersen, 2006, para.2). Documenting the perspectives of the participants in this study as they navigated through the interventions implemented by the action research team made this study ideal for action research. The collaborative nature of this study necessitated the careful identification of participants and data collection methods. The actions taken to accomplish this goal are described below.

Participants. This study focused on members of the Thomas High School math department. This group of teachers consists of 14 general education teachers who work in collaboration with 4 special education teachers. Five of the math instructors have taught between 5 and 15 years, seven have more than 15 years of classroom experience, and two are new to the profession. Teachers from this department were invited to participate in this study. The four coordinate algebra teachers and the four analytic geometry teachers agreed to be

interviewed and observed as members of the case. Each member of the study was required to sign a letter of informed consent (Appendix A). A copy was provided for them to keep for their records.

Data Collection and Analysis. Table 4 outlines the data collection methods that provide both contextual, implicit, and explicit evidence relevant to the problem. The data collection tools identified in this paper were selected based on their use in comparable research studies and the way they aid in understanding teachers' perceptions of data-informed instructional practices. Teacher interviews provided the action research team with an opportunity to further understand the teachers' perspectives. The analysis of teacher survey data was used to assess teachers' beliefs, social normative perspectives, and levels of self-efficacy. The quantitative data gained from the survey was used to frame the intervention(s) identified by the action research team.

Table 4 also outlines the questions that the study addressed and the associated method of data collection. The proposed timeline was influenced in part by the cyclic nature (Creswell, 2013) of qualitative data analysis. The interview and observation data were analyzed when collected. By doing so, the action research team gained direction for adjusting interview questions and study interventions. The method of data analysis depended on the type of data that was collected during each phase of the study. Throughout each step of the data collection process the question was asked: Is the data being collected relevant to teachers' perceptions of data and/or the data talks process? Malterud (2001) maintains that this is an important aspect of ensuring the internal validity of the study.

Table 4. Research Questions and Related Data

Research Question	Collected Data	Analysis Approach
How can the Data Talk process help teachers at Thomas High School impact instructional practices?	Theory of planned behavior survey	Regression analysis used to provide a baseline for teacher's personal, group, and control beliefs
	Individual interviews conducted after intervention Collaborative planning session observations	Analysis follows data collection
	Individual interviews conducted after intervention	Data was transcribed, coded, and discussed by the action research team to determine themes and outliers.
	Classroom and collaborative planning session observations	Qualitative analysis coding techniques. Looking for themes and outliers.
What is learned by the action research team as they explore teachers' perceptions of instructional effectiveness in using data to inform instructional planning and practices at TH?	Action research team meeting transcripts	Qualitative analysis coding techniques. Looking for themes and outliers.
	Action research team member memos/journals	Qualitative analysis coding techniques. Looking for themes and outliers.
What perceived barriers exist in teachers' use of data for instructional purposes at Thomas High?	Individual interviews conducted after intervention	This qualitative data was transcribed, coded, and discussed by the AR team to determine themes and/or outliers.
	Pre-intervention survey developed using the theory of planned behavior framework	Quantitative analysis used to provide a baseline for teachers' personal, group, and control beliefs

Teacher Survey. Using guidelines developed by Icek Ajzens' (n.d.) Theory of Planned Behavior model, a questionnaire was developed to determine the baseline perspectives of the teachers in the study. The resulting information from this survey served as a cost-effective method for providing quantitative data for this study. The objective was for the survey to provide insight regarding teachers' perceptions of data informed instructional effectiveness. The questionnaire results were also used to determine the aspects of the data analysis process that teachers consider most important to instructional planning and practices. These aspects served as the foundation for the intervention(s) that the action research team selects. The outcomes of the data analysis of this survey were used to determine the beliefs of the research participant and the research group. Ajzen's (n.d.) refers to these beliefs as personal accessible beliefs and modal accessible beliefs, respectively.

Interviews. Teacher interviews were an essential part of this study because, as Seidman (2006) explains, when people tell stories they are constructing meaning related to that experience. Understanding these meanings aided the action research team in the analysis of teachers' perspectives about data-informed instruction. Interviews were useful in understanding teachers' perceptions of data usage to guide instruction and what they deemed to be barriers to data usage. These one-on-one interviews were conducted using interview protocols (Appendix C). Each interview was recorded using a digital recorder for later thematic analysis.

Any action research team member who participated in an interview was required to complete a pre- and post-reflective journal (Appendix D). This documentation of the team member's perspective aided in the transparency in the analysis process and helped reduce bias. Malterud (2001) draws a clear distinction between bias and preconceptions in qualitative research. She maintains that, "Preconceptions are not the same as bias, unless the researcher

fails to mention them" (Malterud, 2001, p. 484). The reflective journal completed by the interviewee helped to capture these preconceptions.

Collaborative Planning Observations. Documentation of the scope of planning for data-informed instruction were obtained through collaborative planning observations. One objective of observing teachers was to understand what the teacher means by data-driven instruction. When a teacher claims to have used data to guide instruction, what does this look like? The research team was then be able to determine if this corresponds to the shared definition of data-driven instructional practices.

Observing study participants while they were planning for instruction helped the action research team identify disparities between concept and application of data-informed instructional planning among teachers. Two members of the action research team were part of the collaborative planning team(s), comprised of teachers who teach the same content and grade level. The roles of both action researcher and study participant allowed Ms. Abaeze and Ms. Smart to provide valuable insight into the change process. Thus, these action research team members followed the complete participants model as described by Creswell (2013). Importantly, the influence that researchers had on the observations were documented as part of the study.

Using observations to study teacher workgroup interactions is a practice used by other researchers (Horn et al., 2015; Schnellert et al., 2008). Middle school math teacher workgroups were the focus of the study conducted by Horn et al. (2015). They found that conversational and activity structures during collaborative planning meetings determined how teachers used data. Part of the theory of planned behavior suggests that the ways teachers view social normative structures play a role in their intention to implement knowledge gained from data analyses.

Therefore, it was important to this study to record and analyze teacher collaborative planning sessions to better understand this aspect of the problem.

Acknowledgement of Research Concerns

Addressing the Study Limitations

The two areas that could have been strengthened to improve this study were the inclusion of specific student data and a more robust research environment. The democratic nature of action research lends to a certain level of flexibility because you go where the data takes you. During this study issues surrounding time and district and school priorities posed a challenge. These limitations were addressed creatively.

Navigating time constraints is part of the work culture at any school. For the members of the action research team this obstacle was no different. Initially, the meetings were held afterschool and often after departmental or faculty meetings. This extended day began to wear on all participants. Family obligations and mental fatigue were two factors that led to a more flexible schedule. Action research team members were asked to attend meetings when they could with the understanding that they reviewed the transcript and submit their input via conference calls or email. This helped each member stay abreast of the direction of the study when were all able to meet again. Additionally, members understood that any research or documentation that they were responsible for providing needed to be submitted to me prior to the scheduled meeting. This adjustment was necessary for the project to be completed. Fortunately, there were only a few occasions where action research team members were unable to attend a scheduled meeting.

Akin to time constraints was the challenge of prioritizing school and county initiatives. At times we all felt overwhelmed by the number of new processes, systems, and initiatives that we were expected to access and learn during the time of this study. The new testing platforms, district testing schedules, and navigating curriculum competed for the attention and time of the action research participants. There was little that we were able to due to mitigate the impact of this limitation.

The exclusion of student work could not be avoided, since it was not included in the IRB process. Studying teachers' perceptions of data in making instructional decisions using the data talks instrument did not warrant looking specific student work samples. However, had student work products been included there may have been more knowledge gained regarding teacher data perspectives.

Timing & Key Milestones

Analysis of the action research teams' post meeting reflective journals indicated that members felt that there was a need to address several key areas: (a) improved technology for data analysis, (b) a renewed focus on instructional practices, and (c) the teacher training. Based on the action research team meetings and reflections as well as budgetary and time constraints, the team strongly considering forming a professional learning community designed to address these issues. The thought was to strengthen the effectiveness of the data talks instrument through improved data analysis training. I suggested that the Massive Open Online Courses (MOOCs) program may be the most cost-effective way to achieve this goal. By reviewing the online materials and speaking to educators from other schools, team members researched this intervention to ensure that it meets the needs of the Thomas High teachers.

Using the EdX platform, MOOCS offers a free course entitled Data Wise. This eight-step course is designed help improve teaching by showing teachers how to systematically use data. According to Oberman and Boudett (2015) the eight steps are

- Organize for collaborative work
- Build assessment literacy
- Create data overview
- Dig into student data
- Examine instruction
- Develop an action plan
- Plan to assess progress
- Act and assess

Data Wise is a self-paced professional development series that requires participants to have access to computers. The Data Wise design addresses the key elements of the research questions for this study. One of the key barriers that was identified by the action research team is lack of training. Using a wide range of data sources, this program allows teachers to learn how to analyze student data while collaborating with one another.

Validity & Trustworthiness

Multiple measures were taken to ensure the validity of the study and trustworthiness of the qualitative data. Malterud (2001) states that internal validity is achieved when a study is focused on the topic it purports to investigate. To meet this criterion, the action research team confined its' activities to issues dealing with data-informed instructional planning, the data talks process, and the interaction between the two. A review of the research questions and data collection methods shows that they align with this framework. The generalizability of the

findings of this study addresses the external validity. Schildkamp and Poortman (2015) aligned case descriptions with their theoretical framework to support external validity when they studied factors that play a role in the way data teams work. A similar process was taken for this study.

Subjectivity in Research

At the heart of action research is that it empowers participants to create change in the context of their work environment through individual reflection, collaborative problem solving and taking intentional action (Zepeda, 2013; Blichfeldt & Andersen, 2006). However, because action research team members are embedded in the process there can be a concern that their work lacks objectivity.

To address subjectivity, the action research team and I documented our potential biases and reflections throughout the course of the study. Initially, I considered my position as department chair and did my best to limit imposing my viewpoints on the participants during the process. While I did not conduct formal evaluations of teachers, members in my department view my position as one of authority. Therefore, it was important that I was mindful of the impact of how I expressed my thoughts on data informed instructional planning and practices to the team.

One of my responsibilities as department chair was collecting the data and reporting the results to the administrative team. This process provided me with an opportunity to identify the areas of instructional deficiency across math content areas. It also contributed to the impressions that I formed about certain teachers' instructional practices. Therefore, it was important for me to use member checking to verify my findings.

I have worked at Thomas High School for over 15 years and I have developed a healthy working relationship with the members of my department. These relationships had the potential to create unintended pressure on members to participate. Since only 4 out of the possible 13 members joined the study, I was comfortable that the group understood the voluntary nature of the project. However, I wanted to be sure that the members who did participate were doing so because they were genuinely interested in the problem being study. For example, Ms. Smart is a former student and was a member of the action research team. Was our relationship the determining factor in her decision? She and all other members of the department were reminded that they did not have to participate and there would be no repercussions for withdrawing from the study.

CHAPTER 4

CASE STUDY – THE STORY OF TEACHERS AND DATA

The drive to improve instruction using data at Thomas High began with the school's administrative team. Data talks were used as a school-wide process which initially focused on teachers who instructed Georgia Milestones courses. This process required teachers to select an assessment that they had given to their students and graded. Teachers then filled out a data talks form which required them to identify three areas of student strengths and three areas of student weaknesses, and to reflect on what teachers can do to help students improve. Lastly, these reports were then submitted to the teachers' department chair who in turn reported the findings to the school's leadership team.

Opposition to this process was almost immediate. Many teachers expressed that the process was time consuming and they did not see the value in the exercise. Moreover, some teachers resented the fact that not all teachers were required to participate. Teachers who taught courses assessed through the Georgia Milestones Assessment felt that they were asked to do more work than their non-End of Course test teaching counterparts. Educators who did not teach End of Course tested courses cited data talks as another example of their subjects being treated as less important.

During the second year of implementation, the last phase of the process changed. The school's administrative team felt that teachers were not taking ownership of the data and were missing the point of the data talks process. As a result, instead of the department chairs

presenting the teachers' submissions, teachers were required to prepare a PowerPoint of their findings and present this information to a panel of administrators. In this version data talks, all teachers were required to participate.

Members of the math department realized the need to use student data to improve student achievement, but they did not agree that the data talks process was the most effective way to achieve this goal. As the math department chair at the time, I was interested in finding the best way to have the members of the department use data to best help them improve instruction. Wanting to work smarter, not harder, other members in the department who shared my concerns agreed to work on this action research project to explore teachers' intentions to use data to inform instruction.

The Thomas High School Context

Thomas High is a suburban high school located in the southeastern region of the United States. When it opened a little over 25 years ago, it was the premiere school serving students of color in the Jasper County school district. Over the course of the schools' short history, economic downturns and the opening of magnet schools created shifts in the student body as well as student achievement levels. Now a Title I school, Thomas High continues to attract highly recruited student athletes, but no longer leads the world in robotics and other academic endeavors.

Several personnel changes occurred in the math department during this case study. About half-way through the study, I transitioned from the math department chair position to an Instructional Support Specialist at the school. The math department's leadership changed to the co-chair model. Additionally, two novice teachers were hired. These changes did little to

change the way that the teachers in the fourteen-member department worked to meet the learning needs of the students.

Supported by four resource teachers, math department members meet monthly to work on implementing district and school-mandated programs, share strategies for classroom instruction, and discuss ways to improve student achievement. When the topic of data talks was discussed, the consensus was that using student data was important, but that the data talks process was not particularly helpful in improving instructional practices. Consequently, a suitable method for using data to improve innovative teacher practices and student achievement was still needed.

Coordinate algebra and analytic geometry teachers made up the case for this study. Each of these content teams was comprised of four general education and two special education teachers. One general education teacher on each team served as the content lead. The ninth grade coordinate algebra teachers met collaboratively each week to discuss pacing, content, and the best way to implement the required unit tasks. Navigating lunch duty responsibilities while preparing for instruction proved to be challenging, especially for the two teachers who had less than two years of teaching experience. Only one of these novice teachers had been through the data talks process.

The analytic geometry team of teachers was more experienced. All these teachers had more than five years of teaching experience and had been working on a team with the others for at least two years. The analytic geometry team also met weekly to collaboratively plan for instruction. It was clear that this group of teachers was comfortable challenging their colleagues' ideas and discussing instructional strategies.

Although the special education teachers were in the classroom with the general education teachers daily, they were not always able to plan with them collaboratively. Because at times

they served in two academic departments, their schedules also made it difficult for them to attend all math department meetings. This is important to note because the resource teachers were still responsible for using and understanding student data. They did not participate in this study.

Major Personnel Changes During This Study

Organizations such as school systems are always changing. These changes can create unanticipated challenges during research studies. Fortunately, during this action research project, many of the unforeseen events which were beyond the control of the action research team addressed concerns raised by the focus group and action research team. Germane to this study were changes at the district and school leadership levels.

Five months after the action research team met to discuss possible ways of studying the issue of data informed instructional practices, leadership changes occurred at the district level that directly impacted Thomas High. There was a new regional superintendent who focused on data, technology, and the instructional knowledge of the school leadership team. This highly visible leader brought new expectations and spent more time in the building than staff members were used to. Members of the regional superintendent's team came to the school to assess the level of knowledge and engagement of the assistant principals and instructional support staff as it related to data and instruction.

The expectations of this new district leader were quickly echoed by Thomas High principal Mr. Wiley. Tasked with acclimating four new members of his seven-member leadership team, Mr. Wiley began communicating the vision of the new superintendent. The school's new assistant principal of instruction, Dr. Wright, was given the responsibility of leading the school in this data focused initiative. Although this would be her first time being a

Thomas High assistant principal, her knowledge of the Thomas High culture and climate dated back to 2003 when she served as a math teacher, math department chair, and then academic coach.

Additionally, in August of 2018, Thomas High's academic coach implemented training centered on leading content teams on data use with the Data Wise ACE Habits of Mind process that had been discussed in the first action research team meeting. This change aligned with the desire of the action research team to have more support for teachers during the data analysis process. These changes had a significant impact on this study because they were changes that the action research team had no way of implementing, but desired to see come to fruition.

Noteworthy changes occurred at the department level as well. To begin with there were changes in the leadership structure of the math department. A coordinate algebra and an analytic geometry teacher were selected to lead the department. Each of these co-chairs had a first-year teacher on the team. The new coordinate algebra teacher started in August of 2018, and the new analytic geometry teacher began teaching in January 2019. Neither had previous classroom teaching experience beyond student teaching.

In short, the school-wide and district level changes supported the work being done by the action research team. This shift in expecting all stakeholders to know and understand student achievement data and use this information to drive decision making impacted the school culture and this case study.

The Action Research Team

To address the issue of how student data is used to inform instruction, Thomas High school teachers were invited to participate in the study via an email sent to the entire staff. Additionally, an announcement was made during a faculty meeting asking anyone interested in

participating to attend the inaugural meeting. Five members of the faculty attended the first meeting. These individuals comprised the action research team for this study.

Sarah Countess[2]

Sarah has been an English Language Arts teacher at Thomas High since the school opened and was the only member of the action research team who was not a math teacher. Her desire to serve on the committee stemmed from frustration with the data talks process. Ms. Countess agreed that data can be a powerful tool to impact student achievement, and she was excited about the opportunity to inform how teachers use data to that end.

Ms. Countess' insight and command of the English language proved invaluable to the team, as she often helped the action research team members clarify and articulate their ideas. This often resulted in team members feeling supported and empowered to share more often. Ms. Countess also helped members of the team understand the research that was completed during the first phase of the study.

Joy Christian

Ms. Christian served both on the action research team and the data team that was later formed. As a math teacher who is often assigned to teach honors classes, she often expressed exasperation with the expectations placed on her and her students to cover the curriculum in a timely manner. Ms. Christian came to the action research team hoping to discover a process that would allow her to use data to more effectively impact instruction given these constraints.

During the action research meetings, Ms. Christian often focused on the need for the process to be less time consuming. She maintained that the process of data analysis should not

[2] Pseudonyms were used for all action research team members

simply be “another thing to do,” but that it should be authentic and valuable to instructional practices.

Chante Bridgemont

As former college instructor, Ms. Bridgemont brought a broader perspective to the team. Truly understanding the impact of the failure to meet student needs at the high school level, Ms. Bridgemont’s interest in joining the team was to help develop a process that would strengthen instructional practices at Thomas High. She was also interested in the identifying the reasons teachers seem to resist using data to accomplish this goal. Adept at seeking clarity, Ms. Bridgemont challenged team members’ comments. This aided in the groups’ collective understanding of what each member attempted to express.

Jessica Smart

Ms. Smart was a wonderful addition to the research team. As a former Thomas High student, the lens through which Ms. Smart shared her views of the use of data to inform instruction was helpful in the process. With six years of teaching experience, Ms. Smart participated in the project in part to improve her instructional effectiveness. She is devoted to her alma mater and desires to help the students who live in her community have the same opportunities that she had.

Ms. Smart was the only math teacher on the action research team who taught in a collaborative setting. During team meetings she often reminded other members that the data-informed instructional process should take into consideration the needs of all learners, not just those in a traditional setting. She often advocated for the use of data to strengthen instruction for students in collaborative classes.

Evette Abaeze

Ms. Abaeze showed the most commitment to this project. Before the research began, Ms. Abaeze was experimenting with ways to use data to improve instruction. She believes that data should be known and used by all stakeholders. She consistently requires her students to track their own data to hold them accountable for their learning and their progress. Ms. Abaeze's participation in this action research study was driven in part by the desire to help teachers understand the power and importance of data usage. Her desire to create a comprehensive plan designed to use data effectively and efficiently was clear from the beginning. She embraced the research aspect of the project and became an active member of the data team that was formed during the study.

As one of the new math department co-chairs and analytic geometry content lead, Ms. Abaeze was positioned to impact, monitor, and encourage data use. She worked with the other geometry teachers to guide instruction based on the formative and summative assessment data.

Stages of the Data Talks Study

The action research process used in this study followed the format outlined by Craig Mertler, Director of the EdD Program in Leadership and Innovation at Arizona State University. In his book *Action Research*, he states that there are four basic stages to the action research process: "The planning stage, the acting stage, the developing stage, and the reflecting stage" (Mertler, 2008, p. 29). This design was used to guide the work of the action research team throughout the course of the study.

The Planning Stage

Identifying and limiting the topic. During the first stage of the action research process, Mertler stresses the need for researchers to identify and limit the topic, and to gather information

(Mertler, 2008). This phase of the action research process began in November of 2017 and lasted until February of 2018.

The desire to study the topic of data use to inform instruction was born out of the frustration with the data talks process among some educators at Thomas High. Prior to its formation, members of the action research team would meet informally to discuss their frustrations. It soon became clear that if a positive change was going to occur, the team would have to present a plan to the school's administration for an alternative to the data talks process. The desired outcome was to create a plan that would meet the instructional planning needs of teachers and the data usage goals of the schools' administration.

Gathering information. As mentioned before, a focus group was formed for the purposes of learning teacher perspectives regarding data talks and determining what aspect(s) of the data talks process required improvement. On November 2, 2017, a group of six Thomas High teachers met to discuss the data talks process, its strengths, weaknesses, and potential changes to the process.

The Table 5 outlines the salient themes that arose from the focus group.

Table 5

Salient Themes from Focus Group

Category	Theme	Focus Group Comments
Potentially Positive Aspects	The data talks process promotes teacher reflection on their instructional practices	"…it makes me think about what I could have done better…" "When I look at the data it helps me to think about what I could do better next year"
	The data talks process encourages teacher to reflect on their student performance	"… when I'm grading papers and like a lot of students get a problem wrong I wonder…"

	Data talks may encourage teachers to seek assistance to improve instruction.	"…she approached me and said so what are you doing to get such good scores?"
Potentially Negative Aspects	Data talks are punitive in nature	"I gotcha activity" "We think that it's judging us, as opposed to trying to help us improve our practices, and so we're not as open"
	Data talks lack timeliness	"By the time we analyze the data to present it's too late, we have to move on"
	Data talks waste teachers' time	"the time I'm using to prepare for data talks I could be using to talk to my students about their data – that's what really counts" "It's the whole formality of it… We have to write it, and present it but it doesn't make any use to them (administrators), like what is it for?"
	Data talks are stressful	"…taught me how to fight for my job" "…the process creates shame"

The first theme involved teachers' personal feelings about the data talks process. Of particular interest was that most group members supported using data to inform instruction, but wanted to improve upon the data talks process. Teachers shared that the time being used to prepare for the data talks process could be better spent preparing for using the same information to work with the students. It was even suggested that administrators use classroom observations to determine how teachers are using data instead of the data talks process.

The second theme to emerge from the focus group meeting was the idea of the school climate surrounding data use. Overall the focus group members viewed the process as having negative unintended consequences, especially surrounding teacher morale. An essential part of this belief was that in the absence of linking the data talks process with instructional practices

and/or observations, teachers surmised that data talks were being used to "punish and shame" teachers forcing them to "fight for their jobs" and defend their teaching practices.

The last aspect of the Theory of Planned Behavior, which was used to categorize the themes from the focus group discussion, was the difficulty of implementation of the data talks process. Also referred to as the control factors, the focus group was asked to discuss those things that they feel they cannot control which make the data talks process challenging. They cited time constraints and issues with data validity as major issues with the process. Pointing to lack of student motivation, poor student attendance, academic dishonesty, students and parents being grade driven versus knowledge driven, class sizes, and classroom dynamics focus group members questioned whether the instructional decisions that they made really reflect student ability.

Reviewing related literature. The team wanted to understand issues surrounding data-driven instructional practices beyond the walls of Thomas High. The literature review suggested that there were three key areas that supported teacher data use practices.

Based on the research discussed in Chapter 1, there were some key concerns that traditionally have been cited that members of this focus group did not mention. Research suggests that teachers typically struggle with access to data, understanding how to use data to inform instruction, and difficulty with collaboratively working with data (Kerr et al., 2006; Horn et al., 2015; Jimerson, 2014; Means et al., 2010; Lachat & Smith, 2005). Due to the format of the data talks process, these issues are less of a concern to the focus group participants. The data that teachers were asked to analyze for the data talks process were formative assessments that could be created by the teachers themselves. Therefore, for presentational purposes teachers tended to use data that they had on hand. The data talks process only required a cursory

explanation of what teachers would do to improve student achievement based on the data that they presented making the data talks instrument an ineffective tool for helping teachers to innovate instruction. Lastly, teachers presenting to department chairs or administrators presentation method did not lend itself to using data to collaboratively improve instruction and/or student achievement.

Developing a research plan. Reviewing the focus group results sparked debate among the action research team. While some members felt that the benefits of the data talks instrument held promise for improving instruction, others felt that there may be better ways of addressing the problem that had less of a negative impact. This led to us to wonder what changes could be implemented that would bring about the desired outcome of positively influencing instructional practiced based on student data. Consequently, the team to look at three key areas to direct this change.

First, we looked at the aspects of the data talks process that the focus group felt helped to drive instructional improvement. The level of reflection both on instructional practices and student achievement was thought to be extremely important. In addition to benefits the focus group stated, Ms. Christian noted data talks help with course pacing. In the end identifying student and teacher deficits for in specific units of learning and encouraging teachers to seek out help were aspects of data talks that we all agreed were things we wanted to keep. Ms. Abaeze noted that the process could be strengthened if it invited collaboration. We agreed and thought that we needed to take that into consideration when making decisions regarding the direction of the study.

Next, the team considered more ways the data talks process could be improved to link instruction and data. We felt that creating a method to measure growth would also improve the

data talks model. To accomplish this, members acknowledged that line-item analysis would need occur and there would have to be some tools to facilitate this task. Action research team members felt that the tool could also be used to evaluate the quality and rigor of the assessment.

To decide if the data talks instrument should still be used, Ms. Abaeze was the most vocal. She cautioned the team to not make decisions without first clearly determining the desired outcome and doing the necessary research to inform that decision. This led us to identify research-based strategies that impact teacher data usage. Team members read articles and reported to the group. As we discussed what the leading researchers said about data-driven instructional practices, we realized that a single instrument may be insufficient to accomplish our goal of increasing teacher innovation.

Following the review of the focus group transcript and the available literature on data-driven instructional practices, we were ready to clearly articulate the research problem, purpose, and research questions. We determined that this would help to guide us to the most effective intervention for this context.

The original research problem read: The problem this study will seek to address is the usefulness (or lack thereof) of the data talks process to address teachers' intentions to improve instructional innovation through data usage. Because the consensus among both the focus group and the action research team was that the data talks process was useful in encouraging teacher reflection the team decided to revise the statement to read: The problem(s) this study will seek to address are the aspects of the data talks process that are perceived as a barrier to teachers' intentions to improve instructional innovation through data usage. We felt that revising the statement in this way better reflected the tone and attitude of the Thomas High teachers.

This coupled with the admonition of Ms. Abaeze in an earlier team meeting, helped us to further clarify the goal of the research and led us to a review of the statement of purpose which originally read: The purpose of this action research study will be to improve training, implementation and assessment of data talks in order to create conditions in which teachers are more likely to produce relevant information that influence their practices.

We wanted to create a statement that was both actionable and realistic for the positionality of the group members. Understanding that this was a research project, we were aware that we needed to be able to verify our findings. The result was to omit the assessment of the data talks process. Some team members felt that this was already done when we reviewed the focus group's discussion. Also, we decided that this would allow us to focus on the aspects of the data talks that were sustainable even without administrative or district level support. The revised purpose statement now reads: The purpose of this action research study will be to improve training and implementation of data talks in order to better understand the conditions in which teachers are more likely to produce relevant information that influence their practices.

The other adjustment that was made to the purpose statement was that the phrase "to create conditions" would now read "to better understand the conditions". Having a better understanding of the elements of data talks that influence teaching practices was at the heart of addressing the negative perceptions of the data talks process.

Lastly, the research questions needed to be discussed and reviewed. During this discussion I had to remind the team that the focus had to remain on the case so that we would not seek to involve the staff at-large. I presented them with the questions that I had already created for prior approval. To aid with efficiency we looked at the questions, the methods of research, and the rationale for asking the question. Table 6 outlines the results.

Table 6

Review of Research Questions

Research Question	Data to Be Collected	Rationale
In what ways can the data talks process impact instructional practices at Thomas High?	Collaborative planning session observations and interviews	This data will allow the team to determine if and how teachers used data to inform instruction based on collaborative meeting discussions.
How does the action research team describe what was learned about teachers' perceptions of instructional effectiveness in using data to inform instructional planning and practices at TH?	Action research team meeting transcripts & memos Data team meeting transcripts & invitation analysis Collaborative planning meeting transcripts Teacher interviews	This will allow the action research team to review what is learned at every stage of the study.
What perceived barriers exist in teachers' use of data for instructional purposes at Thomas High?	Collaborative planning meetings Interview transcripts	This information will be useful in developing interventions that best address the needs of the participants at Thomas High.

The Developing Stage

Plan of action. After the focus group met, the action research team came together in February of 2018 to discuss what was learned. Conversational analysis of the focus group transcript along with the discussion of data-driven instructional practices led the action research team to insights into teacher perspectives on the relationship between teacher data usage and instruction. An assessment of the data talks process through this lens suggested that data talks in its current form might not be the most effective way to create conditions that encourage teachers to change their instructional practices to meet the needs of all learners at Thomas High.

By the end of the planning stage, we concluded that collaborative planning that involves data analysis and forming a school-wide data team would be most helpful in improving teacher data-use for instruction. It was decided that changing the context of the data talk process would be the best way to accomplish our goal.

Professional learning communities, school data teams, and mentoring then became the focus of the action research teams' attention. Our meetings then focused on how this would look at Thomas High, the obstacles that we might face in their implementation.

Professional learning communities have a negative reputation at Thomas High. Teachers often view these meetings as something that infringes upon their planning time and has little to do with their course content. Many activities labelled professional learning communities at Thomas are simply ways to bring teachers who have common planning time together to learn how to implement a new district mandated program or understand a new technology. Realizing this we recalled what Ms. Abaeze said about collaborative planning.

The benefits of incorporating the analysis of student data into the already existing collaborative planning meetings were clear. There would be no need to schedule another meeting, and because these meetings were attended by teachers of the same content, they would naturally link the data to the content. The research we reviewed suggested that team conversational structures and group dynamics would impact these data focused conversations. There was concern over lack of structure and oversight in the data analysis process even in these pre-established work groups. We agreed to do more research to see how others were handling this process.

The research also suggested that school data teams support teachers in the data-analysis process (Lachat et al., 2006). We debated who would serve on this data team and the role of the

team in the school. Would we have complete autonomy? Would the school's administrative team be involved? When we returned to school in August 2018, we found out that there would be a school-wide data team. The vision of principal Wiley was for that team to oversee the progress of predetermined ninth grade students and "whatever else we felt was needed." This news was met with some excitement and apprehension. While the data team mandate afforded us an opportunity to implement some of the suggested research-based practices, we were concerned about the inclusion of the schools' administration in the process.

Mentoring was the final intervention that was considered. The major concern surrounding mentoring dealt with cost and implementation. We discussed the supports that might be offered by the district in this area. Ms. Abaeze questioned why the school's data coach did not fill this role. We then discussed that she was currently being trained on the Data Wise process and being mentored herself. A conversation with the data coach revealed that she would be attending the collaborative planning meetings to ensure that decisions were being made based on the data. We were happy to hear that the school data coach would attend the meetings, but felt that her lack of experience with the process did not align with what the research said regarding having an expert lead teacher involved in the data-analysis process. However, because she was a former math teacher and department chair, we hoped that this would offset her lack of experience as a data coach.

The Acting Stage

Collecting data. Members of the data team, and coordinate algebra and analytic geometry cohorts agreed to allow their sessions to be recorded for the purposes of this study. Additionally, some members agreed to answer exit interview questions. It was the desire of the action research team to use these interviews to verify what was learned from the analysis of the

meeting recordings. This data was then used to identify conversational features and teacher viewpoints pertaining the data talks process. Between November 2018 and March 2019, two collaborative planning sessions from each cohort were recorded as well as the data team's Data Wise training. In addition, classroom walk-through observations were conducted to determine the implementation of data-informed instruction.

Analyzing data. Guided by the cautions of Mertler (2008), the data was analyzed. Mertler explained:

> ... it is imperative to remember that the analysis of data must 'match' the research question(s) being addressed, and hopefully answered, by the study. Most qualitative data are appropriately analyzed by means of an inductive process, where the action researcher examines all data for patterns and similarities" (Mertler, 2008, p. 36)

The conceptual framework led us to look at what the data told us about the beliefs, intentions, and actions of the cohort participants. As a result, data analysis for this project took several forms. To learn about the beliefs of the participants the theory of planned behavior survey was analyzed using an F-test to first determine the variance and the appropriate two sample t-test to determine if survey response varied among participant groups. Analysis of the qualitative data involved reviewing and coding the transcripts of the data talks sessions and data team session. The analysis of the collaborative planning session transcripts provided data on the participants' intentions to use data to inform instruction, while the analysis of the interview and observation data provided information about the ways in which cohort members acted on these plans. The team was satisfied that no additional information was needed because analysis of the

transcripts and interviews continued to yield similar results. Therefore, only one action research cycle was needed to complete this study.

The Reflecting Stage

Reflection on the process. This action research case study culminated in a review of the conclusions drawn from the data gathered as well as action research team members reflecting on the project. Team members reviewed the conclusions drawn and wrote their responses to them. Additionally, follow up interviews were conducted with two of the coordinate algebra team members to ensure that two generalizations drawn from the collaborative planning transcripts were accurate. This allowed me as the lead research facilitator to have confidence in the validity of the inferences drawn from the data (Creswell and Miller, 2000).

Action research team reflections. The impact that this study had on the action research team participants was powerful. Members gained confidence in their abilities as a professional to affect change on the system in which they work. Additionally, members expressed a desire to continue to research other issues in education.

For example, Ms. Bridgemont noted that she was "moved to look at more ideas at collecting more detailed data online." Her participation as a member of the action research team member prompted this reflection for the need for professional growth. Additionally, she arrived at the conclusion that, "The introduction of professional learning communities allows for teachers to grow from 'knowledge of practice'." This comment points to the positive impact that this study had on the math department and school community. Action research team members began to see the power of research and implementing best practices as part of their work routines.

Both Ms. Smart and Ms. Christian echoed Ms. Bridgemont's interest in further research surrounding technology that would aid in the data collection and analysis processes. They were keenly aware of the importance of the impact that more efficient data analysis tools could have on teachers ability to plan more effectively. In her reflective journal, Ms. Smart wrote:

> …Moving forward I would like to get some sort of software or system to be able to look at data on a more narrow point of view. Lastly, it would be beneficial for us to track students through common systems so when we conduct or collaborative meetings we can plan accordingly.

The desire for better technological resources was shared by Ms. Christian. She understood that training on these resources were also an important part of the implementation of data driven instructional practices. Yet, Ms. Christian also expressed the need to address the time constraints associated with the process. In her reflections when she wrote that:

> Data users also need more time (non-instructional) if they are to use data well. An online instrument can be implemented for assessment so that grading time can be used to evaluate data.

Recall that Ms. Christian was primarily motivated to join the action research team because she was seeking solutions to effectively cover the curriculum with her accelerated students. Being expected to cover a semester and a half of content in one semester often left her frustrated and concerned that she did not teach at the depth she desired. Participating in this study empowered her to seek research-based solutions to address her problem.

Specific to this study, Ms. Countess shared that the action research process helped to change her perspective on data use for instructional purposes. Her insights reveal that through

reflection and participating in action research studies such as this, educators may grow professionally in unanticipated ways. In her action research exit reflective interview she shared:

> The most meaningful thing that I learned was to subtract emotion for the equation. Looking exclusively at the facts, I was able to identify which students were struggling and where they were falling short as well as doing an honest appraisal of my instruction. My co-teacher and I then made a concentrated effort to group scholars in ways that would force them to stretch and to provide differentiation. Using the Data Wise model also helped to change the tone and focus of grade level meetings. It prevented us from going on different tangents and helped us to come up with realistic goals regardless of where our individual students fell along the continuum of learning.

Overall, the feedback of the action research team members indicated that individual and organizational learning occurred as a result of our work. Furthermore, this team of teachers began to realize that they had the ability to make practical and sustainable changes to the work that they do in ways that were meaningful to them.

Final Thoughts on the Action Research Process

Using the action research paradigm had a positive impact on the action research team's level of professionalism. Throughout the process members shared how much they enjoyed the work, but not the long hours. Ms. Smart, one of the youngest participants, shared that she felt empowered by the experience and that it offered her a sense of control.

This sense of empowerment is one of the elements that Richard Sagor (2010) says is key to ensuring that action research has taken place. Reflecting on the three questions Sagor (2010) states should be asked regarding the inquiry process, I feel confident that the work that was done meets the quality and standards associated with authentic action research. First, our focus was

on professional action. Specifically, our team addressed the problem of implementing the data talks process, mandated by the administration, in a manner that improved its effectiveness and was beneficial to the members in our department individually and collectively. The second question Sagor (2010) poses deals with empowerment. Testimonies from action research team members support the conclusion that they were "empowered to adjust future action based on the results" (Sagor, 2010). The last question Sagor (2010) poses is, "Is improvement possible?" (Sagor, 2010, p. 6). The answer in this case was a resounding yes. Not only was it possible, it was accomplished by this action research team.

As the research facilitator I too grew professionally. This study helped me understand that through a systematic, collaborative effort that true change can be realized in educational practices. This revelation is particularly encouraging because of the length of time I have worked at Thomas. While the intervention that we implemented was simple, the results yielded impacted other departments and prompted the school's administration to have the coordinate algebra team present their Differentiation Day model during a teacher workday.

The strength of this research framework and the findings that it produced will be discussed in the next chapter on the findings.

CHAPTER 5

FINDINGS

While the findings from this study support much of what is already known about teacher data usage, there were new insights to be gained. The analysis of several data sources was used to arrive at these conclusions. Teacher interviews, focus group discussions, collaborative planning sessions, and a theory of planned behavior survey revealed that the manners in which teachers interact with student data is greatly impacted by those they are looking at the data with. In the findings discussed in this section focus was not only given to what teachers shared, but also to those things that were missing from discussions. Table 7 gives a summary of the findings aligned with the associated research question.

Table 7

Research Findings

Research Question	Findings
In what ways can the data talk process impact instructional practices at Thomas High?	a. Data talks can lead to improving consistency in content delivery b. The data talk process can prompt instructional support seeking behaviors among teachers c. The data talks process can lead to creative instructional practices d. Data talks performed collaboratively has a significant impact on instructional practices of the methods studied

How does the action research team describe what was learned about teachers' perceptions of instructional effectiveness in using data to inform instructional planning and practices at TH?	a. The action research team found that teachers perceive analyzing data collaboratively as an effective in informing instructional planning. b. The action research team found that using data to inform instructional planning and practices helped to build a community of learners among teachers. c. The action research team found that content leaders' perception of how to use data shaped the effectiveness of its use for instructional planning. d. The action research team found that teachers' perceptions of how to use data impacted instructional modifications
What perceived barriers exist in teachers' use of data for instructional purposes at Thomas High?	a. Teachers perceptions of hierarchical roles can be a barrier to teachers use of data for instruction. b. Teachers perceptions of the time it takes to use data for instruction can be a barrier c. Teachers view lack of training as a barrier to connection between student work and instructional planning

Research Question 1: Impact of Data Talks on Instructional Practices

Participants in this study generally agreed that the use of data aided in developing better instructional practices. The challenge throughout this research project was making sure that there was a distinction between data analysis and data talks. Members of the case study and action research team often used the terms interchangeably which resulted in the need to cross-check which was being referred to. To be clear, data analysis is an action step in the data talk process, while data talks refers to the discussion of that data individually, a collaborative planning team, or a school administrator using the format outlined in Appendix B.

Once a clear definition of the data talks process was established, the team moved on to determine what the data showed about its impact on instructional planning and practices. The four areas in which data talks were found to be most significant were in

1. Improving the consistency in content delivery

2. Prompting instructional support seeking behaviors
3. Encouraging creative instructional models
4. Collaboratively influencing instructional changes

The Data Talks Process Can Aid in Improving Consistency in Content Delivery

One of the driving factors in selecting the coordinate algebra and analytic geometry teams for this study was that both courses culminate in the Georgia Milestones End of Course test. A review of past results showed an inconsistency in student performance on these assessments. Standardizing what and how teachers in these content areas taught has been a goal of the Thomas High math departmental some time. Unfortunately, efforts at peer observations, math teacher workdays, and weekly collaborative planning meetings without oversight have not yielded the outcomes we have hoped for. The comprehensive approach of using the data talks process during collaborative planning sessions appears to have had a greater impact on improving consistency in content delivery than the strategies used in the past.

Observations performed during this study showed that following collaborative planning meetings which focused on student achievement data, teachers consistently taught the same topics and addressed common student errors. This was especially helpful for less experienced teachers who lacked the pedagogical knowledge to adequately address student deficiencies. As Dr. Smith noted in a discussion with the coordinate algebra content chair after one collaborative planning meeting, “They [the less experienced teachers] just aren’t getting through the material and so their students can’t answer all the questions on the common assessments.”

This revelation brought about due to the data talks process led to two changes significant changes in the practices of the coordinate algebra team. First was the development of the anticipation guide with accompanying guided notes. This guide detailed the skills and concepts

that teachers were to address each day. The second change was a focus on strategically and intentionally addressing common student errors.

For example, during a coordinate algebra team meeting, teachers were discussing the common mistakes that students were making with exponential functions. The group concluded that students were not differentiating between exponential and linear functions so they decided to address the issue during the opening activity the next day. Classroom observations of the opening activity the day following this meeting revealed that the coordinate algebra teachers addressed student misconceptions in the same manner, giving each student an opportunity to better understand the material regardless of the experience level of the teacher.

The Data Talks Process Impacts Instructional Practices by Prompting Instructional Support Behaviors among Teachers Seek

Verified through collaborative planning observations and interview data, teachers tended to seek instructional support following data talks sessions to address specific content and/or pedagogical weaknesses directly linked to the student performance data discussed in the meetings. In the coordinate algebra team, novice teachers were more likely to seek one on one assistance from more experienced teachers, whereas the analytic geometry teachers tended to discuss teaching practices openly and exchange ideas freely. Conversational analysis of the collaborative meeting transcripts revealed that the novice teachers were less likely to participate in discussions involving content, but more likely to ask questions about how to structure the lesson.

For example, after a coordinate algebra data talk meeting, Ms. Stein, one of the new teachers, sought me out to work with her on exponential functions. During the earlier coordinate algebra data talks meeting the data revealed that her students had performed poorly on a common

formative assessment. Although at that time the team discussed why they felt the students didn't do well, Ms. Stein did not speak much. When she and I met, she shared that she wanted to strengthen her understanding of how to teach exponential functions. While she personally understood the concept, she struggled with transferring that knowledge to the students. Seeking assistance in private was the path that this novice teacher felt most comfortable pursuing.

In contrast, the analytic geometry collaborative planning team consistently and openly solicited advice from their peers. This free exchange of ideas was illustrated during an analytic geometry collaborative planning meeting were teachers were discussing the results of a unit test that they had co-designed. Although the data showed that in general the students performed well on question number eight of the test, Jessica Smart recalled that Mr. Stitch used a different instructional method than the other teachers that linked the concepts in question eight with those in question 13 when she shared:

> But you know what Mr. Stitch, your method of teaching all those rules like (number) 13 to the inscribed angles, it just makes so much more sense to me, and I just feel like when I was talking to the accelerated kids yesterday. It just makes so much more sense in general not having to memorize the rules. I think that's why they do bad on those problems because they just trying to memorize rules. But if they think about the fact you got a central angle, you got an inscribed angle, you got an exterior angle, and everything else from there kinda blends to make sense. Like number 13 one of the short answer ones, a lot of my kids still got it wrong, but I don't think they're thinking about …

This probing by Mrs. Smart led to Mr. Stitch sharing his method for using a holistic approach for teaching angles and circles. It also demonstrated how one teacher was able to link student performance data and instructional practices. Later during the meeting Mr. Stitch shared

his method with the team for teaching all the related concepts in the unit using one example. Swapping instructional strategies in this way helped the entire team reevaluate their approaches to teaching the concepts in the unit.

Data Talks Impact Instructional Models

One of the more exciting results of this study was exploring and documenting the impact that the data talks process had on instructional models. The data talks process had an impact on teachers' desires to take risks in developing instruction to meet the needs of all learners. The most noteworthy example was the Differentiation Day developed by the coordinate algebra team.

The coordinate algebra team varied two instructional model designs for Differentiation Day. Both designs required teachers to report data from a common formative assessment. Students were then placed in groups based on their ability. Next, the team met to determine who would teach each group and what content would be covered. The day of implementation students were sent to the designated classrooms and worked on their areas of weakness with their assigned teacher. Using four core teachers, the resource teacher, and an Instructional Support Specialist, this format allowed teachers to address the learning needs of students in smaller homogeneous groups.

A variation of this model was also used. In the teacher swap model, instead of the students switching rooms the teachers did. Each teacher was assigned specific content to cover and rotated to each classroom. In this model allowed novice teachers to be assigned to a topic in which they were stronger pedagogically.

The creativity in these instructional models can be directly linked to the teacher's response to student achievement data as identified during the data talks process. Similar to the

school-wide initiative encouraged by the new Assistant Principal of Instruction, these models sought to address the learning needs of all students.

During his exit interview, veteran coordinate algebra teacher Derrick Duboise reflected on the impact of shifting the data talks to the collaborative planning meetings.

> We use the collaborative data to differentiate our students into groups that we will be teaching in order to move each group. Of course, this info is collected for all of us to use and that informed decision on who is place into each group respectively. I do not see the data talks (reporting to department chair or school administration) as effective as our method of data collection.

This analysis illustrates the importance that members of both cohorts placed on using the collaborative model to create avenues to change teacher practices to better meet the needs of students.

Data Talks Performed Collaboratively has a Significant Impact on Instructional Practices

Participants reported that the data talks process was most helpful for individual reflection leading to improvement in instructional practices. However, respondents reported that when the process was followed during collaborative planning sessions it was most impactful in their use of data. In a survey, cohort members were asked to rank four activities in terms of helpfulness in how they use data to inform instruction. They assigned the most impactful activity a one in the least impactful activity number four. This survey was given following a teacher workday in which one of the planning sessions covered using data for instruction. Table 8 shows the average results of the seven cohort members who responded.

Table 8

Ranking of Impact of Data-Driven Activities on Instructional Practices

Activity	Responses	Average
Data talks with administrators	2, 2, 4, 2, 3, 3, 1	2.43
Data talks during collaborative planning	1, 1, 1, 1, 1, 1, 2	1.14
Data talks during departmental meetings	3, 3, 2, 3, 4, 2, 4	3
Professional development	4, 4, 3, 4, 2, 4, 3	3.43

The results were collaborative planning, data talks with administrators, department meetings, and professional development, in that order. Six of the seven respondents ranked collaborative planning as number one, with the seventh person listing it at number two. In a following up interview Mr. Pippen, an analytic geometry teacher, explained it this way:

> Collaboration with teachers is more effective because we are working with kids daily, know they're levels, and can borrow teaching tips and strategies from each other... with administrators they usually don't know content or the issues (deficiencies) facing the students they just want numbers and ask teachers what they are doing, no accountability for students or parents. Administration just want this level of proficient/distinguished to make numbers look good. While teachers wanna see true growth and learning may not be proficient but you went from a one to a two, I'm happy with that.

This response was reminiscent of the member of the focus group who questioned the rationale behind presenting formative assessment data to members of the school's administration. Teacher perspectives such as these suggest that the context in which data is presented significantly impacts the value teachers assign to its use for instructional purposes.

Research Question 2: Teachers' Perceptions of Instructional Effectiveness in Using Data to Inform Instruction

The value that the members of this case study placed on engaging in the data talks process during collaborative planning meetings was clear. In general, teachers perceived this practice as being more relevant to instructional practices than the traditional administrator focused model. The action research team found that the salient themes that emerged involved teacher collaboration, the development of a community of learners, and the importance of strong content teacher leaders.

The Action Research Team Found that Teachers Perceive Analyzing Data Collaboratively with like Content Teachers as Effective in Informing Instructional Planning

The primary indicator for the action research team viewing teachers' perceptions of collaborative planning as an effective method for informing instructional planning was teacher interviews. We arrived at the conclusion that the data talks process improved collaboration because it offers a lens through which instruction can be viewed. This data analysis collaborative planning model can be strengthened or hindered by the decisions made by the content lead.

For example, after a coordinate algebra data talk meeting in which the data showed that the two new teacher's students were performing poorly the team lead, Keisha Vialet, realized that more time needed to be spent during collaborative planning meetings to discuss how to present the concepts. After the meeting she shared with me that she suspected that the two novice teachers had gaps in content knowledge and therefore struggled with teaching

exponential functions. This observation led to the content lead's reevaluation of how to set meeting agendas to help teachers who may be having difficulty with the course material.

When action research team members met with the school's data team Ms. Countess noted that:

> It (analyzing data collaboratively) has the potential to work because if the focus is going to be on the facts, it'll give meetings structure and it'll give it a focus so they don't devolve into gripe sessions because sometimes our feelings do overshadow all the information we have, and it makes us, I don't know, it frustrates us instead of pushing our kids forward.

Action research team member and analytic geometry teacher, Jessica Smart's view of the collaborative planning data talks experience:

> I just feel our collaborative meetings are extremely data driven and it helps us to see what we need to teach or remediate next. It also helps us see how other classes are doing and what they found effective. Sometimes admin can be far removed from the classroom and can give more general advice.

Of the three types of data talk audiences, self, collaborative planning team, or administrative team, reflecting with the collaborative planning team was found to be the most helpful in building stronger teaching practices.

The Action Research Team Found That the Collaborative Use of Data to Inform Instructional Planning and Practices Helped to Build a Community of Learners

Focusing on data to inform instruction builds a community of learners among teachers was a finding that the action research team came to when the interview and observational data

was looked at collectively. One of the perceived barriers identified when the focus group transcripts were analyzed was that teachers sometimes struggled with what to do with student achievement data. When the action research team reflected on the overarching knowledge gained from this study, we found that teachers gained new insights into their teaching practices by analyzing student data together. When the data talks process was followed it provided the structure needed for teacher learning to take place.

Swapping of instructional practices that were directly linked to student assessment data was evident in the transcripts of the collaborative planning meetings. In the analytic geometry cohort questions regarding instructional strategies and sharing of various strategies occurred at a rate of almost one to two. This suggests that teachers in this cohort were able to share a variety of methods to help their team members forge new instructional practices to meet the needs of their students.

The Action Research Team Found That Content Leaders' Perceptions of How to Use Data Talks Shaped the Effectiveness of Data Use for Instructional Planning

The action research team noted that the coordinate algebra team and the analytic geometry team responded to student achievement data in very different ways. We found that the analytic geometry team spent most of their time reviewing student data in a way that led to an exchange of ideas for improved instructional strategies. Conversational analysis of the coordinate algebra team revealed that they used student data to focus on creating instructional frameworks to address student behavioral, engagement, and motivational issues. When the lead coordinate algebra teachers did discuss instructional practices, they tended to speak in

generalities. For example, this was Dr. Smith's response to Ms. Stein's questions regarding engaging students to learn about exponential functions:

> They did that today with patterns and recursions. They figured all this stuff out by themselves. Just let them talk, let them bounce ideas off of each other. Let them get up. So yeah we taking notes, but on this example I want y'all to get up or use the boards on your desk to work the problem. Just to spice it up so they're not looking at the board all day.

Later in the meeting Dr. Smith realized that Ms. Stein needed more clarity on how to teach the topic and she offered:

> …Like this one. They (the students) figured out before I even showed them the equation. I said where did the 2 come from, from the example? And they said 'Oh, that was the starting number on the chart'. Good. Where did the 3 come from? 'Oh, that's like the common ratio'. So, if I had to build an equation for the exponential function what would it be? What would you say? Now they didn't know to use $y = ab^x$ they just said oh it would be starting value times common ratio to the raised to the x power.

Exchanges such as this suggest that the Coordinate Algebra team may have benefited from a more structured approach of reviewing student data, if the intended outcome was help teachers strengthen their instructional practices Additionally, had these teachers collaboratively reviewed student work samples, the experienced teachers on the team may have been able to offer specific examples for the new teachers.

However, conversational features showed that during this specific coordinate algebra collaborative planning meeting, this exchange was the extent of the content related discussion. Most of the time in this one hour and fifteen-minute meeting was spent discussing student

motivation and differentiation day logistics. The exchange below more adequately reflects the coordinate algebra collaborative planning sessions:

> Dr. Smith: I'm trying to figure out how to get them to do something at home. Cause even when we gave a little practice on the notes, a little five or six questions.
>
> Ms. Vialet: Yep. They didn't do it.
>
> Ms. Stein: I gave them one question for homework and a lot of them didn't do it.
>
> Ms. Vialet: What I told mine was that we're going back, we're going back to the mini-quiz every day. Because I gotta force your hand. I shouldn't have to at this point in the game. We're trying to get you ready for the next level, but it looks like you all don't wanna push yourself even if I'm not saying anything, the parent not saying anything, whoever. But because you're not motivated on your own, I'm gonna have to motivate you.

There were certain group characteristics that may have contributed to the differences in the way the two groups used the data talks process. As mentioned before, the coordinate algebra cohort had two inexperienced teachers on their team. The tactic of student and teacher swapping was useful in helping students receive instruction from more experienced teachers while addressing the student deficiencies as indicated by the data talks process. However, this practice may not have given the novice teachers the opportunities that they needed to struggle with learning how to develop better instructional practices. Moreover, by spending the much of the time discussing the non-instructional aspects of the data, these teachers missed the opportunity to learn how to improve pedagogy from their more experienced colleagues.

Conversely, the analytic geometry cohort gave more attention to specific instructional practices that arose from collaboratively reviewing student assessment data. Ms. Abaeze was intentional about keeping the group focused and reminding them that team at the beginning of the meeting that one of the purposes was to review the data to swap instructional practices. Her opening statement to the group, "So that if we have issues teaching that concept we can go to that teacher and talk about strategies and share strategies and methods to increase our passing rate." In keeping with that mandate, the analytic geometry teachers used the data talks process to learn more about their students and their own pedagogical practices.

The differences in the level of knowledge of the content leads surrounding the data talks process may also have contributed to the response to data and agenda setting. Ms. Abaeze was a member of the action research team and was interested in learning about teachers' data informed instructional practices. Additionally, she participated in the Data Wise ACE Habits of Mind training as a member of the schools' data team. Neither Dr. Smith or Ms.Vialet were able to participate in that training. All three of these teachers had the ability to set the agenda for the collaborative planning meetings and determine how their cohort would respond to data. Nevertheless, the action research team found that the analytic geometry team was more intentional about linking student achievement data to with instructional practice and the coordinate algebra team to instructional frameworks.

The Action Research Team Found that Teachers' Perceptions of how to Use Data Impacted Instructional Modifications

It was difficult for the team not to compare the differences in how the two collaborative planning teams approached how to use the student achievement data. Analysis of the transcripts of the collaborative planning meetings indicated that the analytic geometry team used student

data to discuss instructional strategies, while the coordinate algebra team used student data to discuss instructional frameworks.

To their credit the coordinate algebra team worked throughout the semester to implement Differentiation Day. This instructional model was designed in direct response to student formative assessment data and mimicked the Milestones Mania/Targeted Instruction design created by the assistant principal of instruction. After giving a common quiz, teachers would meet and discuss student grouping by achievement. On a predetermined day, students would be sent to the assigned room based on the work they did on the common assessment.

The barrier that this team struggled to address was the improvement of instructional practices even with regrouping. As Table 9 shows, that much of the coordinate algebra collaborative planning time was spent on non-content related topics. Dr. Smith stated,

> We gotta make sure on remediation day that if you're teaching the red group, these kids gotta be spoon fed. They're low. Maybe we said that red group 1 is the one that could, you know you could kinda… not leave them on their own, but they could they can do a little something. But that red 2 and 3. We just need to focus on maybe one or two topics. The ones who need the most support because that's the group that we know these are 20's and 30's.

Missing from this discussion was what instructional strategies were needed to help these students do better and what whole group instructional strategies might be used to reduce the number of students who fall in the red group. This illustrates that although the coordinate algebra team used formative assessment data to identify student needs, they did not leverage this knowledge to improve instructional practices among teachers.

Table 9

Collaborative Planning Meeting Excerpts

Meeting Segment	Coordinate Algebra Collaborative Planning Meeting	Analytic Geometry Collaborative Planning Meeting
Duration	1 hour 15 minutes	32.5 minutes
Focus	- Designing formative assessments - Holding students accountable for doing work - Designing Differentiation Day	- Line item analysis of Unit 4 Common Assessment - Sharing instructional strategies - Aligning the Unit 5 Common Assessment with the standards
Opening Excerpt	(20th minute) Ms. Stein: "Why we not doing this before the quiz again?" Dr. Smith: "What?" Ms. Stein: "Like um (hesitantly) Differentiation Day" Ms. Vialet: "Because the quiz is the baseline for who goes where… green, yellow… whatever. We gotta have a common assessment to see where they should be"	(1st minute) Ms. Abaeze: "Alright the unit 4 data so y'all can look at it…. This is, this is the percentage of students that got that number correct. I looked at everybody's …. So that again if we have issues teaching that concept we can go to that teacher and talk about strategies and share strategies and methods and to you know, increase our passing rate."
Middle Excerpt	(34th minute) Dr. Smith: "Alright these TICs (virtual assignments) alright everybody good, I mean y'all know how to create a group now?" Ms. Vialet: "Well what are we supposed to do? Is it just to say complete? So once you click on the students…"	(15th minute) Ms. Abaeze: "So how did you teach them for 13? What did you do?" Mr. Stitch: "Well for vertex inside and vertex outside I kinda get a little animated about it and I say I think of myself as a little man standing at the vertex…"
Ending Excerpt	(73rd minute) Ms. Vialet: "We gonna move the quiz to Wednesday?" Dr. Smith: "No Differentiation Day"	(30th minute) Ms. Abaeze: "Last but not least we got a virtual assignment for Verge.

	Ms. Stein: "So what's Tuesday? Growth & Decay?" Dr. Smith: "Yepp"	We all gotta create our dashboard…"

The findings suggest that this barrier may be addressed with adequate training on data usage coupled with strong content knowledge. Both the coordinate algebra and analytic geometry teams had a member who was trained in the Data Wise process. Second year teacher, Mr. Alex Art is a member of the coordinate algebra team, but he rarely spoke during the team meetings. When he did, he tended to discuss instructional design, not instructional practices. In contrast, Ms. Abaeze the analytic geometry lead set the agenda for the collaborative planning meeting and kept the team focused on instructional strategies. This suggests the need for further research on the role of positionality in teacher data use to inform instruction.

Research Question 3: Perceived Barriers in Teachers' Data Use for Instruction

According to Ajzen's theory of planned behavior (n.d.) a persons' intention to act is preceded in part by their perception of the barriers to that action. The analysis of the transcripts revealed that participants in this case study perceived difficulty in reconciling positions of authority, finding the time to collect the data, and lack of training in using data to improve instructional practices as the specific barriers teachers face at Thomas High.

Teachers Perceptions of Hierarchical Roles can be a Barrier to Teachers Use of Data for Instruction

A recurring theme in this study was the perception that while data is helpful in informing instructional practices, it also impacts how teachers' instructional practices are viewed. This dualism appears to color the way teachers feel about analyzing data with their supervisors. Qualitative and quantitative data were used to come to this conclusion. Conversational analysis

shows that this perception may extend beyond a schools' administrative team to include content chairs.

The most revealing example of this phenomena was illustrated in the collaborative planning meetings of the coordinate algebra teachers. Although there are only four coordinate algebra teachers, the math co-chair, Dr. Smith ran the meetings with the content lead Ms. Vialet. These two teachers dominated the discussions and there was a sense of disengagement among the novice teachers surrounding discussions about student achievement data. Both new teachers consistently have the lowest performing students. Yet they are more likely to seek instructional support from one another and not their collaborative planning team. In fact, when student data was discussed they tended to draw back from the discussion.

Analysis of the theory of planned behavior survey suggests that the normative beliefs of have an impact on teachers' view using data on a regular basis to inform instruction. A two-sample t-test for difference in sample revealed that there was a significant difference in the responses of analytic geometry teachers and coordinate algebra teachers in response to statements regarding the perceptions of social pressures to regularly use data for instruction at the $\alpha = 0.05$ level. Members of the analytic geometry cohort were more likely to feel pressured to use student data than their coordinate algebra counterparts. Moreover, both groups reported that district and school administrators were more likely to think that they should use data-driven instructional practices than other teachers.

The importance that supervisors place on data use is a perceived barrier for some teachers. This is supported by data team transcripts and follow up interviews with two cohort members. The interaction that follows highlights the fact that teachers may be less likely to focus on the instructional value of the data talks process when administrators are involved. The

data team was discussing potential barriers to implementing the ACE Habits of Mind as a best practice when Mr. Art, a member of the coordinate algebra cohort, offered this comment:

> We need to be doing work to pursue this (using data to inform instruction). Instead we're in our classrooms trying to dovetail with lesson planning and similar stuff that we're doing. And we need to think that (using data) through because we already tried to come up with data in those collab meetings. We just need to think through how we're going ...

To which Dr. Ashford, the Academic Data Coach responded:

> And then going back to what you said before, when you were asking about the challenges. One of the keys is gonna be the monitoring piece with this and making sure that even your test group fully understands exactly what it is they're doing because even just thinking about what Mr. Art just said, with the data, their collaborative meetings were supposed to focus more on the data, and as long as somebody was coming to the meetings to monitor it and keep them on track with that it worked. As soon as we stopped, I stopped getting the paperwork. I don't even know if they meet collaboratively as soon as we stopped, and so that monitoring piece is gonna have to be there.

After this meeting Ms. Abaeze and Mr. Art stayed behind. Ms. Abaeze began by sharing that she felt that Mr. Art's comments were dismissed and that was the problem with having administration as part of the team. Mr. Art did not feel heard. He said that he was just trying to make a point about the need for improved implementation of the data talks process, but that Dr. Ashford took it out of context. From her comments he gathered that she thought he and his team were trying to avoid the data talks process during collaborative planning. This exchange illustrates how challenging it may be to bridge the divide of preconceived notions associated with hierarchical roles in conversations surrounding data-informed instructional planning.

The words of Ms. Countess perhaps most appropriately summarize this finding. During the initial data team meeting she remarked,

> I know that there are different roles in terms of leadership, but it seems like sometimes you have to suspend the hierarchy if you're just looking at data so that it becomes more so of a partnership instead of a police scene. I think that might be more effective.

Teachers View Lack of Training as a Barrier to Connecting Student Work and Instructional Planning

The data teams' discussion about potential barriers in implementing consistent data-driven instructional practices throughout the school led to a concern about training. These concerns loomed over the data team meeting in the wake of the role out of the district's new curriculum which was referenced when the subject of training arose. Teachers on the team expressed frustration in trying to implement the new curriculum and were concerned that without adequate preparation, shifting the data talks instrument to collaborative planning sessions would yield similar challenges. With respect to the new curriculum, Ms. Countess noted, "… when you roll out a program like this, in my opinion, you train people. We should've been sitting in sessions, going over the tasks, discussing what do we want the kids to get out of this."
Mr. Cartier who was on the curriculum writing team acknowledged that the lack of training was a problem. He said:

> … they (teachers) don't understand the connection and how we should drive the curriculum and that if you utilize the tasks as a guided force, then it helps the students understand supposedly what is going on in the class with the standards. But if all you're doing is worksheets, then you don't have anything to go on.

Understanding that Thomas High teachers may resist what might be considered a new initiative, Dr. Asford offered her perspective regarding how teachers at the school have functioned even when training has been provided. Referring to the MAP (Measures of Academic Progress) testing system used to measure student growth in math, reading, and English language usage she shared the problem that she anticipated. From her point of view, the major issue would not be teachers' ability to understand the process, but their level of commitment. Not wanting this data talks intervention to be poorly implemented, Dr. Ashford articulated the issue that Thomas High teachers have experienced in this way:

> Even when we talk about us in the class and implement this (ACE Habits of Mind), because we've had several trainings on MAP data and looking at the math data and the different reports that the MAP data gives us and if we were looking to this, then this is the report that we would look at, but to me it's what you do with that training after you leave out of here. So, if after you leave out of the PL(professional learning) and you don't go and really look at the reports, yourself to see, then yeah, you don't know how to use them for instruction 'cause you really haven't looked any more at it other than that training.

Mr. Art interjected, "I think that may be the issue because we give ..., we are given a lot of data, but we're never told how to use it to develop instruction."

The concern over how to link data with instruction was evident in Mr. Art's coordinate algebra collaborative planning team even after he completed the Data Wise ACE Habits of Mind training as mentioned before. In contrast Ms. Abaeze's analytic geometry team seemed focus on using data expressly for instructional purposes. The differences in the impact of the training may

be attributed to several factors. This finding may lead to future studies on the impact of content knowledge, teaching experience, and team level positionality as a starting point.

Teachers Perceptions of the Time it Takes to Use Data to Inform Instruction Can be a Barrier to Implementing Data Informed Instructional Practices

During every phase of this study concerns over the time needed to implement data-driven practices was mentioned. The focus group, data team, teacher interview transcripts, and survey analysis paint a picture of how perceptions shape implementation. One of the goals of the Data Wise intervention was to embed the data talks process in collaborative team meetings to minimize the perception of an additional task being assigned to teachers while improving data-driven instructional practices.

The length of the collaborative team meetings may have played a role in reinforcing or dispelling this perception. A review of the length and frequency of the coordinate algebra and analytic geometry weekly collaborative planning meetings revealed that on average the coordinate algebra team met for 70 minutes compared to the 30 minutes. Despite the large differences in the length of meeting times, analysis of the survey data indicates that there was no significant difference in the control belief factor associated with time. This implies that teachers have a relatively strong sense of self-efficacy relating to the time it takes to complete the data analysis process for instructional purposes. There were no observed complaints about the length of the meeting times, even though teachers complained about the amount of time the process takes.

CHAPTER 6

ANALYSIS, CONCLUSIONS, AND IMPLICATIONS

This action research case study was conducted to improve the training and implementation of data talks in order to better understand the conditions in which teachers are more likely to produce relevant information that inform their instructional habits. The action research team did this by exploring the perceptions of teachers' regarding using student data to support instructional practices. More specifically, the action research team sought to gain insight into three specific areas: (1) ways the data talk process impact instructional practices at Thomas High, (2) learning about teachers' perceptions of instructional effectiveness in using data to inform instructional planning and practices at Thomas High, and (3) identifying the perceived barriers exist in teachers' use of data for instructional purposes at Thomas High. What follows is the conclusions that were drawn by the team and the implications that these findings have on future research.

Summary of Findings

The action research team found that the context in which student data is shared impacts the ways in which teachers perceive the data analysis process and use that information. The team determined that teachers in general perceive reviewing data with the school's administrative staff as less helpful in improving instructional practices. Furthermore, data talks with administrators only served to evoke feels of anxiety and fear in teachers. Conversely, when teachers discussed student performance data with same-subject peers they were more likely to seek ways to better understand their instructional practices and seek advice regarding course

content and instructional delivery from their peers. Moreover, these professional learning behaviors aided in more consistent instructional delivery across classrooms.

Teachers' perceptions of the instructional effectiveness of using data to inform instructional planning and practices at Thomas High School were positive. The collaborative nature of data talks held during team meetings was thought to be helpful in many ways. The action research team found that teachers consider participating in the data talks process with their peers as an effective and helpful way to strengthen their instructional practices and better understand the course content. The data-driven decision-making process framed by the data talks instrument also encouraged teachers to experiment with instructional designs that were new to them. In one team this resulted in a sense of collective ownership of student achievement for that content area. Finally, it was determined that teachers' perceptions of the data talks process were influenced by the content team leaders.

The action research team also evaluated the data to learn about teachers' perceptions of instructional effectiveness in using data to improve pedagogy. Conversational and interview analysis revealed that the reflective nature of the data talks process supported individual teachers' in-action instructional behavior by allowing teachers to gain from the experiences of their peers. The creation of a community of learners that was centered on understanding student achievement data encouraged content and instructional based questioning of colleagues. This assistance-seeking behavior could be linked directly to student deficiencies and content standards.

Lastly, this case study revealed several perceived barriers to using data for instructional purposes at Thomas High. The action research team found that participants in this case study perceived that the time it takes to use data to inform instruction, the lack of training on data-

driven instructional practices, and the perception of hierarchal roles in collaborative data-based instructional planning are barriers to using data for instructional purposes at Thomas High.

One of the purposes of this study was to explore teachers' perceptions surrounding data. Therefore, the finding of time being a barrier was identified, but not evaluated to determine its merit. This finding is important because it shapes teachers' willingness to participate in the data talks process.

The second barrier indicated by the theory of planned behavior survey was the perceived lack of training. In response to this obstacle, all members of the study were invited to participate in the Data Wise ACE Habits of Mind training. Only two of the eight members went through the program even though all members expressed a desire to better understand how to use data to improve instruction. The 25% participation rate in the Data Wise ACE Habits of Mind training indicates that teachers may need to be offered professional growth opportunities such as this during contractual hours. The reason that those who did not participate gave was lack of time.

Working with the school's administration was perceived as a barrier to efficient use of data for instructional practices because teachers were more likely to view data talks as punitive when reviewing student achievement data with administrators than when viewing with like-content peers. The action research team found that in general, teachers placed more value on working with their content groups than with administrators in the data talks process. It is important to note that some teachers considered the opportunity to reflect on student performance with administrators as helpful in encouraging reflection on their teaching practices. However, they still questioned the quality of the connection between course content, instruction, and student achievement when working with administrators. Overall, case study participants

perceived that colleagues in their department were more helpful in influencing their teaching practices than were the school's administration.

Conclusions

Addressing the quality of instruction was one of the implicit goals of this action research project. In the early stages of the study, teachers in the math department were concerned about stagnant student achievement. Concerns about the perceived lack of effectiveness of the administrative data talks process to impact instructional practices played a role in the willingness of the action research team members to join this study. As a result of this study, the action research team found that the data talks process can minimize differences in pedagogy and depth of teaching between like content teachers.

Conclusion 1: Data Talks Performed Collaboratively can have a Positive Impact on Instructional Practices, Instructional Models, and Course Pacing

To address the perceived lack of effectiveness of the administrator led data talks process the action research team sought ways to better link the data talks process with instructional planning. The team chose to embed the data talks process into the collaborative planning meetings. This decision was made to purposefully create a closer connection between student data, course content, and instructional planning. The impact of this change was evident in both instructional practices and models suggesting that it may have broader implications in improving teacher content and pedagogical knowledge.

As Ms. Abaeze stated, "When like content teachers discuss common data they are more likely to take ownership and be more willing to work collaboratively toward a solution." Using this premise as the foundation of the embedded data talk intervention, the team found that

teachers were more likely to reflect upon and adjust their instructional practices based on student data when working with their peers. Because the data talks were done during an already established meeting time, this intervention had the benefit of not appearing to be another compliance activity.

The coordinate algebra team also used the data talk process to make changes to their instructional model which helped them to address the issues surrounding pacing. Content lead, Ms. Vialet describes the importance and impact of the data talks process on the Differentiation Day that was designed and implemented by her team:

> We used the data to drive our Differentiation Day…The collaborative piece of it definitely helps a lot when you're with teachers teaching the same thing, everybody's pretty much on the same page and it worked wonders… Here's the thing though I know even in our collaborative planning meetings last year, we had collaborative plans, but it was like everybody was in a different place… It (Differentiation Day) also helps to make sure that you're following the curriculum map and everybody stays pretty much together because you can't do the Differentiation Day without everybody being on the same page or the same place.

This outcome suggests that embedding the data talks process in collaborative planning meetings can aid district coordinators in offering practical solutions to teams struggling with pacing issues and consistency in instructionally delivery across classrooms. When teachers collectively generate solutions to the practical problems they face in the classroom it helps to build collective and self-efficacy. Also, Ms. Vialet's comments indicate that increased levels of accountability were gained from the team approach to addressing student learning using data.

Conclusion 2: Data Talks Performed Collaboratively Provide a Support Structure that Assists in Data-Informed Instruction

The action research team acknowledged that the data talks instrument held the potential to help improve teacher responses to student achievement data at Thomas High. We found that implementing data talks during collaborative planning meetings created conditions in which it was more likely for teachers to produce relevant information that influence their instructional practices. Furthermore, when teachers were trained in data-informed instruction protocols and had the authority to set collaborative meeting agendas, there was an increased focus on instructional strategies. Ms. Abaeze remarked, "Once teachers reviewed their common assessment data, they were able to see their areas of weakness and work together to fix it." The action research team found that this helped to create a support structure within the data talks process.

One of the concerns regarding the data talks process prior to this study was the perceived lack of support for teachers in making instructional adjustments. The action research team agreed that one on the benefits of the data talk process regardless of whether the work was done alone or during collaborative planning was its ability to guide teachers in the process of identifying appropriate responses to student deficiencies. However, administrator led data talks often lacked the feedback necessary to foster deep instructional changes. When the action research team reviewed the collaborative planning transcript data Ms. Bridgemont noted that, "Formal and informal data talks allow the collaborative planning team to discuss, modify, and implement various instructional practices into lesson plans." Shifting the data talks process to the collaborative team meetings offered teachers more meaningful opportunities to receive instructional planning support.

However, coordinate algebra content lead Ms. Vialet cautioned that the support afforded teachers in the embedded data talks design is only as strong as a teacher's desire to participate in the process. In her exit interview she commented,

> If you take advantage of what we talked about in our meetings, if you asked the question, 'How do you teach that or how do you go about you know teaching the kids how to do that when there is a different way?' then it may help them (teachers).

This suggests that education preparation programs and district induction programs might better assist novice teachers by providing training in the area of data analysis for instructional purposes. Allowing aspiring teachers to work through the challenges of working collaborative while they are still in school may help them to transition to the workplace more easily. This research indicates that there is a social-emotional connection between student performance data and teachers' perceptions. Training future teachers to acknowledge and work through potentially negative feelings may be a soft-skill that improves their teaching practices and experiences as an educator.

Conclusion 3: Conducting Data Talks During Collaborative Planning Meetings is a Form of Job-Embedded Professional Learning

The shift in mindset fostered by the collaborative planning embedded data talks process helped to transform what was once thought of as an anxiety fueled individual compliance activity to an opportunity for authentic learning to take place. According to Zepeda, "Job-embedded learning occurs through the ongoing discussions where colleagues listen and learn from each other as they share what does and does not work in a particular setting" (Zepeda, 2014, p.27).

The level of teaching experience appeared to have played a role in type of learning that was acquired. For teachers with little classroom experience the benefits were clear. Coordinate

algebra content lead Ms. Vialet reflected on the value of the data talks experience for new teachers learning how to teach the standards:

> Data talks helped them (the less experienced teachers) a lot because we were able to talk about it (standards-based instruction). We were able to show them that okay this is how you do it. Because they may not be able to teach it that way or they may not have known how to do it because they're new to the curriculum. So that helped them a lot when we sat down with them.

The depth at which these instructional discussions occurred varied between the two cohorts. The analytic geometry team meetings focused more on instructional strategies than the coordinate algebra team. Therefore, while learning about content and pedagogy took place in both groups, it appeared that the analytic geometry teachers benefited more.

Conclusion 4: Teachers Perceptions' of and Responses to Data-Informed Instructional Planning is Shaped by their Audience

In order to respond to student assessment data teachers must interpret the information and reflect on their next steps. Those next steps were often shaped by the context of the data analysis process. Analysis of participant interviews revealed that a teacher's perception of using student assessment data to inform instruction was colored by their intended audience. The action research team looked specifically at independent data analysis, administrative data talks, and collaborative team data talks.

When preparing for data talks before administrators, teachers general reported that they focused on the reactions of the administrators and the consequences that might follow. These emotions do not align well with data use to inform instruction. Moreover, if school

administrators don't observe the teacher following the data talk, the belief that data talks are not a tool for improving instructional practices is reinforced.

Conversely, teachers perceive data talks performed during collaborative planning sessions as valuable and are more likely to use the information used to alter their teaching practices. Ms. Claire Bridgemont summarized this distinction when she commented:

> Performance data is the more beneficial for me when sharing with the collaborative planning team (CPT) and students. With the CPT, reviewing the performance data may result in reteaching topics, modifying assessments, and/or differentiating instruction with students, sharing performance data provides proof of students' hard work or the need for students to work harder. It is also motivation for classes to improve their overall performance versus other classes.

There are two points to consider in the broader application of this conclusion. First, it is important to note that in the context of Thomas High, there already existed a degree of respect for the expertise among teachers on each team. Therefore, it is unclear if the outcomes would be similar for different team dynamics. Also, this conclusion presupposes the value that a teacher places on student performance data. Because, as Ms. Abaeze asserted, "If teachers don't see the importance of tracking their student's data, then it doesn't matter who their audience is. They will still view their data as useless." In the context of Thomas High all of the study participants viewed tracking student data as an important instructional planning activity.

Conclusion 5: Certain Teacher Characteristics Shape the Normative Beliefs of Teachers' Perceptions of the Effectiveness of Using Data to Inform Instruction

The action research team reviewed the observational, survey, and interview data through the lens of the theory of planned behavior. Discussing the three components of the belief system

forwarded by Ajzen (2002), the team surmised that the normative beliefs of teachers had a larger impact on teachers than behavioral and control beliefs. This indicates that the personal attitudes toward data use and obstacles faced in the use of data for instruction were outweighed by what they perceived their collaborative team members felt.

Furthermore, the survey data suggests that teachers in these cohorts appear to be influenced more by their peers than school and district level leaders. At Thomas High this indicates that school administrators should seek to work with content leaders to improve the implementation and outcomes of the data talks practices

Conclusion 6: The Perceived Barriers to Performing Data Talks may be Mitigated through the Collaborative Planning Process

Lack of time and feelings of anxiety were the perceived barriers to performing data talks reported by Thomas High teachers. These two components link directly to the theoretical framework used for this study with time corresponding to controllability and emotion to self-efficacy. Important to reducing the impact that these barriers have to the process was conducting data talks during pre-established meetings. According to Ajzen, "Even when not particularly realistic, perceived behavioral control is likely to affect intentions" (Ajzen, 2002, p.667).

Additionally, offering a framework such Data Wise, streamlined the data analysis process while simultaneously creating an action plan. This helped teachers to view data talks as a worthy endeavor. The democratic nature of instructional decision making aided in improving a sense of both collective- and self- efficacy in implementing new instructional practices.

Action researcher, Joy Christian noted that collaborative planning helps teachers to see how other teachers are using data effectively. As teachers collaboratively discuss the data, they can come up with efficient and effective strategies together.

Conclusion 7: Data Talks Can Help Teachers Make Effective Instructional Decisions

One of the deficiencies identified during this study was the ineffectiveness of the administration data talks process to assist teachers on how to act on student data. The evidence from this study suggests that data talks held during collaborative planning meetings met the burden of "framing discussions around students first and linking discussions to teacher practices" (Zepeda, 2014). One example of this process occurred during an analytic geometry data talks session. While reviewing post-assessment data this team realized that the depth at which the content was being taught didn't align with the test question. Furthermore, Mr. Stitch pointed out:

> Well the thing about number five is that it wasn't a degree it was a percent…that's just another one of those little connection things that if you don't specifically kinda point out they're (students) not going to think of that on their own unless you give them some kind of connection to it. I didn't give them some sort of connection to it.

This type of reflection as to why students were not successful in some of the assessed areas being linked to specific teaching practices was typical of the more experienced analytic geometry cohort.

Implications

Studying teachers' perceptions of the data talks process provides insight into establishing best-practices for using data talks to improve the quality of instruction and student achievement. These findings also add to what is known about adult learning theory and the culture of school change. The following implications are specific to educators and policy makers at various levels.

School Leaders

The results of this study suggest that an approach which is centered on content-specific responses to student achievement data is an effective method for using data to improve

instruction. School administrators can support this practice by discussing data in connection with content standards and instructional practices. Broad conversations regarding passing rates rather than content lead to teachers' perceptions of data being used for punitive purposes. Instead, school leaders partnering with teachers to develop best-practices that are tailored to the needs of the learners in response to student data may yield better results.

Additionally, school administrators should attempt to place teachers in a position to be successful. At Thomas High teachers acknowledged to the importance of data-informed instructional practices, but also expressed a lack of belief that they could implement this practice with fidelity. Providing professional learning opportunities and/or clear guidelines for implementing new practices such as the data talks process may help to reduce levels of anxiety felt by classroom teachers.

Teacher leaders must also be intentional about their efforts to collaboratively use student data to improve instruction. When setting agendas, teacher leaders should seek to understand the levels of content and pedagogical experience of team members and leverage the data talks process to help improve instructional practices.

School leaders at every level are cautioned not to mistake changes in instructional models for improvement in instructional practices. As demonstrated at Thomas High, a focus on instructional practices in response to student work products is needed to improve student learning outcomes. The coordinate algebra team continued to face challenges of a disproportionate number of students failing although they regrouped students according to ability. This response to the data was inadequate to meet the learning needs of the teachers on the team.

School Districts

There are broad implications for using the data talks model across school districts. It may serve as a low- or no-cost method of supporting the professional growth of teachers in both content and pedagogical knowledge. The findings in this study revealed that novice Thomas High teachers needed help with both content and instructional delivery. Although they participated in the district's induction program, they still struggled with the day to day realities of teaching. Wong (2004) notes that mentoring programs are usually poorly implemented and therefore ineffective. This study suggests that adding the data talks process can "provide evidence of the connection between well-executed professional learning communities and student learning" (Wong, 2004, p.45).

The instructional support opportunities derived from the collaborative data talks process extend beyond teachers who are new to the teaching profession. The practice allowed experienced teachers to reflect more deeply on their practices and explore new ways of content delivery. Additionally, the collaborative nature of this intervention allowed veteran teachers to share their expertise which help to strengthen feelings of collective- and self-efficacy. This capacity building component to the data talks process lends to the strengthen of professional learning communities.

Schools of Education

Individuals preparing to become educators would benefit from learning to work collaboratively to improve instructional practices using data talks or similar data analysis protocols. Colleges and universities that prepare students in the teacher education programs for this aspect of teaching help develop new teachers' ability to detect gaps in student comprehension. The adaptation of this skill may be accelerated by the collective experiences of

content team members. Therefore, teaching new educators how to work with student achievement data in this manner will help them to continue to refine their teaching practices. It can also signal to them the content areas in which they need to become more knowledgeable.

Educational Policy Makers

Responses to high-stakes student achievement data drives many of educational policies. Mandates and threats of loss of funding alone will not change the core work of teaching and learning. However, the use of data to strengthen instructional practices may. Educational policy makers would be wise in creating conditions that encourage the expansion of practices such as data talks. This study shows the value of having a process in place which supports teachers in improving instruction. Collaborative data talks may be one way of decreasing the rate of attrition among educators who may be overwhelmed by the feelings of isolation that often describes the work of teachers.

Impact on Future Research

Federal laws that began to hold schools and school districts more accountable for student achievement forced educators to track student progress. These laws reflected the fact that law makers began to more openly focus on data to make decisions regarding educational programs and funding. This has led to more emphasis on how teachers are expected use data daily. However, moving from theory to practice requires more than a mandate from school and district leaders. While making practical decisions based on data is important, so too are the examination of unintended consequences. This action research study was important to informing decision makers about the effectiveness of their implementation processes in bringing about the desired changes to teachers' behavior surrounding data.

District officials would be wise to consider the organizational norms and supports that accompany data-driven instructional mandates. Young (2016) cautions that organizational, school, and classroom routines should be considered when implementing new practices. Moreover, better outcomes may result from embedding professional learning and data use support systems in established school routines (Jimerson & Wayman, 2015). Members of district level professional learning departments will benefit from this research as well. To improve the training and implementation of data-driven instruction, the routines and rituals on the school level will be impacted; if not addressed may be a source of resistance. Therefore, more consideration of school context and culture may be necessary prior to hosting a professional learning presentation.

While school level administrators are familiar with the culture and climate at their school, research suggests that they consider the manner in which they present data. Both Young (2006) and Jimerson (2014) stressed the importance of building level administrators clearly communicating the purpose for data collection and use to teachers. These researchers found that in many cases, teachers' attitudes reflected administrators' attitudes. This study was grounded in the theory of planned behavior and incorporated the findings of Young (2006) and Jimerson (2014) with other factors including personal attitudes (Datnow & Hubbard, 2015) and content/grade level norms (Schildkamp and Poortman, 2015; Young, 2006). These three components formed the cornerstones for exploring teachers' intention to use data in this study and unveiled the power of the potential of collaborative planning data talks to encourage teachers to make changes to their instructional practices.

Research Summary

Reflections of the Action Researcher

At the beginning of this project I was the department chair. This position allowed me to make some decisions regarding the work that was to be done during collaborative planning sessions. When I transitioned into the Instructional Support Specialist position, I was concerned that the level of commitment of the action research team would diminish. Fortunately, the team was committed to the study. The action research process helped me learn from others and empowered me and the other action research team members to make changes that positively impacted the department and our students.

I've learned a great deal about the perceptions of teachers and data-informed instructional practices at Thomas High. Initially, I felt that teachers were not changing their instructional practices because they did not value the student achievement data. I soon learned that the issue had more to do with context and training. Using the theory of planned behavior to frame this study was helpful because it offered a way to connect teacher beliefs regarding the data talks process to their instructional behaviors. This exposed the deeper issues impacting the lack of changes in instructional behavior.

The action research process was invaluable to this study. Having a team to discuss research and a plan of action with was essential to completing this work. It was through this process that, after reviewing the survey results and aligning what was learned with the literature surrounding data informed instructional practices, we decided that embedding the data talks process in collaborative planning sessions was the best course of action. Searching for a low to no cost option to provide training for the type of professional development needed, the team settled on the Data Wise ACE Habits of Mind program offered by MOOCS. This free option

aligned with the data talks instrument that Thomas High teachers were already familiar with while providing a support structure for working collaboratively with student assessment data.

The decision to simply change the context of the data talks process yielded results that we could not have imagined. This change served to reduce anxiety, focus conversations on instruction and student learning, and empower teachers to take collective ownership of the work that they do.

Summary of Action Research Case Study

While the focus of this research was teachers' perceptions of the data talks process the big take away was the context in which this process occurs. Collaboration around student performance data among homogenous content teachers resulted in strengthened instructional practices. The absence of strong content and pedagogical knowledge rendered the data-informed instruction training ineffective. Therefore, if the goal is to improve student learning, then this study shows that improving teachers' content, instructional, and pedagogical knowledge through the collaborative implementation of the data talks process is a promising compliment to the work already being done in schools.

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APPENDIX A

UNIVERSITY OF GEORGIA

CONSENT FORM

Data Talks, Are Teachers Listening?

Exploring Teachers' Intentions to Use Data in Instructional Planning

Researcher's Statement

You are being invited to participate in a research study entitled Data Talks, are Teachers Listening? Before you decide to participate in this study, it is important that you understand why the research is being done and what it will involve. This form is designed to give you the information about the study so you can decide whether to be in the study or not. Please take the time to read the following information carefully. Please ask the researcher if there is anything that is not clear or if you need more information. When all your questions have been answered, you can decide if you want to be in the study or not. This process is called "informed consent." A copy of this form will be given to you.

Principal Investigator: Dr. Karen Bryant

The University of Georgia

bryantkc@uga.edu 706-817-8442

Purpose of the Study

Recent efforts by the schools' administration to improve data used for instruction has prompted this research. I hope to learn more about how teachers think and feel about using data

to plan for instruction. As a member of the math department, who has a common planning period with teachers that teach the same content, you are being asked to participate.

Study Procedures

If you agree to participate, you will be asked to …

- Work as part of the action research team and/or part of the case study participants.
- If you choose to work as a participant only, you will be required to complete a survey that will give the researchers information regarding your feelings on student data. You will also be asked to participate in an interview, allow classroom observations, and allow researchers to observe your collaborative planning sessions.
- If you choose to participate as an action research team member, you are asked to commit to no more than eight meetings. The meetings will cover understanding the problem, researching solutions for the problem, determining appropriate action steps, discussing what we've learned about the problem, and planning next steps.
- The anticipated time commitment is approximately 4 hours over the course of 5 months all completed on campus. The details are two 1-hour training sessions, the completion of two surveys, and two interviews.

Anyone participating in the action research aspect of the study will be asked to commit to an additional

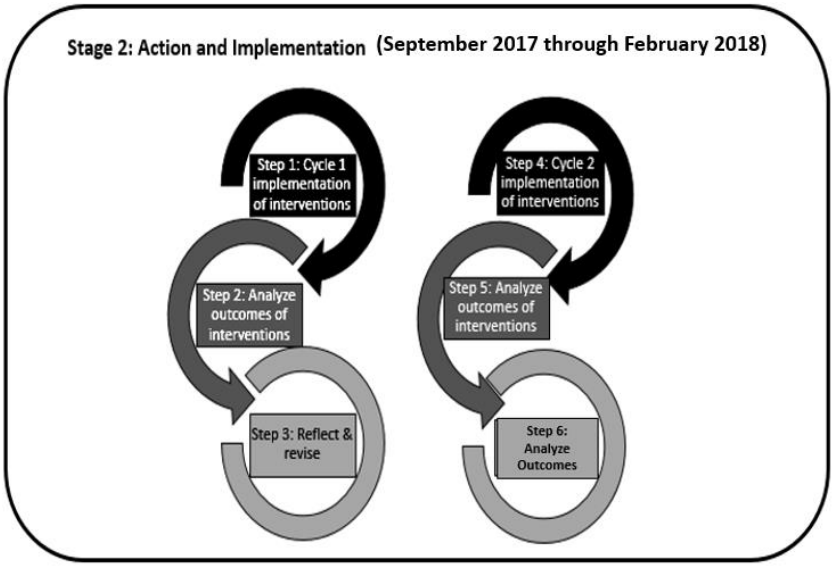
hour long monthly meeting for a total commitment of 9 hours.

- By the end of this study I hope to have answers to the following questions:
    - How does the data talks process help improve instructional practices?
    - What can the action research team learn about what teachers think about the effectiveness of using data to improve instruction?

- How does the data talks process impact how teachers plan to teach?
- How do teachers describe the barriers to using data to inform instruction?

- This is a participatory action research project. The action research team of teachers will study this problem and try to understand it together. While working together, we will interpret the data that we collect and provide suggestions for improving the data talks process based on what we find.
- The survey will ask questions about what you believe about data. These questions focus on your personal beliefs, what you think the teachers, administrators, and district officials believe, and those things that you feel make it difficult to use data in instruction. The interview questions simply ask about how and with whom you planned your instruction and what role student assessment data played in the process.
- Interview and meeting sessions will be recorded unless a member of the group who has not given consent is present. If students are present, nothing will be recorded.
- The tentative timeline for this study is

Stage 1: Planning and Research (August 2017 through September 2017)
Step 1: Determine an area of focus with AR team
Step 2: Review and discuss current literature regarding the issue with AR team
Step 3: Receive training in professional development
Step 4: Develop an action plan



Stage 3: Reflection and Presentation (February 2018 through April 2018)

Step 1: Analyze data

Step 2: Draw conclusions

Step 3: Write final report

Risks and discomforts

- The following is a disclosure of reasonably foreseeable risks or discomforts:
  - Psychological risks. There are little to no psychological risks associated with participating in this study. It is my goal to study the perceptions of teachers surrounding data use as those thoughts and feelings unfold. Any negative feelings experienced during the study will not be directly caused by participation in this research project.
  - There are no known financial, legal or physical risks anticipated as a result of participating in this research.

Benefits

The findings from this project may help in the development of effective teacher training programs related to data usage and instruction.

Incentives for participation

There will be no financial incentives for participation in this study.

Audio/Video Recording

Audio recordings will be used to verify the accuracy of the findings of the study. These recordings will be archived after transcription and kept indefinitely. Please provide initials below if you agree to have this interview audio recorded or not. You may still participate in this study even if you are not willing to have the interview recorded.

_____I do not want to have this interview recorded.

_____I am willing to have this interview recorded.

Privacy/Confidentiality

Your participation in the study will be confidential and only members of the action research team will have access to the data. All identifying information will be removed from survey, interview, and observation forms prior to the action research team having access to it. Only the lead researcher and potentially the transcribing contractor will have access identifying materials. The results of the research study may be published, but your name or any identifying information will not be used. Identifiable data will be secured in a file independent from the one used to analyze data. Only the lead researcher will have access to this file. The project's research records may be reviewed by departments at the University of Georgia and the Dekalb County School District responsible for regulatory and research oversight. Researchers will not

release identifiable results of the study to anyone other than individuals working on the project without your written consent unless required by law.

Taking part is voluntary

Your involvement in the study is voluntary, and you may choose not to participate or to stop at any time without penalty or loss of benefits to which you are otherwise entitled. Your decision to participate in the research will not affect your employment or employment evaluations. If you decide to stop or withdraw for the study, the information /data collected from or about you up to the point of your withdrawal will be kept as part of the study and may continue to be analyzed.

If you have questions

If you have any questions about this research project, please feel free to call me, Aisha James-Johnson. You may ask any questions you have now. If you have questions later, you are encouraged to contact me at Stephenson High School, telephone number 770 262 0062. My email address is arj43912@uga.edu. Questions or concerns about your rights as a research participant should be directed to The Chairperson, University of Georgia Institutional Review Board, Athens, Georgia 30602; telephone (706) 542-3199; email address irb@uga.edu.

Research Subject's Consent to Participate in Research:

To voluntarily agree to take part in this study, you must sign on the line below. Your signature below indicates that you have read or had read to you this entire consent form, and have had all of your questions answered.

_____	_____	_____
Name of Researcher	Signature	Date
_____	_____	_____
Name of Participant	Signature	Date

Please sign both copies, keep one and return one to the researcher.

APPENDIX B

DATA TALKS INSTRUMENT

Common Assessment Analysis: Data Talk

Teacher: _____ Course: _____ Block: _____

Unit Test: _____ Date: _____

Performance Level	Distinguished (92% - 100%)	Proficient (80% - 91%)	Developing (68% - 79%)	Beginner (0% - 67%)
# of Students				
% of Students				

My students demonstrated the most success in the following three standards:

1. _____
2. _____
3. _____

My students scored the lowest in the following three standards:

1. _____
2. _____
3. _____

Plan for remediation:

_____
_____
_____

List the ways your Department Chairperson, Academic Coach, or Administrators can support your improvement efforts.

_____
_____
_____

Reflections

APPENDIX C

Data Talks Teacher Interview Guides/Questions

Notes to Interviewer:
1. Before you begin the interview be sure to complete the first part of the reflexive journal.
2. "Data Talks" DON'T MENTION IT UNLESS THEY DO.
3. Remind the interviewee that the conversation will be recorded.

1. Do you understand what is expected of you regarding using data to inform instruction? Please describe in your own words.

2. In what ways have you used data to change what or how you cover and/or review materials? Be specific.

3. Identify and discuss the specific activity/activities you used during the observed lesson, which were a direct result of data you collected.

4. Describe any ways you planned individually and collaboratively to use data for this lesson.

5. Has there been anything that has impeded your use of data to inform instruction? Please be specific.

APPENDIX D

Data Talks, Are Teachers Listening?
Action Research Team Reflexive Journaling Questions

Instructions: Please answer the following questions as part of the interview & observation protocol.

BEFORE each interview and observation answer the question:

1. What do I expect to see/hear from this person based on what I know about them and their instructional style? Why do I hold these expectations?

2. Given my position, background, etc., how might my presence/relationship to the participant influence this interview or observation?

AFTER each interview and observation

What did I see/hear/experience that confirmed what I expected?

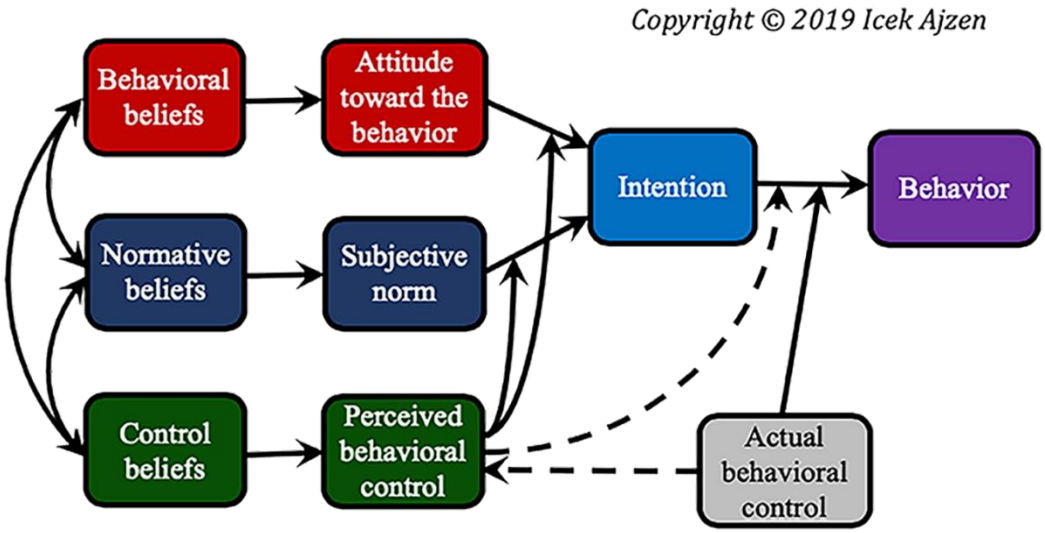
What did I see/hear/experience that contradicted what I expected?

What did I see/hear/experience that I didn't anticipate?

What do I make of these confirmations, contradictions, and surprises?

APPENDIX E

PERMISSION TO USE DIAGRAM



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APPENDIX F

THEORY OF PLANNED BEHAVIOR PARTICIPANT SURVEY

Date: _____ Participant ID # _____

Data Usage Opinion Survey

According to the Theory of Planned Behavior Survey guidelines created by Icek Ajzen (Theory of Planned Behavior, 1985)

There has been a push for teachers to use student performance data as they design class instruction. The attached survey is part of a study that seeks to explore teacher data usage. In particular, your personal opinion regarding how data is or should be used as a regular consideration for teachers is being requested. By regular data use we mean using student data at least 3 days a week to plan instructional activities. This three day a week minimum does not include instances of testing and/or other mandated special activities. Also, keep in mind that student data sources vary. Some examples of student data are exit tickets, quizzes, tests, parking lot activity, minquizzes, MAP test scores, and reading lexiles to name a few.

Please read each question carefully and answer it the best you can. There are right or wrong answers; we are only interested in what you think personally.

You will be issued a participant identification number so that your responses may be kept confidential. No individual responses will be shared. All identifying information will be removed from this questionnaire and destroyed as soon as all data has been collected.

Thank you for your participation in this study.

Part I: Demographic Information

1. Numbers of years teaching	0	1 – 3	4 -10	11+
2. Number of years teaching at this school	0	1 – 3	4 -10	11+

3. Your gender Male Female

4. Did you complete a traditional college/university teacher education program? Yes No

5. Circle the department that best describes the courses that you teach

Science English Math Social Sciences World Languages CTAE
PE Fine Arts Resource

Part II Please answer each of the following questions by circling the number that best describes your opinion. Some of the questions may appear to be similar, but they do address somewhat different issues. Please read each question carefully.

1. Understanding data is

Easy :___ 1__:___ 2__:___ 3__:___ 4__:___ 5__:___ 6__:___ 7___: Difficult

2. The time it takes to understand data is useful

Agree :___ 1__:___ 2__:___ 3__:___ 4__:___ 5__:___ 6__:___ 7___: Disagree

3. My making data informed instructional decisions would be

bad :___ 1__:___ 2__:___ 3__:___ 4__:___ 5__:___ 6__:___ 7___: good

4. My making data informed instructional decisions would be

pleasant :___ 1__:___ 2__:___ 3__:___ 4__:___ 5__:___ 6__:___ 7___: unpleasant

5. My making data informed instructional decisions would help my students

Agree :___ 1__:___ 2__:___ 3__:___ 4__:___ 5__:___ 6__:___ 7___: Disagree

6. During an average week last semester I actively used student data to determine **what** I taught

(Daily) 0 : __ 1__:___ 2__:___ 3__:___ 4__:___ 5 (Daily)

7. During an average week last semester I actively used student data to determine **how** I taught

(Daily) 0 : __ 1__:___ 2__:___ 3__:___ 4__:___ 5 (Daily)

8. For me to use student data on a regular basis to inform instruction is

extremely difficult :___1__:___2__:___3__:___4__:___5__:___6__:___7__: extremely easy

9. Most people who are important to me think that I
should :___1__:___2__:___3__:___4__:___5__:___6__:___7__: I should not
use student data on a regular basis to inform instruction

10. For me to use student data on a regular basis to inform instruction is
extremely good :___1__:___2__:___3__:___4__:___5__:___6__:___7__: extremely bad
11. I plan to use student data on a regular basis to inform instruction
extremely likely :___1__:___2__:___3__:___4__:___5__:___6__:___7__: extremely unlikely

12. Whether or not I use student data on a regular basis to inform instruction is completely up to me
strongly disagree :___1__:___2__:___3__:___4__:___5__:___6__:___7__: strongly agree
13. Most of the teachers with whom I am acquainted use student data on a regular basis to inform instruction
definitely true :___1__:___2__:___3__:___4__:___5__:___6__:___7__: definitely false

14. For me to use student data on a regular basis to inform instruction is
extremely valuable :___1__:___2__:___3__:___4__:___5__:___6__:___7__: extremely worthless

15. I am confident that if I wanted to I could use student data on a regular basis to inform instruction
definitely true :___1__:___2__:___3__:___4__:___5__:___6__:___7__: definitely false

16. It is expected of me that I use student data on a regular basis to inform instruction
definitely true :___1__:___2__:___3__:___4__:___5__:___6__:___7__: definitely false

17. For me to use student data on a regular basis to inform instruction is

extremely pleasant :___1__:___2__:___3__:___4__:___5__:___6__:___7__: extremely unpleasant

18. I will make an effort to use student data on a regular basis to inform instruction
I definitely will :___1__:___2__:___3__:___4__:___5__:___6__:___7__: I definitely will not

19. For me to use student data on a regular basis to inform instruction is
impossible :___1__:___2__:___3__:___4__:___5__:___6__:___7__: possible

20. Most people whose opinions I value would approve of my using student data on a regular basis to inform instruction
strongly disagree :___1__:___2__:___3__:___4__:___5__:___6__:___7__: strongly agree
21. For me to use student data on a regular basis to inform instruction is
interesting :___1__:___2__:___3__:___4__:___5__:___6__:___7__: boring

22. I intend to use student data on a regular basis to inform instruction
strongly agree :___1__:___2__:___3__:___4__:___5__:___6__:___7__: strongly disagree
23. Generally speaking, how much do you care what the district leaders think about what you should do with student data?
not at all :___1__:___2__:___3__:___4__:___5__:___6__:___7__: very much

24. Generally speaking, how much do you care what the school administration think about what you should do with student data?
not at all :___1__:___2__:___3__:___4__:___5__:___6__:___7__: very much

25. Generally speaking, how much do you care what your coworkers think about what you should do with student data?
not at all :___1__:___2__:___3__:___4__:___5__:___6__:___7__: very much

26. Generally speaking, how much do you care what your department members think about what you should do with student data?

not at all :___1__:___2__:___3__:___4__:___5__:___6__:___7__: very much

27. Using student data on a regular basis to inform instruction will help me to gain a better understanding of how I should teach

extremely unlikely :___1__:___2__:___3__:___4__:___5__:___6__:___7__: extremely likely

28. Using student data on a regular basis to inform instruction will help me to identify areas of student weakness

extremely unlikely :___1__:___2__:___3__:___4__:___5__:___6__:___7__: extremely likely

29. Using student data on a regular basis to inform instruction will give me an opportunity to teach students more effectively

extremely unlikely :___1__:___2__:___3__:___4__:___5__:___6__:___7__: extremely likely

30. Using student data on a regular basis to inform instruction will cause me to miss other deadlines

extremely unlikely :___1__:___2__:___3__:___4__:___5__:___6__:___7__: extremely likely

31. Using student data on a regular basis to inform instruction will help me to keep up with student performance

extremely unlikely :___1__:___2__:___3__:___4__:___5__:___6__:___7__: extremely likely

32. Using student data on a regular basis to inform instruction will help me to develop good teaching habits, self-discipline, and a feeling a self-satisfaction

extremely unlikely :___1__:___2__:___3__:___4__:___5__:___6__:___7__: extremely likely

33. Using student data on a regular basis to inform instruction will make me miss out on activities outside of this class

extremely unlikely :___1__:___2__:___3__:___4__:___5__:___6__:___7__: extremely likely

34. Using student data on a regular basis to inform instruction will help me to get information and insight regarding materials that needs to be reviewed
extremely unlikely :___1__:___2__:___3__:___4__:___5__:___6__:___7__: extremely likely

35. Using student data on a regular basis to inform instruction will subject me to tedium and boredom
extremely unlikely :___1__:___2__:___3__:___4__:___5__:___6__:___7__: extremely likely

36. Using student data on a regular basis to inform instruction will help me to work more efficiently
extremely unlikely :___1__:___2__:___3__:___4__:___5__:___6__:___7__: extremely likely

37. In general, how often do you encounter unanticipated events that place demands on your time?
very rarely :___1__:___2__:___3__:___4__:___5__:___6__:___7__: very frequently

38. How often do family obligations place unanticipated demands on your time?
very rarely :___1__:___2__:___3__:___4__:___5__:___6__:___7__: very frequently

39. How often does school administration place unanticipated demands on your time?
very rarely :___1__:___2__:___3__:___4__:___5__:___6__:___7__: very frequently

40. How often does sponsoring extracurricular activities place heavy demands on your time?
very rarely :___1__:___2__:___3__:___4__:___5__:___6__:___7__: very frequently

41. How often do you fail to meet work deadlines?
very rarely :___1__:___2__:___3__:___4__:___5__:___6__:___7__: very frequently

42. If I encountered unanticipated events that placed demands on my time, it would make it more difficult for me to use student data on a regular basis to inform instruction
strongly agree :___1__:___2__:___3__:___4__:___5__:___6__:___7__: strongly disagree

43. If I felt overwhelmed, it would make it more difficult for me to use student data on a regular basis to inform instruction
strongly agree :___1__:___2__:___3__:___4__:___5__:___6__:___7__: strongly disagree

44. If I had family obligations that placed unanticipated demands on my time, it would make it more difficult for me to use student data on a regular basis to inform instruction
strongly agree :___1__:___2__:___3__:___4__:___5__:___6__:___7__: strongly disagree

45. If school administration placed unanticipated demands on my time, it would make it more difficult for me to use student data on a regular basis to inform instruction
strongly agree :___1__:___2__:___3__:___4__:___5__:___6__:___7__: strongly disagree

46. If the extra-curricular activities I sponsor placed heavy demands on my time, it would make it more difficult for me to use student data on a regular basis to inform instruction
strongly agree :___1__:___2__:___3__:___4__:___5__:___6__:___7__: strongly disagree

47. If I failed to meet paperwork deadlines, it would make it more difficult for me to use student data on a regular basis to inform instruction
strongly agree :___1__:___2__:___3__:___4__:___5__:___6__:___7__: strongly disagree

48. The district leaders think that I should use student data on a regular basis to inform instruction
extremely likely :___1__:___2__:___3__:___4__:___5__:___6__:___7__: extremely unlikely

49. My school administrators think that I should use student data on a regular basis to inform instruction
extremely likely :___1__:___2__:___3__:___4__:___5__:___6__:___7__: extremely unlikely

50. The teachers in my building think that I should use student data on a regular basis to inform instruction

extremely likely :___1__:___2__:___3__:___4__:___5__:___6__:___7__: extremely unlikely

51. The members of my department think that I should use student data on a regular basis to inform instruction

extremely likely :___1__:___2__:___3__:___4__:___5__:___6__:___7__: extremely unlikely