DATA USE OF FIRST YEAR INDIANA EDUCATORS: A STATEWIDE SURVEY STUDY

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This study aimed to understand Indiana teachers' data literacy and self-efficacy during their first year of teaching. Even though there is emerging research that indicates different factors that constrain or enable data use, there is still a need for a greater understanding of new teachers' self-efficacy regarding data-driven instructional practices (Armstrong & Anthes, 2001; Datnow, Park, & Wohlstetter, 2007; Togneri & Anderson, 2003). Thus, this study asked the following research questions:

1. What data do first-year teachers have access to in Indiana schools?
2. How do first-year teachers use data?
3. What are first-year teachers' attitudes toward data?
4. How do first-year teachers feel they receive support with data use?

The design of this research was a survey study employing quantitative methods to describe first-year Indiana teachers' perception of data literacy skills, as it relates to the *actions* teachers take to analyze, interpret, and use data to make decisions. All newly licensed Indiana educators with less than one and a half years' experience in a public school were solicited to complete the National Center for Education Evaluation and Regional Assistance, *Teacher Data Use Survey* (Waymen et al., 2016).

This dissertation study found a majority of new Indiana teachers have access to personal and other data types, such as attendance and behavioral data. However, access to the state assessment, periodic, and local data varied across the state. Second, teachers primarily use personal data to tailor instruction to individual student needs, to identify instructional content to use in class, and to form small groups of students for targeted instruction sessions. However, the

use of other data types, such as state assessment data to meet building and district level goals, was not a frequent practice. Third, teacher attitudes toward state assessment and local data are less favorable than other data types, such as personal or *other* data. Further, although Indiana teachers agreed that *students benefit when teacher instruction is informed by data*, they stated, they were not *good at using data to plan lessons*. Finally, teachers that participated in this study felt that their *current professional development opportunities do not provide enough training and support on data use practices*.

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CHAPTER 1

INTRODUCTION

In today's educational climate, school leaders and educators are held to higher accountability for student learning and outcomes. As a result of standards-based accountability, today's teachers need to be equipped with the foundational knowledge on how to access, analyze, and measure student outcomes through the use of multiple data points. With a competitive education market, public school ratings, and teacher evaluations linked to teacher pay, educators must be proficient in data-informed decisions in order to inform their instructional practices and improve student outcomes (Datnow, Park, & Wohlstetter, 2007; Deluca & Bellara, 2013; Farrell & Marsh, 2016; Greenburg & Walsh, 2012; Hess & Kelly, 2005; Hoover & Abrams, 2013; Hosford, English, & Tillman, 2010; Mandinach & Gummer, 2016; Slavit, Nelson, & Deuel, 2016).

Due to low international and national academic growth measures, policymakers continue to create policies where state education agencies (SEA) and local education agencies (LEA) must use data to monitor and improve student outcomes. However, the *how* data is collected, analyzed, and used to drive student outcomes is often left to individual state departments and many cases the school systems themselves (McDonald, Andal, Brown & Schneider, 2007). In response to the immediate need to access *live* student data, the educational market has developed an abundance of data tools to provide student information to teachers through "data warehouses, student information systems, instructional management systems, assessment systems, diagnostic devices, data dashboards, electronic grade books, and spreadsheets" (Mandinach & Gummer, 2016, p. 4). As a result of the availability of these systems, district leaders and school staff have access to a vast array of data systems with immediate access to a multitude of information.

However, the challenge remains on how to use this data to influence student outcomes most effectively.

Merely providing access to data without training fails to develop data-literate teachers. The application of data-informed decisions reaches beyond access to data. Educators must be provided with an array of data-literacy skills to understand and apply data effectively to support student outcomes. Mandinach, Freeman, and Gummer (2015) argued that for teachers to use student data effectively, an inquiry cycle must be applied, which involves identifying the problem, forming a hypothesis, gathering the appropriate data, analyzing data, and creating an actionable recommendation base on these data. According to Wayman, Wilkerson, Cho, Mandinach, and Supovitz (2016), the inquiry cycle should be a collaborative effort which involves teachers working together in reviewing data and supporting positive student outcomes. Further, the examination of teacher attitudes toward the value of data use and access to the appropriate technology are all factors to consider when determining the necessary components of developing data-literate teachers (Hamilton et al., 2009; Mandinach et al., 2015; Mandinach & Gummer, 2013; 2016; Wayman et al., 2016).

However, until recently, many states did not have the capacity to match student state assessment data from year-to-year to effectively measure individual student growth for accountability measures (Greenburg & Walsh, 2012). Micklethwait and Wooldridge stated, "The state is an incredibly blunt instrument; it gets hold of one overarching idea and imposes it without any sensitivity to the local context. [And there] is the desperate craving of politicians for a magical solution" (as cited in Fullan, 2007, p. 235). Thus, although data-driven instruction is not a new term, the application of using data to drive student outcomes is still a relatively new concept for many educational institutions, due to increasing expectations of educational policies

robust use of data and the lack of internal infrastructures to meet the immediate demand. This statement was validated by Greenburg and Walsh (2012), who conducted an analysis of 26 studies published in peer-reviewed journals over the last decade, and found that a majority of the studies found that "teachers have difficulty analyzing data from classroom assessments and are therefore unable to use the data to guide instruction" (p. 4).

Notably, while federal and state data submission requirements continue to morph and change, including most recently with the approval of Every Student Succeeds Act (ESSA, 2015-2016), teachers are expected to use data more broadly than ever to support student outcomes. However, teachers may not have the necessary tools to understand and adapt to the accountability standards. ESSA declared that districts must perform at an acceptable level in a variety of areas, such as student proficiency, academic growth, college career readiness, graduation rates, attendance and truancy, and English language proficiency. Further, it defined that if the standards of performance are not obtained, a school may be at risk as being identified for intervention or comprehensive assistance (ESSA, 2015-2016). Although ESSA outlines clear expectations for school districts, accomplishing these goals requires school districts to learn *how* to translate data into positive outcomes. Thus, the challenge remains on how to train teachers and administrators to use data to drive instructional practices, which lead to student progress.

Increased accountability creates a criticalness to using data to drive instruction. The need to increase outcomes, compounded with the consequences of not meeting accountability standards, demands district and building leaders hire teachers with the foundational knowledge to use data to drive instruction. Although student outcomes and growth should be the primary reason for educators to use data to drive instructional supports, a greater sense of urgency is needed due to the large array of negative consequences, including a potential loss of funds or

even closure. The influence of these negative consequences should not be dismissed. President Obama demanded we "reject[s] a system that rewards failure and protects a person from its consequences" and "called for a new culture of accountability" (as cited in Horsford et al., 2010, p. 119). Using, interpreting, and analyzing data is a necessity to increase academic outcomes in the age of accountability.

This study examined one small component of the data-driven decision-making movement, starting with a foundational and critical element, new teachers' data use. To create a holistic view of the need for data-driven instruction, Chapter 1 introduces the topic. Specifically, Chapter 1 outlines the background and range of the subject matter and is inclusive of the research problem and context, the questions to be examined, and the projected limitations of the study. Chapter 2 establishes an operational definition of data literacy. In addition, the chapter explores national policy trends and summarizes Indiana's response to support local educational agencies to implement data-driven practices. Further, Chapter 2 provides an overview of current research regarding data literacy and data-driven instruction; then, it explores current research on teachers' self-perception of data literacy skills. Finally, the chapter concludes with implications for studying new teachers, actions with data, and data literacy skills. Next, Chapter 3 provides an overview of the research methods used in this study and includes a description of the study's participants, as well as the instrument used to gather data that were examined and analyzed. Chapter 4 presents the findings aligned with each of the four research questions. Finally, Chapter 5 provides a summative discussion of the significant findings and implications for practice, policy, and future research opportunities.

Research Problem and Context

National data trends show minimal academic growth across American students when compared to international counterparts (National Association of Educational Progress [NAEP], 2017). In response, U.S. educational policymakers have focused on implementing regulations to measure student outcomes based on standardized assessment requirements. As seen in the No Child Left Behind Act of 2001 (2002) and most recently ESSA, SEAs and subsequently, LEAs are held accountable for student growth and achievement as defined by data derived from standardized assessments. Even more so, SEAs and LEAs are held responsible for student outcomes for a variety subgroups, such as English learners, special education, free and reduced lunch, foster care, migrant, military, and diverse demographic groups (ESSA, 2015–2016). Further, beyond academics, SEAs and LEAs are accountable for college and career readiness indicators by creating multiple pathways for graduation, increasing graduation rates or face being identified as a school needing a state-imposed target or comprehensive support identification. In a like manner, monitoring disproportionate discipline practices is yet another focus in which SEAs and LEAs must collect and analyze data to drive change. All of this being said, policymakers continue to create policies where SEAs and LEAs must use data to monitor and improve student outcomes. However, in many cases, data infrastructures are not available to meet these requirements (McDonald et al., 2007).

Indiana's students have consistently performed in the top 25% of states over the past decade based on *The Nation's Report Card* (NAEP, 2017). Further, the state has been proactive, and a foundational leader, when compared to other Midwest states, in establishing a variety of partnerships to create a statewide data infrastructure to meet the demands of evolving educational policies. Through organizations, such as with the Regional Educational Laboratory

(REL) Midwest, a division of the National Center for Education Evaluation and Regional Assistance and part of the Institute of Educational Sciences funded by the U.S. Department of Education (USDOE), and the American Institutes of Research's (AIR), Center on Response to Intervention (RTI), Indiana has developed additional avenues for the development of improved systems and professional development (McDonald et al., 2007; RTI, n.d.).

Like many of Indiana's Midwest counterparts, even with additional resources, professional development, and supports, Indiana has obtained stagnant growth, based on 4th-grade reading and math and 8th-grade math results on *The Nation's Report Card* (NAEP, 2017). Further, Indiana is a local control state; thus, even with additional training and resources, there is a lack of clarity of how districts collect, monitor, and analyze data. Therefore, since districts purchase a variety of different student information systems is creates a lack of transparency and a barrier to further understanding the effectiveness of data supports and partnerships available in the state.

Although policies such as NCLB and ESSA may provide a broad context, how local districts and teachers make sense of the implementation of data-driven decision making within Indiana remains unclear. Namely, ESSA placed significance on the collection and use of data to monitor student outcomes, but it does not prescribe how schools and teachers should implement data to foster positive student outcomes. Furthermore, the dialogue surrounding education policy often places teachers as articles of change, rather than critical instruments of reform. However, teachers are the crux of implementing accountability reform. Thus, it is essential to understand their access and data use (Basica & Hargreaves, 2000; Fullan, 2000).

Alternatively, although there is adequate information available regarding pre-service teachers' self-efficacy and data use in recent studies, there is less known about first-year

educators. Instead, the focus of previous related studies examined teacher perception on data initiatives within specific areas, such as assessment data, student learning data, or pre-service teacher data, rather than data use as a broad context, including access, support, and application.

For instance, Datnow and Hubbard (2015) conducted a literature review of empirical studies of teachers' use of assessment data to inform instruction. They found that teachers primarily used benchmark assessment data over different data types. Likewise, they discovered that although teachers were often requested to analyze other data, teacher beliefs impacted the depth of the review and were the primary factor that led to variability in usage. Their findings concluded that the absence of on-going professional development and teacher confidence hampered teachers' desire to use data (Datnow & Hubbard, 2015).

Slavit et al. (2016) analyzed teachers' conceptions and use of student learning data. Through their qualitative study, they examined six teacher groups and their time spent with data, collaboration, and inquiry activities. Overall, they found that teacher belief had a more significant overall influence on the use of data over collaborative teacher inquiry.

Siwatu (2011) looked at the self-efficacy of preservice teachers and their preparedness to teach in both urban and suburban school districts. Findings indicated that often preservice teachers doubted their capabilities, and that could impact their overall ability to use data effectively. The researcher suggested that new teachers should be provided with a support system that incorporates self-efficacy building activities (Siwatu, 2011).

These studies are essential, as they sought to determine a school systems' view of data practices and identified additional professional development or support needs. Further, they provided insight into some common issues in different districts, such as the need for strong

leadership and information systems. However, they lacked detail and information on how to support new teachers and the use of student data appropriately.

To complicate matters further, data-driven decision making has become the default phrase for anything data associated. Understanding how new teachers make sense of data-driven decision-making (DDDM) practices and the support they feel they have available to them, including the opportunity to collaborate with their peers, can contribute to practice and policy. Although ESSA may provide a broad context, how local districts and teachers make sense of the implementation of DDDM remains unclear. Namely, ESSA places significance on the collection and use of data to monitor student outcomes. Still, it does not prescribe how school leaders and teachers should implement data to foster positive student outcomes. Thus, defining how to support teachers is left to school systems, which then must operationalize data use in a way that is both meaningful and can inform decision making.

Consequently, school improvement efforts, such as DDDM, often only focus on the technical aspect of the process and overlook the human element of implementation or the *doing*. Further, macro-level policies, such as the accountability requirements under both federal and Indiana's ESSA plans, interact with micro-level school practices. Thus, individual perceptions and experiences must be examined to understand the current reality of a population, such as new Indiana teachers. Teachers bring experience and knowledge to professional development platforms; yet, the professional development they receive is often pre-determined at the school and district level without inquiry of teacher needs (Darling-Hammond, Hyler, & Gardner, 2017). As Darling-Hammond et al. (2017) expressed,

> Preparation and training for principals and instructional leaders often fail to address how leaders can identify and organize needs-based PD. Without systems in place to ensure

> teachers' needs are being identified and met, PD will not be as effective as it should be. (p. 21)

As such, professional development should be directly linked to teachers' needs and should include teacher feedback.

However, without an adequate understanding of the baseline of new teachers' professional development needs, efforts regardless of how well planned and intended may be implemented with minimal or no impact on teacher practice, and more importantly, positive student outcomes. School leaders could conduct staff needs assessments to assist with professional learning areas, as a way to ensure that professional development is directly connected with practice and supports teachers' wants and needs (Darling-Hammond et al., 2017). Thus, by gathering baseline data across all new teachers in Indiana, this study provides a foundational understanding of new teachers' views regarding what data they have access to, supports available, and how they use data to support student outcomes.

Further, this baseline information has the potential to provide higher education institutions, state policymakers, and administrators a more robust understanding of foundational data literacy training necessities of new teachers before entering the classroom and immediately upon hire. Then, in turn, this foundational data can provide a clearer road to state data literacy policy, data infrastructure needs, support local control and the implementation of data practices aligned to student needs, and meet state and federal requirements, such as ESSA accountability measures. Each of these actions has the potential to increase student outcomes and academic and behavioral growth. In short, school leaders are expected to support and motivate their instructional staffs' use of data; however, many studies have concluded that new teachers often feel ill-prepared in using data to drive high academic outcomes for students (Datnow et al., 2007;

DeLuca & Bellara, 2013; Farrell & Marsh, 2016; Greenburg & Walsh, 2012; Hess & Kelly, 2005, Hoover & Abrams, 2013; Slavit et al., 2016). In a study conducted by Hoy and Spero (2005), they suggest there is a significant increase in efficacy during student teaching, but a substantial decline during the first year of teaching. Further, Bandura's self-efficacy theory proposed that the development of teacher efficacy is more malleable in early learning; thus, first-year educator training is essential to long-term efficacy (Hoy & Spero, 2005; Reeves, Summers, & Grove, 2016). This study examined one small component of the DDDM movement, starting with a foundational and critical component, new teachers' self-reported data use within Indiana.

Given these points, this study aimed to develop a further understanding of Indiana teachers' data use during their first year of teaching. Further, this study sought to identify the self-reported actions first-year teachers take with data, including what data they have access to and organizational supports that may be available. Even though there is emerging research that indicates different factors that constrain or enable data use (Armstrong & Anthes, 2001; Datnow et al., 2007; Togneri & Anderson, 2003), there is still a need for greater understanding of new teachers' self-reported actions. More specifically, the research literature lacks an examination of how new teachers use data to influence their instructional decisions.

Through the examination of this population, it allowed for further understanding and reflection of individuals directly accountable for student outcomes. Developing an understanding of new teacher perception of data-driven knowledge and development needs provides the opportunity for district leaders and higher education institutions to offer training aligned to first-year educators' needs. In addition, understanding new teachers' data use may provide insight for local and state-level leaders in the construction of reform efforts, including the conditions which may support or hinder DDDM application.

Overview of the Study

The purpose of this study was to explore first-year Indiana teachers' data use by asking the following questions:

1. What data do first year teachers have access to in Indiana schools?
2. How do first-year teachers use data?
3. What are first-year teachers' attitudes toward data?
4. How do first-year teachers feel they receive support with data use?

For this reason, it was essential to understand the purpose and outcomes of data-driven instructional practices and current research on teachers' self-perception of understanding the use of student data to drive instruction. For the purpose of this study, data were defined as information which can be collected, such as grades, mobility, course enrollment, discipline, state test scores, graduation rates, attendance rates, socioeconomic status, demographic, and additional information collected by a teacher; that may be used to determine student need, progress, or achievement (Parke, 2012). Further, while there is more than one model for data-driven practices and not one definition that is universally accepted, for the study, the definition of data-driven decision making (DDDM) was utilized.

DDDM is defined as a teaching tool to support instruction by providing information, which assists teachers to customize instruction to address individual learning needs (Dunn, Airola, Lo & Garrison, 2013; Rallis & MacMullen, 2000). Hamilton et al. (2009) defined this process as "teachers, principals, and administrators systematically collecting and analyzing various types of data . . . to guide a range of decisions to help improve the success of students and schools" (p. 46). Assessment is defined as a tool used to measure student knowledge and to gauge progress. Assessment data may be collected in a variety of formats, including

observation, tests, projects, class assignments, portfolios, and other means (Parke, 2012). Finally, data literacy is defined by Mandinach and Gummer (2016) as "the ability to transform information into actionable instructional knowledge and practices by collecting, analyzing, and interpreting all types of data . . . to help determine instructional steps" (p. 2). Further, the Data Quality Campaign (DQC, 2018) defined data literacy as an entire educational unit, stating,

> Data-literate school and district administrators continuously, effectively, and ethically access, interpret, act on, and communicate multiple types of data from state, local, school, and other sources to improve outcomes for all students in a manner that is appropriate to individual professional roles and responsibilities. (p. 1)

In addition to the four terms defined above, another term that should be interpreted is teacher efficacy. Bandura defined "efficacy as a self-reflective, future-oriented belief that one possesses the necessary skill set to successfully accomplish a task" (as cited in Dunn et al., 2013, p. 224). Further, teachers' self-perception and sense of efficacy are directly related to their belief that they have the ability to create positive student outcomes. Thus, if a teacher believes that he or she has the ability to be successful at a specific task, the task has a higher probability of having a positive response from the teacher (Dunn et al., 2013).

Significance of the Study

All schools are under the microscope to obtain higher student outcomes for various student populations, through federal and state-mandated accountability measures. National policies, such as ESSA, require the use of data to monitor state growth in student outcomes based on research-based studies that validate the effectiveness of data-driven approaches. Thus, teachers must acquire a deeper understanding of assessment and other statistical concepts, as well as become fluent in deciphering various data reports, such as tables, charts, dashboards, and

databases. However, one glaring issue is that policy involving the use of data to drive student outcomes is moving at a brisker rate than many states' ability to fund and develop a data collection infrastructure to meet the demand.

Indiana is one of those states, although the state department of education has been proactive and a founding leader, when compared to other Midwest states, through the establishment of multiple partnerships to create a statewide data infrastructure to meet the demands of evolving educational policies. Although the state has developed a center data repository for multiple state data sets, the Indiana Management Performance Hub system lacks transparency, and to date, only houses transitional data from the K–12 setting to college and career placement (Indiana Management Performance Hub, 2019).

As a result, due to the lack of state-defined data tools, school districts and administrators are left to fill in the gap and obtain the necessary data to measure student outcomes. More so, without these pre-determined infrastructures, teachers are then charged to collect and monitor the required data. However, current studies on teacher data literacy skills indicated a gap in both application and self-perception of data literacy skills of teachers that are needed to drive student growth (Datnow & Hubbard, 2015; Dunn, 2016; Hoover & Abrams, 2013; Mandinach et al., 2015; Slavit et al., 2016). Thus, further understanding of teacher data use and actions was needed to adequately support teacher data understanding and use of data to promote positive student outcomes.

Unlike previous research studies, this study was specific to an individual state—Indiana—and population—first-year educators. As such, it provides a snapshot of new Indiana education graduates' perceptions of their data use, including their attitudes toward data use, what data are accessed, what organizational supports they receive, and how they use data. Little is

known about the first year, Indiana educators' data literacy efficacy. By focusing on first-year educators in the state of Indiana, this data can then be used as a baseline to create developmentally appropriate professional development and coursework for educators at the district level. Teacher preparation programs can use this information to develop further preparation and training programs based on targeted areas of need.

With this intention, this study aimed to add to the body of research, inform policymakers and district leaders, and provide improved teacher training by gathering further data on new teachers' data literacy skills. Policymakers must be made aware of disadvantageous gaps between federal data reporting requirements and state and district-level disjointed data infrastructures. In addition, the current infrastructure gaps need to be mitigated before stacking additional requirements on SEAs and LREs data collection.

Further, based on the teacher preparation report in 2014, in order to provide ongoing improvement and support to the current teacher preparation programs, schools must understand the training needs of recent graduates (Council of Chief State School Officers [CCSSO], 2016). Additionally, this report acknowledged, there is an "absence of an adequate knowledge base and the lack of data that allow us to identify confidently what the essential characteristics of strong teacher preparation programs are" (CCSSO, 2016, p. 1). As such, the report suggested that states can assist with identifying weaknesses by conducting statewide surveys of recent teacher preparation, graduates, specifically regarding professional development, feelings of preparedness, and overall job satisfaction, then sharing the results with teacher preparation program leaders (CCSSO, 2016; DQC, 2019). Thus, the results of this study hold importance to Indiana building and district leaders, policymakers, as well as university and college teacher

preparation programs, as a statewide survey seeking to determine additional training and professional development opportunities to support teachers' data knowledge.

Potential Limitations

Although careful thought and effort were made to ensure this study was well structured, it must be acknowledged that certain limitations may exist. Thus, transparency of those limitations must be defined, as follows:

1. Quantitative study: The findings were limited in scope to actions and correlations, based on the quantitative approach of the study. Unlike qualitative studies, it did not provide insight into the details and specifics of teacher perceptions. Although the details regarding why new teachers perceive their data knowledge, as such, would be useful in creating appropriate training and supports, the variance of more information based on the scope and nature of the study would be unmanageable for one researcher.
2. Application: All states are required to have a defined ESSA plan which encompasses multiple forms of data collection and analysis. Although the topic of new teachers' data use may spark interest in many state and educational circles, this study and findings were specific to Indiana. Thus, although the findings may seem applicable to other states, it is specific to Indiana and should not be generalized.
3. Survey instrument: The survey instrument was funded by the USDOE and is a publicly available tool with robust data validation. However, survey studies and findings are primarily dependent upon the response rate. Regardless of study design and defined plans, study outcomes may not be as robust as desired. Further, although the survey was anonymous, some respondents may respond based on what they feel is

the correct response instead of their current practice. Thus, the results of the surveys may be skewed.

4. Researcher bias: Due to the nature of a quantitative survey study, any researcher bias should be limited. Looking at this study and my role in supporting schools in building data-literate cultures, it is possible that my experiences impacted the interpretation of these data. In particular, my work with over fourteen states and supporting the building of many multi-tiered systems of support models and Title I, Part B continuous improvement plans, could influence my view of new teacher data training needs.
5. Survey engagement: Due to the online nature of the survey, some respondents may briskly complete the survey, and their responses may not reflect their true feelings. Additionally, survey response rates are difficult to control, and thus, survey participation may be limited, which may impact the overall findings.
6. Single survey format: A quantitative single, one-time survey is designed to capture one moment in time, which limits generalizations. In addition, it does not consider changes in a person's response over time or through the use of multiple surveys to discard conflicting reactions from the same individual.
7. Survey language: It was critical that the language of the survey is understandable in a way that participants find ease in completion. However, participants frustrated with the content may abandon the survey, and their data were invalid in the findings (Cohen et al., 2018).
8. Local control state: Indiana is a local control state, which allows school districts to choose their data infrastructure system. Due to this, it may be challenging to

understand the total population needs of new teachers because of the variance in data access and systems across school corporations and independent charter schools.

9. Data set: The IDOE provided data that included some 'Original' and proficiency or 'Initial Practitioner' licenses due to the limited capability of IDOE's ability to disaggregate initial licenses (H. Rahman, personal communication, March 30, 2019). As such, the first question of the survey was purposely worded to identify only those teachers with less than eighteen months of classroom experience. However, it should be noted that a teacher with more than eighteen months' experience could inadvertently read the first question and proceed with the remaining items in the survey.

As a researcher, my own biases must be asserted from the start. Through this open acknowledgment, it provided transparency to others of any questions or concerns. I proceeded with caution and realization that my biases were limited, if not eliminated.

CHAPTER 2

LITERATURE REVIEW

Although school districts, under the ESSA accountability requirements, must prepare teachers with the skills to analyze data to improve student outcomes, many studies have found that teachers feel unprepared in using data to drive instruction and student supports. This study explores first-year teachers' actions with data, including attitudes, access, supports, and use. First, this extensive literature review created an operational definition of data literacy and instruction. Second, the review provides an overview of national policy trends, inclusive of high accountability measures, and Indiana's response to support local educational agencies. Next, the review provides an overview of current research regarding data literacy and data-driven instruction, and the impact on student outcomes. Then, the review explored existing research on teachers' self-perception of data literacy skills, including the use of data to support student achievement. Finally, the review concludes with the implications for studying new teachers' data use.

Conceptual Framework

An operational definition was first considered during the development of the conceptual framework, defined as "one that characterizes something in terms of the measures used to establish its presence or lack thereof" (Mandinach & Gummer, 2016, p. 38) based on the complexity of data literacy constructs, it was determined that an operational definition would not be appropriate. Figure 2.1 provides a visual representation of the framework and actions teachers to inform data practices. Thus, this study used the conceptual framework for how teachers use data, as defined by Wayman et al. (2016), as follows:

The actions that teachers take with data are central to the process. These actions inform changes in teachers' knowledge and practice, which in turn can improve student learning. The actions teachers take with data are influenced by four other components: their competence in using data, their attitudes toward data, their collaboration with other teachers, and the organizational supports available.

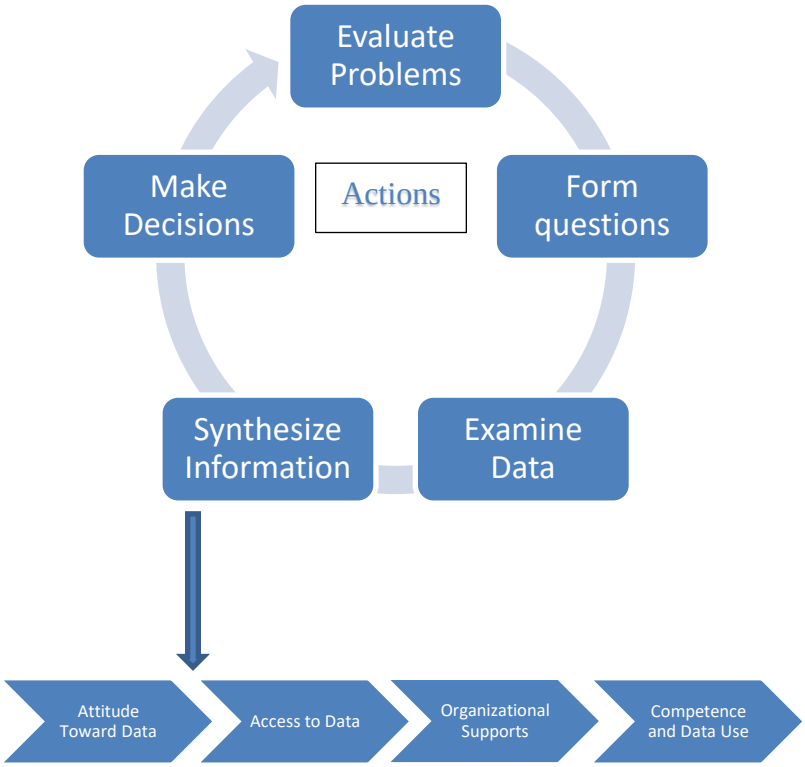


Figure 2.1. Teacher actions. Adapted from Wayman, J. C., Wilkerson, S. B., Cho, V., Mandinach, E. B., & Supovitz, J. A. (2016), *Guide to using the Teacher Data Use Survey* (REL 2017–166).

The teacher action framework used in this study aligned with the National Center for Education Evaluation and Regional Assistance: The Teacher Data Use Survey (Wayman et al.,

2016). First are the actions that teachers use with data: question formation, data examination, synthesizing information, making decisions, and evaluating problems. Also, four components inform the actions teachers use: their competence in data concepts, personal attitude toward data, collaboration, and organizational supports, such as technology systems and on-going professional development opportunities (Wayman et al., 2016). As a result of this action process, teacher knowledge and practices are influenced, which can have a direct impact on student learning.

Inquiry Cycle

The inquiry cycle, or action, is not new to the data analysis process, as defined by Mandinach and Gummer (2016), "It is a roadmap of the complex suite of knowledge, skills, and dispositions a teacher needs to master in order to be data literate in the classroom" (p. 39). Teachers are required to make constant decisions based on the student data they have access to and make instructional decisions aligned to specific student needs (Hoover & Abrams, 2013). In order to understand the actions that teachers must attend to, Mandinach and Gummer (2016) defined five main aspects of the inquiry cycle which include, identifying problem/frame questions, using data, transforming data into information, transforming information into decisions, and evaluating outcomes. The first component, identification of the problem and question framing, identifies the skills and knowledge necessary to define a problem of practice and then change it into a question that can be examined (Mandinach & Gummer, 2016). Explicitly, this requires that the teacher understand the contextual issues within the school, district, and student to identify the root cause of the problem.

Attitudes Toward Data

Teacher attitude can both positively and negatively impact the use of student data. Findings from the Kerr, Marsh, Ikemoto, Darilek, and Barney (2006) study indicated if school staff members question the accuracy and validity of data, they lack the necessary *buy-in* to use various data sources and regress to practices they feel are most beneficial to their students.

Data Access

Teacher access to data through multiple channels, such as state data, interim assessments, formative assessments, as well as classroom observational data, can all be valuable tools in supporting individual student growth. As validated by the National Association of Elementary School Principals (NAESP; 2011), "To gain a deeper understanding of students' learning needs, teachers need to collect data from multiple sources . . . A districtwide data system allows teachers to aggregate data by classroom, content areas, or assignment type to identify patterns in performance" (p. 3). However, during 2016–2017, although 88% of educators reported they had access to student data, the data they reported having access to was the data they had entered, such as student attendance and grades (Tsai & Tosh, 2019). Further, access to discipline data and links between instructional resources tied to student assessment results were rarely reported by 20% of those teachers surveyed. Thus, access to multiple streams of data on an ongoing basis and in an accessible format is essential to growing data literacy amongst educators.

Organizational Supports

Next, organizational supports are necessary to provide clear and immediate student data through the use of different technologies, resources, and supports. The use of technology has also been highlighted in numerous research articles regarding the development of teacher data literacy skills (Reeves, 2017). Datnow et al. (2007) argued that schools must invest in user-

friendly data management systems and provide staff with support and training on the use of these infrastructures including, access to student data and training supports to understand the information. This information can become an invaluable component of the teacher action and data use process.

Further, teacher collaboration is readily available in numerous articles as a valued support tool in student data discussions. Through the effective use of collaboration, teachers are given the opportunity to pool teacher expertise and, through the review of data, have a direct impact on student outcomes (Reeves, 2017). Access to collaboration opportunities resulted in an increase in self-reported efficacy in data use for pre-service teachers in one study (Piro & Hutchinson, 2014).

Competence and Data Use

Kerr et al. (2006) found numerous studies that have determined that teachers often lack the skills necessary to develop questions, examine data, synthesize information, make decisions, and analyze results. Further, through their study, they found that only 23% of their survey respondents rated themselves as moderately or very prepared to use student results and interpret the appropriate action to support learning. Findings from the Dunn et al. (2013) study indicated that teachers who were more confident in their data literacy abilities were more likely to be working with staff to improve the use of data to improve student outcomes. To summarize, teachers must have a foundational understanding and self-belief in their knowledge to effectively use student data to make instructional changes and support strong student outcomes. Data literacy and subsequent data use is a multi-layered, complicated process. However, through the application of the teacher action framework, it will assist in providing a clear path for determining teachers' self-perceived data literacy strengths and areas of needs by providing

valuable insight to targeted areas for professional development and training supports. Given these points, teachers must be prepared to face the challenge of delivering a higher level of differentiation in their instruction to ensure all students can attain academic growth, and as student populations become increasingly diverse.

National Policy

The *A Nation at Risk* report in 1983 was the initial driver in using student assessment results to rank public school districts (Fullan, 2007). As stated in the report, "The educational foundations of our society are presently being eroded by a rising tide of mediocrity that threatens our very future as a Nation and a people" (USDOE, 1983, p. 1). With the introduction of standards-based accountability for the first time, schools were held accountable for student success based on assessment data. As educational reform efforts expanded, student data became a known entity for determining student success through the integration of the continuous improvement cycle, as well as identifying underperforming schools.

During the era of NCLB, data use in schools steadily grew. Educators had to learn to analyze data and adequately interpret data to drive student instruction to support high accountability standards (Datnow et al., 2007; Datnow & Hubbard, 2015; Horsford et al., 2010; Mandinach & Gummer, 2016). Under NCLB, standards-based accountability mandated that educators collect and analyze data to improve student outcomes, especially for student subgroups (Kerr et al., 2006). Specifically, "The theory of action underlying NCLB requires that educators know how to analyze, interpret, and use data so that they can make informed decisions in all areas of education, ranging from professional development to student learning" (Datnow et al., 2007, p. 10). Although compelled by law and need, school leaders are increasingly collecting data; however, questions remain around data analysis and interpretation.

Following NCLB, in 2005, a national advocacy group, the Data Quality Campaign (DQC), began to watch and report on each state's progress on the development of data systems to manage and report student achievement and data. In addition, the DQC reports each state's progress in the collection of longitudinal data and the development of policies (Knapp, Glennie, & Charles, 2016). Further, the DQC defined the essential elements of data infrastructure components, including the ability to:

- follow students' academic progress as they move from grade to grade;
- determine the effectiveness of specific schools and programs;
- identify consistently high-performing schools so that educators and the public can learn from best practices;
- evaluate the effect of teacher preparation programs on student achievement; and/or
- focus school systems on preparing a higher percentage of students to succeed in rigorous high school courses, college, and challenging jobs. (Knapp et al., 2016, p. 30)

The Obama administration expanded the accountability standards started by NCLB with the USDOE, Secretary Arne Duncan's challenge to improve assessment quality to measure student progress (Horsford et al., 2010). Beyond NCLB, the Obama administration provided federal funding to promote accountability, including Race to the Top (RTTT). Unlike NCLB which was state-mandated, RTTT funds were allocated to states that submitted plans which met a new list of expectations, such as linking teacher pay to student achievement, improving tracking of student performance data, and developing an action plan to turn around failing schools (Fullan, 2007; Horsford et al., 2010).

Recently, the United States entered a new era with ESSA, which reauthorized the Elementary and Secondary Education Act of 1965 (ESEA), as a bipartisan measure to provide equal opportunity for all students. With the adoption of ESSA, the need for educators to apply data literacy knowledge to their daily practice has multiplied (ESSA, 2015–2016). ESSA changed the landscape across the country, including Indiana and the accountability metrics used to measure school and student performance. According to the newly established ESSA requirements, understanding the use of data to drive student outcomes is essential to grow all students academically and to ensure school leaders are in a favorable position to meet state accountability measures.

Under ESSA, although the use of assessment data is still a critical component of measuring student outcomes, teachers must now be well versed in analyzing data in other areas. According to Datnow and Hubbard (2015), "The data that educators are drawing on are wide-ranging as well, including data on student achievement, student attendance and behavior, course enrollment patterns, postsecondary success rates, and climate" (p. 2). The requirement of additional data points provides a more holistic view to understand student needs. In response to these new standards, professional organizations such as the National Council for Accreditation of Teacher Evaluation (NCATE) and the National Board of Professional Teaching Standards (NBPTS) recommended "that teacher candidates must be able to analyze student learning needs and make instructional adjustments by using student performance data and other sources of data to inform their practice" (Mandinach et al., 2015, p. 3).

In response to these requirements, leaders in many schools found that they must demonstrate "bottom-line results and use data to drive decisions" (Hess & Kelly, 2005, p. 244). "Looking at student work" is a critical tool that teachers are charged with and "an important

process in teacher professional development" (Slavit et al., 2016, p. 1). District leaders and "principals are expected to help teachers analyze data to improve instructional practice and to use data to guide school improvement" (Farrell & Marsh, 2016, p. 424). Given the increasing evidence that teachers need to be able to analyze and use data to drive student achievement, a more profound understanding of how teachers perceive their ability to use data is needed.

Indiana

As mandated under the federal ESSA regulation, Indiana's ESSA plan defines long-term goals to align with measurable outcomes based on data, with specific emphasis on the following guiding principles: student-centered, equitable, transparent, aligned, actionable, and focused (IDOE, 2018b). Moreover, the plan highlights for schools to establish a well-rounded education environment for all student populations through academics, health and wellness, community and environment, and social-emotional school supports (McAlister, 2016). In return, schools are subsequently held accountable for student academic achievement, academic growth, graduation rates, college and career readiness, attendance, and English language proficiency growth goals (IDOE, 2018b).

In that case, using data to drive instructional practices and supports is not a new topic in Indiana. Instead, in many cases, Indiana has been a leader in the development and implementation of creating data systems and supports for its school systems. Beginning with the state's partnerships with a variety of regional and national research support and outreach centers, Indiana continues to increase avenues for the development of improved systems and professional development.

To start, Indiana is a partner of the REL Midwest, a division of the National Center for Education Evaluation and Regional Assistance, and part of the Institute of Education Sciences

funded by the USDOE. Through this partnership, Indiana works with the REL center as a resource and extended support to develop innovative practices, grounded in research to meet both state and federal requirements, including DDDM practices (McDonald et al., 2007).

In conjunction with the research and work completed by the REL, all of the states within the Midwest region—Minnesota, Iowa, Wisconsin, Illinois, Michigan, Ohio, and Indiana, "have—or are in the process of establishing—individual-level student or teacher longitudinal data systems" (McDonald et al., 2007, p. 2). Although the goal of such systems is to link student data with teacher data, as well as identify problems that may hinder student achievement and target resources to support the areas of need, for many states, these goals continue to be unattainable. However, unlike other states in the REL Midwest region, since 2002, Indiana has an operational student test number system to obtain longitudinal student data. Except for Michigan, which has had a similar data collection system in place since 2000, Indiana has been a leader in the collection of multiple data points compared with other REL partnerships, which implemented similar operations in 2005 and 2006 (McDonald et al., 2007).

Although Indiana may be one of the pioneers of a state student data system, the data system is not a comprehensive and transparent tool. In 2007, Indiana did not have an established mechanism to collect longitudinal data, such as student demographics, special population, enrollment, achievement, special programs (e.g., Early Childhood, honors), and attainment; the state has room for improvement in college test score data. However, it should be noted that Indiana continues to increase its longitudinal data collection, even though it remains inaccessible to educators. Only through a data-sharing agreement with the IDOE, can districts request access to available data from the past several years, such as student achievement scores, demographic data, disability status, and socioeconomic status.

Further, the state lacks a transparent tool to track teacher professional development. As stated by McDonald et al. (2007), "While the state provides approximately $13 million in funds for professional development, there is no electronic tie to specify what development individual teachers receive from those funds" (p. 21). Due to this gap, leaders and teachers do not have a transparent way to sort their professional development and training needs, nor do districts and school leaders have the ability to effectively identify what professional development has been completed by incoming staff to identify additional areas of need.

Another barrier of Indiana's current data system is that Indiana is a local control state. Although school boards must follow both state and federal data collection regulations, any additional data reporting is voluntary and only required as each school board defines. Further, due to differing board rules and requirements, the state has over 20 versions of student information systems currently utilized by its' school systems, causing a great variance in the type of data being collected and analyzed (McDonald et al., 2007). Due to the inconsistent data information systems across school systems, coupled with the lack of transparency of professional development and training needs of teachers, district and school leaders must look at other outlets to determine staff training topics and needs, such as conducting internal staff needs assessments.

Another partnership Indiana has established to increase the use of student data to inform instructional practices is with the AIR's Center on RTI. Indiana established a four-year project "From 2009 through 2013, AIR has worked with the Indiana Department of Education (IDOE) through the Great Lakes East Comprehensive Center and the NCRTI to advance the state's RTI initiative" (Center on RTI, n.d.). The RTI process is a three-tier process where schools use research-based supports for both academic and behavior interventions, in which instructional needs are determined based on multiple data points obtained through a defined period (Gorski,

n.d.). Through this partnership, Indiana developed a guidance document for Response to Instruction team development and practices.

In conjunction, AIR and the IDOE developed professional development opportunities on RTI and supported the pilot of 11 schools RTI implementation across the state (Center on RTI, n.d.). The primary purpose of the pilot was to provide schools targeted training and support on DDDM practices. Similar to the partnership with REL, Indiana is a leader in the implementation of data practices associated with RTI when compared to other states, initiating statewide guidance, training, and ongoing support in the early 2000s.

However, since the initiation of both the REL and AIR's Center on RTI partnerships, plus additional state data systems and statewide RTI professional development opportunities, Indiana has seen minimal academic growth on NAEP. NAEP is mandated by Congress and overseen by the USDOE's, National Center for Education Statistics (NCES), which is the ongoing, national assessment for U.S. students (USDOE, 2017). Based on *The Nation's Report Card* and NAEP results, over the past decade, Indiana has obtained stagnate growth in Grade 4 reading and math, and Grade 8 math.

To begin, the NAEP assessment provides a common assessment across all states in "civics, economics, geography, mathematics, music, and visual arts, reading, science, technology, and engineering literacy, U.S. history, and writing" in 4th, 8th, and 12th grades (Sharp, 2018, p. 2). More thoroughly, the purpose of these assessments is to examine the academic progress of all students through the use of a common assessment, such that a direct comparison of student performance across all states can be derived. Thus, results are reported for each state, as well as some school districts, by the score and the percent of students that were identified as *Basic*, *Proficient*, and *Advanced* on mathematics and reading assessments for

students in Grades 4 and 8 (Sharp, 2018). Consequently, this information can then be utilized by state departments, policymakers, educators, and parents to identify areas of academic need and strengths within their states (Sharp, 2018; USDOE, 2017).

Overall, based on the NAEP assessment results, in 2017, Indiana performed in the top 26% of states in math and the top 22% of states in reading proficiency in both 4th and 8th grades (USDOE, 2017), as reflected in Table 2.1. Even though Indiana is performing near the top 25% of all states in both reading and mathematics, nominal growth in NAEP scores has been acquired over the past ten or more years.

Table 2.1

2017 NAEP National Results Compared to Indiana in Mathematics and Reading

	Score		Proficient				
Grade	National	Indiana	National	Indiana	Subject	Rank	2015–2017 Growth
4	239	247	40%	48%	Math	7th	Not significant
4	222	226	35%	41%	Reading	11th	Not significant
8	283	288	33%	38%	Math	13th	Not significant
8	267	272	35%	41%	Reading	8th	*Significant

Note. Rank = Indiana's ranking out of the 50 states; Growth = *Significant ($p < .05$) score change. U.S. Department of Education, National Center for Education Statistics (2017).

Based on the fourth-grade NAEP mathematics results, although significant growth was obtained in Indiana between 1992 and 2005 and then again in 2009, no statistically significant growth—significant ($p < .05$) score change—has been attained (USDOE, 2017). (See Appendix A for NAEP Grade 4 mathematics results). Conversely, there has been significant national

growth during the 2011 and 2013 assessment window. Similarly, Grade 8 students in Indiana have not shown significant growth on the NAEP mathematics since 2005. Although, it should be noted that statically significant growth was obtained in Indiana during 1990–2005. Further, nationally, there was considerable growth in mathematics for Grade 8 students during the 2007 and the 2013 NAEP, although Indiana did not contribute to this increase (USDOE, 2017). (See Appendix A for NAEP Grade 8 mathematics results).

Similar to math, Grade 4 reading results achieved inconsequential NAEP growth over the past six years. Significant growth in Grade 4 reading proficiency took place from 2002 to 2011 (USDOE, 2017). (See Appendix B for NAEP Grade 4 reading results). Although, it should be noted that Indiana did not have NAEP reading scores reported during 1998 and 2000. During the 2013–2017 NAEP administration, Indiana experienced no significant growth in Grade 4 reading proficiency. Conversely, unlike Grade 4, Grade 8 students in Indiana made a considerable increase in reading proficiency consistently since 2002 (USDOE, 2017). (See Appendix B for NAEP Grade 8 reading results).

With that said, since 2002, Indiana has established a variety of partnerships and, in various ways, has been pioneers in instituting data systems which disaggregate a wide range of student data (McDonald et al., 2007). Although in 2007, the state did not have a system advanced enough to collect longitudinal data, such as student demographics, special population, enrollment, achievement, special programs (e.g., Early Childhood, honors), and attainment. However, Indiana was still a leader in using data to drive student supports. Indiana was one of the first Midwestern states to create statewide supports and guidance in building RTI teams in 2009, in conjunction with the AIR's Center on RTI (Center on RTI, n.d.). Since Indiana's launch, many states have followed their lead in instituting state guidance for the establishment of

RTI teams and procedures. Except for Grade 8 reading proficiency, since the implementation of many additional data tools and training opportunities within the state, Indiana has not seen the fruit of their labor.

Although there have been numerous positive studies linked to DDDM practices, Indiana has not benefited from their attempts based on a decade or more of NEAP outcomes. Thus, a different approach needs to be taken, such as understanding these data use of Indiana teachers, in order to build a foundation of support.

Data-Driven Instruction

As previously established under ESSA, schools are held to higher accountability for all student populations; thus, the concept of using data to drive instruction has increased meaning for schools and educators (Greenberg & Walsh, 2012; Mandinach & Gummer, 2016). Through the use and review of data, school leaders and educators can identify areas of strengths and weaknesses and strategically guide improvement to elicit strong student outcomes. Per Mason (2002), supporters of DDDM believe that effective use of data allows teachers and leaders to isolate successes and challenges, identify areas of improvement, and evaluate the effectiveness of practices. Mandinach and Gummer (2016) explained that the DDDM model delineates data and information and converts that into knowledge through the collection and organization of data. Without the application of background or content expertise, raw data initially does not have meaning. Data must be translated through the use of content knowledge, then summarized to develop purpose in which action can be created.

However, for teachers to be effective in implementing DDDM, they must, at a minimum, have a foundational understanding of data literacy skills. DDDM "refers to the systematic collection of many forms of data from a myriad of sources in order to enhance student

performance" (Dunn et al., 2013, p. 87). Data literacy encompasses how to identify problems, frame questions, use data, transform data into information, transform information into decisions, and evaluate outcomes (Mandinach & Gummer, 2016). Thus, for application of DDDM and the use of multiple sources of data to occur, teachers must be able to identify problems and frame questions, identify these data needed to support the issue, implement action, and measure the outcome based on data. When these components occur in a symphony, greater student outcomes can occur. According to Supovitz and Taylor (2003), high-performing school districts do not use instinct to drive student outcomes; they use data.

Based on numerous studies conducted in the field of education, the consistent and effective application of DDDM practices is far from perfect in schools, yet some school districts have obtained promising growth even among the most marginalized populations (Datnow et al., 2007; Togneri, & Anderson, 2003). As stated by Togneri and Anderson (2003), "Moving beyond islands of excellent schools to systems of success will require that all those involved in education better understand what they must do to help students succeed" (p. 1). Thus, it is critical to recognize the findings of studies that have linked student growth to DDDM practice and the application of data literacy skills.

Duval County Schools

Several studies have linked promising practices and student growth to data-driven instructional and DDDM practices. For example, Supovitz and Taylor (2003) conducted a study to examine the impact of standards-based reform in Duval County schools in Florida from 1999–2000. The Duval County school district reform efforts were to improve learning for all students across the entire district. The study was composed of 150 schools, 65,402 students, and 56% of the population qualified for free/reduced-priced lunch. Through this study, Supovitz and Taylor

(2003) examined the district's changes in state assessment performance data compared to other similar Florida counties' following the application of a variety of reform initiatives. Seven other counties were chosen as a comparison—Broward, Hillsborough, Palm Beach, Orange, Duval, Pinellas, Polk, and Lee—due to comparable student demographics, county size, percent of students eligible for free/reduced lunch, and operations cost (Supovitz & Taylor, 2003).

Duval County's initiatives included a focus on standards for each grade level and a *focal point* for teacher engagement and student work, more opportunities for students to learn materials they were expected to master, professional development for staff and parents, regular examination of data, development of interventions, a monitoring system for those students that are not meeting standards, and a county-wide system for tracking standards and student growth (Supovitz & Taylor, 2003). The findings were reported based on the changes in student performance over three years in elementary and middle school students in reading, writing, and mathematics.

Overall, elementary school Grades 4 and 5 were assessed and showed dramatic growth in all areas compared to the like counties. The middle school remained flat in most areas compared to like counties. However, this study did not define the details of these data analysis and processes used by the elementary school that differed in middle school. Without this detail, it is difficult to replicate the practices in other studies. Supovitz and Taylor (2003) stated that the outcomes and student assessment results "suggest that something systemic is occurring in Duval elementary schools that are resulting in persistent outperformance relative to other counties" (p. 18). Further, they proceeded to state that they believed the outcomes were a direct effect of the standards-based reform efforts, including data-driven instruction implementation (Supovitz & Taylor, 2003).

High Poverty Schools

Another study conducted by Togneri and Anderson (2003) chose five school districts—Aldine Independent School District, Texas; Chula Vista Elementary School District, California; Kent County Public Schools, Maryland; Minneapolis Public Schools, Minnesota; and Providence Public Schools, Rhode Island—as high-poverty schools that were improving student achievement. In particular, this study aimed to learn more about how districts promote instruction across systems and improve performance for all student populations. The study questions were:

- How did the districts create the will to begin instructional reform?
- What strategies guided their reform efforts?
- In what ways did districts change their approaches to professional development?
- How did interactions among the stakeholders facilitate or hinder instructional reform?
- How was leadership distributed across stakeholders to facilitate improvement?

(Togneri & Anderson, 2003, p. 2)

District state assessment data was the primary data source to measure growth over the three-year period, 1998–2000. Although the districts varied in size, location, and operation costs, all districts shared some common variables, such as the rise in poverty and change in the ethnic and racial makeup of their communities over the past decade (Togneri & Anderson, 2003).

Overall, across all districts, elementary students made progress with the gap between white and minority students closing. Similar to Supovitz and Taylor's (2003) research findings, students in middle school and higher grades were more stagnant in their overall growth. However, although not all grade levels and content areas experienced success in their reform efforts, elementary students had strong growth in student achievement (Togneri & Anderson,

2003). Togneri and Anderson (2003) identified the following strategies that were implemented to improve instruction in all five districts: acknowledge poor performance and find solutions, establish an approach for improving instruction system-wide, create a vision for student improvement, professional development, redefined leadership roles, long-haul reform efforts, and "district made decisions based on data, not instinct" (Togneri & Anderson, 2003, p. 5).

Milwaukee Public Schools

Mason (2002) conducted a study of six Milwaukee public schools regarding their increased capacity and use of school data to make decisions and promote school reform. Different from the other studies reviewed, Mason's (2002) study centered around the capacity of the school staff members working directly with the Wisconsin Center for Education Research (WCER) and UCLA's National Center for Research on Evaluation, Standards, and Student Testing (CRESST) and their DDDM application.

Findings from the study indicated that one of the six schools found over a three-year analysis that student reading scores needed improvement and used that data knowledge to place students in the appropriate courses. Further, reallocation of funds provided students in the low-performing-student range to review additional reading resources (Mason, 2002). Additionally, student discipline data were used to determine the students that showed patterns in their behaviors, and teachers were provided with summary information to establish behavior management systems (Mason, 2002). Six challenges were discovered in this study, as follows:

1. Cultivating the desire to transform data into knowledge;
2. Focusing on a process for planned data use;
3. Committing to the acquisition and creation of data;
4. Organizing data management;

5. Developing analytical capacity; and,
6. Strategically applying information and results. (Mason, 2002, p. 6)

Clearly defined by this research, data literacy application and DDDM practices take more than just knowledge. District leaders must be aware of the district challenges that hinder the advancement of application. Specific to the Mason (2002) study, continuous professional development and strong leadership are foundational to the use of data to drive student improvements. As stated by one principal within the study, "More disciplined use of data helped his school refine its data collection to meet specific school needs" (Mason, 2002, p. 7). Further, having a database to access data and train staff on how to identify the correct data sources to support specific student needs is critical in establishing a continuous improvement cycle that can create strong student outcomes.

Teacher Perception and Data Use

Most school districts, under their state accountability requirements as a result of ESSA, engage in data use and require their teachers to analyze data to make instructional decisions for their student populations (Datnow & Hubbard, 2015; Mandinach & Gummer, 2016). Through the use of data, teachers are able to identify students who require remediation, need grade-level support, and those who would benefit from enrichment (Datnow et al., 2007; Dunn et al., 2013; Hoover & Abrams, 2013; Mandinach et al., 2015; Mandinach & Gummer, 2016). Understanding teacher perception regarding data literacy knowledge and understanding of DDDM skills is essential to create appropriate professional development and support structures to establish data-driven school cultures.

However, as stated by Datnow and Hubbard (2015), through the findings of an empirical study review, "The general absence of professional development has hampered teachers' efforts

to use data, as well as their confidence" (p. 3). Thus, previous research findings can serve as a foundation to understand teacher perception of data literacy knowledge, and if teachers perceive they are adequately prepared to apply DDDM to meet both federal and state accountability measures. Examining how educators make sense of the use of data to monitor student performance in a meaningful way can contribute to practice and policy.

Virginia School District

In a survey study conducted by Hoover and Abrams (2013) in a large Virginia school district with approximately 58,500 students, teachers were asked to identify what assessment data they regularly used and how they analyzed these data to make instructional decisions. Hoover and Abrams (2003) suggested that summative assessment data can be formative, and thus provide teachers with data and information that can be used to alter their instructional practices to promote healthy student outcomes. As a result, the survey asked teachers to identify the types and frequency of summative assessments they administered, how often they analyzed the assessment results, as well as, how teachers used the assessment data to inform their instruction.

Based on the survey findings, teachers across all grade levels—kindergarten through Grade 12—reported using teacher-generated assessments more than other assessment types (Hoover & Abrams, 2013). Other evaluations that were common were departmental assessments, benchmark assessments, and norm-referenced assessments. Furthermore, 80% of the teachers stated that they administered district-developed benchmark assessments at least quarterly during the academic year (Hoover & Abrams, 2013).

Teacher analysis of data survey results indicated that although 80% of teachers administered benchmark assessments, only 33% disaggregated these data to determine individual

content standard's needs. Further, 30.6% of the teachers' surveyed responded that they never disaggregated data by subgroups. The most common methods for data analysis reported was a weekly or monthly analysis by mean, mode, and standard deviation of class performance (Hoover & Abrams, 2013). The teachers that completed the survey reported changes in instructional practices following the analysis of assessment data; 96% of the respondents used these data for remediation instruction (Hoover & Abrams, 2013). Teacher survey responses indicated data were used to re-teach concepts and change the pace of future instruction.

Overall, Hoover and Abrams (2013) suggested that although teachers were administering assessments on a similar frequency, they did not analyze data with the same rate or depth of analysis. Correspondingly, teacher judgment and intuition may have caused variation in the analysis of data. The results of this study suggested that as a whole, data analyses were not being conducted in sufficient depth or frequency to result in high student achievement for all students. The Hoover and Abrams (2013) study suggested that the district would benefit from professional development across all grade-level instructors on data disaggregation and analysis to enhance instruction for all student populations. Missing from Hoover and Abram's (2013) study was the teaching experience of the staff members involved. Understanding the different training and support needs of new teachers in order to build a sustainable and successful data-driven instructional model is critical, for both building leaders and higher education institutions.

DDDM Efficacy

Dunn et al. (2013) conducted a study based on previous study findings that indicated that teachers did not receive sufficient training and lacked confidence in their ability to use data to drive instructional practices within their setting. The premise of the Dunn et al. (2013) study had two underlying variables—teacher DDDM efficacy and DDDM concerns. Teacher sense of

efficacy was defined as “teachers’ beliefs about their abilities to successfully engage in classroom level DDDM” (Dunn et al., 2013, p. 223). Teacher DDDM concerns centered around anxiety, which was defined as “the worry tension and apprehension teachers feel about engaging in DDDM” (Dunn et al., 2013, p. 223). The purpose of the Dunn et al. (2013) study was to examine teacher DDDM efficacy and the application of DDDM in the classroom to gain a better foundational understanding of the change process involved with teacher adoption of DDDM practices.

The Dunn et al. (2013) study was composed of two online questionnaires sent to kindergarten through Grade 12 teachers in a northwestern state that had participated in an intensive, job-embedded DDDM professional development. Likert scale, 5-point questions were developed to obtain teacher perception of “efficacy for data identification and access . . . efficacy for data technology use . . . efficacy for data interpretation, evaluation, and application..., and . . . DDM anxiety” (Dunn et al., 2013, p. 229).

Findings from the Dunn et al. (2013) study indicated that teachers, who were more confident in DDDM, were more likely to be working with staff members to improve the use of DDDM in their classrooms. The study also found that participants with increased DDDM anxiety had a decrease in collaboration with their peers. For this reason, the researchers noted that a teacher’s DDDM anxiety must first be addressed before the adoption of DDDM practices (Dunn et al., 2013). As a result, it was suggested that professional development should move past a brief seminar or workshop approach. Instead, it should be job-embedded and on-going and allow time for anxiety to dissipate. Although this study provided some insight into the importance of building the competence of staff in using data to drive instructional practices, this study failed to differentiate the support needed for new teachers compared to veteran staff. As

found in a study conducted by Dunn (2016), pre-service teachers often lacked the confidence to work with data effectively and thus, retreated to other practices. Additional information is needed to support new teachers and their self-confidence with data practices.

Pre-Service Teachers

In a subsequent study conducted by Dunn (2016), results found that although DDDM courses are now *typically* required in teacher licensure coursework within the United States, pre-service teachers remain resistant to learn about DDDM practices. Concern theory served as the theoretical framework for Dunn's study; Dunn (2016) described this theory as a "framework that describes, explains, and predicts probable teacher behavior based upon relevant concerns as a teacher participates in developmental activities and implements an innovation" (p. 31). The study hypothesized that, similar to in-service teachers, pre-service teachers may be resistant to DDDM before receiving instruction (Dunn, 2016). The purpose of the study was to examine the concerns of pre-service teachers' regarding "class-level, teacher-directed data-driven decision-making (DDDM)" (Dunn, 2016, p. 31) while enrolled in a required psychology course examining DDDM practices. Up to this time, no studies were located that addressed pre-service teacher views of DDDM.

In the study, Dunn (2016) established a number of hypotheses for pre-service teacher resistance to DDDM. First, a large number of pre-service teachers were students during the NCLB era, where high stakes tests submersed the U.S. education system. Further, changes in school funding, teacher evaluation, and teacher pay scales have been attached to student test results in some districts, tying extrinsic motivation to standardized assessments, thus giving a negative connotation to DDDM practices (Dunn, 2016). Although many hypotheses have been established as to why pre-service teachers are resistant to DDDM, Dunn's (2016) study's

purpose was to address the gap in the understanding of the *why* pre-service teachers enter the workforce lacking the readiness skills to implement DDDM practices (Dunn, 2016).

The study was composed of 78 teacher education students in a sizeable Midsouthern university in the United States. Students were provided with a survey to complete, following the completion of six hours of class meetings regarding DDDM topics (Dunn, 2016). The results of the study indicated that the students were not receptive to learning more about DDDM and suggested that they believed they knew more about other approaches that would work better; thus, they were likely to pursue alternative instructional practices (Dunn, 2016).

Although this study was limited in size and scope, it did suggest that teacher resistance to DDDM may begin before teachers enter the profession. Similar to the previous study's recommendations, Dunn (2016) recommended that professional development of DDDM practices not be limited to one-day workshops, but rather on-going embedded development where misconceptions about DDDM can be quickly rectified. A follow-up study using the same participants after their first education placement would provide additional insight for the professional and development that benefited their DDDM beliefs, and ultimately, changed their view and attitude toward data use to drive instructional practices.

Conclusion

Although in many schools, DDDM practices are not fully established in some significant and diverse school districts across the United States, the application of data-driven instructional methods have shifted the school climate. For instance, the Duval school district obtained higher student outcomes in elementary grades and across all elementary schools, compared to like districts after the effective implementation of DDDM practices (Supovitz & Taylor, 2003). In a less, concentrated study conducted by Togneri and Anderson (2003), five school districts (Aldine

Independent School District, Texas; Chula Vista Elementary School District, California; Kent County Public Schools, Maryland; Minneapolis Public Schools, Minnesota; and Providence Public Schools, Rhode Island) that were all high-poverty schools that implemented DDDM practices saw steady improvements across elementary student achievement. In all of these settings, district-driven, embedded professional development efforts were initiated to generate systemic improvements.

Although there is evidence that DDDM practices have been shown to improve student learning and achievement, teachers and school cultures are often resistant to using data-driven instructional methods (Dunn, 2016; Dunn et al., 2013). Research findings suggest that teachers are using assessment data; the question that remains unclear is how they are using this data (Datnow & Hubbard, 2015; Dunn et al., 2013; Hoover & Abrams, 2013; Oláh, Lawrence & Riggan, 2010). While, teachers are using data for remediation and re-teaching, yet, many are not using data to support all student growth, through conceptual understanding or disaggregated subgroup data (Hoover & Abrams, 2013; Oláh et al., 2010).

Often, data-driven instruction training has been provided to educators primarily through the workshop and in-service training offered at the school level. However, based on the research reviewed, it appears that schools with the most significant outcomes have initiated embedded and ongoing development opportunities. The study broached the entire district, school, and a population's (pre-service teachers) views on DDDM and data literacy areas, the research has a gap in understanding first-year educators' perspectives. Although the research has uncovered competence, attitude, technology, and leadership as areas that can have a profound impact on instructional practices, no studies were located on the perception of these areas for first-year teachers. Research has suggested that higher education institutions should be partners in this

initiative and take a more substantial role in the preparation of this essential skill in pre-education programs. However, without understanding first-year educators' data literacy, how can higher education facilities effectively create programs?

CHAPTER 3

METHODOLOGY

The purpose of this study was to explore first-year Indiana teachers' data use. Currently, ESSA places significance on the collection and use of data to monitor student outcomes, but it does not prescribe how schools and teachers should implement data to foster positive student outcomes. Federal and state policies coupled with test-based accountability models, provide a general context; however, resident districts and teachers must make sense of the implementation of data-driven decision practices to match the broader demands. Even more specifically, although much work has been done to create supports for schools and the implementation of DDDM practices through organizations, such as REL and AIR, how new teachers are using data to make instructional decisions, within Indiana remains unclear. This research describes the current landscape of Indiana's first-year teachers and their attitudes toward data use, what data first-year teachers have access to in Indiana schools, what organizational supports are available, and how first-year teachers are using data to support student outcomes. Further, the study provides a descriptive baseline for the state of Indiana with respect to first-year teachers' actions with data.

Research Questions

This study aimed to develop further understanding of Indiana teachers' data use during their first year of teaching, including the actions teachers identify they implement with data-driven decision-making practices. A review of current literature and recent studies was conducted, and a glaring gap was discovered; minimal studies have been conducted regarding first-year educators' actions with data and none specific to Indiana. To fill this void, several questions were developed to guide the research:

1. What data do first-year teachers have access to in Indiana schools?
2. How do first-year teachers use data?
3. What are first-year teachers' attitudes toward data?
4. How do first-year teachers feel they receive support with data use?

Research Design

The design of this research was a statewide survey study that employed quantitative methods to describe first-year Indiana teachers' data use through the *actions* teachers take to analyze, interpret, and use data to make informed decisions in all areas of education. A cross-sectional survey design allows for data to be collected at a single point in time, which can measure current attitudes, beliefs, and practices of a targeted population (Creswell, 2012). In addition, this study employed a non-experimental approach, descriptive design, which included producing a questionnaire through a digital survey, collecting data, classifying and displaying these data, and drawing and verifying conclusions (Creswell, 2012; Neeleman, 2018).

Leedy and Ormrod (2001) stated, "Quantitative researchers seek explanations and predictions that will generate to other persons and places. The intent is to establish, confirm, or validate relationships and to develop generalizations that contribute to theory" (p. 102). In the field of education, it is often perceived that quantitative research tends to be deductive and confirmatory. However, in some instances, quantitative research can be classified as exploratory in nature and, thus, is the situation with this research.

A web-based survey allows for efficient distribution to the targeted population—first-year teachers in Indiana. One of the merits of quantitative research is its reliability over time; if the study occurs again, it will elicit the same results (Cohen et al., 2011; Creswell, 2012). As such, a survey instrument is controllable, consistent, replicable, and ultimately predictable.

Quantitative research has been found to have extremely high validity, if accurate sampling, identification, application of an appropriate instrument, such as a survey tool, and the use of the proper statistical application, occurs. As defined by Cohen et al. (2011), validity in quantitative research encompasses credibility, transferability, dependability, and confirmability, creating an essential tool to look at the effects of a population over time.

This study sought to gain an overall picture of Indiana's new teachers' data use and data literacy skills. The survey was administered via email contact during the summer following the 2018–2019 academic year. Further, the timeframe for the administration of the survey was purposeful, allowing new teachers the time to complete the majority of their first year of instruction. Thus, teachers were able to answer the survey questions, having gone through a full year cycle, and the data they had accessed throughout the academic year. As such, the objective of this study was to be able to identify any plausible relationships between different variables, such as new teachers' use of data.

Survey

Due to the size of the population (7,895 educators received an initial Indiana teaching license between January 1, 2017, through March 29, 2019), an online survey study was selected to collect the opinions and insight of first-year teachers' data literacy skills. Muijs (2011) argued that survey studies allow for a large number of data to be collected at a low cost, as well as effort, in comparison with other methods. Further, Creswell (2012) affirmed this by stating, "Web surveys may allow effective and economical surveying of the entire population and thereby skirt around the inference problem . . . promoting a high response rate" (p. 384).

Surveys hinder the ability to control or manipulate the conditions and ensure all participants receive equal treatment and, thus, allows the researcher to explore various aspects of

a situation and test hypotheses through the collection of data (Kelly, Clark, Brown, & Sitza, 2003). Sills and Song suggested that survey studies have been shown to produce low response rates and technological problems, as well as a potential bias toward demographic groups with access to the Internet (as cited in Creswell, 2012). However, the anonymity of the respondents through a survey may also lead to more honest responses than methods, such as interviews, by and large, making a survey a reliable and robust tool to collect feelings and opinions on a particular subject (Muijs, 2011).

In addition to a reduction in sampling error, a large population was selected to gain a strong response that could be generalized to a larger population. Thus, the "attitudes, beliefs, practices, and trends of the population" (Creswell, 2010, p. 382) obtained through this survey may be representative of the broader community with the same characteristics. To mitigate measurement error, a well-developed and previously administered survey instrument was used in this study, the *Teacher Data Use Survey* (Wayman, Wilkerson, Cho, Mandinach, & Supovitz, 2017).

Although there could be unavoidable technical issues that can arise in the administration of a digital survey, in the case of this study, all teachers in Indiana had access to the internet as part of the current educational climate, lessening the concerns of potential demographic bias. Equally important, surveys have been shown as an effective way to collect information for descriptive research. Descriptive research is used to determine and estimate parameters of a specific group to critically describe factors within a situation, such as demographics, attitudes, experiences, and knowledge (Kelly et al., 2003). Through the use of descriptive research, one can describe a subject or phenomenon to understand the *what* behind a situation. More so, through the collection of data, descriptive research can bring new awareness that may otherwise

go unnoticed (Bernard & Bernard, 2012). Thus, through the use of a survey, I desired to obtain a single snapshot of unbiased data, which could be used descriptively to gain clarity of new teachers' data use in the state of Indiana.

Teacher Data Use Survey

A fully developed and published instrument, the *Teacher Data Use Survey* (TDUS), was administered to measure the actions teachers take with data, including their attitudes, supports, and access to data. A team of researchers developed the TDUS through the REL Appalachia and funded by the USDOE's IES, which met the stringent peer review process of these organizations (Wayman et al., 2017). The tool was created to be a consistent and reliable tool to identify strengths and weaknesses in teachers' use of data; thus, it is meant to be generalizable across all states (Wayman et al., 2017). Therefore, the survey was appropriate for a statewide survey study. As defined by the conceptual framework for data literacy,

> Effective use of student data by teachers requires a multifaceted network of actions, attitudes, and supports. Data use should follow an inquiry cycle that involves identifying a problem, forming a hypothesis about how to improve student learning, gathering and analyzing data, and forming actionable recommendations based on the results. (Wayman et al., 2016, p. 1)

Thus, the survey, *Teacher Data Use Survey*, was used aligned with this framework. According to Wayman et al. (2016), the *Teacher Data Use Survey* "can be used to query teachers, administrators, and instructional support staff about how teachers use data to support instruction, their attitudes toward data, and the supports that help teachers use data" (p. 1).

There are three versions of the *Teacher Data Use Survey*: one for teachers, one for instructional support staff, and one for principals. For the purpose of this study, only new

teachers with fewer than one and a half years' experience, and who currently taught in Indiana, were solicited to complete the survey.

The *Teacher Data Use Survey* is composed of nine groups of questions that measure five components, not including the demographic questions. Participants were asked to indicate their skill level in each of the five elements. Survey scales were created within the tool, which was groups of questions that asked the same question in a variety of ways to obtain accurate information from the participants through the 4-point Likert-type scales (Wayman et al., 2016).

Part I. Part I of the survey gathered teacher demographic information. Specifically, Part I asked how long they had been teaching (e.g., six months or less), sex (e.g., binary, female, male), ethnicity, age range (e.g., 20–29 years old, 30–39 years old, 40–49 years old, 50–59years old, and 60 years or older), highest level of education (e.g., bachelor's, master's), grade level of instruction, subject matter, current district student population (e.g., fewer than 200, greater than 10,000), district location (e.g., rural, urban, suburban), and the number of courses taken on assessment (e.g., not sure, 0, 1, 2, more than 2).

Part II. Part II began with a section to collect descriptive data regarding the availability and use of four specific forms of student data:

- State data–for example, state achievement tests.
- Periodic data–for example, commercially available periodic assessments.
- Local data–for instance, district-developed assessments such as formative assessments.
- Personal (teacher) data–such as, classroom-based assessments developed by teachers, such as tests, quizzes, and homework.

For this study, the second section, "Are the following forms of data available to you?" was predefined for the participants (Wayman et al., 2016). Per the survey, the researcher has the ability to customize this area to match a specific school or district's assessment and data choices, such as ILEARN. However, due to all new Indiana teachers' participation in the survey, questions could not be personalized for a local level. Thus, the survey used the study description for data as defined in Table 3.1.

Table 3.1

Descriptive Data

Form of Data	Study Description Utilized
State Data	Indiana State Assessment Data (e.g., ILEARN, IREAD – 3, ISTEP+)
Periodic Data	Benchmark or Interim Assessment Data (e.g., NWEA, MAP, IReady, Scantron, STAR360)
Local Data	District Developed Assessments (e.g., formative assessments)
Personal Data	Teacher developed assessments, homework, class projects
Other	Behavior, attendance, or other data

Note. Adapted from Wayman et al. (2016), p. 2.

Part III. Part III examined how (actions) teachers use data to support student outcomes. Specifically, actions with data are measured in two ways, the Collaborative Team Actions scale and other scales that assess the actions that teachers take with data (Wayman et al., 2016, 2017). For example, the Collaborative Team Action questions asks ten items regarding how a team engages in data-related actions, such as "We explore data by looking for patterns and trends," and asks the teachers to respond *never, sometimes, often,* or *a lot* to the following question (Wayman et al., 2016). Meanwhile, the other scales that assess teacher actions and use of

specific data, such as "Use <personal data> to tailor instruction to individual students' needs," response choices include *less than once a month, once or twice a month, weekly or almost weekly,* or *a few times a week* (Wayman et al., 2016).

Organizational supports were another set of questions within this section, which concentrated on teacher access to computer data systems, principal leadership, and other supports for data use. For example, there were five questions regarding the use of computer data systems, such as "The computer systems (for data use) in my district are easy to use." Similarly, there were five questions about principal leadership, including, "My principal or assistant principal(s) creates protected time for using data." Support for data contained six questions, including "I am adequately prepared to use data." Responses to organizational support questions included scales in which the respondent chooses *strongly disagree, disagree, agree,* and *strongly agree* scales (Wayman et al., 2016).

Part IV. Part IV contained questions geared toward teacher attitude toward data and was measured on two separate scales: attitudes toward data and datas' effectiveness for pedagogy. First, there were four questions related to teacher attitudes toward data; for example, "I find data useful." There were five questions regarding datas' effectiveness for pedagogy, such as "Data help teachers know what concepts students are learning." All questions within Part IV contained the same scale: *strongly disagree, disagree, agree,* and *strongly agree* (Wayman et al., 2016).

Part V. Part V measured teachers' competence in using data. There were four questions within this section, such as "I am good at using data to plan lessons," which used the same scale as questions in Part IV: *strongly disagree, disagree, agree,* and *strongly agree* (Wayman et al., 2016).

Part VI. Part VI measured *Collaborative Team Trust*. Similar to other sections, this section contained five questions and used the *strongly disagree, disagree, agree,* and *strongly agree* scale. One example of a question was, "It's ok to discuss feelings and worries with other members of my team" (Wayman et al., 2016). Table 3.2 contains a sample of survey questions aligned to research issues. *The Teacher Data Use Survey* took participants 15–20 minutes to complete. Appendix D provides a copy of *The Teacher Data Use Survey* (Wayman et al., 2016).

Table 3.2

Survey Question Alignment to Research Questions

Research Question	Survey Section	Survey Questions (Sample)
How do first-year teachers use data to support instruction?	Actions	1. Use benchmark or interim assessment data to identify instructional content to use in class. 2. Use district developed or formative assessment data to develop recommendations for additional instructional support. 3. Use benchmark or interim assessment data to form small groups of students for targeted instruction.
How do first-year teachers perceive their own data competence?	Competence	1. I am good at using data to diagnose student learning needs. 2. I am good at adjusting instruction based on data. I am good at using data to set student learning goals.
What are first-year teachers' attitudes toward data?	Attitudes and Opinions	1. Data help teachers plan instruction. 2. Data offers information about students that was not already known. Students benefit when teacher instruction is informed by data.

Table 3.2 (continued)

Research Question	Survey Section	Survey Questions (Sample)
How do first-year teachers collaborate with other teachers regarding student data?	Collaboration/Support	1. Member of my team trust each other. 2. It's ok to discuss feelings and worries with other members of my team. 3. Members of my team respect colleagues who lead school improvement efforts.
What organizational supports do first-year teachers identify that will help their use of data?	Support	1. 1. My principal or assistant principal(s) has made sure teachers have plenty of training for data use. 2. I have the proper technology to efficiently examine data. The computer systems (for data use) in my district are easy to use.

Note. Adapted from Wayman et al. (2016).

Research Setting and Teacher Profile

The goal of this study was to learn about a specific population—first-year teachers in the state of Indiana. During the 2011–2012 school year, there were approximately 64,000 teachers employed in public schools. Based on the last Indiana teacher count on the IDOE (2018b) website, during the 2016–2017 school year, Indiana had 71,224 licensed educators within the state. For the purpose of this study, 7,895 educators, who obtained an initial license between January 1, 2017, through March 29, 2019, were identified (IDOE, 2019). This data was obtained from the Indiana Department of Education, based on the number of initial licenses applications and licenses approved during the defined timeframe.

The demographics of Indiana's educators are predominately White, with 93% of teachers' self-identifying as such, 4.5% self-identifying as Black, 1.5% self-identifying as Hispanic, and fewer than 1% self-identifying as Asian, multiracial, Native Hawaiian, other

Pacific Islander, or American Indian combined (IDOE, 2018b). Table 3.3 summarizes the ethnicities recognized by Indiana educators, as posted on IDOE (2018b). There were 289 school corporations and a total of 433 public school districts inclusive of charter schools, and 1,135,199 students in the state of Indiana in 2018 (IDOE, 2018b). Public schools are inclusive of traditional models, as well as public charter schools, and are located in rural, urban, and suburban settings.

Table 3.3

Indiana Teacher Count by Ethnicity

Ethnicity	*N*	%
White	66,225	93.0
Black	3,184	4.5
Hispanic	1,039	1.5
Asian	299	.4
Multiracial	367	.5
Native Hawaiian, other Pacific Islander, or Native American	110	.1

Note. Adapted from IDOE (2018b). *School and corporation reports*.

Based on the state of Indiana ethnicity data, the state had a lower percentage of White inhabitants (79.2%), compared with the number of White teachers (93%). Similarly, Black teachers were under-represented by nearly half (4.5%), compared to the state's population at 9.7% (U.S. Census Bureau, 2018). Hispanic educators represented 1.5% of teachers within the state, but the Hispanic population made up 7.0% of the state's population. Although Asian, multiracial, Native Hawaiian, other Pacific Islander, and Native American populations combined

were 3.0% of the state's population, these sub-groups only represented 1.0% of the licensed educators within the state (IDOE, 2018b; U.S. Census Bureau, 2018). Table 3.4 provides Indiana's population estimates, as reported by the U.S. Census Bureau (2018).

Table 3.4

Indiana Population Estimates–July 1, 2018

Ethnicity	*n*	%
White, not Hispanic	5,299,968	79.2
Black or African American	649,112	9.7
Hispanic	468,431	7.0
Asian	160,605	2.4
Multiracial	140,529	2.1
Native Hawaiian, other Pacific Islander, or Native American	33,459	.5

Note. Adapted from U.S. Census Bureau (2018).

Equally important to note, of the 71,224 licensed educators, the largest population had zero to five years of experience, representing 27.2% of the total population of Indiana educators. Interestingly, the second largest group was educators with 20 or more years' experience, 24.4% of the population. Thus, educators with more than five years, but fewer than 20 years' experience represented less than half of the teachers within the state (IDOE, 2018b). Table 3.5 summarizes the number of years of classroom experience of Indiana teachers, as reported by IDOE (2018b).

Table 3.5

Indiana Teacher Count by Years of Experience

Number of Years of Experience	*n*	%
20+ years	17,379	24.4
16–20 years	10,031	14.1
11–15 years	11,689	16.4
6–10 years	12,419	17.4
0–5 years	19,706	27.2

Note. Adapted from IDOE (2018b). School and cooperation reports.

Sampling

This study employed population sampling, which is described as a deliberate and unbiased process due to the researcher providing all participants in the population to participate (Creswell, 2012). According to Creswell (2012), a population study is an entire group of individuals or items that share one or more characteristics from which data can be gathered and analyzed, as such, can make generalizations to the population.

The population for this study included all new K–12 Indiana teachers with no more than one and a half years of classroom teaching experience. A list of educators, who obtained an initial license between January 1, 2017, through March 29, 2019, was requested and received from the IDOE (H. Rahman, personal communication, March 30, 2019). Upon receipt of the required information, 7,895 individuals were selected. All participants were invited to complete the survey. It should be noted that the IDOE provided the following statement,

> For our purposes, the only way we have of identifying an 'initial license' is by looking at those that are of type 'Original' and proficiency of 'Initial Practitioner.' Unfortunately, this includes some licenses that are not true first licenses. For example, every third IP license renewal is issued as an Original and not as a Renewal, due to some licensing requirements (H. Rahman, personal communication, March 30, 2019).

Thus, using conditional branch logic questions within the survey tool, educators will be asked,

> Prior to taking this survey, please read the following statements. If you can answer affirmatively to all the statements below, you are ready to proceed with the survey.
>
> - You are a new educator with no more than 18 months of teaching experience.
> - You are currently licensed to teach in one or more grades K-12. (Wise, 2019)

Further, for participants who responded *no* to this question, their survey was automatically concluded.

To determine the adequate sample size in survey research, Creswell (2012) recommended applying a sampling error formula. As defined by Creswell (2012), "A sampling error formula is a calculation for determining the size of a sample based on the chance (or proportion) that the sample will be evenly divided on a question, sampling error, and a confidence interval" (p. 609). The sampling error is necessary due to the random nature of the population selected, which may not represent the entire population. Although in the case of this study, the entire population was selected to participate. Finally, setting confidence interval values allows the researcher to determine the lower and upper values of the population mean.

For the purpose of this study, the desired margin of error was 5% or a confidence level of 95% (.95) (Pazzaglia, Stafford, & Rodriguez, 2016). The margin of error and confidence level were chosen because they were the standard values in research and based on the large population

size (Agresti & Finlay, 2014; Creswell, 2012; Pazzaglia et al., 2016). Based on the Sample Size Calculator (Creative Research Systems, 2012), through the selection of a confidence level of 95%, a margin of error at .5, and a population size of 7,895, the targeted number of completed survey respondents for this study was 367.

Research Participants

The participants for this study included only newly licensed educators, who obtained an initial Indiana educator license from January 1, 2017, through March 29, 2019. Based on the initial license list obtained by the IDOE, 7,895 initial licenses were awarded within this time frame (IDOE, 2019). As such, all 7,895 educators were sent the survey. In order to be identified as an active participant in this study, educators had to meet the following criteria: be a new educator with no more than one and a half years' experience, be currently employed in a school within Indiana, and teach in Grades K–-12. Further, elementary generalist, core curriculum (e.g., language arts, math, history, and science), special education, and specialized teachers (e.g., visual and performing arts, art, and consumer science) were included within the study.

By limiting the survey to new teachers with limited classroom experience, it allowed for the only initial exposure to data-driven concepts and development during the teacher preparation program and new teacher training at the school level. It allowed for district administrators to understand the foundation of teacher data literacy needs, attitudes, and organizational support needs of first-year teachers. The survey participant limitations allowed for both school administrators and higher education institutions to identify potential areas of additional training and support needs.

Overall, 565 educators completed the survey, 24.6% or 136 participants responded *no* to the first question, which indicated that they did not meet the new teacher definition within this

study. Additionally, for those participants who responded *no* to this initial question, their survey automatically stopped, and they were thanked for their time. The other 75.6% of the participants or 426 educators responded *yes*, which indicated that they read and met the survey study definition of the new Indiana educator. However, only 403 of the respondents answered demographic questions. As such, with 403 active participants, the confidence level of 95% and a margin of error of .5 was met.

On the whole, 315 female respondents (78.16%) participated in this survey study, compared to 87 male respondents (21.59%), and one participant was binary (.25%). Further, 374 of the 403 respondents (92.8%) were white, ten were Black or African American (2.48%), nine were Hispanic (2.23%), five were Asian (1.24%), one was multiracial (.25%), and four were other (.99%). In addition, the majority of respondents, 280 (69.48%) were between the ages of 20 to 29 years old. Other age groups represented included 59 (14.64%) respondents were between the ages of 30 to 39, 37 (9.18%) respondents were between the ages of 40 to 49, 24 (5.96%) respondents were between the ages of 50 to 59, and three (.74%) individuals were 60 years or older.

Finally, 323 individuals (80.15%) stated the highest education completed was a bachelor's degree. Further, 76 respondents (18.86%) reported they had completed a master's degree, one (.25%) stated they had completed an Ed.S., and three (.74%) individuals had completed an Ed.D. or Ph.D. program. Table 3.6 provides a frequency distribution of the survey participants by demographic area, represented by the number and percent.

Table 3.6

Frequency Distribution of Survey Respondents by Demographic Area

Demographic	*n*	%
Gender		
Binary	1	.25
Female	315	78.16
Male	87	21.59
Ethnicity		
White, not Hispanic	374	92.80
Black or African American	100	2.48
Hispanic	9	2.23
Asian	5	1.24
Multiracial	1	.25
Other	4	.99
Age		
20–29	280	69.48
30–39	59	14.64
40–49	37	9.18
50–59	24	5.96
60+	3	.74
Degree		
Bachelor's	323	80.15
Master's	76	18.86
Ed.S.	1	.25
Ed.D./Ph.D.	3	.74
Total	403	100.00

Elementary generalists completed the survey at a higher rate than other areas, with 33.1% of all respondents (132) self-identifying as such. Next, math content area educators represented the lowest response rate with, 21 (5.3%) respondents. Then, science content teachers represented 25 (6.2%) respondents, history content educators represented 34 (8.5%) respondents, English

content teachers represented 47 (11.8%) respondents, special educators represented 58 (14.5%) respondents, and other content areas represented 82 (20.6%) of the survey participants.

Both Black or African American and Caucasian were represented in all content areas. Caucasian participants represented 92.8% of the survey respondents, and Black or African American participants represented 2.33% of survey respondents. It should be noted; this data were similar to the data reported from the IDOE's (2018b) school and corporation reports, where it was stated that Caucasian educators represented 93% of Indiana's teachers and Black or African American educators represented 4.5% of all teachers within the state.

Meanwhile, educators who were Hispanic only were represented as English (4.7%), elementary generalists (1.5%), and other content areas (6.1%). Further, Hispanic teachers were 6.1% of the survey respondents, which was a greater representation for this subgroup when compared to the IDOE's (2018b) school and corporation reports, which was only 1.5% of Indiana's educators are Hispanic.

Similarly, educators recognized as Asian represented 2.4% of survey respondents, which was a more significant percent than the number of Asian educators in Indiana, which was .4% (IDOE, 2018b). In addition, Asian educators reported themselves as elementary generalists (1.5%), special educators (1.7%), and other content areas (2.4%).

Next, one individual was multiracial and a special educator. Also, this representation of the teacher survey matched the state's educator population at .5% (IDOE, 2018b). Finally, the educators who selected another ethnicity category were an elementary generalist or history content specialist. Table 3.7 summarizes the ethnicities selected by Indiana educators, as posted on IDOE (2018b). Further, Table 3.7 also provides a frequency distribution of the survey participants by ethnicity, compared to the content area of instruction.

Table 3.7

Frequency Distribution of Survey Respondents by Content Area by Ethnicity

Content	Black *n* (%)	Caucasian *n* (%)	Hispanic *n* (%)	Asian *n* (%)	Multiracial *n* (%)	Other *n* (%)	Total *n (%)*
English	2 (4.7%)	43 (91.5%)	2 (4.7%)	0 (0%)	0 (0%)	0 (0%)	47 (11.8%)
Math	0 (0%)	21 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	21 (5.3%)
Science	1 (4%)	24 (96%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	25 (6.2%)
History	1 (2.9%)	32 (94.1%)	0 (0%)	0 (0%)	0 (0%)	1 (2.9%)	34 (8.5%)
Elem General	3 (2.3%)	122 (94.2%)	2 (1.5%)	2 (1.5%)	0 (0%)	3 (2.3%)	132 (33.1%)
Spec. Ed.	2 (3.4%)	54 (93.1%)	0 (0%)	1 (1.7%)	1 (1.7%)	0 (0%)	58 (14.5%)
Other	1 (1.2%)	74 (90.2%)	5 (6.1%)	2 (2.4%)	0 (0%)	0 (0%)	82 (20.6%)
Total Respondents							399 (100%)

An array of district sizes was represented during this survey study. Overall, 9% of respondents stated that they work in school districts with fewer than 200 students. Further, 25% of respondents stated they worked in districts with more than 200 students, but not greater than 1,000 students. In addition, 27% of respondents were employed in districts with more than 1,000 but fewer than 5,000 students, 15.3% of respondents were associated with districts that had fewer than 5,000 students, but not more than 10,000 students, and 15.8% of respondents worked in

districts with more than 10,000 students. Finally, 8.3% of respondents stated they were currently not employed or intentionally left this response blank.

Interestingly, participants selected that the school district worked in—rural, urban, or suburban—nearly at the same frequency. Overall, 122 (30.6%) respondents selected they worked in a rural district, 127 (31.8%) respondents stated they worked in urban districts, and 122 (30.6%) individuals stated they were employed in suburban districts. Finally, 28 (7%) respondents intentionally left this question blank or were not currently employed. Table 3.8 provides a frequency distribution of the survey participants by ethnicity, compared to district size and location.

Table 3.8

Frequency Distribution of Survey Respondents by District Characteristics by Ethnicity

Demographic	Black *n* (%)	Caucasian *n* (%)	Hispanic *n* (%)	Asian *n* (%)	Multiracial *n* (%)	Other *n* (%)	Total *n* (%)
District Size							
<200	1 (2.9%)	31 (88.6%)	1 (2.9%)	1 (2.9%)	0 (0%)	1 (2.9%)	35 (9%)
>200–1,000	1 (1%)	94 (94%)	3 (3%)	0 (0%)	1 (1%)	1 (1%)	100 (25%)
>1,000–5,000	3 (2.8%)	100 (93.5%)	3 (2.8%)	1 (1%)	0 (0%)	0 (0%)	107 (27%)
>5,000–10,000	3 (4.9%)	55 (90.2%)	1 (1.6%)	0 (0%)	0 (0%)	2 (3.3%)	61 (15.3%)
>10,000	2 (3.2%)	58 (92%)	0 (0%)	3 (4.8%)	0 (0%)	0 (0%)	63 (15.8%)
Currently not employed or blank	0 (0%)	32 (97%)	1 (3%)	0 (0%)	0 (0%)	0 (0%)	33 (8.3%)
District Location							
Rural	0 (0%)	116 (95.1%)	4 (3.3%)	0 (0%)	0 (0%)	2 (1.6%)	122 (30.6%)
Urban	7 (5.5%)	113 (89%)	3 (2.4%)	4 (3.1%)	0 (0%)	0 (0%)	127 (31.8%)
Suburban	3 (2.5%)	114 (93.4%)	1 (.8%)	1 (.8%)	1 (.8%)	2 (1.6%)	122 (30.6%)
Currently not employed or blank	0 (0%)	27 (96.4%)	1 (3.6%)	0 (0%)	0 (0%)	0 (0%)	28 (7%)
Total Respondents							399 (100%)

Nearly 50% of individuals who took part in this survey instructed students in kindergarten through fifth grade. Middle school teachers instructing Grades 6 to Grade 8 represented 23.82% of respondents. Similarly, high school teachers represented 26.8% of all participants.

Public school educators represented the majority of respondents, with 85.31% of individuals identifying as such. Charter school teachers only represented 6.5% of respondents. Finally, 8.19% of participants stated that they were currently unemployed at the time the survey was distributed. Table 3.9 provides a frequency distribution of the survey participants by grade level of instruction and location of instruction.

Table 3.9

Frequency Distribution of Survey Respondents by Grade Level

Grade Level	*n*	%
KG	25	6.20%
1-5	174	43.18%
6-8	96	23.82%
9-12	108	26.80%
Type		
Public	302	85.31%
Public Charter	23	6.50%
Currently, not employed	29	8.19%

Surprisingly, when asked to identify how many data or assessment courses the participants were exposed to in their teacher preparation program, over 50% of respondents stated none or they were not sure. Nevertheless, 25.62% of teachers indicated they were enrolled in two or more data or assessment courses, and 24.63% stated they were enrolled in one class. Table 3.10 provides a frequency distribution of the survey participants by a count of courses teachers were required to take on data or assessment in teacher preparation.

Table 3.10

Participants Count by College Data or Assessment Course

Course	*n*	%
None	98	24.38%
One	99	24.63%
Two or more	103	25.62%
Not sure	102	25.37%

Overall, the participants of this study encapsulated the current educator population in the state, as aligned with the Indiana educator's population summary, posted on IDOE (2018b). All demographics and ethnicities were represented within the participants and at a similar rate as the current Indiana landscape. Further, an almost equal number of respondents participated in suburban, rural, and urban districts, as well as grade levels of instruction. Thus, there was not a threat of a particular bias, since the participants of this study, replicated the population of educators within the state of Indiana.

Recruitment

As part of this research, a list of current Indiana initially licensed educators was obtained through the IDOE. As such, a data request was submitted through the IDOE's Office of Legal Affairs at datarequests@doe.in.gov (IDOE, 2019). Within the request, it was specified that a definitive list of Indiana educators who had obtained their first educator's license, K–12, for the timeframe January 1, 2017, through March 29, 2019, was required. Further, it should be noted, that teacher data were publicly available through the Indiana Educator License lookup within the IDOE website; however, as presented, it is not in a searchable fashion by date or licensure type

(e.g., initial licensure) (IDOE, 2019). Thus, a request was submitted to the department to include both the names and the emails collected through the most recent IDOE, Certified Employee (DOE-CE) collection, identifying only Indiana educators who obtained an initial license since January 1, 2017. Overall, 7,895 educators, who were awarded their initial license, received an email with a request to participate in the survey study.

Based on data obtained, randomized numbers were applied to replace all student names and personally identifiable information (PII). Participants received an email survey directly from me. Upon the first group of completed surveys received, a follow-up email was sent to those non-respondents, who did not respond after one week. Following the second week, those teachers, who did not respond, received a third follow-up email. Finally, a fourth and final survey was emailed with one last request. However, dependent on the number of respondents, if fewer than 367 (based on the sample size requirements to meet 95% confidence interval with a .5 margin of error) of the participants completed the online survey, an additional email would be sent to remaining parties.

Consent and Confidentiality

Protecting participants was of the utmost importance. All participants were given a randomized number in place of a name. The randomized number was automatically computed using an excel randomization tool. All information collected was only published as a *whole group*, and no individual information or data were released. This information was obtained to identify current areas of strengths and additional professional development and training needs of new teachers.

By participating in the survey, participants provided consent to use their responses in the research study. To clarify this further for participants, the first question within the survey was a

yes or *no* question, “I understand that by completing this survey, I am agreeing to have my responses used in this research study.” When completing the survey, if a respondent selected *no*, the survey immediately ended, using the conditional branch logic embedded in the survey platform. Participates had the right at any time to request that they no longer participate in the study. (See Appendix C for the survey participant cover letter).

Risks and Benefits

As part of this study, new teachers had the potential opportunity to improve educator training for new teachers based on data. Further, district leaders can use this information to support the ongoing training needs of new staff members and provide additional professional development and outreach training to staff. At survey time, there were no identified risks for completing this survey.

Survey Instrument

In order to collect the maximum number of responses, an online survey tool, Qualtrics, which is a Web-based program, was utilized. Qualtrics is a web-based survey instrument designed to collect and analyze information. Due to the specific criteria of the sample group selection, the online survey tool selected must have a conditional branch logic, integrated within the platform. Conditional branch logic is a feature that changes what question a respondent sees based on how they answer the previous question (Qualtrics, 2019). Through this condition, it creates a custom path based on a respondent’s answers, thus, giving the capability to end the survey for respondents who identified outside of the specific sample requirements. For example, if a respondent responded *no* to the question, “Are you a new teacher with 18 months or less teaching experience in a classroom?” the survey automatically ended and thanked the respondent for their time. At that point, the response from this survey was removed from data analysis. In

addition, any data collected were “secure with enterprise-grade security features including, data encryption, redundancy, continuous network monitoring” (Qualtrics, 2019).

Instrument Testing

Prior to administering the survey, the survey was piloted with an academic administrator well versed in data literacy. Participants in the pilot survey were emailed a copy of the survey and asked to evaluate the overall length and clarity of the survey questions. Through the use of a pilot, it ensured that the survey instrument was valid and reliable in obtaining responses appropriate to the questions. Further, it allowed for formatting changes, which allows for greater access and understanding for the participants.

Descriptive Statistics

Although this research topic has been relatively unexplored within the population —first-year teachers’ data use—the need to collect introductory data was critical to understand areas that teachers identify as a need. Thus, descriptive statistics, through analyzing the relative frequencies between different variables, met the demand of this study. As defined by Agresti and Finlay (2014), “The purpose of descriptive statistics is to summarize data, to make it easier to assimilate the information” (p. 31). Through the use of frequency distributions, using the categorical data, a visual comparison, and association of two variables may be identified. As stated by Agresti and Finlay (2014), “There is said to be an association between two variables if certain values of one variable tend to go with certain values of the other” (p. 55).

Descriptive statistics were calculated for demographic items. Further, descriptive statistics were used in the preliminary analysis for all variables to determine the means, standard deviations, and frequencies. Each demographic variable, such as degree level earned, was examined for potential relationships with each scaled score. These results are presented through

text, charts, and graphs in Chapter 4, and a summary of implications and future research based on the results are described in Chapter 5.

In addition, the demographic questions were divided into the following categories. First, school levels were divided into three levels: elementary (K–5), middle school (Grades 6–8), and high school (Grades 9–12). Next, educational degrees obtained were divided into three categories: bachelor's, master's, Ed.S., and Ed.D./Ph.D. By considering degree attainment, the possible relationship between a teachers' access to further instruction on assessment and data practices and their perception of data used to drive instruction could be explored.

District size was separated into the following: smaller than 200 students, >200–1,000 students, >1,000–5,000 students, >5,000–10,000 students, and greater than 10,000 students. In addition, district location was categorized as rural, urban, or suburban. Regarding primary teaching responsibility areas, this question included elementary generalist, special education, English, mathematics, science, social studies, and other. The classroom category titled other was added for those educators that did not fall within the five designated areas. Finally, the number of courses taken on assessment was divided into *not sure, 0, 1, 2*, and *more than 2*.

Responses were averaged for each participant, providing a scale score. The measure of central tendency was used to describe the *average* member of the survey respondents (Agresti & Finlay, 2014). Through this analysis, the mean was displayed based on each section of the survey tool, data use, actions, support, and attitude. In addition, data were displayed for each demographic question and analyzed for mean, median, and mode compared to all participants, as well as the display of the sample size for each scale. Thus, this display of data allowed for basic comparisons to be made, based on the normal distributions of data, as well as the standard deviation. To define, the standard deviation is one way to calculate dispersions, which is a

useful way to measure the average distance of a score to the mean (Calkins, 2010). Standard errors of means and confidence intervals for means were also obtained.

Inferential Statistics

Chi-squares were calculated to examine the measure of association between a variety of demographic variables and questions within the survey (Agresti & Finlay, 2014). As such, Chi-squared tests are often used for testing relationships between categorical variables. Statistically significant differences were identified at a significance level of less than .05 ($p < .05$); thus, if any relationships were found to have a $p < .05$ (e.g., school district size and type of data accessible to teachers), then it could be assumed there was a relationship between those variables. Finally, statistical significance was used to determine if the findings of the study occurred by chance.

After the survey administration and collection period were completed, the survey data were downloaded in an Excel format and reviewed for errors. A statistical analysis software program, SPSS, was used in the data analysis for this study. Known as one of the most used statistical software in educational research, SPSS is user-friendly and reliable (Cohen et al., 2011; Cohen et al., 2018; Muijs, 2011).

Conclusion

A quantitative research approach was selected for this study based on my desire to gain an in-depth understanding of first-year Indiana teachers' data use. As such, 7,895 educators who had obtained an initial Indiana educator's license between January 1, 2017, through March 29, 2019, were elicited to complete the *Teacher Data Usage Survey* (Wayman et al., 2016). Based on the survey's completed, 403 first-year Indiana teachers participated, which met the minimum 367 participants necessary to meet the 95% confidence interval requirement.

Qualtrics, an online survey tool with branch logic, was used to administer the survey to ensure all participants answered the same questions based on their response to each prompt to maintain the reliability of the study (Qualtrics, 2019). It should be noted that not all participants were prompted to answer every question based on their response to specific inquiries, due to the branch logic. For example, if the respondent answered no, to "*Do you have collaborative meeting time?*" then, no additional questions about collaboration were prompted for that individual. Thus, the number of respondents for each item varied.

It should also be noted, all participant personally identifiable information was protected through the survey process, through Qualtrics, and no participant data could be tied back to the individual participant. Thus, through this quantitative research, I intended for the findings to provide information that will inform higher education, district and building administrators, policymakers, professional development, and practices that will lead to more effective use of data to drive higher student outcomes.

CHAPTER 4

RESULTS

The purpose of this chapter is to analyze and report the data that were collected, as it relates to the four research questions designed for this survey study. Particularly, what data first-year educators have access, how they use data, their attitude toward data, and what supports they feel they receive with data use. Quantitative data analysis was completed in two phases. In the first phase, descriptive statistics, including means and standard deviations, were calculated for items on the *Teacher Data Use Survey*. Next, a series of Chi-squared tests were conducted to furnish data to determine if there was a relationship between two nominal-level variables (e.g., district size and access to data). In summary, Table 4.1 displays a visual model of the data analysis for each of the research questions of the study.

Table 4.1

Research Questions and Data Analysis Table

Research Question	Survey Data Source	Data Analysis
What data do first-year teachers have access to in Indiana Schools?	Data access	Descriptive statistics and Chi-square
How do first-year teachers use data?	Actions	Descriptive statistics
What are first-year teachers' attitudes toward data?	Attitudes and opinions	Descriptive statistics and Chi-square
How do first-year teachers feel they receive support with data use?	Collaboration and support	Descriptive statistics and Chi-square

This chapter is organized into four sections. Each of the four sections present the analysis of the research questions, the findings that relate to each specific item, and a summary of the results.

Research Question #1–What Data Do First-Year Teachers Have Access To In Indiana Schools?

The first analysis focused on new teachers' ratings of the data they had access to during their first 18 months of teaching. Participants were asked if they had access to five different types of data:

- State data – Indiana state assessment data (e.g., ILEARN, IREAD, ISTEP+);
- Periodic data – Benchmark or interim assessment data (e.g., NWEA, MAP, IReady, Scantron, STAR360);
- Local data – District-developed assessments (e.g., Formative Assessments);
- Personal data - Teacher developed assessments, homework, class projects; and
- Other - Behavior, attendance, or other data.

Both descriptive and inferential statistics were used to analyze the data available to first-year teachers. A variety of data were analyzed to determine the strength of the relationship between targeted nominal data points, using Chi-squared inferential statistics. Two different relationships were examined: grade level of instruction and data availability and the subject of instruction and data availability.

Overall, 78.06% of respondents stated they had access to state data (M = 1.22, SD = 41). Similarly, 78.10% of survey participants stated they had access to periodic data, such as a benchmark or interim assessment data (M = 1.22, SD = .41). Local data (e.g., formative assessments) access was only accessible to 68.40% of respondents (M = 1.32, SD = .46).

However, 94.93% of survey participants stated they had access to personal data, such as teacher-developed assessments (M = 1.05, SD = .22). Further, 93.82% of participants stated they had access to other data, such as behavior and attendance data (M = 1.06, SD = .24). Table 4.2 provides a frequency distribution of the survey participants and the data they had access to.

Table 4.2

Frequency Distribution of Survey Respondents and Data Access

Access to Data	*M*	SD	%
Data			
State Assessment	1.22	.41	78.06
Periodic	1.22	.41	78.10
Local	1.32	.46	68.40
Personal	1.05	.22	94.93
Other	1.06	.24	93.82

Grade Level of Instruction and Data Availability

A Chi-square test was conducted to examine the relationship between grade level of instruction and state data availability. A Chi-square test is appropriate when testing the strength of the relationship between two nominal-level variables. There was not a significant relationship between grade level of instruction and state data availability (χ^2 = 6.42, p = .093). The findings of the Chi-square test of independence are presented in Table 4.3.

Table 4.3

Chi-Square Test of Independence Between Grade Level and State Data Availability

	Grade Level					
Variable	KG	1-5	6-8	9-12	χ^2	*p*
State data availability					6.42	.093
No	7	12	26	16		
Yes	8	59	94	56		

Additionally, a Chi-square test was conducted to examine the relationship between grade level of instruction and periodic availability of data. There was a significant relationship between grade level of instruction and periodic data availability ($\chi^2 = 19.40$, $p = .00$). The findings of the Chi-square test of independence are presented in Table 4.4.

Table 4.4

Chi-Square Test of Independence Between Grade Level and Periodic Data Availability

	Grade Level					
Variable	KG	1-5	6-8	9-12	χ^2	*p*
Periodic data availability					19.40	.00
No	3	26	24	27		
Yes	12	54	106	42		

Three additional Chi-squared tests were conducted to examine the relationship between grade level of instruction and local, personal, and other data. Table 4.5 presents the findings of the Chi-squared test of independence between grade level and local, personal, and other data.

Table 4.5

Chi-Square Test of Independence Between Grade Level and Local, Personal, and Other Data Availability

Variable	χ^2	*p*	*Significance*
Local data availability	3.047	.38	no
Personal data availability	8.780	.03	yes
Other data availability	6.971	.07	no

Subject of Instruction and Data Availability

Next, a Chi-square test was conducted to examine the relationship between the subject of instruction and state data availability. There was not a significant relationship between the subject of instruction and state data availability ($\chi^2 = 7.142$, $p = .308$). The findings of the Chi-square test of independence are presented in Table 4.6.

Table 4.6

Chi-Square Test of Independence Between Subject of Instruction and State Data Availability

	Subject of Instruction								
Variable	Elem	English/ELA	History	Math	Sp.Ed.	Science	Other	χ^2	*p*
								7.142	.308
State data availability									
No	23	4	6	1	8	4	14		
Yes	72	28	14	14	38	17	33		

Finally, a Chi-square test was conducted to examine the relationship between the subject of instruction and the periodic availability of data. There was a significant relationship between the subject of instruction and periodic data availability ($\chi2 = 28.804$, $p = .000$). Likely, three additional Chi-square tests were conducted to examine the relationship between the subject of instruction, local data, personal data, and other data. The findings of the Chi-square tests of independence between-subject of instruction and periodic, local, personal, and other data are presented in Table 4.7.

Table 4.7

Chi-Square Tests of Independence Between Subject of Instruction and Periodic, Local, Personal, and Other Data Availability

Variable	χ^2	*p*	Significant
Periodic data availability	18.804	.000	yes
Local data availability	7.948	.242	no
Personal data availability	15.067	.020	yes
Other data availability	13.755	.032	yes

Summary of Research Question 1

Both descriptive and inferential statistics were used to analyze the data available to first-year teachers. Overall, nearly 95% of K-12 educators who completed the survey have access to personal data, and almost 94% have access to other data, such as attendance and behavior data. The lowest category of data access was local data, with only 69.4% of K-12 teachers having access.

A variety of data were analyzed to determine the strength of the relationship between targeted nominal data points, using Chi-squared inferential statistics. Two different relationships were examined, grade level of instruction and data availability, and the subject of instruction and data availability.

Based on the Chi-square findings, there were a variety of significant relationships. Some of these relationships included grade level of instruction and data availability; in particular, teachers of grades 6-8 had greater access to periodic data compared to other grade levels.

Finally, the subject of instruction and access to data was analyzed. Teachers that were instructors of other areas (e.g., physical education, music, art) had less access to period, personal, and other data compared to other areas of instruction. Although, this finding was not surprising due to the differences in curriculum and measurement of student growth and outcomes compared to core content areas such as English, math, science, and history.

Research Question #2–How Do First-Year Teachers Use Data?

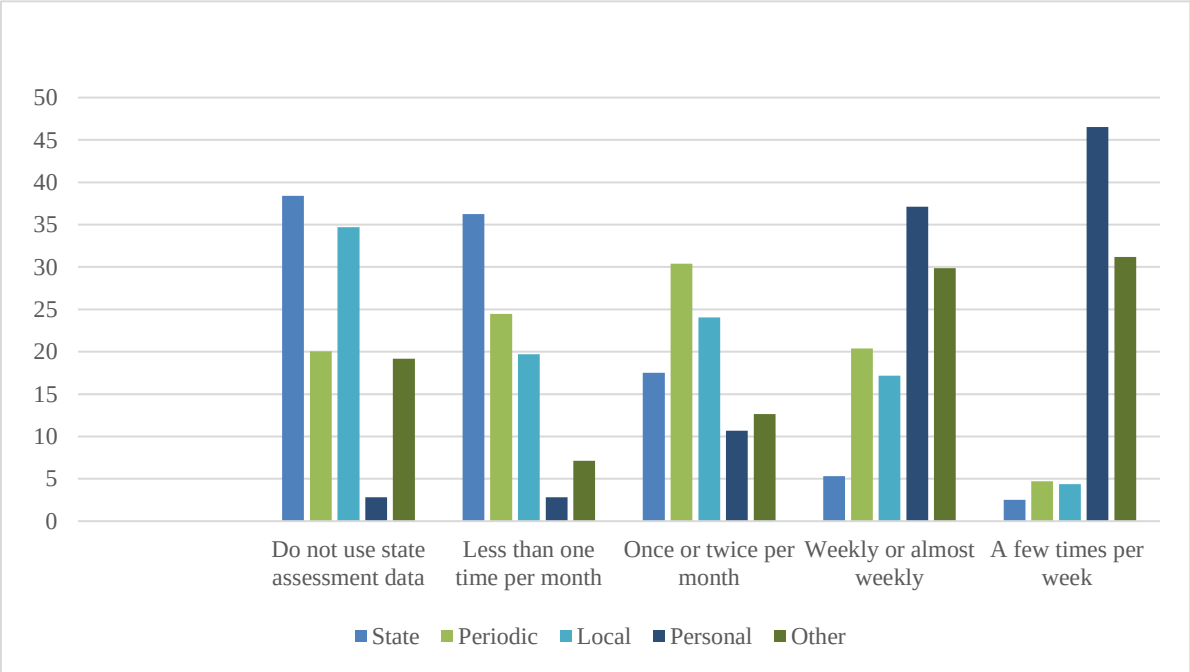
Survey participants were asked a series of questions about how they used different forms of data, including state, periodic, local, personal, and other data. Participants were asked how frequently they used the following types of data: state data, periodic data, local data, personal data, and other data. Then, based on their responses, descriptive statistics were calculated to compare each percentage of the sample.

Frequency of State Assessment Data Use

Overall, 38.4% of participants *do not use state assessment data* (N = 123). While 36.25% of survey respondents stated, they use state assessment data *less than one time per month* (N = 116). Conversely, 46.54% of teachers use personal data weekly. In addition, 31.17% use other data, such as behavior and attendance data weekly. The findings of assessment data use by frequency, and data type are presented in Table 4.8.

Table 4.8

Assessment Data Use as a Percentage of the Sample



The findings of data use represented by mean and standard deviation are presented in Table 4.9.

Table 4.9

Means and Standard Deviation of the Use of Different Data Types

Variable	*M*	*SD*	*n*
State Data	1.97	1.000	320
Periodic Data	2.65	1.150	319
Local Data	2.37	1.240	320
Personal Data	4.22	.095	318
Other Data	3.47	1.470	308

How Teachers Use State Assessment Data

Table 4.10 summarizes descriptive statistics for the eight survey questions that addressed how new teachers use state assessment data to support student outcomes. The combined responses of participants on their use of data resulted in a mean of 1.67 (e.g., a mean of 1.67 per month). The largest rating average (M = 1.89, SD = 1.04) was the use of state assessment data to form small groups of students for targeted instruction. The most modest rating average (M = 1.40, SD = .76) was a discussion of state assessment data with a student.

Table 4.10

How Teachers Use State Assessment Data as a Percentage of the Sample

State Data Use	One or two times per year	A few times per year	Monthly	Weekly	*n*
Use state assessment data to identify instructional content to use in class.	51.25% (82)	27.50% (44)	13.13% (21)	8.13% (13)	160
Use state assessment data to tailor instruction to individual students' needs.	51.25% (82)	22.50% (36)	18.13% (29)	8.13% (13)	160
Use state assessment data to develop recommendations for additional instructional support.	46.25% (74)	29.38% (47)	16.88% (27)	7.50% (12)	160
Use state assessment data to form small groups of students for targeted instruction.	49.69% (79)	22.01% (35)	17.61% (28)	10.69% (17)	159
Discuss state assessment data with a parent or guardian.	67.92% (108)	23.90% (38)	5.66% (9)	2.52% (4)	159
Discuss state assessment data with a student.	73.58% (117)	16.98% (27)	5.66% (9)	3.77% (6)	159
Meet with a specialist (e.g., instructional coach) about state assessment data.	69.23% (108)	19.23% (30)	8.33% (13)	3.21% (5)	156
Meet with another teacher about state assessment data.	56.60% (90)	20.75% (33)	16.35% (26)	6.29% (10)	159

How Teachers Use Periodic Assessment Data

Table 4.11 summarizes descriptive statistics for the eight survey questions that addressed how new teachers use periodic assessment data. The combined responses of participants on their use of periodic assessment data resulted in a mean of 1.75. The largest rating average (M = 2.35, SD = 1.05) was the use of interim or benchmark assessment data to form small groups of students for targeted instruction. The lowest rating average (M = 1.51, SD = .71) was the discussion of interim or benchmark assessment data with parent or guardian.

Table 4.11

How Teachers Use Periodic Assessment Data as a Percentage of the Sample

Periodic Data Use	One or two times per year	A few times per year	Monthly	Weekly	*n*
Use interim or benchmark assessment data to identify instructional content to use in class.	32.05% (50)	35.90% (56)	24.36% (38)	7.69% (12)	156
Use interim or benchmark assessment data to tailor instruction to individual students' needs.	25.64% (40)	33.97% (53)	27.56% (43)	12.82% (20)	156
Use interim or benchmark assessment data to develop recommendations for additional instructional support.	27.56% (43)	32.69% (51)	25.64% (40)	14.10% (22)	156
Use interim or benchmark assessment data to form small groups of students for targeted instruction.	25.64% (40)	32.05% (50)	23.72% (37)	18.59% (29)	156

Table 4.11 (continued)

Periodic Data Use	One or two times per year	A few times per year	Monthly	Weekly	*n*
Discuss interim or benchmark assessment data with parent or guardian.	59.09% (91)	33.12% (51)	5.19% (8)	2.60% (4)	154
Discuss interim or benchmark assessment data with a student.	46.10% (71)	38.31% (57)	12.34% (19)	3.25% (5)	154
Meet with a specialist (e.g., instructional coach) about interim or benchmark assessment data.	56.41% (88)	32.05% (50)	8.33% (13)	3.21% (5)	156
Meet with another teacher about interim or benchmark assessment data.	35.26% (55)	39.10% (61)	21.15% (33)	4.49% (7)	156

How Teachers Use Local Assessment Data

Table 4.12 summarizes descriptive statistics for the eight survey questions that addressed how new teachers use local assessment data. Specifically, the question inquired how often in a typical month was local data (district developed assessments) developed and used in their school or district. The combined responses of participants on their use of local assessment data resulted in a mean of 1.88 (e.g., a mean of 1.88 per month). The largest rating average (M = 2.17, SD = .97) was the use of district developed assessment data to tailor instruction to individual students'

needs. The smallest rating (M = 1.56, SD = .71) was the discussion district developed assessment data with a parent or guardian.

Table 4.12

How Teachers Use Local Assessment Data as a Percentage of the Sample

Local Data Use	One or two times per year	A few times per year	Monthly	Weekly	*n*
Use district developed assessment data to identify instructional content to use in class.	33.08% (44)	39.10% (52)	22.56% (30)	5.26% (7)	133
Use district developed assessment data to tailor instruction to individual students' needs.	30.83% (41)	31.58% (42)	27.82% (37)	9.77% (13)	133
Use district developed assessment data to develop recommendations for additional instructional support.	34.09% (45)	34.85% (46)	20.45% (27)	10.61% (14)	132
Use district developed assessment data to form small groups of students for targeted instruction.	35.11% (46)	33.59% (44)	22.14% (29)	9.16% (12)	131
Discuss district developed assessment data with a parent or guardian.	54.89% (73)	35.34% (47)	8.27% (11)	1.50% (2)	133
Discuss district developed assessment data with a student.	47.73% (63)	35.61% (47)	13.64% (18)	3.03% (4)	132

Table 4.12 (continued)

Local Data Use	One or two times per year	A few times per year	Monthly	Weekly	*n*
Meet with a specialist (e.g., instructional coach) about district developed assessment data.	54.89% (73)	33.08% (44)	10.53% (14)	1.50% (2)	133
Meet with another teacher about district developed assessment data.	42.42% (56)	32.58% (43)	18.18% (24)	6.82% (9)	132

How Teachers Use Personal Assessment Data

Table 4.13 summarizes descriptive statistics for the eight survey questions that addressed how novice teachers use personal assessment data. In particular, the overarching question asks how often in a typical month do they use personal assessment data to support student outcomes. The combined responses of participants on their use of personal assessment data resulted in a mean of 2.80 (e.g., a mean of 2.8 per month). The largest rating average (M = 3.37, SD = .75) was the use of teacher-developed assessment data to tailor instruction to individual students' needs. The smallest rating (M = 1.95, SD = 1.04) was meeting with a specialist (e.g., instructional coach) about teacher-developed assessment data.

Table 4.13

How Teachers Use Personal Assessment Data as a Percentage of the Sample

Personal Data Use	One or two times per year	A few times per year	Monthly	Weekly	*n*
Use teacher developed assessment data to identify instructional content to use in class.	3.74% (7)	9.09% (17)	43.32% (81)	43.85% (82)	187
Use teacher developed assessment data to tailor instruction to individual students' needs.	3.23% (6)	6.99% (13)	39.25% (73)	50.54% (94)	186
Use teacher developed assessment data to develop recommendations for additional instructional support.	4.81% (9)	16.04% (30)	41.71% (78)	37.43% (70)	187
Use teacher developed assessment data to form small groups of students for targeted instruction.	5.35% (10)	17.65% (33)	38.50% (72)	38.50% (72)	187
Discuss teacher developed assessment data with a parent or guardian.	29.19% (54)	32.97% (61)	22.16% (41)	15.68% (29)	185
Discuss teacher developed assessment data with a student.	14.44% (27)	25.67% (48)	32.62% (61)	27.27% (51)	187
Meet with a specialist (e.g., instructional coach) about teacher developed assessment data.	45.16% (84)	25.81% (48)	17.74% (33)	11.29% (21)	186

Table 4.13 (continued)

Personal Data Use	One or two times per year	A few times per year	Monthly	Weekly	*n*
Meet with another teacher about teacher developed assessment data.	18.18% (34)	25.13% (47)	33.69% (63)	22.99% (43)	187

Summary for Research Question 2

Descriptive statistics were used to analyze how first-year teachers use data. Overall, teachers who participated in this survey study used *personal data* more often than other data (M = 4.22, SD = .95). However, the survey participants stated they also used *other data*, such as behavior and attendance data (M = 3.47, SD = 1.47). The survey participants stated they accessed *state data*, such as state assessment results, the least (M = 1.97, SD = 1.00).

Teachers, regardless of the type of data (e.g., state, periodic, local, personal) used data to form small groups of students for targeted instruction monthly and weekly at a higher frequency than other items (M = 2.35). Conversely, discussing assessment data with a parent or guardian was the item that occurred at the lowest frequency (M = 1.69).

Research Question #3–What Are First-Year Teachers' Attitudes Toward Data?

Survey participants were asked a series of questions about their attitude toward various forms of data, including state, periodic, local, personal, and other data. First, participants were asked how useful state, periodic, local, personal, and other data is to their instructional practices. Based on their responses, descriptive statistics, including means and standard deviations, were calculated for each item. Then, using inferential statistics, a series of Chi-square tests were conducted to determine if there was a relationship between the number of assessment or data

courses taken, and attitude towards data. Next, nine survey questions that addressed what first-year teachers' attitude and opinions regarding data were reviewed. As well as four survey questions that ask about teacher attitude towards their personal use of data were analyzed using descriptive statistics, including percentages of the sample for comparison.

Attitudes Toward Various Assessment Data

Table 4.14 summarizes descriptive statistics for the five survey questions that addressed how first-year teachers felt different assessment data were in their practice, including state, periodic, local, personal, and other data sources. Teachers were asked how they rated various assessment data usefulness to student instruction, using a Likert score rating with four choices, *not useful*, *somewhat useful*, *useful*, and very *useful*. Overall, 30.84% of survey respondents stated *other* data as very useful (e.g., behavior and attendance), and an additional 37.34% of respondents stated these data were useful. However, 44.65% of survey participants agreed that state assessment data is not useful.

Table 4.14

How Useful Different Forms of Data Are to Teachers Practice as a Percentage of the Sample

Variable	State (n = 318)	Periodic (n = 318)	Local (n = 313)	Personal (n = 320)	Other (n = 308)
Not Useful	44.65	19.81	26.20	2.19	17.53
Somewhat Useful	41.51	35.85	33.55	6.25	12.29
Useful	12.26	31.13	29.39	26.25	37.34
Very Useful	1.57	13.21	10.86	10.86	30.84

A Chi-square test was conducted to examine the relationship between the number of college assessment or data courses taken and attitude toward state assessment data, using inferential statistics. Survey participants identified the number of assessment courses they completed during their teacher preparation programming (e.g., two or more, one, not sure, or none). A Chi-square test is appropriate when testing the strength of the relationship between two nominal-level variables. There was not a significant difference between the number of college assessment or data courses taken and attitude toward state assessment data ($\chi 2 = 5.024$, $p = .831$). The findings of the Chi-square test are presented in Table 4.15.

Table 4.15

Chi-Square Test of Independence Between The Number of Assessment or Data Courses Completed and Attitude Toward State Assessment Data

	Number of Assessment or Data Courses (n = 317)					
Variable	Two or More	One	Not Sure	None	χ^2	p
Attitude Toward State Assessment Data					5.024	.831
Not Useful	37	38	36	30		
Somewhat Useful	29	29	35	39		
Useful	12	7	9	11		
Very Useful	1	1	1	2		

Similarly, a Chi-square test was conducted to examine the relationship between the number of college assessment or data courses taken and attitude towards periodic, local, personal, and other assessment data. There was not a significant relationship between the

number of college assessment or data courses taken and attitude towards these four different assessment types. Table 4.16 presents the findings of the Chi-square test of independence between the number of assessment or data courses taken, and periodic, local, personal, and other data availability.

Table 4.16

Chi-Square Test of Independence Between The Number of Assessment or Data Courses Taken, and Periodic, Local, Personal, and Other Data Availability

Variable	χ^2	*p*	*Significance*
Periodic data availability	16.043	.066	no
Local data availability	7.549	.580	no
Personal data availability	7.915	.543	no
Other data availability	11.061	.272	no

Teacher Attitudes and Opinions About Data

Descriptive statistics for the nine survey questions that addressed first-year teachers' attitudes and opinions regarding data are summarized in Table 4.17. Using a Likert score rating with four choices—*strongly disagree*, *disagree*, *agree,* and *strongly agree*—teachers were asked to rate their attitude and opinions about data use. The combined responses of participants on their attitude and opinions on data resulted in a mean of 3.17. The largest rating average (M = 3.27, SD = .69) was, *Students benefit when teacher instruction is informed by data*. Further, based on the survey participants, 38.35% strongly agreed that *Students benefit when teacher instruction is informed by data.* In addition, 53.4% of respondents agreed with this statement.

The smallest rating average (*M* = 3.01, *SD* = .76) was *I like to use data*, in which 19.51% of respondents disagreed or strongly disagreed with this statement.

Table 4.17

Teacher Attitude and Opinions About Data as a Percentage of the Sample

Variable	Strongly disagree	Disagree	Agree	Strongly agree	*n*
Data helps teachers plan instruction.	2.43% (5)	5.83% (12)	54.85% (113)	36.89% (76)	206
Data offer information about students that was not already known.	3.41% (7)	12.20% (25)	61.46% (126)	22.93% (47)	205
Data help teachers know what concepts students are learning.	2.44% (5)	7.80% (16)	60.98% (125)	28.78% (59)	205
Data help teachers identify learning goals for students.	2.91% (6)	3.88% (8)	61.17% (126)	32.04% (66)	206
Students benefit when teacher instruction is informed by data.	2.91% (6)	5.34% (11)	53.40% (110)	38.35% (79)	206
I think it is important to use data to inform education practice.	2.44% (5)	5.37% (11)	55.61% (114)	36.59% (75)	205
I like to use data.	4.39% (9)	15.12% (31)	55.12% (113)	25.37% (52)	205
I find data useful.	3.40% (7)	5.34% (11)	61.17% (126)	30.10% (62)	206
Using data helps me be a better teacher.	3.40% (7)	10.19% (21)	54.85% (113)	31.55% (65)	206

Teacher Attitudes Toward Their Own Use of Data

Four survey questions that ask about teacher attitude towards their personal use of data using descriptive statistics are summarized in Table 4.18. Using a Likert score rating with four choices—*strongly disagree*, *disagree*, *agree*, and *strongly agree*—teachers were asked to rate their attitude about their personal data use. The highest rating average (M = 4.01, SD = 1.00) was *I am good at using data to set student learning goals.* The lowest rating (M = 3.92, SD = .99) was, *I am good at using data to plan lessons which* 30.58% of respondents disagreed or strongly disagreed. While the combined responses of participants on their attitude on data use resulted in a mean of 3.96.

Table 4.18

Teacher Attitude Toward Their Own Data Use as a Percentage of the Sample

Variable	Strongly disagree	Disagree	Agree	Strongly agree	*n*
I am good at using data to diagnose student learning needs.	4.85% (10)	23.30% (48)	57.77% (119)	14.08% (29)	206
I am good at adjusting instruction based on data.	5.34% (11)	18.93% (39)	62.62% (129)	13.11% (27)	206
I am good at using data to plan lessons.	4.37% (9)	26.21% (54)	55.83% (115)	13.59% (28)	206
I am good at using data to set student learning goals.	4.37% (9)	21.36% (44)	58.74% (121)	15.53% (32)	206

Summary for Research Question 3

Both descriptive and inferential statistics were used to analyze the attitude of first-year teachers. Based on the participants' responses, 44.65% of new teachers stated that state

assessment data is not useful. Further, 68.18% of survey respondents stated *other* data useful or very useful (e.g., behavior and attendance), which was higher than any other data type. In addition, based on the survey participants' responses, 91.75% agreed or strongly agreed that *Students benefit when teacher instruction is informed by data.* However, 30.58% of teachers disagreed or strongly disagreed with the statement, *I am good at using data to plan lessons*. Thus, although many teachers understand the *benefit of informing student instruction with data*, three-tenths of new educators who completed *the Teacher Data Usage Survey* did not fee*l good* at using data to plan their lessons.

Further, using inferential statistics, a Chi-squared test was implemented to identify if there was a significant relationship between two nominal variables, the number of college assessment or data courses taken and attitude toward each of the five assessment types: state, periodic, local, personal, and other. Based on the responses of the survey participants, the number of assessment or data courses they completed during their teacher preparation program did not impact their attitude toward the usefulness of data.

Research Questions #4–How Do First-Year Teachers Feel They Receive Support with Data Use?

The next series of questions focused on understanding how new teachers receive support with data. Survey participants were asked a series of questions within four domains: how first-year teachers feel supported with data use generally, principal support, technology access and training, and collaboration opportunities. Based on the responses, descriptive statistics, including means and standard deviations, were calculated for each item, as well as a percentage of the sample.

Teacher Support With Data

Table 4.19 summarizes descriptive statistics for the six survey questions that addressed how first-year teachers felt supported with data use. Using a Likert score rating with four choices—*strongly disagree*, *disagree*, *agree*, and *strongly agree*—teachers were asked to rate how they felt supported by their school or district. Overall, teachers felt there was someone at their school who answered their questions about data, with 52.60% of respondents agreeing and 22.54% strongly agreeing with this question. Further, 74.43% of respondents either agreed or strongly agreed that they were adequately prepared to use data. Similarly, 70.52% of respondents agreed or strongly agreed that they were adequately supported in the effective use of data. The lowest two ratings were: *My district provides enough professional development about data use* with 54.34% of respondents agreeing or strongly agreeing, and *My district's professional development is useful for learning about data use*, with only 48% of respondents agreeing or strongly agreeing.

Table 4.18

Teacher Support With Data as a Percentage of the Sample

Variable	Strongly disagree	Disagree	Agree	Strongly agree	*n*
I am adequately supported in the effective use of data.	6.36% (11)	23.12% (40)	53.76% (93)	16.76% (29)	173
I am adequately prepared to use data.	5.11% (9)	20.45% (36)	55.68% (98)	18.75% (33)	176
There is someone who helps me change my practice (e.g., my teaching) based on data.	11.43% (20)	32.00% (56)	42.86% (75)	13.71% (24)	175

Table 4.19 (continued)

Variable	Strongly disagree	Disagree	Agree	Strongly agree	*n*
There is someone who answers my questions about using data.	5.78% (10)	19.08% (33)	52.60% (91)	22.54% (39)	173
My district provides enough professional development about data use.	9.25% (16)	36.42% (63)	39.31% (68)	15.03% (26)	173
My district's professional development is useful for learning about data use.	9.71% (17)	38.29% (67)	39.43% (69)	12.57% (22)	175

Principal Support With Data

Next, Table 4.20 summarizes descriptive statistics for the six survey questions that addressed how first-year teachers identified they were supported by principals and data use, using a Likert score rating with four choices—*strongly disagree, disagree, agree*, and *strongly agree*—. The highest rating average (*M* = 3.20, *SD* = .81) was, M*y principal or assistance principal(s) encourage data use as a tool to support effective teaching*. The lowest rating average (*M* = 2.50, *SD* = .84) was, *My principal or assistant principal(s) has made sure teachers have plenty of training for data use*, and (*M* = 2.50, *SD* = .86), *My principal or assistant principal(s) creates protected time for using data*. The combined responses of participants on principal support in data use resulted in a mean of 2.82.

Table 4.19

Principal Support With Data as a Percentage of the Sample

Variable	Strongly disagree	Disagree	Agree	Strongly agree	*n*	*M*	*SD*
My principal or assistance principal(s) encourage data use as a tool to support effective teaching.	6.34% (13)	5.85% (12)	49.76% (102)	38.05% (78)	205	3.2	.81
My principal or assistant principal(s) creates many opportunities for teachers to use data.	4.37% (9)	22.82% (47)	47.57% (98)	25.24% (52)	206	2.94	.81
My principal or assistant principal(s) has made sure teachers have plenty of training for data use.	9.71% (20)	44.17% (91)	33.01% (68)	13.11% (27)	206	2.5	.84
My principal or assistance principal(s) is a good example of an effective data user.	4.39 (9)	21.46% (44)	48.78% (100)	25.37% (52)	205	2.94	.80
My principal or assistance principal(s) discusses data with me.	6.83% (14)	23.41% (48)	50.24% (103)	19.51% (40)	205	2.82	.82
My principal or assistant principal(s) creates protected time for using data.	10.68% (22)	41.75% (86)	33.98% (70)	13.59% (28)	206	2.5	.86

Technology Support and Access With Data

Descriptive statistics were used for the five survey questions regarding access to technology to support data use, as summarized in Table 4.21. Survey participants were asked if first-year teachers had access to programs, systems, and other technology to help them access and use student data. A Likert score rating with four choices—*strongly disagree*, *disagree*, *agree*, and *strongly agree*—was used; the combined responses of participants regarding access to programs, systems, and other technology to help them access and use student data resulted in a mean of 2.83. The highest rating average (M = 3.00, SD = .75) was, *I have the proper technology to efficiently examine data*. The lowest rating average (M = 2.74, SD = .78) was, *The computer systems (for data use) in my district are easy to use.*

Table 4.20

Technology Access and Support With Data as a Percentage of the Sample

Variable	Strongly disagree	Disagree	Agree	Strongly agree	*n*	*M*	*SD*
I have the proper technology to efficiently examine data.	4.39% (9)	15.12% (31)	57.07% (117)	23.41% (48)	205	3.0	.75
The computer systems in my district provide me access to lots of data.	4.85% (10)	20.87% (43)	54.37% (112)	19.90% (41)	206	2.89	.77
The computer systems (for data use) in my district are easy to use.	6.31% (13)	27.67% (57)	51.46% (106)	14.56% (30)	206	2.74	.78
The computer systems in my district all me to examine various types of data at once (e.g., attendance, achievement, demographics).	6.80% (14)	27.67% (57)	49.03% (101)	16.50% (34)	206	2.75	.81
The computer systems in my district generate displays (e.g., reports, graphs, tables) that are useful to me.	4.41% (9)	31.37% (64)	47.06% (96)	17.16% (35)	204	2.77	.78

Collaboration and Data Use

Overall, 83.65% of survey participants stated they had collaboration time for data discussions at their school or district (M = 1.16, SD = .37). Using a Likert score rating with four choices—*less than once a month, once or twice a month, weekly or almost weekly*, and *a few times a week*—participants were asked, *How often do you have scheduled meetings to work in collaborative team(s)?* Forty-six percent of respondents stated they had collaboration time *weekly or almost weekly*. Further, nearly 20% of participants stated that they had collaboration time *a few times a week*. Next, 26.26% of respondents stated they had collaboration time *once or twice a month*. Finally, 7.56% of survey participants stated that they had collaboration time, *less than once a month*.

Table 4.22 summarizes descriptive statistics for the five survey questions regarding collaboration time to support data use. The combined responses of participants regarding collaboration time resulted in a mean of 4.53. The highest rating average (M = 4.59, SD = 1.11) was, *Members of my team trust each other*, and (M = 4.59, SD = 1.08) *Members of my team respect those colleagues who are experts in their craft*. The lowest rating average (M = 4.44, SD = 1.04) was, *Members of my team respect colleagues who lead school improvement efforts*.

Table 4.21

Collaboration and Data Use as a Percentage of the Sample

Variable	Strongly disagree	Disagree	Agree	Strongly agree	*n*	*M*	*SD*
Members of my team trust each other.	2.91% (5)	5.81% (10)	55.81% (96)	35.47% (61)	172	4.59	1.11
It's ok to discuss feelings and worries with other members of my team.	2.33% (4)	8.72% (15)	54.07% (93)	34.88% (60)	172	4.56	1.12
Members of my team respect colleagues who lead school improvement efforts.	0.58% (1)	11.63% (20)	59.30% (102)	28.49% (49)	172	4.44	1.04
Members of my team respect those colleagues who are experts in their craft.	2.33% (4)	5.81% (10)	56.98% (98)	34.88% (60)	172	4.59	1.09
My principal or assistance principal(s) fosters a trusting environment for discussing data in teams.	4.07% (7)	9.88% (17)	52.91% (91)	33.14% (57)	172	4.48	1.16

Collaboration Time and Data Practices

Finally, Table 4.23 summarizes descriptive statistics for the 10-survey questions regarding how collaboration time was used to support data practices. Using a Likert score rating with four choices—*never, sometimes, often,* and *always*—survey participants were asked their

opinion on how they used their collaboration time to review data. The highest rating average (*M* = 2.67, *SD* = .87) was, *We draw conclusions based on data*. While the lowest rating average (*M* = 2.33, *SD* = .87) was, *We identify questions that we will seek to answer using data.* Overall, the combined responses of participants regarding collaboration time and data review resulted in a mean of 2.518.

Table 4.22

Collaboration Time and Data Practices as a Percentage of the Sample

Variable	Never	Sometimes	Often	Always	*n*	*M*	*SD*
We approach an issue by looking at data.	8.72% (15)	50.00% (86)	25.58% (44)	15.70% (27)	172	2.48	.86
We discuss our preconceived beliefs about an issue.	8.72% (15)	44.77% (77)	35.47% (61)	11.05% (19)	172	2.49	.80
We identify questions that we will seek to answer using data.	15.20% (26)	47.37% (81)	26.32% (45)	11.11% (19)	171	2.33	.87
We explore data by looking for patterns and trends.	13.95% (24)	36.05% (62)	35.47% (61)	14.53% (25)	172	2.51	.91
We draw conclusions based on data.	8.19% (14)	35.67% (61)	37.43% (64)	18.71% (32)	171	2.67	.87
We identify additional data to offer a clearer picture of the issue.	14.53% (25)	46.51% (80)	23.26% (40)	15.70% (27)	172	2.40	.92

Table 4.23 (continued)

Variable	Never	Sometimes	Often	Always	*n*	*M*	*SD*
We use data to make links between instruction and student outcomes.	8.72% (15)	36.63% (63)	37.21% (64)	17.44% (30)	172	2.63	.87
When we consider changes in practice, we predict possible student outcomes.	8.77% (15)	40.35% (69)	32.75% (56)	18.13% (31)	171	2.60	.88
We revisit predictions made in previous meetings.	14.53% (25)	39.53% (68)	31.40% (54)	14.53% (25)	172	2.46	.91

Summary of Research Question 4

While teachers (75.14%), who completed the *Teacher Data Use Survey,* chose agreed or strongly agreed, that they *feel there is someone at their school who answers their questions about data*. While 54.34% agreed or strongly agreed that their *district provides enough professional development about data use.* Only 48% of respondents agreed or strongly agreed that their district's *professional development is useful for learning about data use*.

Principal support was analyzed. Based on the survey participants' responses, 87.81% stated they agreed or strongly agreed that *My principal or assistance principal(s) encourage data use as a tool to support effective teaching*. However, only 46.12% of participants agreed or strongly agreed that *My principal or assistant principal(s) has made sure teachers have plenty of training for data use. W*hile only 47.57% of respondents agreed or strongly agreed that *My principal or assistant principal(s) creates protected time for using data.* Additionally, 30.24% of

respondents disagreed or strongly disagreed that *My principal or assistance principal(s) discusses data with me.*

Based on the survey, participants' responses regarding access to technology for student data, 80.48% stated they agreed or strongly agreed that *I have the proper technology to efficiently examine data*. However, nearly 34% of respondents disagreed or strongly disagreed that *The computer systems (for data use) in my district are easy to use.*

Overall, new teachers trust their collaborative teams; 91.28% of survey participants agreed or strongly agreed with this statement. During the collaboration meeting time, 18.71% of the participants felt they always *draw conclusions based on data.* Although 8.19% of respondents stated, they never used data to draw conclusions. Further, 11.11% of participants stated they always *identify questions that we will seek to answer using data,* and 15.2% of respondents reported they never *identify questions that we will seek to answer using data* (see Table 4.23).

CHAPTER 5

CONCLUSION

This final chapter contains the conclusions from the study about the findings and the resulting recommendations. This chapter is composed of five sections; the first four sections provide a conclusion and recommendations for each of the four research questions. The final section offers the opportunity to share recommendations for future studies and make final comments.

Findings From the Study

Research Question #1–What Data Do First-Year Teachers Have Access To In Indiana Schools?

"Education historically has produced a plethora of data, but these data have typically been stored in ways rendering them inaccessible to most practitioners" (Wayman & Stingfield, 2006, p. 552). As such, to answer the first research question, what data do first-year teachers have access to in Indiana schools; the data from the Teacher Usage Survey was analyzed for the following data sources

- State data–Indiana State Assessment Data (e.g., ILEARN, IREAD, ISTEP+);
- Periodic data–benchmark or interim assessment data (e.g., NWEA, MAP, IReady, Scantron, STAR360);
- Local data–District-developed assessments (e.g., Formative Assessments);
- Personal data–Teacher-developed assessments, homework, class projects; and
- Other–Behavior, attendance, or other data.

Prior to looking at how teachers analyze and use data to support student outcomes, it first must be understood what data new teachers have access to in Indiana schools. Both descriptive and inferential statistics were used to analyze the data available to first-year teachers.

Based on the quantitative data collected, new teachers had access to personal data, such as teacher-developed assessments at a higher frequency than the other data types (94.93%). This data correlates with previous research, as discussed in Mandinach et al., (2008) findings, teachers prefer utilizing personal data, such as homework assignments, in-class tests, and classroom performance to inform their decisions about student learning and outcomes. In addition, 93.82% of participants stated they had access to other data, such as behavior and attendance data. Interestingly, both of these data types are typically not normed and may be prone to a higher level of subjectivity.

Further, based on the data from the Teacher Usage Survey, no differences were found between the access to periodic data, such as benchmark assessments and state assessment data. In both cases, approximately 78% of participates had access to these data types. This study's findings are similar to previous research; teachers are wary of using data from high stakes assessment data, such as state assessment to determine their students' needs (Mandinach et al., 2008).

Meanwhile, Indiana is a local control state, while SEA's and LEA's must use data to monitor and improve student outcomes, based on current policies, what data is shared with educators is left to the school district and building leadership (McDonald et al., 2007). Based on this study, over 20% of new teachers who participated in this survey in Indiana do not have access to the data from the assessments mandated, such as ILEARN, for state accountability purposes. Interestingly, national data trends have exhibited minimal academic growth across

American students, including stagnate growth in Indiana (National Association of Educational Progress [NAEP], 2017; ESSA, 2016).

A Chi-square test was used to examine if a relationship exists between two different variables, to examine this area further. There was a significant relationship between grade level of instruction and periodic data availability ($\chi 2 = 19.40$, $p = .00$), which would include benchmark and interim assessments. In particular, teachers that provide instruction in grades KG, 1-5, or 6-8 had greater access to periodic data than high school teachers (see Table 4.4). This finding is substantiated in current research and literature, that elementary and middle school teachers have access to and use data to support student outcomes at a higher level when compared to high school teachers (Reeves et al., 2017).

Research Question #2–How Do First-Year Teachers Use Data?

Using data to drive instructional changes continues to be a conversation topic in education. Teachers' data use to "problematize practice, and knowledge becomes dynamic, an ongoing negotiation of learning goals, student understandings, and implications on practice" (Slavit, Nelson, & Deuel, 2016, p. 9). Although this may be true, teacher data use studies at this time, have been limited and have only examined a small number of data use practices (Reeves et al., 2016). Further, no studies targeting first-year teacher data use and none, specific to Indiana, were located by the research before this study's implementation. However, literature does shed some light on data use practices that occur with educators with less frequency or regularity such as, using data to identify reasons for student performance, identifying promising instructional practices, and inform specific instructional changes (Nelson, Slavit, & Deuel, 2012, Slavit et al., 2016).

This study validates many previous studies' findings and adds to the current research. Namely, new teachers in Indiana are mainly using data to tailor instruction to individual students' needs, identifying instructional content to use in class, develop recommendations for additional instructional support, and form small groups of students for targeted instruction for remediation and re-teaching. Similarly, few teachers are using data to support all student growth through conceptual understanding or disaggregated subgroup data. Previous research suggests that teachers often examine individual patterns and think on a per-pupil basis, rather than analyzing data at different levels of aggregation or classroom-wide patterns (Mandinach et al., 2008). As a result of using personal data at a higher rate than other data types, new teacher decision making may lack systematicity, from student to class, to year over year growth, due to personal bias, variation, and reliability of the data collected.

Survey participants were asked eight questions on how they use the following data types: state, periodic, local, and personal data, to garnish a foundational understanding of how first-year Indiana educators use data. Overall, survey participants use personal data more often than other data ($M = 4.22$, $SD = .95$). For instance, 43.85% of respondents selected they use personal assessment data to identify instructional content to use in class weekly. Consistent with this study, Farley-Ripple and Buttram (2014) and Cosner (2011) found the most common data use practices were setting curricular or instructional priorities. Correspondingly, Cosner (2011) also found teachers first focus on using data to identify instructional objectives, then evolve to groups of students, and eventually evaluate instructional effectiveness.

Moreover, as determined by this study, teachers use personal data weekly or monthly over other data types. Specifically, it was determined that personal data were used to tailor instruction to individual students' needs (89.79%), to identify instructional content to use in class

(87.17%), to develop recommendations for additional instructional support (79.14%), and to form small groups of students for targeted instruction (77.00%). These findings are similar to Reeves et al., 2016 study,

> which identified that most frequently, data were used to determine students' level of achievement after instruction; identify next steps for instruction (e.g., move on and/or re-teach); identify patterns in student thinking (e.g. errors and/or misconceptions); evaluate the effectiveness of one's instruction (e.g., lessons and/or units); and modify instruction or lesson plans for current students (e.g., activities, representations, and/or materials).

Comparatively, 78.1% of teachers in this study use interim or benchmark assessment data to form small groups of students for targeted instruction ($M = 2.35$, $SD = 1.05$) at a higher level than the other areas addressed, such as use interim or benchmark assessment data to develop recommendations for additional instructional support. These findings are similar to previous research that substantiated the use of benchmark assessment data in the current accountability landscape is predominant in teachers' work with data (Datnow and Hubbard, 2015).

Interestingly, the lowest area of periodic data use ($M = 1.51$, $SD = .71$) was the discussion of interim or benchmark assessment data with parent or guardian. Data were used less frequently to communicate student performance to parents, as found in 2016, Reeves et al., teacher data use study.

In general, data use practices seen in this study were consistent with previous research. Primarily, first-year Indiana educators use data to set curricular and instructional practices, recommend additional student supports, and to form small groups of instruction. Personal teacher data were used by nearly 95% of survey participants, while state assessment data were only used by 78% of participants. Regardless of data type, state, periodic, local, personal, or other, the use

of data in parent discussion was the lowest-rated area by survey participants. In this case, only 1.50% of respondents agreed that they use local data to discuss district developed assessment data with a parent or guardian weekly.

Research Question #3–What Are First-Year Teachers' Attitudes Toward Data?

Teacher data beliefs have been found in previous studies to constrain or facilitate data use practices (Reeves et al., 2016). For example, in Kerr et al.'s (2006) study of data use across three different districts, found teacher beliefs impacted data use. Teachers that found value and validity in a specific data type, such as personal data, use that data type at a higher frequency than data viewed as invalid or lacked importance. Likewise, if no one cares about a specific topic, then there will be no impact (Parke, 2012).

Previous research has suggested that teachers' beliefs are essential predictors of teaching practices, including data-driven methods (Hoy& Spero, 2005). As such, both descriptive and inferential statistics were used to analyze teacher attitudes towards data use. Overall, survey respondents found *other* data (e.g., behavior and attendance) was most useful, with 68.18% of survey participants identifying *other* data as useful or very useful. Conversely, 44.65% of respondents state that state assessment data as not useful. Thus, in this study, teacher attitude towards the use of different data types aligns with the information obtained from the first two research questions of this study.

Teacher beliefs vary; however, teacher self-efficacy beliefs have the ability to impact one's ability to do something, such as access, analyzed, and use data to support student instruction outcomes (Datnow & Hubbard, 2015). Research by Hoy and Spero (2005) found that teacher self-efficacy is related to teaching practices and student achievement. Thus, successful data use by teachers requires a level of self-efficacy in analyzing and interpreting data and

anxiety or self-belief that one is not good at using data to plan lessons can impede them (Dunn et al., 2013). The findings of the frequency of Teacher Attitude Toward Their Own Data Use are presented in Table 4.22.

Research Questions #4–How Do First-Year Teachers Feel They Receive Support With Data Use?

There have been various studies and literature that analyze the effect of individual and organizational level factors associated with teacher data use, including factors such as how teachers feel supported through principal leadership, collaboration, and data infrastructures (Reeves et al., 2016). Thus, to gather information about how first-year Indiana teachers feel they receive support with data use, a series of questions were asked, including

- how first-year teachers feel supported with data use generally,
- principal support,
- technology access and training, and
- collaboration opportunities to discuss student data.

Descriptive statistics were calculated to garnish a greater understanding of how teachers felt supported with data use.

Teacher support with data. First, survey participants were given six survey questions that addressed how first-year teachers feel supported with data use. Overall, 75.14% agree or strongly agree that they *have someone at their school who answers their questions about data*. Similarly, 74.43% of respondents agree or strongly agree that they *are adequately prepared to use data*. Thus, the majority of teachers feel that they are prepared to use data and have someone to ask questions. However, they do not feel adequately supported by current professional development opportunities.

Only 54.34% of respondents agree or strongly agree that *My district's professional development is useful*. Even more so, less than 48% of respondents agree or strongly agree that their *district's professional development is useful for learning about data use*. These findings are consistent with Datnow and Hubbard's (2015) study based on a national study that 43% of teachers surveyed "received some training on how to analyze data from state and benchmark assessments, though they did not find it adequate" (p. 16). Many other studies validated this and found that many teachers have limited professional development opportunities to support their understanding of data or how to plan instruction based on data (Wayman et al., 2017; Mandinach and Gummer, 2013; Kerr et al., 2006). Access to training and the quality of training to support data use to improve student outcomes are both areas needing further research.

The findings of the frequency of *Teacher Support With Data* are presented in Table 4.23.

Principal support. There is a large body of research that identifies the role of leadership in supporting teacher data use, namely principals (Reeves et al., 2016; Kerr et al., 2006; Farley-Ripple & Buttram, 2014: Wayman et al., 2016, 2017). Both the allocation and coordination of resources must be in place to create a positive culture, including principal actions to support or constrain collaboration time and data use (Cosner, 2011; Datnow et al., 2007; Hamilton et al., 2009; Wayman, 2016).

Thus, survey participants were given six survey questions that addressed how first-year teachers feel they are supported by principals and data use. Specifically, rating how their principal and assistance principal(s) support them in using data with a Likert score rating with four choices, strongly disagree, disagree, agree, and strongly agree. Based on the responses, teachers selected *My principal or assistant principal(s) encourage data use as a tool to support effective teaching* as the most substantial-rated area (M = 3.20, SD = .81) with 87.81% agreeing

or strongly agreeing. Further, 74.14% of respondents agree or strongly agree that *My principal or assistance principal(s) is a good example of an effective data user*.

While the teachers that completed this survey indicated that their principal encourages data use as a tool and serves as a good example; only 47.57% of respondents agree or strongly agree *My principal or assistant principal(s) creates protected time for using data*. Thus, while principals referenced in this study may support data use and serve as an example, by not allowing protected time to work with data, may have a direct effect on teacher data use and collaboration. Leadership decisions on when and how often, and what data is made available, can directly impact the implementation of any initiative, including data use (Conser, 2011). The findings of the frequency of *Principal Support With Data* are presented in Table 4.24.

Technology access and training. "The current emphasis on data use requires that schools integrate data delivery technology in order to make the best use of data for educational improvement, particularly when teachers are involved" (Wayman & Stingfield, 2006, p. 552). As such, participants were then asked five survey questions regarding access to technology to support data use. Using a Likert score rating with four choices, strongly disagree, disagree, agree, and strongly agree, first-year teachers were asked what programs, systems, and other technology they had access to assist them access and use student data. Overall, 80.48% of respondents agree or strongly agree that *I have the proper technology to efficiently examine data*. Similarly, 74.27% of participants agree or strongly agree that *The computer systems in my district provide me access to lots of data*.

However, only 64.22% of new teachers agree or strongly agree that *The computer systems in my district generate displays (e.g., reports, graphs, tables) that are useful to me*. Similarly, only 66.02% of respondents agree or strongly agree, *The computer systems (for data*

use) in my district are easy to use. Thus, while survey participants agree that their *districts have technology systems that provide access to a variety of data*, over 34% of respondents do not *feel that the data systems display data in a way that is useful or easy to use*. This finding is similar to the current literature on technological data infrastructures available in schools. As identified by Wayman and Stingfield (2006), data access issues have historically hampered teacher data use.

This study found no difference; schools often produce a plethora of data. However, the data has been stored in a way that is seemingly too incomprehensible to access and comprehend, or completely inaccessible. The findings of the frequency of *Technology Access and Support With Data* are presented in Table 4.21.

Collaboration. Research on collaboration and data use suggests that collaboration can be a lever to implementing data practices to make instructional improvements. However, research also suggests several contextual factors such as the need for a variety of resources, a culture of continuous improvement, and supportive leadership, which must be present in tandem with collaboration to achieve positive outcomes (Mandinach et al., 2013, 2016).

To understand current exposure to collaboration practices, participants completed two sections of questions regarding collaboration opportunities. First, five survey questions were posed regarding collaboration time to support data use. Similar to the other questions regarding how teachers feel supported a Likert score rating with four choices, less than once a month, once or twice a month, weekly or almost weekly, and a few times a week, was implemented. Then, ten survey questions were asked regarding how collaboration time was used to support data practices. Using a Likert score rating with four choices, never, sometimes, often, and always, survey participants were asked their opinion on how they use their collaborative time to review data.

Collaboration and data use. Research has noted that structured time is critical for successful collaboration (Datnow et al., 2007; Kerr et al., 2006; Supovitz & Taylor, 2003; Wayman et al., 2016, 2017). Yet, based this the responses from this survey, consistent meeting times were only identified in 46% of the participants. To begin, 83.65% of survey participants stated (N = 172), they *have collaborative time for data discussions at their school or district* (M = 1,16, SD = .37). Of those respondents, 46% have collaborative time weekly or almost weekly, while 20% of participants stated that they had collaboration time a few times a week. The remaining 34% attend at a much less frequent schedule.

Additionally, current research regarding collaboration highlights there is an essential need for trust, focus on student learning, shared values, and reflective dialog to establish a productive collaboration culture (Wayman et al., 2016, 2017). Overall, 91.28% of survey respondents agree or strongly agree that *Members of my team trust each other*. Next, 91.86% agree or strongly agree that *Members of my team respect those colleagues who are experts in their craft*. Further, 88.95% agree or strongly agree that *It's ok to discuss feelings and worries with other members of my team.* Similarly, 87.79% agree or strongly agree that *Members of my team respect colleagues who lead school improvement efforts*. Finally, 86.05% of respondents agree or strongly agree that *My principal or assistance principal(s) fosters a trusting environment for discussing data in teams*.

Thus, based on the survey participants that have collaboration opportunities in their current school environment, the majority feel positive towards their team members, trust each other, and respect the leaders of the improvement efforts. However, while team trust is essential to open collaboration, other areas that have shown positive growth is timely access to data, evidence of student learning, guides or tools for collaborative activities, and ongoing

professional development (Kerr et al., 2006; Wayman et al., 2016, 2017; Cosner, 2011, Datnow et al., 2007). The findings of the frequency of Collaboration and Data Use are presented in Table 4.30.

Collaboration and data practices. As published in a U.S. Department of Education study in 2011, "Working in groups may afford teachers the advantages of clarifying and framing problems and correcting data interpretation errors with help from colleagues." Besides, recent evidence has suggested collaborative teams have potentially positive effects on in-service teacher beliefs and practices (Reeves, Summers & Grove, 2016; Wayman et al., 2016, 2017). Although current research has indicated the positive effects on student outcomes based on data analysis, only 18.71% of survey participants stated they are drawing conclusions based on student data. Similarly, only 18.13% of respondents indicated they always *consider changes in practice, we predict possible student outcomes*, and an additional 32.75% often apply this practice.

Unlike how similarly individuals feel about their collaboration team regarding honesty and trust, how collaboration teams use data during collaboration time varies wildly. For example, 14.53% of respondents never revisit predictions made in previous meetings, while another 14.53% of respondents always revisit predictions made in previous meetings. See Table 4.23, Collaboration Time and Data Practices descriptive statistics.

Recommendations

Recommendations for District Administrators

Access to data. Based on the findings of this study, as well as a study conducted by the American Research Institute in 2012, lack of timeliness and accessibility of data is a common barrier that can impede student outcomes (Faria et al., 2012; Wise, 2019). Yet, data use and analysis are at the forefront of most district-level efforts. Through state and federal

accountability requirements, district leaders are expected to monitor the effectiveness of their district-level plans based on student performance on assessments, including periodic and state-level performance (Greensburg & Walsh, 2012; Horsford et al., 2010). Through the systemic and ongoing monitoring of periodic student assessment performance, school leaders and teachers may be able to identify students that are not performing as anticipated at that time of the year and plan targeted and responsive actions prior to the student being assessed on state assessments. The need to evaluate this continuous improvement cycle may be critical in growing overall student performance, as well as individual student growth.

However, for assessment data to be useful for instructional planning, the data needs to be distributed to the knowledgeable decision-makers, including teachers (Mandinach, E. B., Honey, M., & Light, D., 2006). One way to ensure the appropriate stakeholders have access to data in a timely and efficient manner is through a data warehouse system (Mandinach & Gummer, 2016). Thus, district administrators may consider analyzing their data system for the usefulness of information and ease of access from multiple vantage points, including educators and parents, if accessible. More so, to ensure all stakeholder needs are attended to, a district data system advisory committee could be established in determining the district's requirements and selecting a data system to meet all users' needs, as identified by the National Center of Elementary School Principals (2011). The system selected may allow teachers to disaggregate data by teacher, classroom, content area, or assignment type. Through the use and access to an online data warehouse, besides providing immediate access to both periodic and state assessment data, information can be presented in a way to tie student performance to broader district goals and provide analysis tools to educators across the district.

Further, without understanding how to operationalize and use data, access to data is unlikely to influence teachers' practices or students' learning (Tsai & Tosh, 2019). Thus, on-going, targeted professional development is suggested to help ensure district and school goals can be met. Through targeted district-wide professional development, staff will be able to become familiar with the use of the district data system and establish a systemic data culture community. Further, the district can then monitor a school's progress in executing data and support each school's professional development needs to use data effectively and consistently to meet overarching district goals. However, the first step is to ensure the district has an accessible and guaranteed way to provide district stakeholder relevant and immediate access to student data to drive healthy outcomes.

Data for long term planning. Based on research conducted by the Education Development Center for Children and Technology, their study identified that school administrators use test data to understand patterns of strengths and weaknesses for an individual class, grade, and building-wide performance (Mandinach et al., 2006). Further, these schools and districts may then be able to allocate better resources, including staff professional development and student supports, such as remediation programs. However, the same researchers found that unlike district administration, educators prefer to use different sources of data such as homework, tests, and classroom performance data, over high-stakes tests to determine student needs. Stating, teachers use data to identify individual student needs rather than identify patterns for a class or schoolwide needs. "As a result, teachers' decision-making strategies often lack systematicity, from student-to-student, class-to-class, and year-to-year, are unintentionally tinged with personal bias, and ignore key statistical concepts like distribution, variation, and reliability" (Mandinach, E. B., Honey, M., & Light, D., 2006, p. 2).

Many teachers do not examine data in a way to meet the long-term trajectories defined in many district and state plans. Thus, due to the different perceptions of data use between teachers and administrators, district initiatives often lose translation in implementation. As such, it is suggested that district administration should conduct an internal analysis of potential barriers to student data and data use within each educational setting within their jurisdiction.

More so, district administration should consider developing the preparation of district goals with a variety of stakeholders, such as a data team inclusive of teachers, then tie those goals to various data points to measure outcomes. For example, while district goals can be linked to state accountability measures, different data points could be selected and used to measure student performance towards those goals throughout the year. In addition, through the creation of a defined written plan goals can become more attainable, measurable, and relevant. Not to mention, this process may allow for critical elements to be defined and identified, such as staff roles, timelines, and specific data to be collected and analyzed. As stressed by Coburn and Turner (2012), district leaders can influence the data culture in school by promoting a clear vision and norms to support systemic data use for continuous improvement.

Recommendations for School Principals

Culture of continuous support. There has been a positive association with schools between principals' support and facilitated data use, including the attitudes and data used to support educational practice amongst educators (Wayman et al., 2017). In one study, it was discovered that school leaders who built a culture of data use were more likely to implement a system of continuous improvement (Park et al., 2012). Further, in this study, they found that school leaders who encouraged staff to believe in the importance of data for improving both teaching and learning, spanning beyond accountability and compliance, had a higher success rate

in implementing data practices. Instead, these administrators focused on the use of data to improve student outcomes as a commitment to students.

Professional development. Ongoing professional development and coaching are suggested to support educators' effective use of how to use student data to drive district, school, and individual student goals. High-quality training on effective data use, inclusive of state, periodic, local, personal, and other data, can be provided, to achieve greater district, school, and individual classroom goals (Data Quality Campaign, 2018). Further, new educators may be supported in how they use individual student scores, mean scores, and passing rates, including distribution of scores to make decisions on how to help students on multiple data and assessment tools (Mandinach et al., 2006). Through ongoing coaching, teachers may be able to broaden their data skills on the entire distribution of students, rather than focusing on individual students. Even more so, by understanding the importance and reason behind the various data points, such as state, period, local, personal, and other, educators may be able to target multiple levels of improvement, from the district, school, grade, classroom, and individual student need.

"Teacher data use is affected by how confident teachers feel about their knowledge and skills in data use, but teacher training has generally not addressed the necessary skills" (Horne, 2014, p. 3). Thus, building teachers' confidence through ongoing support and professional development may be implemented to address this pivotal need. School principals may assist in this process by establishing an influential data culture within their schools by implementing consistent, routine, and effective support to their staff. Through the development of a school-wide data team, team members may be able to serve as mentors and advisors on data use throughout the school. Each team member could bring a variety of different background experiences and knowledge of data use to the team.

Further, the role of the data team is not only to support individual teacher training and support needs but to solicit input from the school community on training or system needs. In addition, this team may assist with defining how the school can use data to support the school and district goals, including what concepts are critical to student growth and outcomes (e.g., student achievement, various data, evidence of growth, collaboration). More so, the data team could provide ongoing data leadership to the school by providing resources, support, and serve as a leader in monitoring student progress.

Data tools. Data, inclusive of teacher-made quizzes to state standardized assessments, are used to inform teacher practice. However, first-year teachers should have access to these critical items (Mandinach & Gummer, 2016). Thus, school administrators could provide teachers tools to assist them in how to look at different data points to improve student outcomes. Through free support networks, such as the What Works Clearinghouse, the Center on Response to Intervention, and the RTI Action Network, school leaders can access a variety of tools and templates, including instructional integrity checklist and collaborative conference tools, to assist educators in implementing best data practices in their schools.

In addition, data sources could be made available in an accessible location. While not all data, such as disaggregated state assessment data is readily accessible through state or district systems, principals can create internal repositories to ensure staff has access to necessary data to support student growth. Further, principals can create a precise data plan to define what data should be reviewed and at what intervals to measure continued progress to broader school and district goals.

Collaboration time. While providing a team of support may be essential in supporting teacher data literacy growth, dedicated collaboration time may also be necessary for teacher data

use and knowledge (Mandinach et al., 2015; Mandinach & Gummer, 2013; 2016; Wayman et al., 2016). Teachers and other school stakeholders could establish a protected time to collaborate, analyze, and interpret student data to adjust instructional supports. Principals can set the tone and serve as leaders of data use by fostering a culture of collaboration, collective responsibility, and continuous improvement; this can be achieved by protecting time within the day for all school employees to use and problem solve with data to increase performance (Data Quality Campaign, 2018).

Further, collaboration time can be embedded in the school schedule, allowing teachers the opportunity to connect with their peers and leadership team to ask questions, seek assistance, and problem-solve with others. In addition, collaboration meetings could be guided by the support of a school developed tool or template, such as an instructional integrity checklist or collaborative conference tool to assist educators in implementing targeted data practices to obtain higher student outcomes. Then based on the uniform collection of data, professional development needs can be identified and tied to direct school or individual needs throughout the school year.

Recommendations for State Policymakers

Access to data. Forty states "do not include disaggregated achievement data for at least one federally required subgroup" (Data Quality Campaign, 2019, p. 2). Further, twenty-one states do not report data by gender, which has been a requirement for twenty years; Indiana is one of these states. Further, while the Indiana Department of Education, Learning Connection website has a location for student growth data to be populated, the data did not fill in the chart when the researcher attempted to access the information (Indiana Department of Education, 2009).

For schools to meet federal and state accountability demands, schools need to continuously access, interpret, and act on reliable and high-quality data. One of the most critical needs is the ability for schools to obtain assessment data in an accessible manner (Mandinach & Gummer, 2016). While having access to current state assessment data can be essential to schools, having access to longitudinal data may be necessary to measure overall growth and needs. Indiana should consider providing schools access to longitudinal data, as well as current data in an immediately accessible infrastructure that allows schools to make actionable decisions and system-wide improvements (Data Quality Campaign, 2018; Horne, 2014). While Indiana has the Department of Education Compass data portal, the data currently available is a high-level overview and does not provide educators access to student data in a manner to create actionable plans.

A state to examine is Georgia. Georgia provides teachers access to a state longitudinal data system, which includes data for each school district within the state. Further, the state partners with educators and inquires about their needs when determining the type of data that will be made available. Most importantly, the state website provides access to ready-made training support materials to access and make meaning of the data available, geared towards educators. (See Appendix E for Georgia Department of Education longitudinal data access).

State policy. There is a need to support teacher data literacy through state policy (Horne, 2014). State policymakers may promote teacher data literacy by ensuring schools have access to quality data and adopting a common language throughout the state regarding teacher data literacy. Further, it is recommended to ensure that school districts and corporations have access to data in up-to-data technology infrastructures. Thus, Indiana may consider developing a "policy and practice questions that will help set priorities for data-driven decision making in

support of student success," (Data Quality Campaign, 2018, p. 3). To ensure that various needs are met, Indiana may consider holding a statewide data conference to communicate and build relationships with those working most closely with education data (Dabney, 2019).

Recommendations for Teacher Preparation Programs

Preservice teachers should have access to applicable support and training with tools that they can continue to use once hired within a school district or corporation (Data Quality Campaign, 2019; Data Quality Campaign, 2018; Horne, 2014). Though utilizing a single state data system, teacher preparation programs would be able to train preservice teachers on systems prior to entering a school district for immediate implementation upon hire.

More so, preservice teachers may benefit from direct instruction and practice on how to interpret data in educational settings and to improve classroom instruction, such as hands-on practice on how to aggregate data by classroom and other areas such as special populations and demographics areas. Understanding how to interpret data may assist teachers in the identification of student strengths and weaknesses in their classroom, target specific student population needs, as well as, identify individual student needs (Datnow and Hubbard, 2015; Basica & Hargreaves, 2000). Finally, preservice teachers may benefit from having training on how to synthesize relevant data with various stakeholders, including parents, students, peers, and school leaders, to generate questions, inform decisions, or provide additional understanding of student needs.

Recommendations for Future Research

Two of the lowest rate response areas of this study were access to user data through an electronic system and useful professional development regarding data use. Findings from this study are vastly similar to the RAND study conducted by Tsai and Tosh in 2019, where a

majority of teachers have access to some type of data management system, however, the usefulness and ease of access have not been beneficial to many teachers. Further, if the data teachers have access to are limited to grades and attendance data and lacking longitudinal or state assessment data, teachers may be missing data needed to support data efforts outside of their classroom, such as building and district goals. To validate this, responses collected through this *Teacher Data Use* study found fewer than 48% of educators agreed or strongly agreed that their *district's professional development is useful for learning about data use.*

Thus, based on the findings in this study and the results of the recent 2019 RAND study, it is recommended that a state-wide study of current school district electronic data dashboards is conducted. Specifically, through this study, it is suggested that an analysis of what data teachers have access to—including, state, periodic, local, personal, and other data, such as behavior and attendance—occurs across Indiana. In addition, educators' perceptions of ease of access and usefulness of the data they have access to should be reviewed. Before researching how school districts provide data-driven professional development and training to staff, it is suggested to determine what data teachers have access to within their given data systems and identify any needs.

Further, based on the foundational data collected during this study, it would be beneficial to determine if there are different training, systems, or attitudes toward data practices across school districts. Specifically, teacher needs should be identified through the disaggregation of the *Teacher Data Use Survey* results by reviewing various indicators, including demographics, as well as corporation location and population (e.g., rural, urban, and suburban) (Wayman, 2017). In particular, this type of data analysis would allow for inequities across populations to be

identified and targeted, and purposeful supports could then be implemented based on individual subgroup's needs.

Finally, due to Indiana not having a streamlined state data infrastructure that allows for a consistent means for collecting and displaying district data, it would be beneficial to understand the best approach to improve teacher data literacy growth. At this time, often, when teachers enter the classroom, teacher preparation programs have not been able to provide targeted training and support using a uniform tool for instruction. Thus, to provide further insight into teacher professional development needs and outcomes, a study should examine *where*, *when,* and *how* pre-service and new teachers apply data-driven practices with positive student outcomes. Then, based on the study findings, it may be determined if it is best to provide data literacy training and support through teacher preparation programs or administration training.

Final Comments

There is one foundational piece missing to the data puzzle, accessible access to mandated data. Starting from Indiana's Department of Education data warehouse, down to the districts, schools, teachers, and parents, there seems to be a chronic issue with accessible data access, regardless if it is current or historical records. Due to this lack of accessibility, higher education institutes are unable to train teachers with a holistic view of data use adequately. Thus, when teachers enter the classroom, they are underprepared for the demands and need extensive training needs, which, as found by this study, was one of the lowest-rated areas, professional development.

Even more so, the use of data in education is not a phenomenon of the past; it is ever-present and highlighted within the new state-required ESSA plans. More important than ever, teachers must be fluent in identifying, analyzing, and measuring student outcomes using data,

often without the assistance of state dashboards or tools. As previously stated, based on a recent review of state "report card" dashboards, conducted by the DQC (2019), 41 states currently do not report disaggregated achievement data for at least one subgroup, required under ESSA (DQC, 2019). Twenty-one states failed to disaggregate for gender within their achievement data. In addition, discipline data were missing for 26 states. These data gaps are vastly evident, which leaves professional development and training on how to access the necessary data to higher education, district administration, and building principals.

Further, technology tools and dashboards do not address data needs inclusively. Many districts have invested in technology tools that produce a vast array of data reports, such as instructional management systems, assessment systems, diagnostic reports, data dashboards, and electronic grade books, and have not experienced student success. With this in mind, ongoing support and professional development are necessary to train teachers on how to interpret the data and determine what support steps are essential to obtain positive student outcomes. Providing technology access is vital to allow educators to store and examine data; however, without the necessary instruction on data interpretation, monitoring, and analysis, technology is merely a repository. Thus, ongoing training and a clear vision of *why* teachers are being asked or required to use data are necessary for effective data use and as a catalysis to improve student outcomes.

Pre-service and in-service training are critical to equip educators to become data-driven, data-based, and data-informed to meet the increasing pressure to improve educational outcomes of all students (Mandinach & Gummer, 2016; Mandinach & Gummer 2016). Too often, adult learning is treated differently than student learning. One data practice that teachers use is identifying a student's baseline and meet students where *they are,* then build their skills to a level of proficiency. However, this has not been the same approach with adult learners, including

educators. Teachers are hired and placed in classrooms to provide targeted education to students with limited support access to the necessary data or ongoing professional development targeted to their learning needs. A teacher would not instruct a student on how to solve for a missing variable within an Algebra equation without first assessing the student's knowledge of fractions. First, the teacher must determine if the student has the knowledge needed to learn more difficult concepts; teachers are no different. Building leaders need to understand new teachers' foundational knowledge and beliefs regarding data use in education, and to create the appropriate supports that will provide a clear path to learn more difficult concepts.

States, including Indiana, need to continue to improve the data infrastructures they provide schools. Regardless of district location (e.g., rural, urban, suburban) or size, all educators should have the same data access to support student outcomes. Teachers need immediate access to, and understanding of the value of numerous data reports to support Indiana student outcomes. Based on this study, new teachers lean on personal data to drive student instruction and support; however, individual teacher data is only as reliable as the individual teacher. The lack of transparency of teacher personal data and the direct link to student growth in state assessments and other high-stake tests (e.g., NAEP, ACT, SAT) does not allow school leaders to identify greater content areas, grade, or school needs. Teachers must be aware and knowledgeable on how to look at data at the individual level, but also more globally at individual class, building, district, and state levels to create targeted improvement over time. First, access to essential data must be provided, and then professional development, both are critical, plus what is needed to obtain growth for all of our state's youth.

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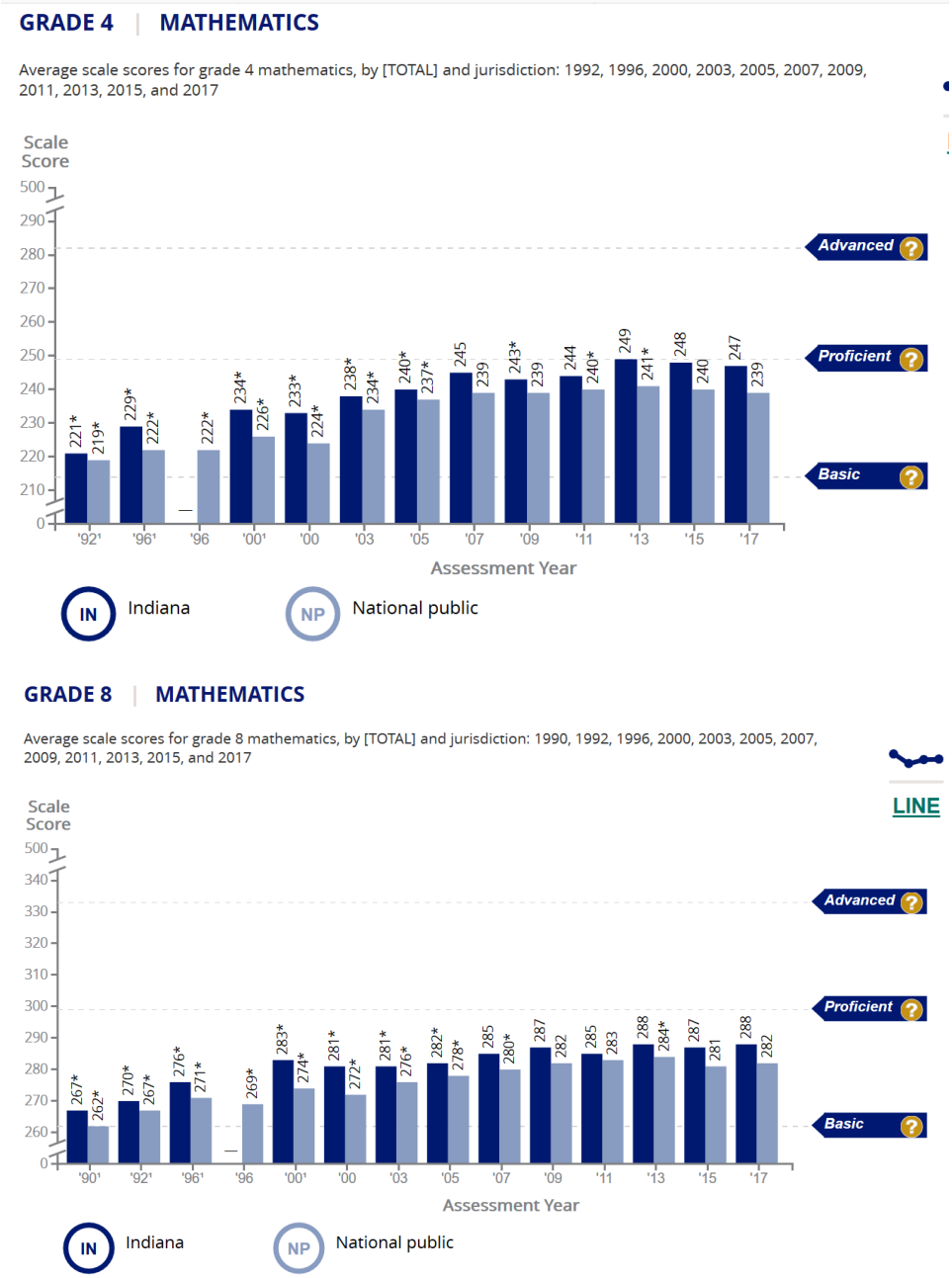
APPENDIX A: NAEP, INDIANA AND NATIONAL, GRADES 4 AND 8 MATHEMATICS



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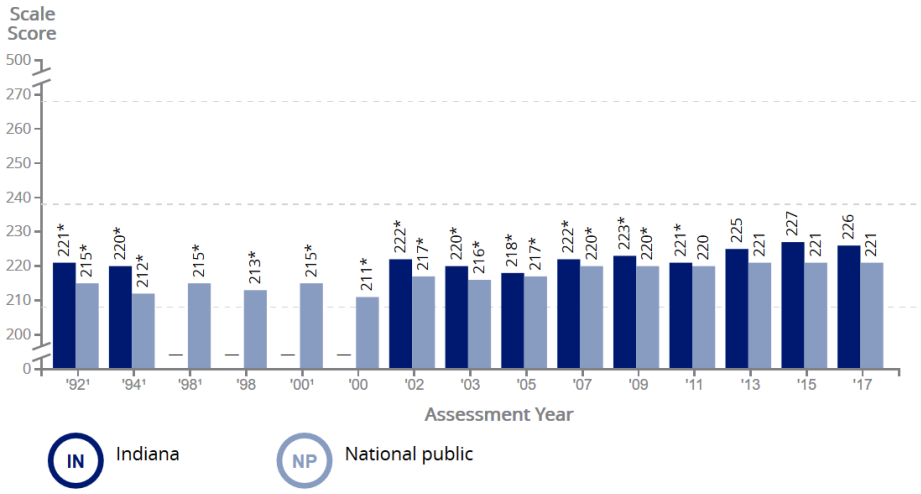
APPENDIX B: NAEP, INDIANA AND NATIONAL, GRADES 4 AND 8 READING

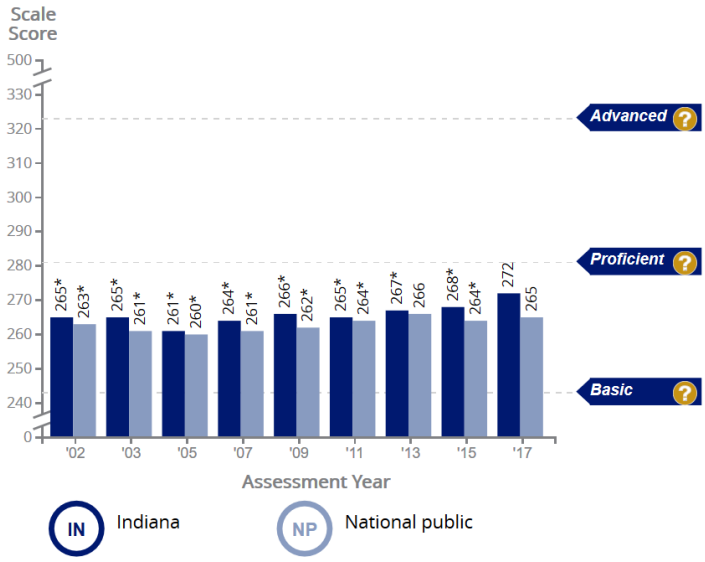
GRADE 4 | READING

Average scale scores for grade 4 reading, by [TOTAL] and jurisdiction: 1992, 1994, 1998, 2000, 2002, 2003, 2005, 2007, 2009, 2011, 2013, 2015, and 2017



GRADE 8 | READING

Average scale scores for grade 8 reading, by [TOTAL] and jurisdiction: 2002, 2003, 2005, 2007, 2009, 2011, 2013, 2015, and 2017



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APPENDIX C: SURVEY COVER LETTER

Date,

Dear Participant:

My name is Robin Wise, and I am an Ed.D. student in Educational Leadership at Indiana University. For my dissertation, I am examining the perception of new educators and their use of data to drive student instruction. Because you are a new teacher and have obtained an initial teaching certificate from the Indiana Department of Education within the past two years, I am inviting you to participate in this research study by completing the linked survey.

The following survey will require 10–15 minutes to complete. There is no compensation for responding, nor is there any known risk. In order to ensure that all information will remain confidential, please do not include your name. Copies of the project will be provided to my Indiana University dissertation chair.

If you choose to participate in this project, please answer all questions as honestly as possible and submit the completed survey promptly. Participation is strictly voluntary, and you may refuse to participate at any time. Completion and submission of the survey will indicate your willingness to participate in this study.

Thank you for taking the time to assist me in my educational endeavors. The data collected will provide useful information regarding the ongoing professional development needs for preservice and in-service educators.

If you would like a summary copy of this study, please send an email request to rmwise@indiana.edu.

If you require additional information or have questions, please contact me at the email listed below. If you are not satisfied with the manner in which this study is being conducted, you may report (anonymously if you so choose) any complaints to the individuals listed below.

Sincerely,

Robin Wise
rmwise@indiana.edu
Dr. Christopher Lubienski
clubiens@iu.edu

APPENDIX D: TEACHER DATA USE SURVEY: TEACHER VERSION

Teacher Data Use Survey: Teacher Version

Tools

Jeffrey C. Wayman
Wayman Services, LLC

Vincent Cho
Boston College

Ellen B. Mandinach
WestEd

Jonathan A. Supovitz
University of Pennsylvania

Stephanie B. Wilkerson
Magnolia Consulting, LLC

The Teacher Data Use Survey can be used to query teachers, administrators, and instructional support staff about how teachers use data to support instruction, their attitudes toward data, and the supports that help teachers use data.

A guide on how to use this survey, along with all three versions of the survey, is available in Wayman, J. C., Wilkerson, S. B., Cho, V., Mandinach, E. B., & Supovitz, J. A. (2016). *Guide to using the Teacher Data Use Survey* (REL 2017–166). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Appalachia. That report is available at https://ies.ed.gov/ncee/edlabs/projects/project.asp?projectID=2461.

ies NATIONAL CENTER FOR EDUCATION EVALUATION AND REGIONAL ASSISTANCE
Institute of Education Sciences
U.S. Department of Education

REL APPALACHIA
Regional Educational Laboratory At CNA

Teacher Data Use Survey
Teacher Version

Jeffrey C. Wayman
Vincent Cho
Ellen B. Mandinach
Jonathan A. Supovitz
Stephanie B. Wilkerson

Prepared for the Institute of Education Sciences (IES) under Contract ED-IES-12-C-0005 by Regional Educational Laboratory Appalachia administered by CNA.

Welcome! The purpose of the Teacher Data Use Survey is to learn about how teachers use data for educational improvement in your district. Administering the Teacher Data Use Survey can provide many benefits to district and school leaders as well as teachers. Among them the Teacher Data Use Survey can yield:

- A comprehensive perspective on how teachers use data, their attitudes toward data, and the supports that help them use data.
- An evidence base from which to plan ongoing support, such as professional development, computer data systems, and collaborative structures for data use.
- A triangulated assessment of how administrator and instructional support staff view teacher data use.

There are three versions of the Teacher Data Use Survey: one for teachers, one for instructional support staff and one for principals and assistant principals.

The Teacher Data Use Survey takes about 15–20 minutes to complete. Please continue to the next page to start the survey.

The following questions ask about various forms of data that you may use in your work.

1. Are the following forms of data available to you?

Form of data	Yes	No
<State data>	☐	☐
<Periodic data>	☐	☐
<Local data>	☐	☐
<Personal data>	☐	☐
Other	☐	☐

If you indicated "no" to all options in question 1, skip to question 10. If you responded "yes" to any option, please proceed to question 2.

2. Teachers use all kinds of information (i.e., data) to help plan for instruction that meets student learning needs. How frequently do you use the following forms of data?

Form of data	Do not use	Less than once a month	Once or twice a month	Weekly or almost weekly	A few times a week
<State data>	☐	☐	☐	☐	☐
<Periodic data>	☐	☐	☐	☐	☐
<Local data>	☐	☐	☐	☐	☐
<Personal data>	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐

3. If you marked the "other" option above, please specify the form of data here:

_____

_____

4. Now, how useful are the following forms of data to your practice?

Form of data	Not useful	Somewhat useful	Useful	Very useful
<State data>	☐	☐	☐	☐
<Periodic data>	☐	☐	☐	☐
<Local data>	☐	☐	☐	☐
<Personal data>	☐	☐	☐	☐
Other	☐	☐	☐	☐

5. If you marked the "other" option above, please specify the form of data here:

_____

_____

If you indicated that <state data> is not available to you in question 1, OR if you indicated that you do not use <state data> in question 2, please go to question 7.

6. These questions ask about <state data>. In a typical school year, how often do you do the following?

Action	One or two times a year	A few times a year	Monthly	Weekly
a. Use <state data> to identify instructional content to use in class.	☐	☐	☐	☐
b. Use <state data> to tailor instruction to individual students' needs.	☐	☐	☐	☐
c. Use <state data> to develop recommendations for additional instructional support.	☐	☐	☐	☐
d. Use <state data> to form small groups of students for targeted instruction.	☐	☐	☐	☐
e. Discuss <state data> with a parent or guardian.	☐	☐	☐	☐
f. Discuss <state data> with a student.	☐	☐	☐	☐
g. Meet with a specialist (e.g., instructional coach or data coach) about <state data>.	☐	☐	☐	☐
h. Meet with another teacher about <state data>.	☐	☐	☐	☐

Items adapted from Wayman, J. C., Cho, V., & Shaw, S. (2009). *Survey of Educator Data Use*. Unpublished instrument.

If you indicated that <periodic data> is "not available" to you in question 1, OR if you indicated that you "do not use" <periodic data> in question 2, please go to question 8.

7. These questions ask about <periodic data> used in your school or district. In a typical month, how often do you do the following?

Action	Less than once a month	Once or twice a month	Weekly or almost weekly	A few times a week
a. Use <periodic data> to identify instructional content to use in class.	☐	☐	☐	☐
b. Use <periodic data> to tailor instruction to individual students' needs.	☐	☐	☐	☐
c. Use <periodic data> to develop recommendations for additional instructional support.	☐	☐	☐	☐
d. Use <periodic data> to form small groups of students for targeted instruction.	☐	☐	☐	☐
e. Discuss <periodic data> with a parent or guardian.	☐	☐	☐	☐
f. Discuss <periodic data> with a student.	☐	☐	☐	☐
g. Meet with a specialist (e.g., instructional coach or data coach) about <periodic data>.	☐	☐	☐	☐
h. Meet with another teacher about <periodic data>.	☐	☐	☐	☐

Items adapted from Wayman, J. C., Cho, V., & Shaw, S. (2009). *Survey of Educator Data Use*. Unpublished instrument.

If you indicated that <local data> is "not available" to you in question 1, OR if you indicated that you "do not use" <local data> in question 2, please go to question 9.

8. These questions ask about <local data> developed and used in your school or district. In a typical month, how often do you do the following?

Action	Less than once a month	Once or twice a month	Weekly or almost weekly	A few times a week
a. Use <local data> to identify instructional content to use in class.	☐	☐	☐	☐
b. Use <local data> to tailor instruction to individual students' needs.	☐	☐	☐	☐
c. Use <local data> to develop recommendations for additional instructional support.	☐	☐	☐	☐
d. Use <local data> to form small groups of students for targeted instruction.	☐	☐	☐	☐
e. Discuss <local data> with a parent or guardian.	☐	☐	☐	☐
f. Discuss <local data> with a student.	☐	☐	☐	☐
g. Meet with a specialist (e.g., instructional coach or data coach) about <local data>.	☐	☐	☐	☐
h. Meet with another teacher about <local data>.	☐	☐	☐	☐

Items adapted from Wayman, J. C., Cho, V., & Shaw, S. (2009). *Survey of Educator Data Use.* Unpublished instrument.

If you indicated that <personal data> is "not available" to you in question 1, OR if you indicated that you "do not use" <personal data> in question 2, please go to question 10.

9. These questions ask about <personal data>. In a typical month, how often do you do the following?

Action	Less than once a month	Once or twice a month	Weekly or almost weekly	A few times a week
a. Use <personal data> to identify instructional content to use in class.	☐	☐	☐	☐
b. Use <personal data> to tailor instruction to individual students' needs.	☐	☐	☐	☐
c. Use <personal data> to develop recommendations for additional instructional support.	☐	☐	☐	☐
d. Use <personal data> to form small groups of students for targeted instruction.	☐	☐	☐	☐
e. Discuss <personal data> with a parent or guardian.	☐	☐	☐	☐
f. Discuss <personal data> with a student.	☐	☐	☐	☐
g. Meet with a specialist (e.g., instructional coach or data coach) about <personal data>.	☐	☐	☐	☐
h. Meet with another teacher about <personal data>.	☐	☐	☐	☐

Items adapted from Wayman, J. C., Cho, V., & Shaw, S. (2009). *Survey of Educator Data Use.* Unpublished instrument.

The remainder of this survey asks general questions about the use of data to inform your education practice. For the rest of this survey, please consider only the following when you are asked about "data":

- *State achievement tests.*
- *Periodic assessments.*
- *Locally developed assessments.*

10. These questions ask about supports for using data. Please indicate how much you agree or disagree with the following statements:

Statement	Strongly disagree	Disagree	Agree	Strongly agree
a. I am adequately supported in the effective use of data.	☐	☐	☐	☐
b. I am adequately prepared to use data.	☐	☐	☐	☐
c. There is someone who answers my questions about using data.	☐	☐	☐	☐
d. There is someone who helps me change my practice (e.g., my teaching) based on data.	☐	☐	☐	☐
e. My district provides enough professional development about data use.	☐	☐	☐	☐
f. My district's professional development is useful for learning about data use.	☐	☐	☐	☐

Items adapted from Wayman, J. C., Cho, V., & Shaw, S. (2009). *Survey of Educator Data Use*. Unpublished instrument.

11. These questions ask about <u>your</u> attitudes and opinions regarding data. Please indicate how much you agree or disagree with the following statements:

Statement	Strongly disagree	Disagree	Agree	Strongly agree
a. Data help teachers plan instruction.	☐	☐	☐	☐
b. Data offer information about students that was not already known.	☐	☐	☐	☐
c. Data help teachers know what concepts students are learning.	☐	☐	☐	☐
d. Data help teachers identify learning goals for students.	☐	☐	☐	☐
e. Students benefit when teacher instruction is informed by data.	☐	☐	☐	☐
f. I think it is important to use data to inform education practice.	☐	☐	☐	☐
g. I like to use data.	☐	☐	☐	☐
h. I find data useful.	☐	☐	☐	☐
i. Using data helps me be a better teacher.	☐	☐	☐	☐

Items adapted from Wayman, J. C., Cho, V., & Shaw, S. (2009). *Survey of Educator Data Use*. Unpublished instrument.

12. These questions ask how your principal and assistant principal(s) support you in using data. Principals and assistant principals will not be able to see your answers. Please indicate how much you agree or disagree with the following statements:

Statement	Strongly disagree	Disagree	Agree	Strongly agree
a. My principal or assistant principal(s) encourages data use as a tool to support effective teaching.	☐	☐	☐	☐
b. My principal or assistant principal(s) creates many opportunities for teachers to use data.	☐	☐	☐	☐
c. My principal or assistant principal(s) has made sure teachers have plenty of training for data use.	☐	☐	☐	☐
d. My principal or assistant principal(s) is a good example of an effective data user.	☐	☐	☐	☐
e. My principal or assistant principal(s) discusses data with me.	☐	☐	☐	☐
f. My principal or assistant principal(s) creates protected time for using data.	☐	☐	☐	☐

Items adapted from Wayman, J. C., Cho, V., & Shaw, S. (2009). *Survey of Educator Data Use*. Unpublished instrument.

13. Your school or district gives you programs, systems, and other technology to help you access and use student data. The following questions ask about these computer systems. Please indicate how much you agree or disagree with the following statements:

Statement	Strongly disagree	Disagree	Agree	Strongly agree
a. I have the proper technology to efficiently examine data.	☐	☐	☐	☐
b. The computer systems in my district provide me access to lots of data.	☐	☐	☐	☐
c. The computer systems (for data use) in my district are easy to use.	☐	☐	☐	☐
d. The computer systems in my district allow me to examine various types of data at once (e.g., attendance, achievement, demographics).	☐	☐	☐	☐
e. The computer systems in my district generate displays (e.g., reports, graphs, tables) that are useful to me.	☐	☐	☐	☐

Items a–d adapted from Wayman, J. C., Cho, V., & Shaw, S. (2009). *Survey of Educator Data Use*. Unpublished instrument.

14. These questions ask about your attitudes toward <u>your own</u> use of data. Please indicate how much you agree or disagree with the following statements:

Statement	Strongly disagree	Disagree	Agree	Strongly agree
a. I am good at using data to diagnose student learning needs.	☐	☐	☐	☐
b. I am good at adjusting instruction based on data.	☐	☐	☐	☐
c. I am good at using data to plan lessons.	☐	☐	☐	☐
d. I am good at using data to set student learning goals.	☐	☐	☐	☐

Items adapted from Wayman, J. C., Cho, V., & Shaw, S. (2009). *Survey of Educator Data Use*. Unpublished instrument.

The following questions ask about your work in collaborative teams.

15. How often do you have scheduled meetings to work in collaborative team(s)? (Check only one.)
    - ☐ Less than once a month.
    - ☐ Once or twice a month.
    - ☐ Weekly or almost weekly.
    - ☐ A few times a week.
    - ☐ I do not have scheduled meetings to work in collaborative teams.

If you answered "I do not have scheduled meetings to work in collaborative teams" in question 15, please go to question 18.

16. As you think about your collaborative team(s), please indicate how much you agree or disagree with the following statements:

Statement	Strongly disagree	Disagree	Agree	Strongly agree
a. Members of my team trust each other.	☐	☐	☐	☐
b. It's ok to discuss feelings and worries with other members of my team.	☐	☐	☐	☐
c. Members of my team respect colleagues who lead school improvement efforts.	☐	☐	☐	☐
d. Members of my team respect those colleagues who are experts in their craft.	☐	☐	☐	☐
e. My principal or assistant principal(s) fosters a trusting environment for discussing data in teams.	☐	☐	☐	☐

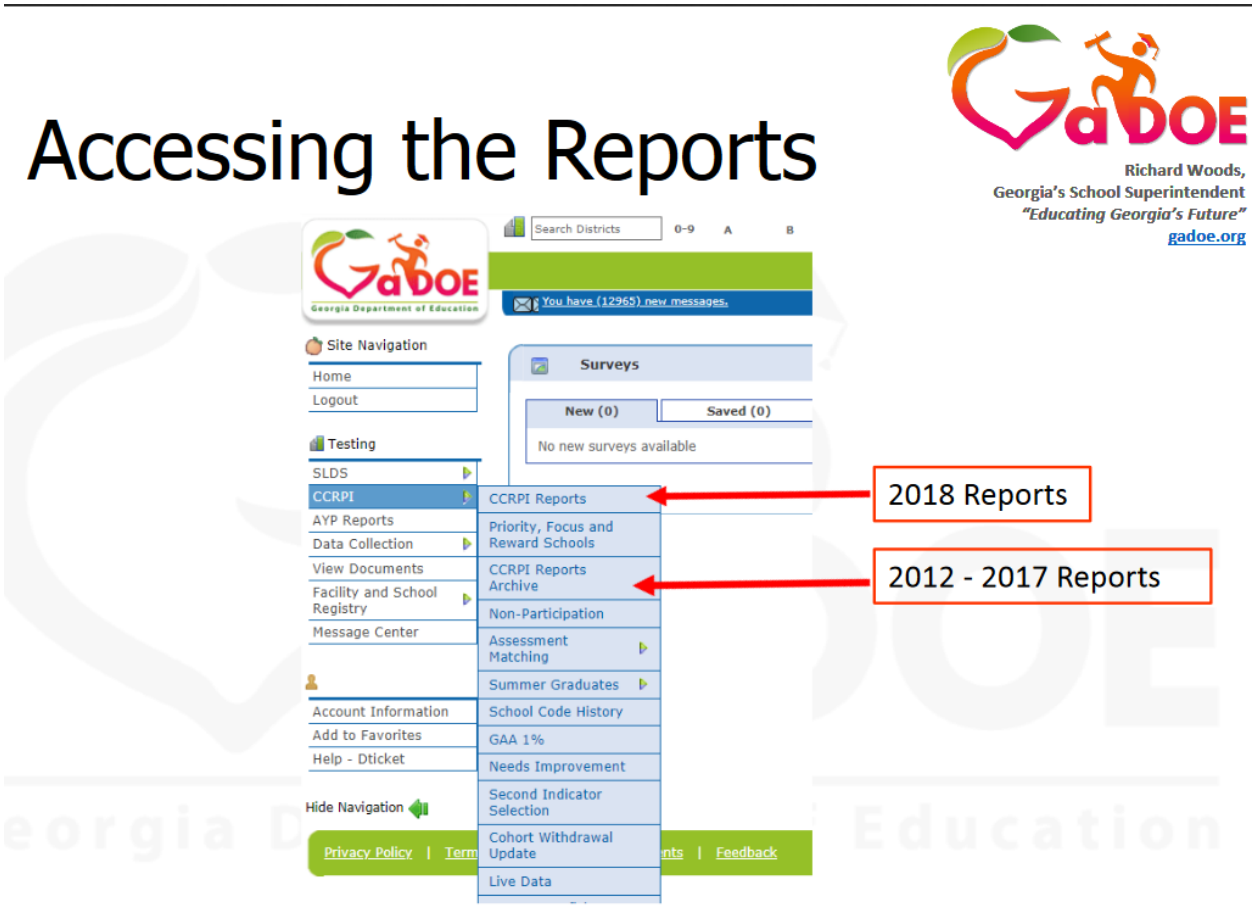
Items a–d are from University of Chicago Consortium on School Research. (2013). *Teacher Survey Codebook*, Chicago, IL: Author.

17. How often do you and your collaborative team(s) do the following?

Action	Never	Sometimes	Often	A lot
a. We approach an issue by looking at data.	☐	☐	☐	☐
b. We discuss our preconceived beliefs about an issue.	☐	☐	☐	☐
c. We identify questions that we will seek to answer using data.	☐	☐	☐	☐
d. We explore data by looking for patterns and trends.	☐	☐	☐	☐
e. We draw conclusions based on data.	☐	☐	☐	☐
f. We identify additional data to offer a clearer picture of the issue.	☐	☐	☐	☐
g. We use data to make links between instruction and student outcomes.	☐	☐	☐	☐
h. When we consider changes in practice, we predict possible student outcomes.	☐	☐	☐	☐
i. We revisit predictions made in previous meetings.	☐	☐	☐	☐
j. We identify actionable solutions based on our conclusions.	☐	☐	☐	☐

18. What else would you like to share with us about data use?

APPENDIX E: GEORGIA DEPARTMENT OF EDUCATION LONGITUDINAL DATA



CURRICULUM VITA

Robin M. Wise

EDUCATION

2020	Indiana University, Bloomington, Indiana Ed.D. in Educational Leadership
2003	Ball State University, Muncie, Indiana M.A. in Special Education
1996	Ball State University, Muncie, Indiana B.S. in Special Education

PROFESSIONAL EXPERIENCE

2016 – present	K12, Inc., Herndon, Virginia Director of Compliance and Operations
2014 – 2016	K12, Inc., Herndon, Virginia Senior Manager, Academic Services Special Programs
2012 – 2014	K12, Inc., Herndon, Virginia Manager, Special Programs
2009 – 2010	K12, Inc., Indianapolis, Indiana Director of Special Services, Hoosier Academies
2009 – 2010	University of Phoenix, Indianapolis, Indiana Adjunct Instructor
2000 – 2009	Carmel High School, Carmel, Indiana Special Education Teacher and Autism Resource Team Member
1999 – 2000	Cove High School Northbrook, Illinois Special Education Teacher and Behavior Coach
1996 – 1999	Ritenour High School, Town and Country, Missouri Transition to Work, Special Education Teacher

LICENSURE/CERTIFICATION

2020	Indiana Director of Exceptional Children License
2020	Indiana School Superintendent License
2018	Indiana University Educational Law Certificate