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The Relationship of the Teaching, Empowering, Leading and Learning (TELL) Survey Responses to Student Smarter Balanced Assessment (SBA) in Math and English: Teacher Professional Development and Student Achievement

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Abstract

The purpose of this study is to identify the relationship between changes in teachers' professional learning conditions and changes in student achievement. The study examined conditions as measured by three state-wide administrations of the New Teacher Center's Teaching, Empowering, Leading, and Learning (TELL) Survey in Oregon from 2014 to 2018 and contemporaneous student achievement data from Oregon state achievement tests, the Smarter Balanced Assessment (SBA) in Math and English. Participants were all 274 schools in Oregon with data for all administrations of relevant instruments. Data were disaggregated based on district and school size, poverty level, and English Language Learner (ELL) population. Analysis of study data were guided by three research questions: (a) how have measures of student achievement and teacher professional development changed over time in districts and schools in Oregon, (b) how do the changes in professional development correlate to student outcomes on the Smarter Balanced Assessment in Math and English, and (c) which professional development factor(s) are most closely related to or predictive of subsequent changes in student outcomes? Analyses included repeated measures analysis of variance (RM-ANOVA) for all instruments, analysis of variance (ANOVA) for both raw scores and calculated change scores, and correlation analysis among both raw and change scores within and between instruments. The study found strong within instrument correlations but few and weak correlations among SBA and

TELL professional development measures during the study period. Implications for future study and professional development applications discussed include further research into outlier cases with strong improvement on both student achievement and professional development measures, more purposeful connection of professional development measures to professional development implementation, and more concrete connection of professional development to student learning.

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Chapter 1: Introduction

The discourse around improving student learning outcomes in political, media, and research landscapes is energetic, varied, and often contentious. Numerous voices within these landscapes advocate for different approaches to improving student learning outcomes. The conversation around student learning, however varied, remains inextricably tied to conversations around teaching. Improvements in one have deep and abiding connections to, if not improvement, then at least maintenance, of the other. Ladd (2009) showed that teaching and learning conditions are predictive of student learning improvements in both math and reading. Additionally, Johnson, Kraft, and Papay (2011) demonstrate that positive conditions for teachers improve student achievement. Consequently, any study of changes in student learning outcomes must also consider attendant changes in conditions for teaching and learning more broadly and vice versa. It would be insufficient to point to changes in student outcomes without exploring and understanding the context that elicits those changes.

One of the many tools measuring changes in student outcomes over time in the United States is the New Teacher Center's Teaching, Empowering, Leading and Learning (TELL) survey which grew out of an interest in better understanding and measuring teacher retention and conditions of teaching and learning as they relate to student achievement (New Teacher Center, 2014a). This biennial survey administered in 11 states nationwide began as an effort of the North Carolina Professional Teaching Standards Commission to better understand the implications of national survey data from the National Center for Education Statistics' School and Staffing survey for

teaching and learning in their state. Since its development in 2002, the survey effort has grown and been replicated including administrations in Oregon in 2014, 2016, and a third administration in early 2018. The relatively recent Oregon adoption of the TELL in 2014 coincides with shifts in measurement of student learning outcomes using the Smarter Balanced Assessment as the state-mandated test for Oregon public schools, which began in the 2014-2015 school year. These instruments in combination, provide a window into the conditions of Oregon educators for teaching and learning and the resultant learning outcomes for Oregon students.

The TELL employs eight constructs that emerged from the North Carolina Professional Teaching Standards Commissions review of literature and the National Center for Education Statistics School and Staffing Survey: time, facilities and resources, community support and involvement, managing student conduct, teacher leadership, school leadership, professional development, and instructional practices and support (New Teacher Center, 2014b). All of these constructs contribute to both teacher retention and conditions for teaching and learning, the two central considerations of TELL inquiry. Each can also be considered a potential lever or mechanism for improving student learning outcomes. The relative effectiveness of focusing attention on improving any particular lever as a means to improving student learning outcomes is debated, because the question persists: in what domain should policy makers, educational leaders, and others focus their work to improve student learning?

One of the levers many of these voices advocate for achieving improved student outcomes is through improved professional development of teachers. Little (1993) did this explicitly when discussing approaches to professional development in a context of educational reforms focused on improving student learning outcomes. Professional development of teachers has been enshrined in policy and law at federal (ESEA, 1965; ESSA, 2015), state (ORS 329.824), and local levels (OSBA, 2017). Indicative of this was the President's 2017 budget proposal that included more than $1.5 billion dollars in federal funds and grants focused on "investments to recruit, develop, support, and retain the outstanding teachers and leaders students need" ("The President's Fiscal Year 2017 Budget Request," 2016, p. 1). This area, in particular, has great promise for improving the conditions for teaching and learning, as well as the subsequent student learning outcomes (Hirsch, 2009). It also has great challenges because the relative strength of effects of professional development on student learning outcomes can be difficult to accurately gauge in practice and within the existing literature (Yoon, 2009).

Purpose Statement

The purpose of this study is to identify the relationship between changes in teachers' professional learning conditions and changes in student achievement. The study examined conditions as measured by three state-wide administrations of the New Teacher Center's Teaching, Empowering, Leading, and Learning (TELL) Survey in Oregon from 2014 to 2018 and contemporaneous student achievement data from Oregon state achievement tests. The TELL survey describes professional development

as the “availability and quality of learning opportunities for educators to enhance their teaching” (TELL, 2017, p. 3). Examination of changes in teacher professional learning conditions and the relationship between those changes and differential student outcomes as measured by state assessments could be used to identify promising cases from which more can be learned about the successful connection of adult professional learning to increases in student outcomes. The analysis examined the data at both the school and district levels for significant relationships.

Research questions include:

1. How have measures of student achievement and teacher professional development changed over time in districts and schools in Oregon?

2. How do the changes in professional development relate to student outcomes on the Smarter Balanced Assessment in Math and English?

3. Which Professional Development factor(s) measured by the TELL Survey are most closely related to changes in student outcomes?

Significance

This research focuses on the relationship between professional learning and student learning outcomes. Teaching and learning conditions, including conditions for professional development, can predict student achievement in mathematics and reading as measured by test scores (Ladd, 2009). Further, improved conditions for teaching and learning relate to improved student learning outcomes (Johnson, Kraft, & Papay, 2011). Among these, professional development is one of a handful of significant predictors of student learning gains in a value-added analysis (Ferguson &

Hirsch, 2014). Better understanding the influence of these factors in schools and districts can allow policy-makers, district and school leaders, and teacher leaders to make informed decisions about how to best allocate resources in support of professional learning; how to better target time and opportunities for professional learning; and may also identify models of successful professional learning for further study.

Summary

This chapter considers the current discourse around improving student learning outcomes as a shared goal for a variety of stakeholders within and around the education landscape. It also discusses the gap in research between inputs to improving conditions for teaching and learning such as professional development and measurable outputs of improved student learning. This study seeks to address that gap through an analysis of TELL Oregon survey data as related to contemporaneous student achievement data for the state during the period between 2014 and 2018. Examining correlations between changes in teacher professional learning and changes in student learning outcomes as measured by state assessments, especially those that show positive improvements, may help future research focus on promising schools and districts. It may serve as an additional data point to aid policy makers, educational decision makers, and other stakeholders in targeting future resource allocation and improvement efforts on those aspects of conditions of teaching and learning which are most efficacious for improving student learning outcomes by patterning such efforts after those schools and districts whose results are most promising. The following

chapter will review the research literature in the area of professional development to ground and contextualize the study in established understandings of what constitutes effective professional development; how effective professional development transfers to classroom practice; the challenges of bringing such professional development to scale; and effective means for evaluating the effect of professional development on conditions of teaching and learning and, subsequently, on student learning outcomes. The literature review will also establish theoretical frameworks for understanding what is meant by professional development, student learning outcomes, and a model for evaluation of professional development that connects the two.

Chapter 2: Literature Review

This chapter will review literature in the area of professional development as it pertains to this study considering first, and most broadly, what constitutes professional development. The review will then use existing research to articulate a working definition and theoretical framework for understanding what is meant by *effective* professional development. This definition will be extended and contextualized through a consideration of professional development as a context for and condition of teaching and learning. After discussing professional development from a theoretical and contextual lens, the review will consider how best to evaluate professional development in light of these theoretical frames and the subsequent connection such evaluation has to current understandings of professional development's connection to student learning outcomes as well as what gaps exist in this area of research.

Professional Development Defined

Kennedy (2016) discusses that in-service teacher professional development can take many forms and serve many goals. The author stresses that any discussion of professional development should address the ideas offered to teachers and the aspects of practice they hope to improve. Kennedy states that professional development can encompass a broad range of pedagogy, content knowledge, and philosophical or theoretical perspectives and strategies. This echoes Desimone's earlier (2009) notions that many experiences count as teacher learning and that professional development is often synonymous with education reform.

Darling-Hammond, Wei, Andree, Richardson, and Orphanos (2009) address similar findings in their review of professional development research and explicitly connect the notions of professional development and professional learning. Their work considers professional development an important subset of overall teacher learning, one which links teacher development to student learning. They are careful to qualify that the linkage may not be immediate and that connections between specific professional development activities, even effective ones, may take time to emerge in student achievement data. Further, their research points to the many ways in which structural shifts toward embedding professional development into the work of schools creates more overlap between formal and informal professional development.

This kind of shift to systematic and structural approaches that fuse professional development and professional learning are also identified and even called for by others. Easton (2008) does this by arguing that traditional formal professional development activities are not bad or wrong, simply insufficient. This insufficiency arises from the tendency of many traditional formal professional development activities to fall short of meeting the criteria of effectiveness that will be discussed later. Chief among those deficiencies identified by the author is that professional development is something that is done to teachers rather than by them. Easton argues that in order for teachers and their practice to improve as a result of professional development, the focus must shift to one oriented around professional learning with the teacher at the center. Her core argument is that for professional development to

become truly effective teachers must become self-developers by "becoming" learners themselves by engaging in a process of professional learning" (p. 761).

Easton's arguments are not new notions. They echo Fuller's (1969) consideration of the developmental concerns of teachers at different stages in their professional lives. Fuller found that teachers at different stages of their careers had differing learning needs and thus would be more receptive to different types of professional development. This thinking begins to shift the focus of professional development to one that is grounded in teachers' concerns—not unlike Easton's perspectives that teachers as learners must drive their own professional development.

In a concerns-based model, professional development and professional learning are driven by the concerns that teachers identify for themselves or in their own practice. An understanding of professional development as originating from a problem-solution perspective is helpful in understanding teacher-initiated professional development efforts. Loucks and Hall (1979) study application of the concerns-based adoption model to instructional improvement. The model suggests that teachers are more likely to enact new approaches within their classrooms if they have first identified that the approach will solve a perceived problem. The concerns-based adoption model recognizes that self-identified needs are a powerful motivator for adult learners and consequently can have a significant impact on the implementation of strategies learned in any particular professional development. Even when there is teacher choice in the area or focus of professional development though, Loucks and Hall find that implementation of new learning may also take time before it can

positively impact student learning outcomes. This implementation dip, as teachers try new strategies, must then be accounted for in evaluations of professional development vis-a-vis examinations of changes in student learning outcomes. Despite enthusiasm for chosen professional development, they reveal that it may take time for teachers to become proficient in the practical application of new learning at levels sufficient to positively impact students.

Similarly, Silva and Herdeiro (2014) discuss professional development as essential to how teachers live within the educational system and fundamental to teacher formation throughout their careers. They define professional development as relating to both the activities of teaching and the beliefs that underpin those activities. This is a notion pertinent both to an understanding of professional development itself and to the ways in which it provides a context for teaching and learning as will be discussed later. From a definitional perspective, it is helpful to consider how professional development can comprise both the act of teaching and its underpinning beliefs. Kyndt, Gijbels, Grosemans, and Donche (2016) make this distinction by explicitly distinguishing between formal and informal professional development. Formal professional development activities are those that are explicitly designed to impact teacher learning and behavior, while informal professional development activities are those that result in teachers learning through some other facet of their work.

These understandings of professional development can be understood on a continuum of professional development from formal to informal with professional

learning potentially occurring anywhere along the continuum depending on a variety of mediating factors. They typify the range of different understandings that exist in the research and highlight the idea that for teachers, the education system is *noisy* (Kennedy, 2016). The professional development *noise* prompted Kennedy to frame a meta-analysis of the professional development research around a theory of action that helps ground an understanding of professional development. That two-part theory of action defines professional development as a pedagogical approach to helping teachers solve an identified problem through changes in their—the teachers—teaching practice.

Many other studies also discuss the role that teacher choice plays in the effectiveness of professional development (e.g. Beach & Willows, 2014; Borko, 2004; Ciampa & Gallagher, 2015; Desimone, 2009; Ham, 2010; Kennedy, 1998). However, much formal professional development derives its mandate not from individual teacher choice but from some source external to the teacher participating in the professional development (Borko, 2004). Borko also points out that in the United States specifically, professional development has been enshrined in law and contract language. This goes hand in hand with the idea of professional development mentioned earlier that professional development is often driven by reform agendas (Desimone, 2009). Differing motivations for participation in professional development give rise to a complex context for its enactment and for its effectiveness in impacting classroom practice (Kennedy, 2016). Teachers who choose the form or content, or both, of their professional development are more likely to enact changes based on that professional development (Beach & Willows, 2014; Billings & Kasmer, 2015;

Blanchard, LePrevost, Tolin, & Gutierrez, 2016; Ham, 2010; Kennedy, 2016). Borko points out that choice is not always an option, though, and given the investment at federal, state, and local levels of time, money, and other resources, it thus becomes practically desirable to define what constitutes effective professional development. Such a definition may guide evaluation of professional development regardless of impetus in either the teacher concerns-based milieu described by Loucks and Hall; in the reform-based context articulated by Borko; or in some intersection of the two as might often be the case in contexts like the ones described by Elmore, Fullan, DuFour, Darling-Hammond and others' whose work is considered later in this chapter.

Features of Effective Professional Development

Despite the obvious fiscal incentives to define effectiveness and focus professional development efforts around those practices that are shown to be most impactful, most sources agree that currently enacted professional development is woefully inadequate (Borko, 2004). Even though researchers identify much professional development as weak, Kennedy (1998; 2016) believes, in concert with Desimone (2009), that there is adequate research consensus to define a salient set of features that comprise effective professional development. Those features include a content focus, sustained development over time, assistance with implementation, support for teachers, follow up, and a critical mass of teacher participants (Blank & de las Alas, 2009). Kennedy (1998) highlights that not all of these features bear equal weight. Specifically, rejecting one-shot workshops as ineffective professional development because they lack sustained development over time may correct the

wrong flaw. In fact, some findings suggest that focus on student learning and relevance to a particular content within the professional development are more important than issues like duration (Kennedy, 1998). While there is not unanimity on these features, the broad consensus is compelling enough to understand them as at least a reliable starting point for further study of professional development (Kennedy, 2016). In a meta-analysis of professional development studies, Kennedy (2016) clarifies that content can be understood to have foci that include "generic teaching practice, subject specific practices, curriculum and pedagogy, and how students learn" (p. 2). This deepens the understanding of content focus (Blank & de las Alas, 2009) as a key feature of professional development.

Guskey (2000) organizes thinking about professional development slightly more broadly, using only four categories for characterizing effectiveness: (a) focus on learning and learners, (b) emphasis on individual and organizational change, (c) incremental change toward a long-term vision, and (d) professional development context embedded in the work of teaching. These characteristics that comprise effectiveness add importantly to those articulated by Kennedy insofar as they push researchers toward a contextualized understanding of professional development that is bigger than pedagogical approaches to teaching teachers or any set of *best* instructional strategies. Guskey's definition embraces a wide range of professional development approaches including training, observation and assessment, curriculum adoption, study groups, inquiry or action research, individually guided activities, and mentoring. Each of these have strengths and weaknesses which are, in Guskey's

analysis, governed by how they are used and connected to context. This recognizes that the context is complex and multifaceted such that no one approach can account for all professional development factors that will result in teachers' professional learning.

Professional development embedded in context

Accepting the claim that professional learning must be embedded in the day to day work of teaching—that teaching and learning are inherently connected activities—it is helpful to review some of the literature around common embedded professional development structures for such learning. These are the formal systems and structures in place to promote and provoke professional learning that alters practice and impacts student outcomes. Darling-Hammond (2009) calls this contextualized understanding a "new paradigm" for professional development because the lines between formal and informal professional development in a contextualized framework are blurred. Many researchers identify the structures of the new paradigm as professional learning communities. This section will consider some of the features of professional learning communities as contexts for embedded professional development and professional learning that impacts student learning outcomes.

Professional learning communities depend upon "supportive and shared leadership, collective creativity, shared values and vision, supportive conditions and shared personal practice" (Darling-Hammond, 2009, p. 10). Each of these attributes are also addressed in the core constructs of the TELL survey, which will be discussed further in the consideration of evaluation of professional development that follows.

Elmore (1997) observed similar features in a case study of New York City's District 2 where he found that professional development was understood as the work of administrative leaders not a "specialized function that some people in the organization do and others don't" (p. 12). He, too, considers this a blurring of traditional lines, but one which has an observed positive effect on both teacher professional learning and on student achievement outcomes within the district. Elmore concludes that this embedded focus on professional learning, irrespective of a specific formal professional development approach, empowers this shift. In this model, the role of effective professional development strategies become more fluid and are seen as tools in the professional learning tool kit.

Fullan (2007) takes these arguments a step further and claims that the term professional development has outlived its usefulness when such a shift to contextualized learning occurs. He writes that in order for professional development to be effective, professional learning must occur in the context in which teachers work. He establishes four connected premises on the foundation that (a) formal professional development is a barrier to professional learning because (b) improvement must occur in the setting where teachers work; (c) student learning depends on teacher learning; and (d) deprivatization of teacher practice underpins efforts to improve what happens in the classroom. All of these, he says, are shaped by teachers' working conditions so much that traditional, formal professional development tools "are not useless, but they can never be powerful enough, specific enough or sustained enough to alter the culture of the classroom and the school" (p. 35).

Fullan's definition of professional development is narrower than those discussed earlier, but helpful to elucidate the nested and contextual nature of professional development and professional learning within the district, school, and classroom. This speaks to the TELL's inclusion of other contextual factors as core constructs alongside professional development but does not override Darling-Hammond's (2009) findings that professional development in professional learning communities are linked to improvements in student learning outcomes, including reduced dropout, lower absenteeism, and achievement gains in math and reading.

In order for professional learning communities to serve as an effective professional development approach, teachers must be better understood as learners. Borko's (2004) analysis of professional development highlights the need to better understand teachers as learners. Specifically, Borko supports the logic that it is inappropriate to expect teachers to cultivate a community of learners among their students if they are not also part of a parallel learning community of their own. The importance of this community appears with special prominence in the literature related to online learning that deals extensively with teachers as learners seeking community (Beach & Willows, 2014; Blanchard et al., 2016; Brooks & Gibson, 2012; Kabilan, Adlina, & Embi, 2011; Koellner, Jacobs, & Borko, 2011; Trust, 2012). Despite this acknowledgement that community is a necessary and important attribute of professional development, one that is fundamental to an understanding of teachers as learners, "there is little empirical base…to shed light on the mechanisms by which this [community] relationship works" (Borko, 2004, p. 3). Further, the success of

professional development is often heavily influenced by teachers' motivation to learn the material, which can be a challenging hurdle to overcome in the case of externally mandated professional development (Kennedy, 2016). Informal professional development, on the other hand, is often characterized by teachers who willingly seek and adopt the role as learners (Silva & Herdeiro, 2014). This idea is further extended in studies focusing on teachers as learners as in Shabani, Khatib, and Ebadi's (2010) work applying Vygotsky's concepts of Zone of Proximal Development (ZPD) to teachers. In this work, teachers are viewed on a continuum of continuous learning seeking always to expand their capabilities from their current level of proficiency into their ZPD. This requires professional development opportunities that allow teachers as learners to imitate and perform new practices with the support and scaffolding provided by a capable instructor (Shabani et al., 2010). This thinking is mirrored in Petrie and McGee (2012) who stress the importance of both approaching professional development with an understanding of teacher as learner and extending this thinking to understand teachers as a diverse group of learners with varied needs. In this way, both the research around professional development aimed at teachers' ZPD and understanding of teachers as diverse learners recognizes the complexity of effectively constructing any one-size-fits-all professional development that meets the varied needs of teachers (Petrie & McGee, 2012; Shabani et al., 2010).

The recognition of teachers as learners is insufficient to successfully improve professional development for teachers because their learning is intended to help them improve their teaching practice, varied and multifaceted as that may be (Kennedy,

2016). If professional development is approached with a narrow lens of teachers as learners only, the result can be simple imitation of learned content or practices rather than more nuanced application of teaching beliefs and practices that fully address the complex teaching contexts in which educators work (Petrie & McGee, 2012). Thus, Petrie and McGee argue that it becomes important to give teachers the opportunity during professional development to act as learners and also to reflect critically as teachers and thereby work to apply learned material to their work context. This notion can also take the form of having teachers switch between their learner and facilitator hats during the course of a professional development sessions (Koellner et al., 2011). Even this dual role can be expanded to understand the teacher-learner as a collaborator in the development of the professional development itself. One model calls for explicit feedback-seeking from teacher participants at various points in the professional development to help determine and direct next steps in the professional development itself (Woolley, Rose, Mercado, & Orthner, 2013).

These findings echo sentiments voiced earlier by researchers and practitioners arguing for a redefinition of teachers' work to include professional learning as part of the work of teaching rather than a discrete activity separate and distinct from that work. One older study examining the relationship between effective teacher community, a critical feature of professional learning communities, found that the organization of teachers' work in ways that promote professional community associates positively with the organization of classrooms for learning and improved student academic performance (Louis & Marks, 1998). This study looked closely at

the impact of the professional community's influence on the organization of the classroom and the relative effect of that community on student achievement. A more recent case study of two schools' implementation of the professional learning community model in New Jersey found related increases in the sense of efficacy of the professional community among teachers (Mindoch & Lieberman, 2012). Professional community efficacy is a measure of collegiality which Lois and Marks (1998) connected to improved student achievement.

Among the voices supporting the notion of professional learning as essential to the work of education, Elmore argues for systemic reforms mirroring those professional learning structures more commonly seen in the medical field (Elmore & Albert Shanker Institute, 2000), and DuFour suggests we must fundamentally redesign teacher professional development as residing in the "workplace not the workshop" (DuFour, 2004). DuFour's call for redesign has received broad application in a variety of school communities across the United States under a theoretical understanding of teacher professional development as fundamentally grounded in collective problem solving for those challenges that teachers face in their day-to-day work. His job-embedded notion of professional development that focuses on identifying what students should know or do, how that can be measured, and how to support those who struggle in itself reflects many of the principles other researchers put forth as theories of effective professional development.

Features of effective professional development include a content focus, sustained development, assistance with implementation, support for teachers, follow

up, and a critical mass of teacher participants (Blank & de las Alas, 2010). In schools that implement some version of DuFour's notion of professional learning communities, there exists a nexus of these two theories of action resulting in professional practice that simultaneously constitutes professional development and learning. Consequently, it is necessary to return to the question of the impact that professional development has on improving student outcomes and how best to go about evaluating it.

Evaluation of professional development

The features of effective professional development are distinct from the measurement and evaluation of professional development in terms of the research. While many researchers focusing on professional development seek to evaluate its effectiveness, they have historically been concerned with documenting teacher satisfaction, attitude, or innovation (Desimone, 2009) rather than evaluating the professional development's effect on teacher actions, beliefs, or student outcomes. Concerns-based adoption models (e.g. Fuller, 1969; Loucks & Hall, 1979) endorse this approach to evaluation of professional development, because the model prioritizes teacher concern and perception as chief indicators of learning, adoption, and application.

Alternatively, Borko (2004) suggests evaluating professional development in a three-phase approach that examines professional development first at the teacher level, second at the context level, and third across various contexts. This theoretical framework for professional development evaluation also begins to address one of the

core elements of the theory of action that Kennedy (2016) proposes: namely that teacher professional development should ultimately result in a positive impact on student achievement.

Even when this kind of evaluation of professional development takes place, there are numerous intervening factors that may impact changes in student achievement thereby problematizing the ability to establish causal links between professional development and changes in student achievement (Gersten, Taylor, Keys, Rolfhus, & Newman-Gonchar, 2014).

The logic is that improving the teachers and their practice will in turn improve student outcomes. Yoon, Duncan, Lee, Scarloss, and Shapley (2007) detail this logic in a theory of action that comprises three steps: "First professional development enhances teacher knowledge and skills. Second, better knowledge and skills improve classroom teaching. Third, improved teaching raises student achievement" (p. 4). This theory of action builds upon a body of research supporting the notion that professional development of teachers can positively impact student outcomes.

While the logic of teacher learning improving student learning flows from a common-sense analysis of what might happen if teachers learn improved ways to practice the art and craft of teaching, there is only a limited body of rigorous empirical research that supports a causal relationship between teacher learning and student learning. In part this is because of the complexities of accurately and reliably measuring the various stages in the process. In their review of over 1,300 research studies related to teacher professional development Yoon et al. found only nine studies

that met the rigorous standards of evidence to establish such causal links (Yoon, Duncan, Lee, Scarloss, & Shapley, 2007). Within that group of studies, there was a large degree of variability in terms of both the types of professional development, the duration of that professional development, and the implementation of the teacher learning in classroom practice. Consequently, there is significant room for more high-quality research in this area.

Others have built on the findings in this study, however, and suggest a few salient points about what is currently known regarding professional developments' potential impacts on student learning. Darling-Hammond's (2009) synthesis of professional development research finds that effective professional development for teachers is related to student achievement gains; that collaborative professional learning promotes school change beyond individual classrooms; and that professional development is most effective when it is intensive, ongoing and connected to practice, focuses on the teaching and learning of specific academic content, connected to other school initiatives, and builds strong working relationships among teachers.

Ultimately, though, the intended beneficiaries of professional development are assumed to be students (Kennedy, 2016). Consequently, any discussion of professional development's impact must go beyond teachers as learners and teachers as teachers and assess the impact of professional development on student achievement (Blank & de las Alas, 2009). Blank and de las Alas further argue that research into professional development should include measures of student outcomes to ensure that there is a thoughtful and thoroughgoing approach to assessing the impact of

professional development on students. Many studies that address the impacts of professional development on student achievement do so by default rather than by design (Kennedy, 2016). This occurs for a variety of reasons, among them the reality that many studies that relate to professional development are also concerned with something else in the context and the fact that numerous differences may exist across contexts being addressed by a studied form of professional development, such as differences in curricula or student population despite common forms of professional development (Kennedy, 2016). Additionally, some studies of professional development are able to measure student achievement by default insofar as the professional development relates to a content area that is already assessed as part of a local, state, or federal assessment initiative independent of the professional development research per se. Kennedy sorts these measures of professional development's effectiveness into categories that are proximal to the professional development and distal to the professional development arguing that proximal assessments of professional development may more closely address the impacts of the professional development itself, while the distal assessments may better reflect the lasting impacts of such professional development. Others point to the importance of assessing the effectiveness of professional development over time to ensure that any positive effect of the professional development is the result of long-term behavior change not short term compliance with a particular professional development initiative (Kennedy, 2016).

Guskey (2000) proposes a model of evaluation for professional development that considers the effects of professional development in light of the multiple mediating factors that impact professional development. He highlights that while it can be difficult to establish causal relationships between professional development and subsequent gains in student achievement in the absence of professional development that designs for evaluation from its genesis, improvement in student learning is never observed without the presence of professional development. The complicated context for professional learning means, in Guskey's view, that notions of effective professional development cannot account for all factors, but thoughtful evaluation practices, especially over time can establish evidence of relationships between professional development and changes in student learning outcomes.

Guskey (2000) proposes an evaluation model built on Guskey and Spark's (1996) model of relationship between professional development and improvements in student learning. The model highlights the complexities inherent in the system with the strongest relationships flowing from quality professional development through teacher knowledge and practices to improved student learning outcomes. Consistent with Elmore's (1997) claims that other managerial and contextual factors influence student outcomes; so, too, does Guskey and Sparks' (1996) model focus on the potential of professional development as an improvement lever if other factors are held constant. Evaluations that understand, account for, and address this complexity are essential to accurate understandings of the impact professional development has on student learning outcomes. Guskey (2000) encapsulates this notion in the statement

that "educational improvement efforts that do not take into consideration the complex nature of the relationship between professional development and improvement in student learning, or the various factors that impinge on that relationship, are unlikely to succeed…in [bringing about] high levels of learning for all students" (p. 77).

From this thinking, Guskey (2000) articulates a five-level approach to the evaluation of professional development. The levels move from participant's reactions, to participants' learning, to organization support and change, to participants' use of new knowledge and skills, and finally arrive at evaluation of student learning outcomes. While the TELL survey and analysis of student achievement data from state assessments do not address all of these levels, and thus do not represent as thorough an evaluation of professional development as Guskey articulates here, they do examine evidence from multiple levels of the evaluation model and address much of the complexity within the system. Further, examination of these data over time provide an additional depth of understanding not discussed by Guskey in his thinking about evaluation of more discrete professional development efforts and settings.

The New Teacher Center's research briefs related to the TELL survey also address the complex context for evaluating professional development in light of its relationship to student learning outcomes. The teaching and learning context measured by TELL has been demonstrated to predict changes in student achievement, impacts on teacher retention, and direct connections between higher student achievement and more positive teaching and learning contexts (New Teacher Center, 2014). These findings parallel the research conducted by others using different instruments

discussed above and validate the approach that will be outlined in future chapters for this study.

Research gap

This review of literature demonstrates that professional development and professional learning exist on a continuum and within a complex context. The context increasingly works to embed professional development and professional learning for teachers. This contextualization of professional development holds great promise for increased teacher professional learning and the subsequent adoption of improved practices, enhanced knowledge, and enacted skill by teachers in the classroom in ways that can positively impact student learning outcomes. When teachers do improve their effectiveness in the classroom, student learning also improves and thus it follows that careful examination of the conditions for teaching and learning alongside examination of student learning outcomes has the potential to yield important understandings about the role of professional development in improving student outcomes.

Each of the studies in this literature review call for additional research regarding professional development. Many of the calls for additional research are unique to the research project in question, but some themes emerge from the reviewed literature. Some researchers call for a move beyond understandings of "learning communities per se" to discuss in greater depth "the content such groups discuss and the nature of the intellectual work they are engaged in" (Kennedy, 2016). Additionally, many of the studies contained herein lack specific connections to evaluations of professional development that include measures of impact on student

achievement. These measures are either called for or mentioned as areas for further inquiry in multiple studies (Blank & de las Alas, 2009; Borko, 2004; Desimone, 2009; Kennedy, 2016). Finally, Kennedy (2016) makes a call for research about "the nature of professional development expertise" including the selection of providers of professional development, the characteristics of their preparation, instruction, classrooms, and the assessment of their efficacy. In a contextualized understanding of professional development this notion becomes still more complex and worthy of additional study.

For these reasons, it is necessary to examine closely the context for teaching and learning in the state of Oregon alongside the attendant student learning outcomes. While previous research using TELL survey data and annual state assessments has demonstrated connections between teaching and learning conditions (Ladd, 2009; Ferguson & Hirsch, 2014; Kraft & Papay, 2012) no studies have examined a single state's data in both domains, professional development and student learning outcomes over time to determine trends and patterns that may point future research toward promising districts and schools whose experiences may be instructive for future efforts to leverage professional development for improved student learning and overall systemic improvements.

Chapter 3: Methodology

The following chapter discusses the methodology used to identify the relationship between changes in teacher perception of professional learning conditions and changes in student achievement. The study examined conditions as measured by three state-wide administrations of the New Teacher Center's Teaching, Empowering, Leading, and Learning (TELL) Survey in Oregon from 2014 to 2018 and contemporaneous student achievement data from Oregon state achievement tests. Analysis focused on changes in teacher perceptions of their professional learning conditions as measured by the TELL Survey which defines professional development as the "availability and quality of learning opportunities for educators to enhance their teaching" (TELL, 2017, p. 3) as the independent variable. Student outcomes as measured by Oregon's official state assessment in English language arts and mathematics, the Smarter Balanced Assessment, are used as dependent variables to identify promising cases for future study based on the correlation of adult professional learning to increases in student outcomes. The analysis examined the data at both the school and district levels for significant relationships. Discussion of the research questions, methodology, participants and setting, instrumentation, and data analysis follow.

Research Questions and Hypothesis

The study is constructed around the following three research questions:

1. How have measures of student achievement and teacher professional development changed over time in districts and schools in Oregon?

2. How do the changes in professional development correlate to student outcomes on the Smarter Balanced Assessment in Math and English?

3. Which Professional Development factor(s) are most closely related to or predictive of subsequent changes in student outcomes?

Though the research documenting direct relationships among professional development gains and student achievement gains is scarce, the logic of that relationship is well founded based on the literature discussed in Chapter 2. This study hypothesizes that such a relationship exists and employs methodology designed to address the research questions while also controlling for intervening factors that often confound studies seeking to document similar relationships.

Rationale for Methodology

This quantitative study performed analysis of variance (ANOVA) and repeated measures analysis of variances (RM-ANOVA) to examine the changes in measures of student achievement on the Smarter Balanced Assessment (SBA) in Math and English (ELA) teacher professional development on the TELL survey. According to Warner (2013) ANOVA allows the researcher to compare means of subjects on quantitative measures with multiple groups of study participants. ANOVA limits Type I error by conducting an omnibus *F* test for which can be examined for significance using the measure of Pearson's *r*. Post hoc tests subsequent to a significant finding for *F* allow for determination of between group differences and their relative effect size via the calculation of Eta-squared. Consistent with exploratory study methodology discussed by Warner (2013) all post hoc tests used the Bonferroni correction to limit Type I error

in the determination of statistical significance. Results reported herein use this corrected measure of statistical significance at the $p < .05$ level.

While ANOVA allows for between group distinctions, RM-ANOVA helps to examine the unit of analysis over time on repeated administrations of the same instrument to the same subjects—for the purpose of this study, the subjects are the schools themselves. This within-subjects analysis establishes the significance of grouping variables across the multiple years of SBA and TELL data. The resultant output of this analysis is a measure of the statistical significance of change over time and the effect of independent variables on that change using Eta-squared. Warner (2013) cautions that a limitation of RM-ANOVA is that basic assumptions of linearity and sphericity must be met in order to interpret effect size measures accurately.

Because both ANOVA and RM-ANOVA generate a measure of effect size using Eta-squared, interpretation of eta-squared values must be established. This study aligned with Cohen's (1988) interpretation of small effects ($\eta^2 < .02$), medium effects ($.02 < \eta^2 < .06$), large effects ($.06 < \eta^2 < .16$), very large effects ($.16 < \eta^2 < .50$), and extremely large effects ($\eta^2 > .50$) because the focus of this interpretation is on the effects relative to each other within the study rather than on the generalizability of the effect across a broader population as might be more appropriate in a study that samples schools for comparison with the population at large.

Linearity was examined through correlation analysis within instruments and across instruments and administrations. Correlation measures the strength of relationship between one or more independent variables and a dependent variable

through the computation of a correlation coefficient known as Pearson's correlation. Cohen et al. (2003) define a correlation coefficient as the standard measure of the linear relationship between two variables ranging between -1.00 and +1.00. Perfect correlations, those with an absolute value equal to 1 mean that knowledge of one variable would allow for perfect prediction of the other. In social sciences, the general interpretation of these correlation coefficients relates to the correlation size with 0.8 to 1.0 indicating a very strong relationship, 0.6 to 0.8 indicating a strong relationship, 0.4 to 0.6 indicating a moderate relationship, 0.2 to 0.4 indicating a weak relationship, and 0.0 to 0.2 indicating a weak or no relationship (Muijs, 2011). This study conforms to the standard interpretation of statistical significance in social science research that $p < .05$ is statistically significant. That is, that the results of statistical tests can be understood to be non-random more than 95% of the time.

The unit of analysis for this study is the school, even though both the SBA data and the TELL data are generated by individual students and teachers. Consistent with Ingersoll, Sirinides, and Dougherty's (2017) approach to analyzing TELL and student achievement data across many schools, this study focused on the between group variation among schools using the percent of passing scores for SBA and the percent of agreement scores on the TELL as the raw scores for the school. This treatment of the scores assumes that schools themselves remain relatively stable in terms of student and staff population demographics and does not account for mobility and variability of individuals within schools during the study period as this is beyond the scope of the present study. Implications of this limitation are discussed further in Chapter 5.

Participants and Setting

The data for the study draw from two publicly available data sets shared by the Oregon Department of Education which oversees the education of 578,947 students (ODE, 2017). These students are taught by 31,140 teachers in Oregon's 1,240 public schools which are organized into 198 school districts. The study period is from 2014 to 2018, during which time the student population in Oregon grew by 11,890 students, or about 2%. Teaching staff for the same period increased by approximately 9% statewide. Oregon school districts vary in size with small districts (1 to 999 students) comprising 58% of Oregon districts, medium districts (1,000 to 6,999 students) comprising 33% of districts, and large school districts (7,000+ students) comprising the remaining 9%. Conversely, in 2018, small districts accounted for only 7% of students compared to 38% attending medium districts, and 55% attending large districts (ODE, 2017).

Data on student and teacher race/ethnicity indicate increased numbers of students and staff of color during the study period though both saw increases of less than 2%. State data indicate that 67% of Oregon students are White, 2% are Black, 23% are Hispanic, 4% are Asian, 1% are Hawaiian/Native Pacific Islander, 1% are American Indian/Alaska Native, and 6% are Multi-racial. Teacher demographics differ particularly for the White and Hispanic groups. Teacher race/ethnicity data indicate that teachers are 91% White, 1% Black, 5% Hispanic, 2% Asian, <1% Hawaiian/Native Pacific Islander, 1% American Indian/Alaska Native, and 2% Multi-racial.

Two other demographic factors often reported in connection with student achievement, and therefore relevant to study demographics, are English Language Learner status and Free/Reduce Price Lunch status. State reports indicate that there are 2,833 English Language Learner students comprising 4% of the student population statewide. Free/Reduced Price Lunch data, an indicator of Socio-Economic status, indicate that 51% of Oregon students are eligible for Free/Reduced Price Lunch and may therefore be considered economically disadvantaged for the purposes of student achievement test reporting (ODE, 2017).

Sampling

The study participants are drawn from the Oregon public school population described above. Districts and schools in the study were selected based on participation in each of the study's instruments at or above the reporting threshold for each instrument for the duration of the study period. For the TELL Survey, participant districts had to exceed the instrument's participation threshold of 35% of licensed district staff including at least 20 total participants. Individual schools had to exceed a 40% participation rate among licensed staff for inclusion. Districts and schools not meeting this participation threshold for each of the three TELL administrations were excluded from the study. For the Smarter Balanced Assessment, study participants were only included if participation rates were above the state required 94.5% participation threshold. In 2016 and 2018, 54% of licensed staff in Oregon participated in the TELL survey, which was down from 60% in 2014 (TELL, 2018). As a result, the study sample population may differ slightly from the overall population in ways

that will be reported in the discussion of the study data in Chapters 4 and 5. Substantive differences were noted as limitations of the study and included in discussions of areas for future research covered in Chapter 5. The instruments themselves are each discussed in detail in the section that follows.

Instrumentation

This investigation occurs through analysis of TELL survey data and Smarter Balanced Assessment data. Specifics of the data sampled from these instruments, their constructs, reliability, and validity are discussed individually below. The study includes only those districts and schools that participated in all instrument administrations during the study period.

Teaching, Empowering, Leading, and Learning Survey. According to information provided by the New Teacher Center (2017) in their analysis of cross-state TELL survey results, The TELL Survey was initially developed based on the North Carolina Teacher Working Conditions Survey, which was first administered in 2002. Since that time 13 states, 18 districts, and several groups of independent districts and schools have administered the TELL. Each administration has been facilitated by the New Teacher Center to ensure the that administration of the survey conforms with standardization procedures. In managing their administration of the survey, states have discretion to modify, remove, or add survey items relative to their particular context and areas of concern, though only one such additional question has been added to the Oregon instrument since its implementation in 2014. That question is the 13th question in the Professional Development construct and appeared for the first time on the 2016

administration of the survey. All constructs, including this newest one, are discussed in detail later in this chapter.

In Oregon, the survey has been administered biennially beginning in 2014. It is administered anonymously online, and all licensed educators statewide are invited to participate in the survey. To ensure anonymity, results for individual districts are reported only when district participation exceed 35% of licensed staff members and a minimum participation threshold of 20 individuals. Individual school data are reported only when participation exceeds 40% of the licensed staff. State-wide participation in 2018 included 54% of the licensed staff population in the state with a total of 19,556 individuals participating (TELL, 2018).

The survey includes eight constructs covering a range of indicators of district and school effectiveness including: (a) facilities and resources, (b) community support and involvement, (c) school leadership, (d) managing student conduct, (e) instructional practices and support, (f) teacher leadership, (g) professional development, and (h) use of time. The number of questions within each construct vary from a minimum of six for the facilities and resources construct to a maximum of 13 in the professional development construct. Definitions for each of the constructs provided by the survey developers are included in Table 1 below.

Table 1

TELL Constructs and Descriptors

TELL Construct	Description
Facilities and Resources	Availability of instructional, technology, office, communication, and school resources to educators
Community Support & Involvement	Community and parent/guardian communication and influence in the school
School Leadership	Ability of school leadership to create trusting, supportive environments and address teacher concerns
Managing Student Conduct	Policies and practices to address student conduct issues and ensure a safe school environment
Instructional Practices & Support	Data and support available to teachers to improve instruction and student learning
Teacher Leadership	Teacher involvement in decisions that impact classroom and school practices
Professional Development	Availability and quality of learning opportunities for educators to enhance their teaching
Use of Time	Available time to plan, to collaborate, to provide instruction, and to eliminate barriers in order to maximize instructional time during the school day

Note. Data compiled from TELL Survey (2018)

This study is limited to the questions within the Professional Development construct on the TELL survey. The Professional Development construct included 13 questions in the 2018 Oregon administration of the TELL. The first administration of the TELL survey in Oregon included only 12 questions. Question 13, “Professional development in this school supports teachers in developing formative assessments

aligned to standards" (TELL, 2018) was added in 2016 and also appeared in the most recent administration of the survey. For each of the prompts, survey participants may choose one of five response options including "strongly disagree," "disagree," "agree," "strongly agree," and "don't know." In general, results for the survey are reported as percentage of respondents who agree or strongly agree with individual questions. The entire 2018 TELL instrument is included in Appendix 1. The 13-question prompts for the Professional Development construct on the 2018 TELL are enumerated below along with the brief labels that will be employed in results reporting for this study which are appended as a parenthetical to each statement (TELL, 2018):

1. Sufficient resources are available for professional development in my school. (Resources)
2. An appropriate amount of time is provided for professional development. (Time)
3. Professional development offerings are data driven. (Data-driven)
4. Professional learning opportunities are aligned with the school's improvement plan. (Alignment)
5. Professional development is differentiated to meet the needs of individual teachers. (Differentiation)
6. Professional development deepens teachers' content knowledge. (Content)
7. Teachers are encouraged to reflect on their own practice. (Reflection)
8. In this school, follow up is provided from professional development. (Follow-up)

9. Professional development provides ongoing opportunities for teachers to work with colleagues to refine teaching practices. (Colleagues)
10. Professional development is evaluated and results are communicated to teachers. (Evaluation)
11. Professional development enhances teachers' ability to implement instructional strategies that meet diverse student learning needs. (Implementation)
12. Professional development enhances teachers' abilities to improve student learning. (Learning)
13. Professional development in this school supports teachers in developing formative assessments aligned to standards. (Assessment)

The validity and reliability of the TELL survey have been established through both an internal review process including factor analyses and reliability tests to generate internal consistency estimates conducted by the New Teacher Center consistent with guidelines from the Standards for Educational and Psychological Testing (American Educational Research Association, American Psychological Association and National Council on Measurement in Education, 2014). Additionally, an external analysis was conducted by Swanlund (2011) in conjunction with the Gates Foundation's Measuring Effective Teachers Project. Both analyses have demonstrated that the instrument is valid. Validity means that each construct, in fact, measures what it intends to measure without overlapping with other constructs (Muijs, 2011). New Teacher Center (2014) found via a component correlation matrix that all eight constructs have factor correlations below .70 and are therefore valid constructs for

inclusion in the survey. Individual factors that correlate above this threshold could be understood as being too closely related and potentially measuring the same thing. Additionally, the constructs were analyzed for their reliability to ensure that they were consistent across multiple administrations with similar populations by calculating a Cronbach's alpha. Alpha coefficients above .70 are considered acceptable (George & Mallory, 2003) and all eight constructs were found to have alpha coefficients above .80 (NTC, 2014).

Smarter Balanced Assessment. The Smarter Balanced Assessment (SBA), developed by the Smarter Balanced Assessment Consortium (SBAC) in collaboration with numerous state education agencies in Oregon, has among its purposes to produce valid, reliable, and fair information about students' English and Math achievement levels relative to the Common Core State Standards (SBAC, 2017). The assessment also serves to measure proficiency of students relative to grade level standards as they progress toward college and career readiness. For this reason, the SBAC has carefully constructed an assessment that is reliable for the overall population and target sub-populations. Further, the assessment design allows for the reporting of cut scores that have a strong rationale connecting the scores to measures of proficiency on relevant standards while also providing precision and consistency. The SBAC reports strong correlations of item scores with overall performance on relevant measures of academic achievement and weak correlations of item scores with demographic characteristics. Multiple arguments for validity and comparisons with similar assessments indicate that the SBA is a valid instrument for its intended purpose.

Reliability of the Smarter Balanced Assessment was established through statistical testing of an achievement level setting population at both the overall and claim levels for both English Language Arts and Math (SBAC, 2017). The assessments are organized into "claims" which focus on specific categories within the overall score. The English Language Arts claims include (a) reading, (b) writing, (c) speaking/listening, and (d) research. The Math claims include (a) concepts and procedures, (b) problem-solving/modeling, (c) communicating reasoning, and (d) data analysis. Bias in the overall scores was found to be both small and insignificant and, while some systemic bias was identified in some claim scores with fewer items, the computer adaptive format of the test allows for error control at the claim level. Marginal reliability for target sub-populations was also calculated using achievement level setting populations and found to be reliable across all demographic groups, though slightly less so in the first decile only (SBAC, 2017). This means that the assessment results are least accurate for those test takers scoring in the bottom 10 percent and are most accurate for those test takers earning the highest scores.

Because the Smarter Balanced Assessment is a large, computer-adaptive assessment employed for state and federal level accountability, the complete instrument is not included as an appendix to this study. However, blueprints of the instrument and extensive research related to its reliability and validity are widely available online via the Oregon Department of Education website, the Smarter Balanced Assessment Consortium website and other resources. Each of these are included in the reference section of this study.

Data Analysis

The study began with an exploration and description of the data using descriptive statistics. The sample demographic disaggregation included district and school size (small, medium, and large) using Oregon Department of Education thresholds; district and school socioeconomic status (SES) or poverty level using Free and Reduced Lunch participation percentages with a 40% threshold for high and low poverty groupings; and English language learner (ELL) percentages with a 40% threshold for high ELL and low ELL groupings. This disaggregation is reported and used for comparison grouping to understand potential interference with observed correlations. For example, if a very strong relationship ($r > 0.8$) is identified between changes in professional development and SBA scores in one district but not another, comparison of the strength of other variables' relationship to the dependent variable may better explain the observed differences. Comparisons like these using Pearson's correlation coefficient help more accurately identify the potential relationships between professional development and student outcomes. Discussion of substantive differences between participant district and schools and the overall population will be reported. In addition to analysis of the raw agreement percentages, change over time in scores were accounted for through the calculation of change scores which are a sum of mean changes on all measures. Subsequent to this description, analysis focused on the three research questions as described in Table 2 below.

Table 2

Focus questions and research methods

Focus Question	Method
1. How have measures of student achievement and professional development changed over time in districts and schools in Oregon?	Review and analysis of SBA Math, SBA ELA, and TELL survey data across the study period using ANOVA and RM-ANOVA including disaggregation for districts and schools by school size, type, and demographics
2. How do the changes in professional development correlate to student outcomes on the Smarter Balanced Assessment in Math and English?	Analysis of correlation between changes in TELL (% agreement on PD construct overall) and changes in Student pass rate (3s/4s on SBA Math and ELA)
3. Which Professional Development factor(s) measured by the TELL survey are most closely related to changes in student outcomes?	Analysis of correlation between changes in TELL (% agreement on construct items 1-13) and changes in student pass rates

Following data disaggregation, ANOVA and RM-ANOVA analysis, the study employed correlation analysis to identify the existence of strong linear relationships within the data. These correlations are measured through the calculation of Pearson's correlation coefficient. Calculation of the correlation coefficient follows the formula $r = \frac{\sum_{i-1}^{n}(x_i-\bar{X})((Y_i-\bar{Y})}{(n-1)S_x-S_y}$ where X_i and Y_i are the SBA and TELL scores being compared and $\bar{X}$ and $\bar{Y}$ are the means for the SBA and TELL scores, *n* is the number of cases, and S_x and S_y represent the standard deviations for the variables (Muijs, 2011). Correlations were reported using accepted descriptions of correlation strength with $r <$ .10 labeled as a weak correlation, $r <$ .30 as labeled as a modest and $r <$ .50 labeled as

a moderate correlation, and $r < .80$ labeled as a strong correlation and $r > .80$ labeled as a very strong correlation (Muijs, 2011).

These analyses included controls for disaggregation by groups as discussed above and examinations of potential differences in effect sizes for various types of districts, schools, settings, or demographic groups within the study participants. The 13 individual question prompts within the Professional Development construct on the TELL survey were also compared via correlation analysis to determine the relative strength of their relationship to changes in student achievement.

Summary

The study investigated the relationships among responses to the TELL Professional Development construct and student achievement outcomes measured by the Smarter Balanced Assessment in Oregon from 2014 to 2018. Participants included those districts and schools that had reportable data for each of the instruments' administrations during the study period and were disaggregated for a variety of demographic factors. Analysis examined the relative strength of relationships among individual items within the construct and changes in student achievement outcomes. Chapter 4 discusses the demographics of the participants in greater detail and enumerates the results of the study's data analysis.

Chapter 4: Results

Introduction

This chapter reports the results of data analysis for four administrations of the Smarter Balanced Assessment (SBA) in both Math and English Language Arts (ELA) and three administrations of the Teaching, Empowering, Leading and Learning (TELL) survey between 2014 and 2018 in the state of Oregon. The analyses are organized around three research questions: (a) How have measures of student achievement and teacher professional development changed over time in Oregon, (b) How do the changes in professional development correlate to student outcomes on the Smarter Balanced Assessment in Math and English, and (c) Which professional development factor(s) measured by the TELL survey are most closely related to changes in student outcomes? Reporting of findings begin with a review of descriptive statistics for study schools and districts. These statistics include district sizes, descriptions of English Language Learner (ELL) and low Socio-Economic status (SES) populations followed by reports of changes in SBA and TELL results. Subsequent to this descriptive work, correlations within and among SBA and TELL results will be reported. The chapter will conclude with reporting regression analyses that follow from identified correlates.

Descriptive Statistics

The study includes 274 individual schools within 71 school districts which met study criteria of participation in all relevant instruments during the study period at or above public reporting thresholds. The sample represents 22% of schools in Oregon

and 37% of school districts. District sizes ranged from a minimum of 19 students in one study district to a maximum of 16,156; school sizes ranged from 19 to 1,064 students. The mean district size was 1,249 students with a district median of 432 students and a standard deviation of 2,432 students. The mean school size was 324 students with a school size median of 264 students and a standard deviation of 210 students. Distributions of district and school sizes are reflected below in Figure 1. School size categories were established using +/- 1 standard deviation from the mean school size resulting in categories of small (> 1 SD below the mean), medium (+/- 1 SD from mean), and large (> 1 SD above the mean). These categories included 17, 214, and 43 schools respectively.

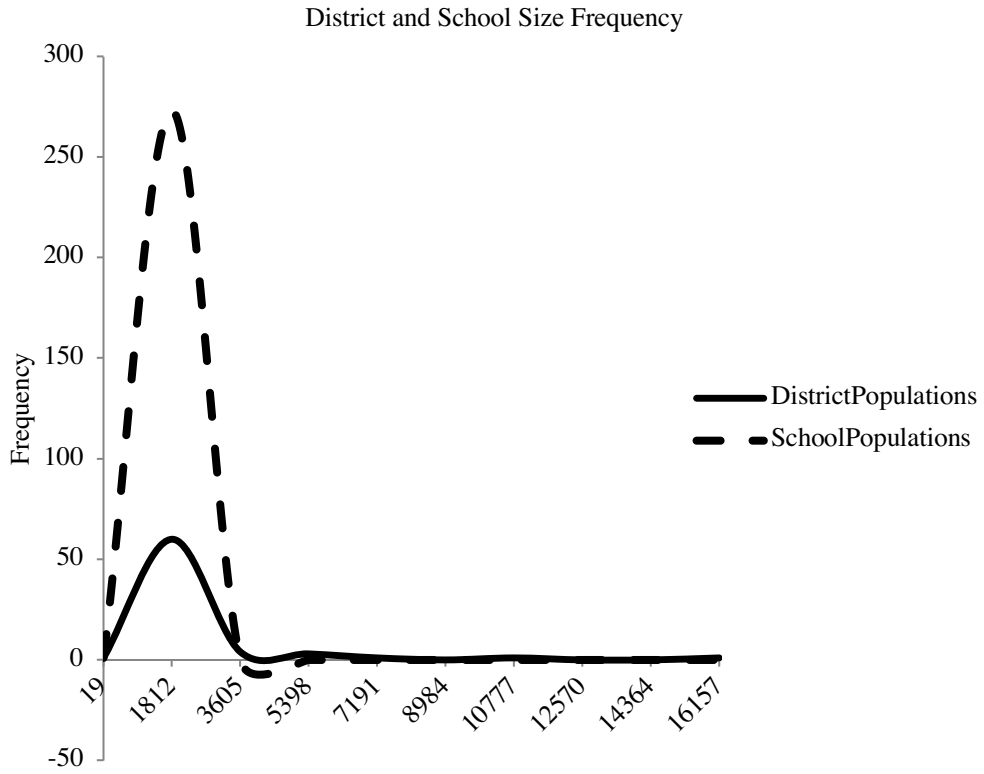

Figure 1. *Histogram of district and school populations.*

Two subgroups of interest to the study are English Language Learners (ELL) and students of low socio-economic status (SES). Populations for these groups in each school were determined using descriptive statistics based on the total participation rate of the 2018 Math SBA data. Of the 274 schools in the study group, 271 had reportable data for low SES students. The mean school population of low SES students was 188 with a minimum of 11 and maximum of 1,036 and a standard deviation of 153 students. In comparison to the total school population, the low SES population ranged from 3.7% of a school's total population to 100% of the school population with a median population of 60% and standard deviation among schools of 29%. English Language Learner (ELL) populations within schools were reportable in 129 of the 274 study schools and had population totals ranging from six to 166 with a mean of 47 and standard deviation of 39 students. As a percentage of their school's total population, ELL students comprised from 1.4% to 60.1% of a school's students with a mean of 16% and a standard deviation among schools of 13%. Demographics of study schools for each of these categorical grouping variables appear in Table 3 below.

Table 3

Demographic Characteristics of Study Schools (n = 274)

Characteristics	*n*	%
District size		
Small (1-999)	75	27
Medium (1000-6999)	127	46
Large (7000+)	72	26
School size		
Small (> 1 SD below mean))	17	6
Medium (+/- 1 SD of mean)	214	78
Large (> 1 SD above mean)	43	16
Poverty level		
Low poverty (< 40% of school population)	79	29
High poverty (> 40% of school population)	195	71
ELL level		
Low ELL (< 40% of school population)	263	96
High ELL (> 40% of school population)	11	4

Changes in SBA results

Cumulative change scores for each study school's total population were calculated for both the SBA Math and ELA. Change scores reflected the change in percent proficient across all administrations of the SBA during the study period. Mean change scores for all districts were negative for the study period with mean SBA Math scores declining by 1.23% and SBA ELA scores declining by -0.18% with standard deviations of 8.05% and 7.00% respectively. Distribution of change scores for all districts followed a relatively normal curve and are reflected in the histogram included as Figure 2 below.

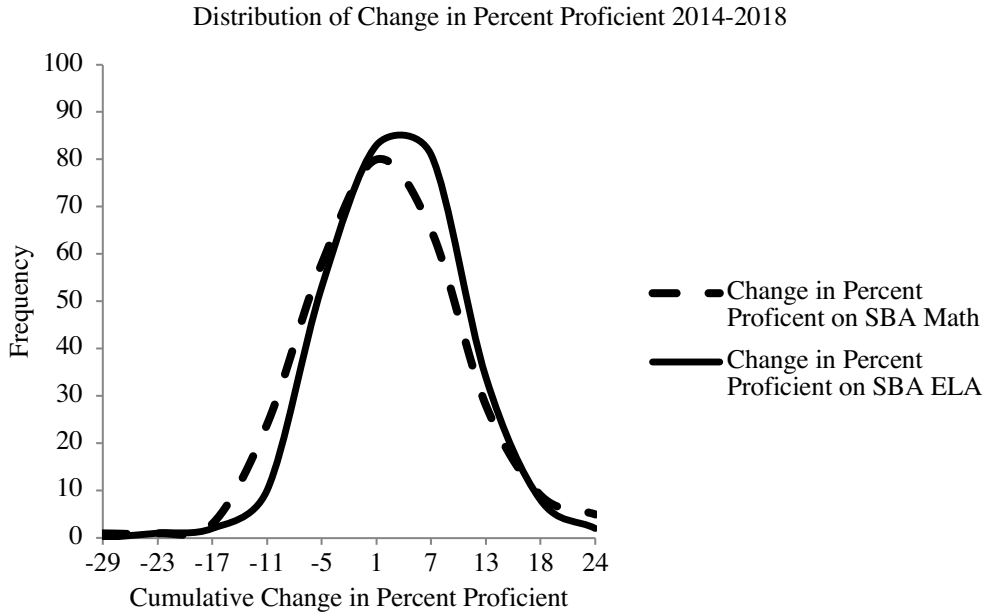

Figure 2. *Histogram of cumulative change scores on SBA 2014-2018.*

The statistical significance of these changes was explored through a repeated measure analysis of variance (RM-ANOVA). The results of this analysis indicted there was a statistically significant change over time in SBA Math among the study schools, $F(3, 819) = 8.82$, $p < .05$. Post hoc tests including a Bonferroni correction are reported in Table 4 below and identify statistically significant differences in SBA Math data from the 2016 test year to the 2017 test year and again from the 2017 to 2018 test year. Calculations of Eta-squared values for each of the statistically significant changes indicate small effect sizes for the observed changes.

Table 4

Post hoc results for RM-ANOVA of Math SBA results (n = 274)

Post hoc tests	Comparison	Mean Difference	*p**	η^2
2018 SBA Math				
	2018 vs. 2017	.66	.28	.01
	2018 vs. 2016	1.93	.00	.08
	2018 vs. 2015	1.23	.07	.02
2017 SBA Math				
	2017 vs. 2016	1.27	.00	.05
	2017 vs. 2015	.57	1.00	.01
2016 SBA Math				
	2016 vs. 2015	.70	.25	.02

*Bonferroni corrected *p.*

Scores on the SBA ELA were subjected to a similar analysis using RM-ANOVA which also indicated statistically significant changes over time among the 274 study schools, $F(3, 819) = 17.34$, $p < .05$. Post hoc tests for the SBA ELA RM-ANOVA reported below in Table 5 identify statistically significant changes across all years of the SBA ELA except when comparing the 2018 and 2015 test years where differences were not statistically significant. Eta-squared calculations of effect size suggest most of these changes had a small effect except for the change from 2016 to 2017 which demonstrates a large effect size.

Table 5

Post hoc results for RM-ANOVA of SBA ELA (n = 274)

Post hoc tests	Comparison	Mean Difference	*p**	η^2
2018 SBA ELA				
	2018 vs. 2017	1.33	.00	.06
	2018 vs. 2016	1.23	.01	.04
	2018 vs. 2015	.18	1.00	.00
2017 SBA ELA				
	2017 vs. 2016	2.56	.00	.19
	2017 vs. 2015	1.50	.00	.06
2016 SBA ELA				
	2016 vs. 2015	1.06	.01	.04

*Bonferroni corrected *p.*

Disaggregation of Smarter Balanced Assessment change scores

Smarter Balanced Assessment change scores were disaggregated by four factors: (a) district size, (b) school size, (c) poverty level, and (d) English language learner (ELL) population. Criteria for these disaggregation groups for district and school size (small, medium, and large) used Oregon Department of Education thresholds; district and school socioeconomic status (SES) or poverty level using Free and Reduced Lunch participation percentages with a 40% threshold for high and low poverty groupings; and English language learner (ELL) percentages with a 40% threshold for high ELL and low ELL as discussed earlier in this chapter and in Chapter 3's discussion of methodology. For each of these disaggregation criteria, an analysis of variance (ANOVA) was performed to determine the statistical significance of

observed changes in SBA Math and SBA ELA scores during the study period. Reporting of those ANOVA results follow.

SBA Change results by district size. Disaggregation by district size for SBA change scores reveals statistically significant differences in scores based on district size for SBA Math but not for SBA ELA scores. SBA scores in small districts reflected cumulative increases of 1.24% and 1.26% on math and ELA respectively, while medium and large districts' data reflect declines in the percentage of students who scored at or above the proficient level. The largest decline was in large districts' math scores with a mean decline of 3.81% over the study period. Comparison of percent proficient on SBA Math and ELA exams are reflected in Figure 3. SBA Math ANOVA results, $F(2, 271) = 7.60$, $p < .05$, indicate that changes in SBA Math scores were significantly different between small districts ($M = 1.24$, $SD = 8.91$) and large districts ($M = -3.81$, $SD = 6.23$) though comparisons did not indicate significant differences between these groups and medium size school districts ($M = -1.22$, $SD = 8.024$). The comparison of small and large districts yielded a weak effect for district size after a Bonferroni correction ($\eta^2 = .10$).

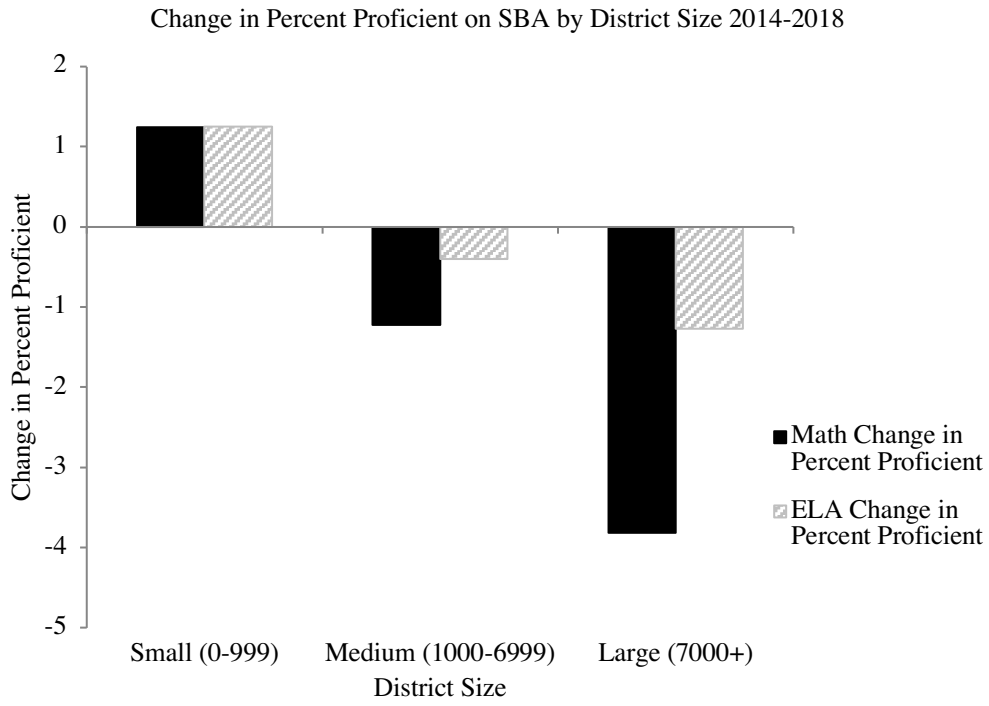

Figure 3. Change in percent proficient by district size.

SBA Change results by school size. Disaggregation by school size for SBA change scores revealed no statistically significant differences in scores based on school size for either SBA Math or SBA ELA scores. SBA scores in small schools reflected cumulative change of .34% and -2.6% on math and ELA respectively, while medium and large school's data reflected declines in the percentage of students who scored at or above the proficient level in math. The largest decline was in large schools' math scores with a mean change of -2.6% over the study period. Medium schools demonstrated an increase of 2.3% on SBA ELA scores while large schools' SBA ELA scores declined. Comparison of percent proficient on SBA Math and ELA exams are reflected in Figure 4. SBA Math ANOVA results, $F(2, 271) = .972$, $p = .38$,

indicate that changes in SBA Math scores were not significantly different among small schools (M = .34, SD = 13.26), medium schools (M = -1.08, SD = 8.02) and large schools (M = -2.59, SD = 4.99). SBA ELA ANOVA results similarly indicated no significant differences by school size, $F(2, 271) = 1.87$, p = .16, among small (M = -2.6, SD = 9.63), medium (M = .23SD = 7.11), and large schools (M = -1.23, SD = 4.73).

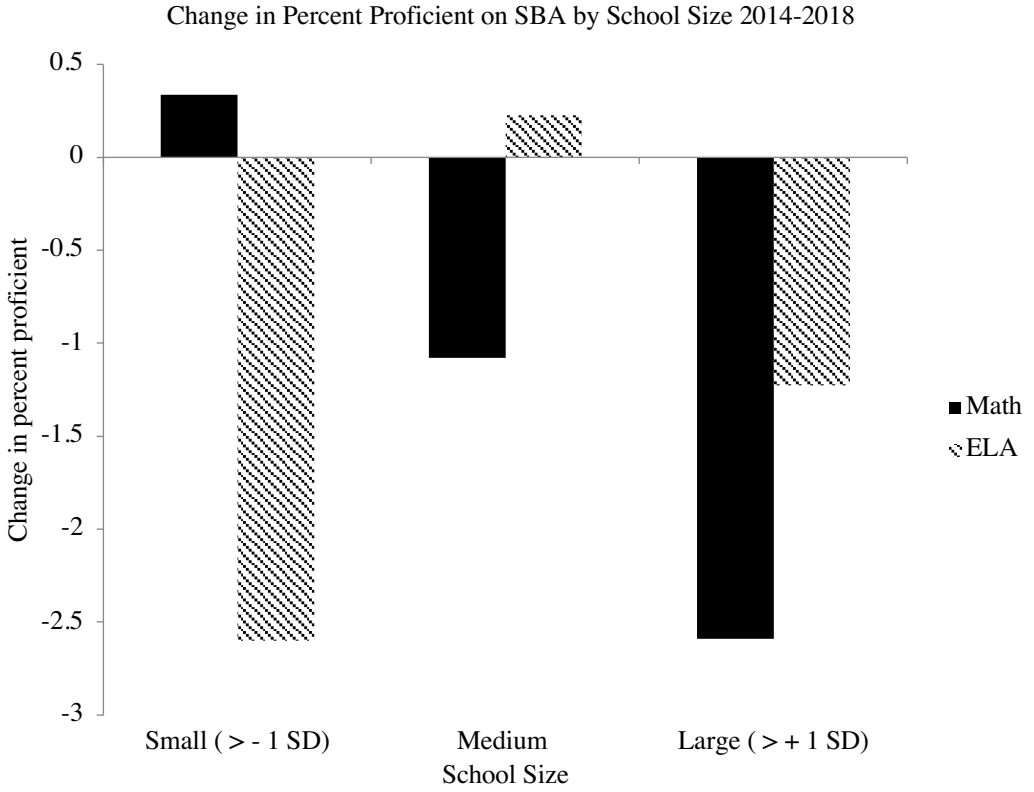

Figure 4. Change in percent proficient on SBA by school size 2014-2018.

SBA Change results by poverty level. Poverty levels in each district were also used to disaggregate cumulative change score data. Schools with poverty levels below 40% were considered "low poverty" and reported math scores lower by 0.12% during the study period and ELA scores higher by 0.98%. Schools with greater than 40% low

SES students were considered “high poverty” and reported declines of 1.68% on the math SBA and 0.65% on the SBA ELA. These scores are compared graphically in Figure 4. ANOVA results indicated that none of the groups differed significantly for either SBA Math, $F(1, 272) = 2.11$, $p = .15$, or SBA ELA $F(1, 272) = 3.06$, $p = .08$.

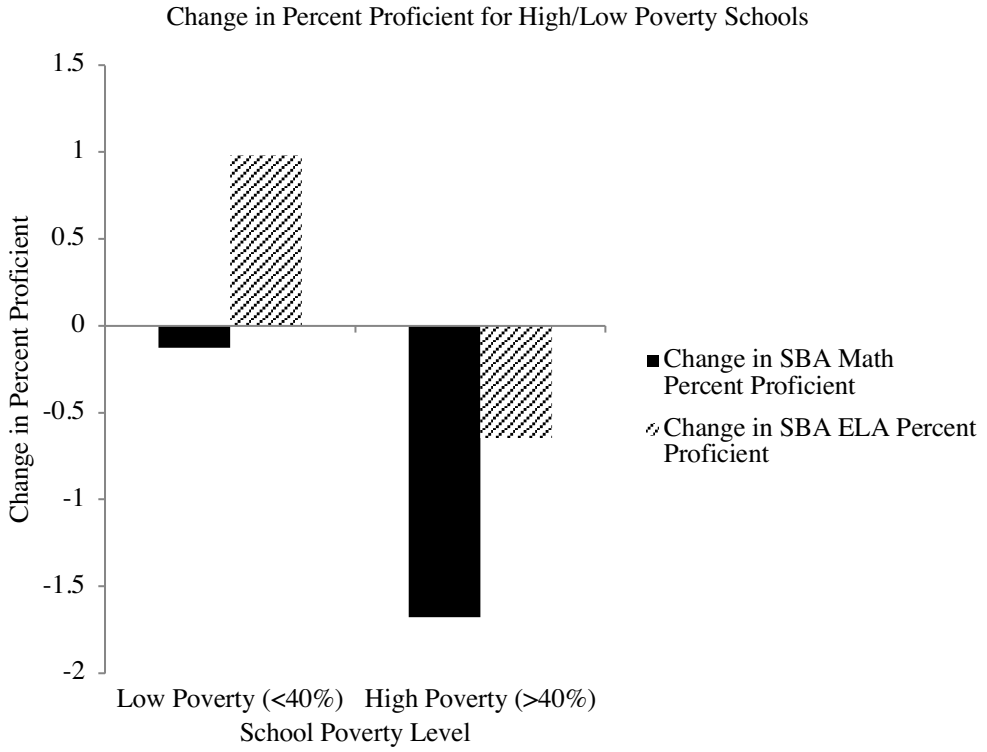

Figure 5. Change in percent proficient by poverty level.

SBA change results by ELL population. Disaggregation of change scores by ELL population, again using the 40% level for a distinction between high and low ELL population, showed declines in math performance for both high and low ELL schools of 4.81% and 1.08% respectively. Schools with high ELL populations also saw declines in ELA with scores for the study period dipping by 4.59% in contrast to low ELL population schools which realized a 0.01% improvement in ELA scores for

the same period. The contrasts are reflected in Figure 6. ANOVA results indicated that differences in math scores were not significant $F(1, 272) = 2.28$, $p = .13$, the differences in ELA scores were significant $F(1, 272) = 4.63$, $p = .03$ and had a small effect ($\eta^2 = .02$).

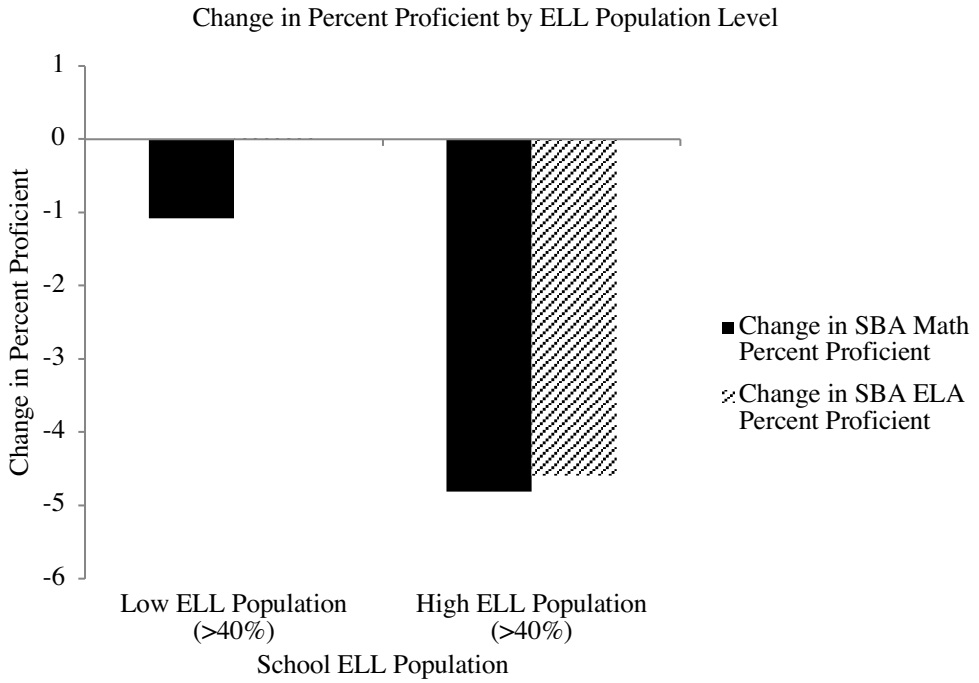

Figure 6. Change in percent proficient by ELL population.

Changes in TELL results overall and by question

Analysis of cumulative changes in TELL responses for all 13 questions within the professional development construct demonstrated a mean positive change for the study period. Repeated measures analysis of variance (RM-ANOVA) of mean scores for professional development across the study period demonstrated significant changes among administrations of the instrument for study schools, $F(2, 273) = 78.05$, $p < .05$. Table 6 below reports results of post hoc tests including a Bonferroni correction and

calculations of effect sizes for the differences among administrations of the TELL which indicate a large effect between 2016 and 2018 (η^2 = .07), and very large effects between 2014 and 2016 (η^2 = .20) and between 2014 and 2018 (η^2 = .32).

Table 6

Post hoc results of RM-ANOVA for overall TELL professional development scores (n = 274)

Post hoc tests	Comparison	Mean Difference	*p**	η^2
2018 TELL PD Overall				
	2018 vs. 2016	1.34	.00	.07
	2018 vs. 2014	3.97	.00	.32
2016 TELL PD Overall				
	2016 vs. 2014	2.63	.00	.20

*Bonferroni corrected *p.*

Differences in the overall changes in professional development for the study's disaggregated grouping variables revealed by ANOVA are reported in Table 7 below. Results show significant differences in overall professional development change scores based on district size, $F(2, 271) = 33.97$, $p < .05$, with a medium effect size for differences between small and medium districts (η^2 = .04), and very large effects for differences between medium and large districts (η^2 = .15), and small and large districts (η^2 = .33). An ANOVA using school size as the grouping variable also revealed significant differences, $F(2, 271) = 6.92$, $p < .05$, with effect size calculations ranging from medium in comparisons of small and medium schools (η^2 = .02) and medium and large schools (η^2 = .03), to very large when comparing small and large schools (η^2

= .15). ANOVA results were not significant for comparisons based on poverty level nor for comparisons based on ELL level.

Table 7

ANOVA results for changes in overall professional development scores disaggregated by grouping variables

	Small		Medium		Large		High		Low				
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*	η^2
District Size[a]	1.18	4.10	3.13	5.29	7.79	5.40					33.97	< .05	0.20
School Size[a]	0.34	2.82	3.66	5.24	6.00	7.19					6.92	< .05	0.05
Poverty Level[b]							3.53	5.70	4.55	5.30	1.88	0.17	
ELL Level[b]							6.91	4.75	3.69	5.60	3.52	0.06	

Note. District size *n* values for small (*n* = 75), medium (*n* = 127), and large (*n* = 72). School size *n* values for small (*n* = 17*),* medium (*n* = 214), and large (*n* = 43). Poverty level *n* values for high (*n* = 79) and low (*n* = 195). ELL Level *n* values for high (*n* = 11) and low (*n* = 263).
[a]*df* = 2, 271. [b]*df* = 1, 272.

Further analyses for each of the factors within the professional development construct also demonstrate mean positive changes across the study period. Repeated measures ANOVA for each of the factors are detailed in sections that follow to examine and report the significance and effect sizes of these changes over time. Following this analysis, ANOVA data with disaggregation by grouping factors of a) district size, b) school size, c) poverty level, and d) ELL level are also reported for each PD factor. Individual factors are labeled consistent with Chapter 3's keyword labels for each of the instrument prompts.

Resources. Analysis of the resources prompt—"sufficient resources are available for professional development in my school" (TELL, 2018)—over time using RM-ANOVA revealed significant differences across the administrations of the instrument, $F(2, 273) = 135.53$, $p < .05$. Table 8 below reports results of post hoc tests including a Bonferroni correction and calculations of effect sizes for the differences in the resources prompt among administrations of the TELL which indicate a large effect for differences between 2016 and 2018 ($\eta^2 = .14$), and very large effects for differences between 2014 and 2016 ($\eta^2 = .30$) and between 2014 and 2018 ($\eta^2 = .43$).

Table 8

Post hoc results for RM-ANOVA of TELL Resources prompt (n = 274)

Post Hoc tests	Comparison	Mean Difference	p*	η^2
2018 Resources prompt				
	2018 vs. 2016	2.38	.00	.14
	2018 vs. 2014	6.18	.00	.43
2016 Resources prompt				
	2016 vs. 2014	3.80	.00	.30

*Bonferroni corrected *p.*

Disaggregation of the resources prompt was subjected to ANOVA which yielded the results displayed in Table 9 below. Significant differences existed based on district size, school size, and poverty level. Poverty level had a medium effect size ($\eta^2 = .02$).

Table 9

Disaggregated ANOVA results for TELL resources prompt

	Small		Medium		Large		High		Low				
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*	η^2
District Size[a]	2.59	5.28	5.47	6.72	11.17	6.72					34.92	< .05	0.21
School Size[a]	1.47	3.43	5.80	6.75	9.91	8.28					10.66	< .05	0.07
Poverty Level[b]							5.63	7.00	7.53	7.06	4.09	< .05	0.02
ELL Level[b]							10.00	6.10	6.02	7.11	3.35	0.07	

Note. District size *n* values for small (*n* = 75), medium (*n* = 127), and large (*n* = 72). School size *n* values for small (*n* = 17*),* medium (*n* = 214), and large (*n* = 43). Poverty level *n* values for high (*n* = 79) and low (*n* = 195). ELL Level *n* values for high (*n* = 11) and low (*n* = 263).
[a]*df* = 2, 271. [b]*df* = 1, 272.

Subsequent post hoc tests to determine effect sizes of between group differences revealed a small effect for the difference between small and medium districts (η^2 = .05), a large effect for the difference between medium and large districts (η^2 = .14), and a very large effect for the difference between small and large districts (η^2 = .34). Medium effect sizes were found for differences in school size between small and medium size schools (η^2 = .03) and medium and large schools (η^2 = .05) while a very large effect size was found for the difference between small and large size schools (η^2 = .22). The results of these post hoc tests are displayed in Table 10 below.

Table 10

TELL resources construct post hoc results with Bonferroni correction comparing district and school size

Post Hoc tests	Comparison	Mean Difference	p*	η^2
District size				
	Small vs. Medium	2.88	.01	.05
	Small vs. Large	8.58	.00	.34
	Medium vs. Large	5.70	.00	.14
School size				
	Small vs. Medium	4.33	.03	.03
	Small vs. Large	8.44	.00	.22
	Medium vs. Large	4.11	.00	.05

Note. District size n values for small (n = 75), medium (n = 127), and large (n = 72). School size n values for small (n = 17*),* medium (n = 214), and large (n = 43). *Bonferroni corrected p.

Time. Analysis of the time prompt —"an appropriate amount of time is provided for professional development" (TELL, 2018)—over the study period using RM-ANOVA revealed significant differences across the administrations of the instrument, $F(2, 273) = 121.16$, $p < .05$. Table 11 below reports results of post hoc tests including a Bonferroni correction and calculations of effect sizes for the differences in the time construct among administrations of the TELL which indicate a large effect size for differences between 2016 and 2018 ($\eta^2 = .09$), and very large effect sizes for differences between 2014 and 2016 ($\eta^2 = .32$) and between 2014 and 2018 ($\eta^2 = .40$).

Table 11

Post hoc results for RM-ANOVA of TELL time construct (n = 274)

Post Hoc tests	Comparison	Mean Difference	p*	η^2
2018 Time prompt				
	2018 vs. 2016	1.95	.00	.09
	2018 vs. 2014	6.01	.00	.40
2016 Time prompt				
	2016 vs. 2014	4.06	.00	.32

*Bonferroni corrected *p.*

Disaggregation of the time prompt was subjected to ANOVA which yielded the results displayed in Table 12 below. Significant differences existed based on district size and school size.

Table 12

Disaggregated ANOVA results for TELL time prompt

	Small		Medium		Large		High		Low				
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*	η^2
District Size[a]	2.12	5.63	4.86	6.19	12.10	7.31					49.12	< .05	0.27
School Size[a]	1.12	4.43	5.85	7.00	8.74	9.04					7.01	< .05	0.05
Poverty Level[b]							5.62	7.41	6.99	7.31	1.94	0.17	
ELL Level[b]							9.82	6.29	5.85	7.41	3.06	0.08	

Note. District size *n* values for small (*n* = 75), medium (*n* = 127), and large (*n* = 72). School size *n* values for small (*n* = 17*),* medium (*n* = 214), and large (*n* = 43). Poverty level *n* values for high (*n* = 79) and low (*n* = 195). ELL Level *n* values for high (*n* = 11) and low (*n* = 263).
[a]*df* = 2, 271. [b]*df* = 1, 272.

Subsequent post hoc tests to determine effect sizes of between group differences revealed a small effect size for the difference between small and medium districts (η^2

= .05), very large effect sizes for both the difference between medium and large districts (η^2 = .22), and for the difference between small and large districts (η^2 = .37). Medium effect sizes were found for differences in school size between small and medium schools (η^2 = .03) and medium and large schools (η^2 = .02) while a very large effect size was found for the difference between small and large schools (η^2 = .16). The results of these post hoc tests are displayed in Table 13 below.

Table 13

TELL time prompt post hoc results with Bonferroni correction comparing district and school size

Post Hoc tests	Comparison	Mean Difference	*p**	η^2
District size				
	Small vs. Medium	2.74	.01	.05
	Small vs. Large	9.98	.00	.37
	Medium vs. Large	7.24	.00	.22
School size				
	Small vs. Medium	4.73	.02	.03
	Small vs. Large	7.63	.00	.16
	Medium vs. Large	2.89	.06	.02

Note. District size *n* values for small (*n* = 75), medium (*n* = 127), and large (*n* = 72). School size *n* values for small (*n* = 17*),* medium (*n* = 214), and large (*n* = 43).
*Bonferroni corrected *p.*

Data-driven. Analysis of the data-driven prompt—"professional development offerings are data driven" (TELL, 2018)—over the study period using RM-ANOVA revealed significant differences across the administrations of the instrument, $F(2, 273) = 12.41$, $p < .05$. Table 14 below reports results of post hoc tests including a

Bonferroni correction and calculations of effect sizes for the differences in the data-driven prompt among administrations of the TELL which indicate a medium effect sizes for differences between 2014 and 2016 (η^2 = .04) and between 2014 and 2018 (η^2 = .07). Differences between 2016 and 2018 were not significant.

Table 14

Post hoc results for RM-ANOVA of TELL data-driven prompt (n = 274)

Post Hoc tests	Comparison	Mean Difference	*p**	η^2
2018 Data-driven prompt				
	2018 vs. 2016	.52	.35	.01
	2018 vs. 2014	1.72	.00	.07
2016 Data-driven prompt				
	2016 vs. 2014	1.20	.00	.04

*Bonferroni corrected *p.*

Disaggregation of the data-driven prompt was subjected to ANOVA which yielded the results displayed in Table 15 below. Significant differences existed based on district size and ELL Level. ELL Level had a weak effect size (η^2 = .03).

Table 15

Disaggregated ANOVA results for TELL data-driven prompt

	Small		Medium		Large		High		Low				
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*	η^2
District Size[a]	-0.55	5.02	0.95	6.14	5.43	6.25					20.96	< .05	0.13
School Size[a]	-1.06	3.73	1.82	6.07	2.28	7.91					1.86	0.16	
Poverty Level[b]							1.45	6.34	2.38	6.20	1.24	0.27	
ELL Level[b]							7.27	6.34	1.48	6.21	9.18	< .05	0.03

Note. District size *n* values for small (*n* = 75), medium (*n* = 127), and large (*n* = 72). School size *n* values for small (*n* = 17*),* medium (*n* = 214), and large (*n* = 43). Poverty level *n* values for high (*n* = 79) and low (*n* = 195). ELL Level *n* values for high (*n* = 11) and low (*n* = 263).
[a]*df* = 2, 271. [b]*df* = 1, 272.

Subsequent post hoc tests to determine effect sizes of between group differences for district size revealed a large effect size for the difference between medium and large districts (η^2 = .11) and a very large effect size for the difference between small and large districts (η^2 = .22). The differences between small and medium districts were not significant. The results of these post hoc tests are displayed in Table 16 below.

Table 16

TELL data-driven prompt post hoc results with Bonferroni correction comparing district size

Post Hoc tests	Comparison	Mean Difference	p*	η^2
District size				
	Small vs. Medium	1.49	.23	.02
	Small vs. Large	5.98	.00	.22
	Medium vs. Large	4.49	.00	.11

Note. District size n values for small (n = 75), medium (n = 127), and large (n = 72).
*Bonferroni corrected p.

Alignment. Analysis of the alignment prompt—" professional learning opportunities are aligned with the school's improvement plan" (TELL, 2018)—over the study period using RM-ANOVA revealed significant differences across the administrations of the instrument, $F(2, 273) = 27.64$, $p < .05$. Table 17 below reports results of post hoc tests including a Bonferroni correction and calculations of effect sizes for the differences in the alignment construct among administrations of the TELL which indicate medium effect sizes for differences between 2016 and 2018 ($\eta^2 = .05$), and for differences between 2014 and 2016 ($\eta^2 = .06$), and a large effect size for differences between 2014 and 2018 ($\eta^2 = .14$).

Table 17

Post hoc results for RM-ANOVA of TELL alignment prompt (n = 274)

Post Hoc tests	Comparison	Mean Difference	*p**	η^2
2018 Alignment prompt				
	2018 vs. 2016	1.27	.00	.05
	2018 vs. 2014	2.80	.00	.14
2016 Alignment prompt				
	2016 vs. 2014	1.53	.00	.06

*Bonferroni corrected *p.*

Disaggregation of the alignment prompt was subjected to ANOVA which yielded the results displayed in Table 18. Significant differences existed based on district size and school size.

Table 18

Disaggregated ANOVA results for TELL alignment prompt

	Small		Medium		Large		High		Low				
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*	η^2
District Size[a]	0.23	4.97	2.17	6.71	6.58	7.22					19.09	< .05	0.12
School Size[a]	-0.82	3.45	2.67	6.39	4.86	9.11					4.49	< .05	0.03
Poverty Level[b]							2.39	6.96	3.82	6.46	2.50	0.12	
ELL Level[b]							6.46	5.61	2.65	6.85	3.30	0.07	

Note. District size *n* values for small (*n* = 75), medium (*n* = 127), and large (*n* = 72). School size *n* values for small (*n* = 17*),* medium (*n* = 214), and large (*n* = 43). Poverty level *n* values for high (*n* = 79) and low (*n* = 195). ELL Level *n* values for high (*n* = 11) and low (*n* = 263). [a]*df* = 2, 271. [b]*df* = 1, 272.

Subsequent post hoc tests to determine effect sizes of between group differences revealed a large effect size for the difference between medium and large districts (η^2 =

.09), and a very large effect size for the difference between small and large districts (η^2 = .21). The difference between small and medium districts was not significant. Post hoc tests of school size show that the difference between small and large schools had a large effect size (η^2 = .10). Other school size differences were not significant. The results of these post hoc tests are displayed in Table 19 below.

Table 19

TELL alignment prompt post hoc test results with Bonferroni correction comparing district and school size

Post Hoc tests	Comparison	Mean Difference	p*	η^2
District size				
	Small vs. Medium	1.95	.09	.02
	Small vs. Large	6.36	.00	.21
	Medium vs. Large	4.41	.00	.09
School size				
	Small vs. Medium	3.50	.08	.02
	Small vs. Large	5.68	.05	.10
	Medium vs. Large	2.19	.18	.01

Note. District size *n* values for small (n = 75), medium (n = 127), and large (n = 72). School size *n* values for small (n = 17*),* medium (n = 214), and large (n = 43).
*Bonferroni corrected *p*

Differentiation. Analysis of the differentiation prompt—"professional development is differentiated to meet the needs of individual teachers" (TELL, 2018)—over the study period using RM-ANOVA revealed significant differences across the administrations of the instrument, $F(2, 273) = 76.51$, $p < .05$. Table 20 below reports results of post hoc tests including a Bonferroni correction and

calculations of effect sizes for the differences in the differentiation prompt among administrations of the TELL, which indicate a medium effect size for differences between 2016 and 2018 (η^2 = .04), and very large effect sizes for differences between 2014 and 2016 (η^2 = .22) and between 2014 and 2018 (η^2 = .31).

Table 20

Post hoc results for RM-ANOVA of TELL differentiation prompt (n = 274)

Post Hoc tests	Comparison	Mean Difference	*p**	η^2
2018 Differentiation prompt				
	2018 vs. 2016	1.20	.00	.04
	2018 vs. 2014	4.24	.00	.31
2016 Differentiation prompt				
	2016 vs. 2014	3.03	.00	.22

*Bonferroni corrected *p*

Disaggregation of the differentiation prompt was subjected to ANOVA which yielded the results displayed in Table 21. Significant differences existed based on district size and school size.

Table 21

Disaggregated ANOVA results for TELL differentiation prompt

	Small		Medium		Large		High		Low				
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*	η^2
District Size[a]	1.60	4.54	3.55	5.49	8.19	7.34					25.30	< .05	0.16
School Size[a]	1.24	4.07	4.14	6.12	5.93	7.49					3.57	< .05	0.03
Poverty Level[b]							3.83	6.18	5.24	6.54	2.83	0.09	
ELL Level[b]							4.82	7.86	4.21	6.25	0.10	0.76	

Note. District size *n* values for small (*n* = 75), medium (*n* = 127), and large (*n* = 72). School size *n* values for small (*n* = 17*),* medium (*n* = 214), and large (*n* = 43). Poverty level *n* values for high (*n* = 79) and low (*n* = 195). ELL Level *n* values for high (*n* = 11) and low (*n* = 263). [a]*df* = 2, 271. [b]*df* = 1, 272.

Subsequent post hoc tests to determine effect sizes of between group differences revealed a medium effect size for the difference between small and medium districts (η^2 = .03), a large effect size for the difference between medium and large districts (η^2 = .11), and a very large effect size for the difference between small and large districts (η^2 = .23). After applying the Bonferroni correction, between group differences based on school size were not found to be significant. The results of these post hoc tests are displayed in Table 22 below.

Table 22

TELL differentiation prompt post hoc test results with Bonferroni correction comparing district and school size

Post Hoc tests	Comparison	Mean Difference	p*	η^2
District size				
	Small vs. Medium	1.95	.03	.03
	Small vs. Large	6.59	.00	.23
	Medium vs. Large	4.64	.00	.11
School size				
	Small vs. Medium	2.90	.17	.02
	Small vs. Large	4.69	.05	.09
	Medium vs. Large	1.79	.28	.01

Note. District size n values for small (n = 75), medium (n = 127), and large (n = 72). School size n values for small (n = 17*),* medium (n = 214), and large (n = 43). *Bonferroni corrected p.

Content-focus. Analysis of the content-focus prompt—" professional development deepens teachers' content knowledge" (TELL, 2018)—over the study period using RM-ANOVA revealed significant differences across the administrations of the instrument, $F(2, 273) = 65.96$, $p < .05$. Table 23 below reports results of post hoc tests including a Bonferroni correction and calculations of effect sizes for the differences in the content-focus prompt among administrations of the TELL which indicate a medium effect size for differences between 2016 and 2018 ($\eta^2 = .07$), and very large effect sizes for differences between 2014 and 2016 ($\eta^2 = .17$) and between 2014 and 2018 ($\eta^2 = .28$).

Table 23

Post hoc results for RM-ANOVA of TELL content-focus prompt (n = 274)

Post Hoc tests	Comparison	Mean Difference	p*	η^2
2018 Content-focus prompt				
	2018 vs. 2016	1.59	.00	.07
	2018 vs. 2014	4.25	.00	.28
2016 Content-focus prompt				
	2016 vs. 2014	2.65	.00	.17

*Bonferroni corrected *p.*

Disaggregation of the content-focus prompt was subjected to ANOVA which yielded the results displayed in Table 24 below. Significant differences existed based on district size and school size.

Table 24

Disaggregated ANOVA results for TELL content-focus prompt

	Small		Medium		Large		High		Low				
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*	η^2
District Size[a]	1.24	4.66	3.63	6.41	8.47	7.31					25.75	< .05	0.16
School Size[a]	0.29	2.91	5.25	6.51	5.79	8.53					4.08	< .05	0.03
Poverty Level[b]							3.88	6.84	5.15	6.64	1.97	0.16	
ELL Level[b]							7.82	6.51	4.10	6.78	3.19	0.08	

Note. District size *n* values for small (*n* = 75), medium (*n* = 127), and large (*n* = 72). School size *n* values for small (*n* = 17*),* medium (*n* = 214), and large (*n* = 43). Poverty level *n* values for high (*n* = 79) and low (*n* = 195). ELL Level *n* values for high (*n* = 11) and low (*n* = 263).
[a]*df* = 2, 271. [b]*df* = 1, 272.

Subsequent post hoc tests to determine effect sizes of between group differences revealed a medium effect size for the difference between small and medium districts (η^2 = .04), a large effect size for the difference between medium and large districts (η^2

= .11), and a very large effect size for the difference between small and large districts (η^2 = .26). A medium effect size was found for differences in school size between small and medium schools (η^2 = .03) and a large effect size was found for differences between small and large schools (η^2 = .10). The differences between medium and large schools for this construct were not significant after applying the correction. The results of these post hoc tests are displayed in Table 25 below.

Table 25

TELL content-focus prompt post hoc test results with Bonferroni correction comparing district and school size

Post Hoc tests	Comparison	Mean Difference	*p**	η^2
District size				
	Small vs. Medium	2.39	.02	.04
	Small vs. Large	7.23	.00	.26
	Medium vs. Large	4.84	.00	.11
School size				
	Small vs. Medium	3.96	.04	.03
	Small vs. Large	5.50	.04	.10
	Medium vs. Large	1.54	.55	.01

Note. District size *n* values for small (*n* = 75), medium (*n* = 127), and large (*n* = 72). School size *n* values for small (*n* = 17*),* medium (*n* = 214), and large (*n* = 43).
*Bonferroni corrected *p.*

Reflection. Analysis of the reflection prompt—"teachers are encouraged to reflect on their own practice" (TELL, 2018)—over the study period using RM-ANOVA revealed significant differences across the administrations of the instrument, *F(*2, 273) = 50.40, $p < .05$. Table 26 below reports results of post hoc tests including a

Bonferroni correction and calculations of effect sizes for the differences in the reflection prompt among administrations of the TELL which indicate large effect sizes for differences between 2016 and 2018 (η^2 = .09) and for differences between 2014 and 2016 (η^2 = .09), with very large effect sizes for differences between and between 2014 and 2018 (η^2 = .25).

Table 26

Post hoc results for RM-ANOVA of TELL reflection prompt (n = 274)

Post Hoc tests	Comparison	Mean Difference	*p**	η^2
2018 Reflection prompt				
	2018 vs. 2016	1.74	.00	.09
	2018 vs. 2014	3.62	.00	.25
2016 Reflection prompt				
	2016 vs. 2014	1.88	.00	.09

*Bonferroni corrected *p.*

Disaggregation of the reflection prompt was subjected to ANOVA which yielded the results displayed in Table 27 below. Significant differences existed based on district size, school size, and ELL level. ELL level had a medium effect size (η^2 = .02).

Table 27

Disaggregated ANOVA results for TELL reflection prompt

	Small		Medium		Large		High		Low				
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*	η^2
District Size[a]	1.40	4.97	2.68	6.52	7.61	5.41					23.83	< .05	0.15
School Size[a]	0.82	3.13	3.41	5.97	5.81	8.17					4.49	< .05	0.03
Poverty Level[b]							3.50	6.50	3.94	5.86	0.27	0.60	
ELL Level[b]							8.36	3.08	3.43	6.34	6.58	< .05	0.02

Note. District size *n* values for small (*n* = 75), medium (*n* = 127), and large (*n* = 72). School size *n* values for small (*n* = 17*),* medium (*n* = 214), and large (*n* = 43). Poverty level *n* values for high (*n* = 79) and low (*n* = 195). ELL Level *n* values for high (*n* = 11) and low (*n* = 263).
[a]*df* = 2, 271. [b]*df* = 1, 272.

Subsequent post hoc tests to determine effect sizes of between group differences revealed a large effect size for the difference between medium and large districts (η^2 = .13), and a very large effect size for the difference between small and large districts (η^2 = .27). The difference between small and medium school district sizes was not significant after applying the correction. Likewise, school size between group differences were not significant after applying the Bonferroni adjustment. The results of these post hoc tests are displayed in Table 28 below.

Table 28

TELL reflection prompt post hoc test results with Bonferroni correction comparing district and school size

Post Hoc tests	Comparison	Mean Difference	p*	η^2
District size				
	Small vs. Medium	1.28	.44	.01
	Small vs. Large	6.21	.00	.27
	Medium vs. Large	4.93	.00	.13
School size				
	Small vs. Medium	2.58	.24	.01
	Small vs. Large	4.99	.05	.09
	Medium vs. Large	2.41	.07	.02

Note. District size n values for small (n = 75), medium (n = 127), and large (n = 72). School size n values for small (n = 17*),* medium (n = 214), and large (n = 43). *Bonferroni corrected p.

Follow-up. Analysis of the follow-up prompt—"in this school, follow up is provided from professional development" (TELL, 2018)—over the study period using RM-ANOVA revealed significant differences across the administrations of the instrument, $F(2, 273) = 70.87$, $p < .05$. Table 29 below reports results of post hoc tests including a Bonferroni correction and calculations of effect sizes for the differences in the follow-up prompt among administrations of the TELL which indicate a medium effect size for differences between 2016 and 2018 ($\eta^2 = .04$), and very large effect sizes for differences between 2014 and 2016 ($\eta^2 = .21$) and between 2014 and 2018 ($\eta^2 = .29$).

Table 29

Post hoc results for RM-ANOVA of TELL follow-up prompt (n = 274)

Post Hoc tests	Comparison	Mean Difference	p*	η^2
2018 Follow-up prompt				
	2018 vs. 2016	1.11	.00	.04
	2018 vs. 2014	4.26	.00	.29
2016 Follow-up prompt				
	2016 vs. 2014	3.15	.00	.21

*Bonferroni corrected *p.*

Disaggregation of the follow-up prompt was subjected to ANOVA which yielded the results displayed in Table 30 below. Significant differences existed based on district size and school size.

Table 30

Disaggregated ANOVA results for TELL follow-up prompt

	Small		Medium		Large		High		Low				
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*	η^2
District Size[a]	1.81	5.25	4.09	6.45	7.11	7.19					12.84	< .05	0.09
School Size[a]	0.77	2.49	4.08	6.18	6.58	8.86					5.25	< .05	0.04
Poverty Level[b]							3.94	6.75	5.05	6.29	1.57	0.21	
ELL Level[b]							7.09	5.49	4.14	6.65	2.10	0.15	

Note. District size *n* values for small (*n* = 75), medium (*n* = 127), and large (*n* = 72). School size *n* values for small (*n* = 17*),* medium (*n* = 214), and large (*n* = 43). Poverty level *n* values for high (*n* = 79) and low (*n* = 195). ELL Level *n* values for high (*n* = 11) and low (*n* = 263). [a]*df* = 2, 271. [b]*df* = 1, 272.

Subsequent post hoc tests to determine effect sizes of between group differences revealed medium effect sizes for the differences between small and medium districts

(η^2 = .03) and for the difference between medium and large districts (η^2 = 04), and a large effect size for the difference between small and large districts (η^2 = .15). A large effect size was found for differences in school size between small and large school sizes (η^2 = .11). Other between group differences in school size were not significant. The results of these post hoc tests are displayed in Table 31 below.

Table 31

TELL follow-up prompt post hoc test results with Bonferroni correction comparing district and school size

Post Hoc tests	Comparison	Mean Difference	*p**	η^2
District size				
	Small vs. Medium	2.28	.03	.03
	Small vs. Large	5.30	.00	.15
	Medium vs. Large	3.02	.01	.04
School size				
	Small vs. Medium	3.31	.09	.02
	Small vs. Large	5.82	.03	.11
	Medium vs. Large	2.51	.08	.02

Note. District size *n* values for small (*n* = 75), medium (*n* = 127), and large (*n* = 72). School size *n* values for small (*n* = 17*),* medium (*n* = 214), and large (*n* = 43).
*Bonferroni corrected *p.*

Colleagues. Analysis of the colleagues prompt—"professional development provides ongoing opportunities for teachers to work with colleagues to refine teaching practices" (TELL, 2018)—over the study period using RM-ANOVA revealed significant differences across the administrations of the instrument, $F(2, 273) = 69.42$, $p < .05$. Table 32 below reports results of post hoc tests including a Bonferroni

correction and calculations of effect sizes for the differences in the colleagues prompt among administrations of the TELL which indicate a medium effect size for differences between 2016 and 2018 (η^2 = .07), and very large effect sizes for differences between 2014 and 2016 (η^2 = .17) and between 2014 and 2018 (η^2 = .30).

Table 32

Post hoc results for RM-ANOVA of TELL colleagues prompt (n = 274)

Post Hoc tests	Comparison	Mean Difference	*p**	η^2
2018 Colleagues prompt				
	2018 vs. 2016	1.64	.00	.07
	2018 vs. 2014	4.41	.00	.30
2016 Colleagues prompt				
	2016 vs. 2014	2.77	.00	.17

*Bonferroni corrected *p.*

Disaggregation of the colleagues prompt was subjected to ANOVA which yielded the results displayed in Table 33 below. Significant differences existed based on district size and school size.

Table 33

Disaggregated ANOVA results for TELL colleagues prompt

	Small		Medium		Large		High		Low				
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*	η^2
District Size[a]	1.32	5.00	3.50	6.34	9.22	6.48					34.07	< .05	0.20
School Size[a]	-0.47	4.05	4.18	6.10	7.47	8.96					9.58	< .05	0.07
Poverty Level[b]							4.06	6.79	5.27	6.56	1.80	0.18	
ELL Level[b]							7.91	6.41	4.26	6.72	3.12	0.08	

Note. District size *n* values for small (*n* = 75), medium (*n* = 127), and large (*n* = 72). School size *n* values for small (*n* = 17*),* medium (*n* = 214), and large (*n* = 43). Poverty level *n* values for high (*n* = 79) and low (*n* = 195). ELL Level *n* values for high (*n* = 11) and low (*n* = 263). [a]*df* = 2, 271. [b]*df* = 1, 272.

Subsequent post hoc tests to determine effect sizes of between group differences revealed a medium effect size for the differences between small and medium districts (η^2 = .03), a large effect size for the difference between medium and large districts (η^2 = .16), and a very large effect size for the difference between small and large districts (η^2 = .32). Medium effect sizes were found for differences in school size between small and medium size schools (η^2 = .04) and between medium and large schools (η^2 = .03). A very large effect size was found for differences between small and large school sizes (η^2 = .17). The results of these post hoc tests are displayed in Table 34 below.

Table 34

TELL colleagues prompt post hoc test results with Bonferroni correction comparing district and school sizes

Post Hoc tests	Comparison	Mean Difference	p*	η^2
District size				
	Small vs. Medium	2.18	.03	.03
	Small vs. Large	7.90	.00	.32
	Medium vs. Large	5.72	.00	.16
School size				
	Small vs. Medium	4.65	.01	.04
	Small vs. Large	7.94	.00	.17
	Medium vs. Large	3.28	.01	.03

Note. District size n values for small (n = 75), medium (n = 127), and large (n = 72). School size n values for small (n = 17*),* medium (n = 214), and large (n = 43). *Bonferroni corrected p.

Evaluation. Analysis of the evaluation prompt—"professional development is evaluated and results are communicated to teachers" (TELL, 2018)—over the study period using RM-ANOVA revealed significant differences across the administrations of the instrument, $F(2, 273) = 52.42$, $p < .05$. Table 35 below reports results of post hoc tests including a Bonferroni correction and calculations of effect sizes for the differences in the evaluation prompt among administrations of the TELL which indicate a small effect size for differences between 2016 and 2018 ($\eta^2 = .02$), and very large effect sizes for differences between 2014 and 2016 ($\eta^2 = .18$) and between 2014 and 2018 ($\eta^2 = .23$).

Table 35

Post hoc results for RM-ANOVA of TELL evaluation prompt (n =274)

Post Hoc tests	Comparison	Mean Difference	*p**	η^2
2018 Evaluation prompt				
	2018 vs. 2016	.66	.10	.02
	2018 vs. 2014	3.23	.00	.23
2016 Evaluation prompt				
	2016 vs. 2014	2.57	.00	.18

*Bonferroni corrected *p.*

Disaggregation of the evaluation prompt was subjected to ANOVA which yielded the results displayed in Table 36 below. Significant differences existed based on district size and school size.

Table 36

Disaggregated ANOVA results for TELL evaluation prompt

	Small		Medium		Large		High		Low				
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*	η^2
District Size[a]	1.12	4.17	2.61	5.82	6.53	6.15					19.24	< .05	0.12
School Size[a]	0.71	2.66	2.99	5.55	5.42	7.60					4.88	< .05	0.04
Poverty Level[b]							2.91	6.01	4.01	5.47	2.00	0.16	
ELL Level[b]							4.73	7.32	3.16	5.81	0.75	0.39	

Note. District size *n* values for small (*n* = 75), medium (*n* = 127), and large (*n* = 72). School size *n* values for small (*n* = 17*),* medium (*n* = 214), and large (*n* = 43). Poverty level *n* values for high (*n* = 79) and low (*n* = 195). ELL Level *n* values for high (*n* = 11) and low (*n* = 263). [a]*df* = 2, 271. [b]*df* = 1, 272.

Subsequent post hoc tests to determine effect sizes of between group differences revealed a large effect size for the differences between medium and large districts (η^2 = .09), and a very large effect size for the difference between small and large districts (η^2 = .21). Between group differences for small and medium districts were not significant for this prompt. A small effect size was found for differences in school size between medium and large school sizes (η^2 = .02) and a large effect size was found for differences in school size between small and large school sizes (η^2 = .10). Other between group differences in school size were not significant. The results of these post hoc tests are displayed in Table 37 below.

Table 37

TELL evaluation prompt post hoc test results with Bonferroni correction comparing district and school size

Post Hoc tests	Comparison	Mean Difference	p*	η^2
District size				
	Small vs. Medium	1.50	.16	.02
	Small vs. Large	5.42	.00	.21
	Medium vs. Large	3.92	.00	.09
School size				
	Small vs. Medium	2.28	.28	.01
	Small vs. Large	4.71	.05	.10
	Medium vs. Large	2.43	.04	.02

Note. District size n values for small (n = 75), medium (n = 127), and large (n = 72). School size n values for small (n = 17*),* medium (n = 214), and large (n = 43). *Bonferroni corrected p.

Implementation. Analysis of the implementation prompt—"professional development enhances teachers' ability to implement instructional strategies that meet diverse student learning needs" (TELL, 2018)—over the study period using RM-ANOVA revealed significant differences across the administrations of the instrument, $F(2, 273) = 64.71$, $p < .05$. Table 38 below reports results of post hoc tests including a Bonferroni correction and calculations of effect sizes for the differences in the implementation prompt among administrations of the TELL which indicate a medium effect size for differences between 2016 and 2018 ($\eta^2 = .06$), a large effect size for differences between 2014 and 2016 ($\eta^2 = .16$) and a very large effect size for differences between 2014 and 2018 ($\eta^2 = .29$).

Table 38

Post hoc results for RM-ANOVA of TELL implementation prompt (n = 274)

Post Hoc tests	Comparison	Mean Difference	p*	η^2
2018 Implementation prompt				
	2018 vs. 2016	1.47	.00	.06
	2018 vs. 2014	4.38	.00	.29
2016 Implementation prompt				
	2016 vs. 2014	2.91	.00	.16

*Bonferroni corrected *p.*

Disaggregation of the implementation prompt was subjected to ANOVA which yielded the results displayed in Table 39 below. Significant differences existed based on district size and school size.

Table 39

Disaggregated ANOVA results for TELL implementation prompt

	Small		Medium		Large		High		Low				
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*	η^2
District Size[a]	1.69	4.88	3.55	6.95	8.64	6.37					24.44	< .05	0.15
School Size[a]	0.24	2.68	4.17	6.37	7.07	8.84					6.89	< .05	0.05
Poverty Level[b]							4.15	7.01	4.94	6.30	0.74	0.39	
ELL Level[b]							7.46	5.85	4.25	6.83	2.35	0.13	

Note. District size *n* values for small (*n* = 75), medium (*n* = 127), and large (*n* = 72). School size *n* values for small (*n* = 17*),* medium (*n* = 214), and large (*n* = 43). Poverty level *n* values for high (*n* = 79) and low (*n* = 195). ELL Level *n* values for high (*n* = 11) and low (*n* = 263). [a]*df* = 2, 271. [b]*df* = 1, 272.

Subsequent post hoc tests to determine effect sizes of between group differences revealed a large effect size for the differences between medium and large districts (η^2 = .12), and a very large effect size for the difference between small and large districts

(η^2 = .28). Between group differences for small and medium districts were not significant for this prompt. A medium effect size was found for differences in school size between small and medium school sizes (η^2 = .03), a small effect size was found for differences between medium and large school sizes (η^2 = .02), and a large effect size was found for differences in school size between small and large school sizes (η^2 = .14). The results of these post hoc tests are displayed in Table 40 below.

Table 40

TELL implementation prompt post hoc test results with Bonferroni correction comparing district and school size

Post Hoc tests	Comparison	Mean Difference	p*	η^2
District size				
	Small vs. Medium	1.86	.13	.02
	Small vs. Large	6.95	.00	.28
	Medium vs. Large	5.09	.00	.12
School size				
	Small vs. Medium	3.93	.04	.03
	Small vs. Large	6.83	.01	.14
	Medium vs. Large	2.90	.04	.02

Note. District size n values for small (n = 75), medium (n = 127), and large (n = 72). School size n values for small (n = 17*),* medium (n = 214), and large (n = 43).
*Bonferroni corrected p.

Learning. Analysis of the learning prompt—"professional development enhances teachers' abilities to improve student learning" (TELL, 2018)—over the study period using RM-ANOVA revealed significant differences across the administrations of the instrument, $F(2, 273) = 56.73$, $p < .05$. Table 41 below reports

results of post hoc tests including a Bonferroni correction and calculations of effect sizes for the differences in the learning prompt among administrations of the TELL which indicate a medium effect size for differences between 2016 and 2018 (η^2 = .06), a large effect size for differences between 2014 and 2016 (η^2 = .14) and a very large effect size for differences between 2014 and 2018 (η^2 = .26).

Table 41

Post hoc test results for RM-ANOVA of TELL learning prompt

Post Hoc tests	Comparison	Mean Difference	*p**	η^2
2018 Learning prompt				
	2018 vs. 2016	1.51	.00	.06
	2018 vs. 2014	4.17	.00	.26
2016 Learning prompt				
	2016 vs. 2014	2.66	.00	.14

*Bonferroni corrected *p.*

Disaggregation of the learning prompt was subjected to ANOVA which yielded the results displayed in Table 42 below. Significant differences existed based on district size and school size.

Table 42

Disaggregated ANOVA results for TELL learning prompt

	Small		Medium		Large		High		Low				
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*	η^2
District Size[a]	1.23	5.04	3.28	6.98	8.81	6.90					27.31	< .05	0.17
School Size[a]	-0.06	3.05	3.91	6.57	7.16	9.31					7.34	< .05	0.05
Poverty Level[b]							3.86	7.36	4.94	6.32	1.30	0.26	
ELL Level[b]							7.64	6.28	4.03	7.09	2.76	0.10	

Note. District size *n* values for small (*n* = 75), medium (*n* = 127), and large (*n* = 72). School size *n* values for small (*n* = 17*),* medium (*n* = 214), and large (*n* = 43). Poverty level *n* values for high (*n* = 79) and low (*n* = 195). ELL Level *n* values for high (*n* = 11) and low (*n* = 263). [a]*df* = 2, 271. [b]*df* = 1, 272.

Subsequent post hoc tests to determine effect sizes of between group differences revealed a large effect size for the differences between medium and large districts (η^2 = .13), and a very large effect size for the difference between small and large districts (η^2 = .29). Between group differences for small and medium districts were not significant for this prompt. Medium effect sizes were found for differences in school size between small and medium school sizes (η^2 = .03), and for differences between medium and large school sizes (η^2 = .03), and a large effect size was found for differences in school size between small and large school sizes (η^2 = .14). The results of these post hoc tests are displayed in Table 43 below.

Table 43

TELL learning prompt post hoc test results with Bonferroni correction comparing district and school size

Post Hoc tests	Comparison	Mean Difference	p*	η^2
District size				
	Small vs. Medium	2.06	.08	.02
	Small vs. Large	7.58	.00	.29
	Medium vs. Large	5.52	.00	.13
School size				
	Small vs. Medium	3.97	.04	.03
	Small vs. Large	7.22	.01	.14
	Medium vs. Large	3.26	.02	.03

Note. District size *n* values for small (*n* = 75), medium (*n* = 127), and large (*n* = 72). School size *n* values for small (*n* = 17*),* medium (*n* = 214), and large (*n* = 43). *Bonferroni corrected *p.*

Assessment. Analysis of the assessment prompt—"professional development in this school supports teachers in developing formative assessments aligned to standards" (TELL, 2018)— over the study period using RM-ANOVA revealed no significant differences across the administrations of the instrument, $F(2, 273) = 1.42$, $p = .23$. Disaggregation of the assessment prompt was analyzed using ANOVA which yielded the results displayed in Table 44 below. No significant differences were found based on the disaggregation.

Table 44

Disaggregated ANOVA results for TELL assessment prompt

	Small		Medium		Large		High		Low				
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*	η^2
District Size[a]	-0.40	4.25	0.35	5.88	1.35	6.31					1.80	0.17	
School Size[a]	0.24	3.93	0.30	5.51	1.00	6.73					0.29	0.75	
Poverty Level[b]							0.62	5.79	-0.13	5.19	0.99	0.32	
ELL Level[b]							0.46	3.86	0.40	5.69	0.00	0.98	

Note. District size *n* values for small (*n* = 75), medium (*n* = 127), and large (*n* = 72). School size *n* values for small (*n* = 17*),* medium (*n* = 214), and large (*n* = 43). Poverty level *n* values for high (*n* = 79) and low (*n* = 195). ELL Level *n* values for high (*n* = 11) and low (*n* = 263). [a]*df* = 2, 271. [b]*df* = 1, 272.

Overall Correlations

The next layer of analysis shifts focus to the second and third research questions: (a) how do the changes in professional development relate to student outcomes on the smarter balance assessment in math and English, and (b) which professional development factor(s) measure by the TELL survey are most closely related to changes in student outcomes? Correlation analyses first established whether there was a relationship among administrations of the instruments themselves. Comparisons of the SBA math and ELA assessments across administrations and with cumulative change scores yielded the correlation matrix that appears in Table 45 below, which includes significant and strong correlations ($r > .60$) across all administrations of the SBA, as well as correlations between individual SBA administrations and calculated cumulative change scores for both SBA Math and ELA. Significant correlations were not observed between cumulative change scores for SBA math and the 2015 and 2015

administrations of the SBA ELA exam, nor for the 2016 SBA math exam. The cumulative change score for SBA ELA demonstrated significant correlations with all measures except 2015 and 2016 SBA Math and 2016 and 2017 SBA ELA. Other observed correlations among individual test scores with change scores were in the weak to moderate range ($0 < r < .40$). Table 45 below details all correlations.

Table 45

Correlation matrix for SBA test results including cumulative change

	1	2	3	4	5	6	7	8	9
1. 2018 SBA Math	_								
2. 2017 SBA Math	0.95*	_							
3. 2016 SBA Math	0.92*	0.94*	_						
4. 2015 SBA Math	0.88*	0.90*	0.94*	_					
5. 2018 SBA ELA	0.83*	0.82*	0.77*	0.73*	_				
6. 2017 SBA ELA	0.79*	0.83*	0.78*	0.74*	0.95*	_			
7. 2016 SBA ELA	0.77*	0.80*	0.82*	0.76*	0.92*	0.94*	_		
8. 2015 SBA ELA	0.73*	0.76*	0.76*	0.76*	0.90*	0.93*	0.94*	_	
9. SBA Math Cumulative Change	0.29*	0.12*	0.00	-0.20*	0.25*	0.13*	0.07	-0.03	_
10. SBA ELA Cumulative Change	0.26*	0.15*	0.05	-0.05	0.26*	0.08	-0.01	-0.18*	0.62*

Note. $n = 274$. * $p < .05$.

Similar analysis for all administrations of the TELL survey and the calculated cumulative change score for the TELL also showed statistically significant strong ($r > .80$) correlations across administrations of the instrument and moderately strong correlations among the change score and both the 2016 ($r = .44$) and 2018 ($r = .66$) administrations of the TELL.

Table 46

Correlation matrix for overall PD construct across all TELL administrations

	1	2	3
1. TELL PD 2018	_		
2. TELL PD 2016	0.87*	_	
3. TELL PD 2014	0.80*	0.81*	_
4. TELL PD Cumulative Change	0.66*	0.40*	0.08

Note. $n = 274$. $^*p < .05$.

Comparison of SBA scores and overall TELL scores for the professional development (PD) construct showed significant, but weak ($r < .2$) correlations between the 2018 TELL PD construct and the 2016 and 2017 SBA ELA assessment. No other significant correlations among SBA and TELL PD overall results were observed.

Table 47

Correlation matrix comparing SBA scores and overall TELL PD scores

	1	2	3	4	5	6	7	8	9	10
1. 2018 SBA Math	–									
2. 2017 SBA Math	0.95*	_								
3. 2016 SBA Math	0.92*	0.94*	_							
4. 2015 SBA Math	0.88*	0.90*	0.94*	_						
5. 2018 SBA ELA	0.83*	0.82*	0.77*	0.73*	_					
6. 2017 SBA ELA	0.79*	0.83*	0.78*	0.74*	0.95*	_				
7. 2016 SBA ELA	0.77*	0.80*	0.82*	0.76*	0.92*	0.94*	_			
8. 2015 SBA ELA	0.73*	0.76*	0.76*	0.76*	0.90*	0.93*	0.94*	_		
9. TELL PD Construct 2018	0.07	0.08	0.07	0.10	0.11	0.13*	0.12*	0.10	_	
10. TELL PD Construct 2016	0.03	0.02	0.02	0.05	0.07	0.08	0.07	0.07	0.87*	_
11. TELL PD Construct 2014	-0.02	-0.02	-0.04	-0.01	0.08	0.09	0.08	0.06	0.80*	0.81*

Note. $n = 274$. $*p < .05$.

Analysis of correlations among the cumulative change in individual PD factors measured by the TELL PD construct with cumulative change in SBA scores for both Math and ELA and overall cumulative change scores for the TELL PD construct found significant and strong ($r > .80$) correlations among change scores in all PD factors and the overall change in the PD construct with the exception of the factor related to assessment, which correlated moderately ($r = .45$) with the overall TELL change score. No statistically significant correlations among TELL change scores for factors or overall were found to correlate with SBA change scores. Complete results of these tests are displayed in the correlation matrix shown in Table 48.

Table 48

Correlation matrix comparing cumulative change scores for each prompt within the TELL PD construct and cumulative change scores for SBA Math, ELA, and TELL PD construct overall

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Resources	_														
2. Time	0.86*	_													
3. Data driven	0.66*	0.63*	_												
4. Alignment	0.75*	0.73*	0.80*	_											
5. Differentiation	0.69*	0.70*	0.59*	0.63*	_										
6. Content	0.79*	0.75*	0.67*	0.73*	0.79*	_									
7. Reflection	0.76*	0.75*	0.71*	0.80*	0.61*	0.75*	_								
8. Follow-up	0.73*	0.68*	0.69*	0.76*	0.65*	0.74*	0.72*	_							
9. Colleagues	0.81*	0.79*	0.68*	0.76*	0.75*	0.83*	0.80*	0.81*	_						
10. Evaluation	0.64*	0.63*	0.66*	0.72*	0.67*	0.67*	0.65*	0.76*	0.74*	_					
11. Implementation	0.82*	0.80*	0.71*	0.79*	0.73*	0.85*	0.82*	0.78*	0.86*	0.72*	_				
12. Learning	0.84*	0.81*	0.71*	0.82*	0.72*	0.87*	0.86*	0.79*	0.89*	0.70*	0.94*	_			
13. Assessment	0.33*	0.32*	0.28*	0.28*	0.38*	0.40*	0.33*	0.36*	0.38*	0.25*	0.37*	0.36*	_		
14. SBA Math	-0.07	-0.10	-0.01	-0.03	-0.06	-0.10	-0.10	-0.04	-0.07	-0.05	-0.10	-0.10	0.03	_	
15. SBA ELA	0.02	-0.01	0.00	0.02	0.01	-0.01	-0.04	-0.01	-0.02	-0.01	-0.03	0.00	0.09	0.62*	_
16. TELL PD Construct	0.89*	0.87*	0.80*	0.88*	0.81*	0.90*	0.87*	0.86*	0.92*	0.80*	0.93*	0.94*	0.45*	-0.08	0.00

Note. $n = 274$. *$p < .05$.

While no significant correlations were found among TELL change scores and SBA change scores, ANOVA results consistently indicated a large to very large effect size for district size across instruments, factors within instruments, and administrations of the instruments. Consequently, analyses of correlations among SBA and TELL change scores disaggregated by district size were also conducted. For small districts, a significant correlation of moderate strength (r = .56) was found between changes in SBA Math and ELA scores. No other significant correlation was observed for small districts. Complete results comparing SBA and TELL change in small districts appears in Table 49 below.

Table 49

Correlation matrix comparing SBA and TELL change in small districts

	SBA Math Change	SBA ELA Change
SBA Math Change	_	
SBA ELA Change	.56*	_
TELL PD Construct Change	.05	.07

Note. n = 76. *p < .05.

In medium-sized districts, a moderate to strong correlation (r = .71) was observed between SBA Math and ELA, though no other statistically significant correlations were found. Complete results of correlations comparing SBA and TELL results change in medium districts appear in Table 50 below.

Table 50

Correlation matrix comparing SBA and TELL change in medium districts

	SBA Math Change	SBA ELA Change
SBA Math Change	–	
SBA ELA Change	.71*	_
TELL PD Construct Change	-.01	-.04

Note. $n = 127$. $*p < .05$.

Large districts differed from small districts insofar as significant correlations between changes in SBA ELA scores and changes in TELL scores were observed though they were weak ($r = .25$). The relationship between change in SBA Math and ELA scores had a moderate relationship ($r = .45$). Complete results of the correlation analysis of statistically significant change scores for large districts is shown in Table 51.

Table 51

Correlation matrix comparing SBA and TELL change in large districts

	SBA Math Change	SBA ELA Change
SBA Math Change	_	
SBA ELA Change	.45*	_
TELL PD Construct Change	.09	.25*

Note. $n = 72$. $* p < .05$.

Because large districts demonstrated a significant, albeit weak, correlation among change scores in SBA ELA scores and TELL scores, further analysis was conducted to determine change in which TELL factors correlated most strongly with changes in SBA scores for large districts. The correlation matrix in Table 52 shows results of this

analysis including significant but weak (.20 < *r* < .40) relationships between SBA ELA change and changes in the TELL factors of differentiation (*r* = .28), content (*r* = 24), and learning (*r* = .31).

Table 52

Correlation matrix comparing SBA and TELL change by prompt in large districts

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Resources	_													
2. Time	.85*	_												
3 Data driven	.37*	.39*	_											
4. Alignment	.62*	.63*	.73*	_										
5. Differentiation	.69*	.65*	.39*	.55*	_									
6. Content	.75*	.72*	.39*	.61*	.78*	_								
7. Reflection	.66*	.69*	.56*	.76*	.50*	.57*	_							
8. Follow-up	.61*	.55*	.55*	.71*	.66*	.70*	.51*	_						
9. Colleagues	.79*	.72*	.44*	.68*	.73*	.78*	.68*	.76*	_					
10. Evaluation	.50*	.44*	.51*	.63*	.65*	.54*	.46*	.70*	.68*	_				
11. Implementation	.75*	.76*	.47*	.72*	.77*	.83*	.74*	.71*	.86*	.65*	_			
12. Learning	.83*	.80*	.45*	.75*	.72*	.84*	.75*	.70*	.87*	.62*	.93*	_		
13. Assessment	.42*	.34*	.28*	.38*	.38*	.44*	.38*	.45*	.46*	.30*	.40*	.41*	_	
14. SBA Math	.09	.01	.13	.06	.03	.04	.14	.12	.12	.10	.07	.09	-.03	_
15. SBA ELA	.37	.22	.06	.11	.28*	.24*	.13	.15	.20	.22	.23	.31*	.07	.45*

Note. $n = 72$. *$p < .05$.

Summary

This chapter has reviewed results of RM-ANOVA, ANOVA, and Correlation analyses of SBA Math, SBA ELA, and TELL scores including consideration of relationships among overall scores, cumulative change scores, scores for individual factors within the TELL PD construct, and with disaggregation for groupings by district size, school size, poverty level, and ELL level. Significant changes and significant effect sizes were identified for each of the analyses. The implications and limitations of these findings in relationship to the purpose statement, research questions, relevant literature, and areas for further study will be discussed further in the chapter that follows.

Chapter 5: Discussion

Introduction

The purpose of this study was to identify the relationship between changes in teachers' professional learning conditions and changes in student achievement. The study examined conditions as measured by three state-wide administrations of the New Teacher Center's Teaching, Empowering, Leading, and Learning (TELL) Survey in Oregon from 2014 to 2018 and contemporaneous student achievement data from Oregon state achievement tests. The TELL survey describes professional development as the "availability and quality of learning opportunities for educators to enhance their teaching" (TELL, 2017, p. 3). The intention from the outset was to determine whether the examination of changes in teacher professional learning conditions and the relationship between those changes and differential student outcomes as measured by state assessments could be used to identify areas of further and more specific inquiry into the practical application of the successful connection of adult professional learning to increases in student outcomes. To that end, the analysis examined the data at both the school and district levels for significant relationships guided by three research questions:

1. How have measures of student achievement and teacher professional development changed over time in districts and schools in Oregon?

2. How do the changes in professional development correlate to student outcomes on the Smarter Balanced Assessment in Math and English?

3. Which professional development factor(s) measured by the TELL Survey are most closely related to changes in student outcomes?

Chapter 1 addressed the current discourse around improving student learning outcomes as a shared goal for a variety of stakeholders within and around the education landscape. It also discussed the gap in research between inputs to improving conditions for teaching and learning, such as professional development, and measurable outputs of improved student learning. The design of this study sought to address that gap through examination of correlations between changes in teacher professional learning and changes in student learning outcomes as measured by state assessments. The premise of this design presupposes that strongly correlated positive improvements may help future research focus more narrowly on the promising practices of schools and districts to find models for others. Data of the kind sought by this study might also serve as an additional data point to aid policy makers, educational decision makers, and other stakeholders in targeting future resource allocation and improvement efforts on those aspects of conditions of teaching and learning which are most efficacious for improving student learning outcomes by patterning such efforts after those schools and districts whose results are most promising.

The research literature in the area of professional development ground and contextualize the study in established understandings of what constitutes effective professional development; how effective professional development transfers to classroom practice; the challenges of bringing such professional development to scale;

and effective means for evaluating the effect of professional development on conditions of teaching and learning and, subsequently, on student learning outcomes. The literature review also established theoretical frameworks for understanding what is meant by professional development, student learning outcomes, and a model for evaluation of professional development that connects the two.

The review of literature demonstrated that professional development and professional learning exist on a continuum and within a complex context. The context increasingly works to embed professional development and professional learning for teachers. This contextualization of professional development holds great promise for increased teacher professional learning and the subsequent adoption of improved practices, enhanced knowledge, and enacted skill by teachers in the classroom in ways that can positively impact student learning outcomes. When teachers do improve their effectiveness in the classroom, student learning also improves; and thus it follows that careful examination of the conditions for teaching and learning alongside examination of student learning outcomes has the potential to yield important understandings about the role of professional development in improving student outcomes.

Each of the studies in the literature review called for additional research regarding professional development. Many of the calls for additional research were unique to the research project in question, but some themes emerged from the reviewed literature. Some researchers call for a move beyond understandings of learning communities to discuss in greater depth the content and intellectual work of these collaborative groups (e.g. Dufour, 2004; Kennedy, 2016). Additionally, many of

the studies lacked specific connections to evaluations of professional development that included measures of impact on student achievement. These measures are either called for or mentioned as areas for further inquiry in multiple studies (Blank & de las Alas, 2009; Borko, 2004; Desimone, 2009; Kennedy, 2016). Finally, Kennedy (2016) makes a call for more research about professional development expertise including the selection of providers of professional development, the characteristics of their preparation, instruction, classrooms, and the assessment of their efficacy. In a contextualized understanding of professional development, this notion becomes still more complex and worthy of additional study. This study's call for further research echoes and extends many of these notions while simultaneously recognizing some of these complexities as limitations in the present research context—an idea discussed further in the limitations section in this chapter.

For these reasons, it is necessary to examine closely the context for teaching and learning in the state of Oregon alongside the attendant student learning outcomes. While previous research using TELL survey data and annual state assessments has demonstrated connections between teaching and learning conditions (Ladd, 2009; Ferguson & Hirsch, 2014; Kraft & Papay, 2012), no studies have examined a single state's data in both domains, professional development and student learning outcomes, over time to determine trends and patterns that may point future research toward promising districts and schools whose experiences may be instructive for future efforts to leverage professional development for improved student learning and overall systemic improvements. This study sought to do that and subsequently calls into

question the generalizable strength of connections identified by other researchers like Kraft and Papay (2012) and Ladd (2009) between measures of teaching and learning conditions and student achievement outcomes. However, these differences may be due to the specificity of this study's focus on Professional Development rather than the overall measures of teaching and learning conditions that are more broadly discussed by these authors. Others who have focused specifically on the connections among TELL's measures of professional development and their connection to student achievement based on state measures have produced similar findings to those reported here. This study's results are consistent with studies in both rural Maryland (Sheehe, 2015) and Kentucky (Xu, 2016), though these studies both employed shorter time horizons and a smaller total sample of schools. Each of these studies found few and weak correlations among measures of professional development and student achievement.

Investigation of the relationships among responses to the TELL Professional Development construct and student achievement outcomes measured by the Smarter Balanced Assessment in Oregon from 2014 to 2018 included those districts and schools that had reportable data for each of the instruments' administrations during the study period and were disaggregated for a variety of demographic factors. Analysis examined the relative strength of relationships among individual items within the construct and changes in student achievement outcomes. Results of RM-ANOVA, ANOVA, and correlation analyses of SBA Math, SBA ELA, and TELL scores including consideration of relationships among overall scores, cumulative changes

scores, scores for individual factors within the TELL PD construct, and with disaggregation for groupings by district size, school size, poverty level, and ELL level were reported in Chapter 4. Significant changes and effect sizes were identified for each of the analyses. The implications and limitations of these findings in relationship to the research questions and areas for further study will be discussed in depth in the sections that follow.

Discussion of results

The first of three research questions guiding this study considered how measures of student achievement and teacher professional development changed over time in districts and schools in Oregon. Analysis of study data conducted using RM-ANOVA and ANOVA revealed different changes across the sample and study period. Those differences will be discussed separately by instrument and then in comparison to one another below.

Change in SBA results over time. SBA Math scores were found to change significantly over time on a year to year basis across the study, but the change from the beginning of the study period to the end of the study was not significant ($p = .02$). Further, despite the significance of the year to year changes in SBA math results for study schools and districts, effect sizes for these changes remained small ($\eta^2 < .02$). Similarly, SBA ELA results failed to demonstrate significant differences between baseline results from year one and results at the end of the study despite some year to year differences of significance. This unevenness over time in SBA results and the lack of significant consistent change at scale, either positive or negative, contrast with

and impact subsequent correlational analyses with TELL scores, where more demonstrable changes occurred. Before turning to these contrasting results, however, the results for disaggregated groups merit further discussion.

Consideration of the changes in SBA results using disaggregation for district and school size, poverty level, and ELL population revealed inconsistent changes with weak effect sizes. When disaggregated for district size, only changes in SBA Math data were found to differ significantly ($p < .05$) in ANOVA results, but even these differences demonstrated only weak effect sizes ($\eta^2 = .10$). ANOVA results for other grouping variables found no significant differences except for changes in SBA ELA results based on the ELL population, though even this difference had a small effect size ($\eta^2 = .02$).

Across all analyses of SBA results, the only generalizable finding was that changes during the study period were, at best, small and weak. In this context of little significant change, either positive or negative, and no observable changes with strong effect sizes, the possibility of identifying strong relationships between professional development, or any other improvement initiative or variable for that matter, become far more difficult to demonstrate.

Change in TELL results over time. Analysis of the TELL results over time reveal a stark contrast to the discussion of SBA results above. Overall TELL results on the professional development (PD) construct subjected to RM-ANOVA demonstrated significant differences across time with strong to very strong effect sizes ($\eta^2 > .20$) especially when examining differences across the entire study period. Significant

differences were also observed among study schools based on district size and school size using ANOVA for calculated change scores with district size having the strongest effect size in results ($\eta^2 = .20$).

Because the results for the overall PD construct demonstrated such strong significant changes both across time and in analyses for district and school sizes, the analysis results for individual factors within the construct warrant further discussion, as well. Of the 13 prompts within the PD construct, 10 demonstrated significant changes over time with very large effect sizes ($\eta^2 > .22$) in RM-ANOVA tests comparing baseline data to the instrument's most recent administration. Of these, the prompt for resources—"sufficient resources are available for professional development in my school" (TELL, 2018)—and the prompt for time—"an appropriate amount of time is provided for professional development" (TELL, 2018)—stand out as having the strongest effect sizes ($\eta^2 = .43$ and $\eta^2 = .40$ respectively). The 13th prompt, added in the second administration of the TELL did not demonstrate significant change, likely in part because of its late appearance as part of the instrument, which meant that only two administrations of the TELL were available for comparison; and similarly, fewer administrations of the SBA were available for comparison. Consequently, the study included fewer points of comparison across the study schools. These comparative limitations reduce the power of correlation analyses and consequently the likelihood of finding statistically significant results (Warner, 2013). District size, especially in the difference between small and large districts demonstrated large to very large effect sizes across all factors except assessment in the

PD construct, while school size differences between large and small schools had large to very large effect sizes for only 9 of the 13 prompts. Poverty-level had a significant medium effect size only for the resources prompt, and ELL population demonstrated a weak effect size for the data-driven prompt. Otherwise, these two grouping variables did not demonstrate significance in the results for each of the PD construct prompts. Other studies that have considered district size have found mixed results given the benefits of economies of scale and the attendant challenges that those scale factors can present (Gilcrease, 2004; Killeen, Monk, & Plecki, 2002). Gilcrease (2004) found that district size had a limited impact on professional development factors, while Killeen, Monk, and Plecki (2002) determined that professional development resources scaled positively in correlation with increasing district size. It is worth noting that resources as defined in Killeen, Monk, and Plecki's (2002) work is only one of the factors considered by the TELL's PD construct, and their study employed different instrumentation.

The results of analyses of changes in TELL data over time represent a sharp contrast to the SBA results discussed above given the numerous significant differences and effect sizes both over time and across disaggregate groups. These data demonstrate positive change on numerous elements of professional development during the study period which necessitate careful examination of any observable impacts of these changes on student achievement data. This discussion follows in response to the study's second research question.

Relationships between SBA results and TELL Results. The second of the three research questions asked: How do the changes in professional development correlate to student outcomes on the Smarter Balanced Assessment in Math and English? Correlational analysis of the SBA and TELL results began by examining within instrument correlations, as this contextually could impact understanding of between instrument correlations. Predictably, each of the instruments generated strongly correlated results across administrations with stronger correlations observed with closer temporal proximity. Cumulative change calculations for each instrument were less strongly correlated to raw instrument scores, but cumulative change scores for SBA math, SBA ELA, and TELL were all found to correlate with individual administration scores and likewise demonstrated stronger correlations with more recent administrations of the instrument. These within-instrument correlations follow an expected pattern given each instruments' demonstrated reliability discussed in Chapter 3. Analyses of the TELL instrument indicated that it was reliable across multiple administrations and that the constructs included on the TELL had a correlation coefficient lower than .70 (NTC, 2014). Thus, unless significant changes occurred at the schools studied, one would expect correlated results across administrations of the instrument. The observed pattern confirms this reliability and suggests that the changes that occurred were reflective of changes in the conditions being measured over time.

The next layer of correlation analysis examined relationships between instruments, which generated far fewer significant correlations. In fact, only the SBA

ELA results from the 2016 and 2017 years were found to correlate significantly with TELL results. These correlations were both weak ($p < .05$, $r = .12$ and $p < .05$, $r = .13$ respectively) and chronologically inverse to the study's hypothesized correlational relationship. That is, the student achievement results that related most closely to professional development results preceded the professional development rather than following it. While this study was not designed to establish causal relationships, all the literature suggesting that professional learning by teachers impacts student achievement presumes that the teacher learning happens prior to the related improvements in student learning. The correlations observed among raw scores on the instruments here follow the opposite pattern and suggest, at best, that there may have been a weak relationship between teaching and learning conditions more generally, but likely do not reveal much about the impact of professional learning on student outcomes.

Analysis of calculated change scores for each of the instruments and each of the factors within the PD construct on the TELL were devoid of statistically significant relationships despite strong within-instrument correlations among change scores. Here, too, the data show little to no evidence of a relationship between measures of professional development and student achievement. The limitations section later in this chapter discusses in further detail features of the study design and data that may contribute to the absence of observable relationships. First, however, a brief discussion of the third and final research question will complete this discussion of results.

The third research question asked: which professional development factor(s) measured by the TELL Survey are most closely related to changes in student outcomes? As discussed above, no significant correlations were observed in the study population. However, because of the consistently significant and very large effect size observed for district size across all PD factors in ANOVA data, correlation analysis of the data disaggregated by district size merits mentioning. Statistically significant correlation of moderate strength was observed between the SBA ELA change scores and the overall TELL PD change scores in large districts. Subsequent analysis of each PD factor's change score as it related to the SBA ELA change score in these large districts revealed significant but weak relationships in the TELL factors of differentiation, content, and learning. The importance of these weak correlations is undercut by the relatively smaller effect size found for these changes in an ANOVA examination of the same factors for large districts. The three correlated factors were not found to have as strong a change effect size as other factors in the earlier analyses, suggesting that though a relationship was observed, the importance of that relationship is very limited. All of these data call into question the strength of relationship between professional development and student achievement, though they are insufficient to undermine the possibility that such a relationship could exist because of limitations present in these data and in the design of the present study.

Limitations

The results reported earlier and discussed above were subject to numerous limitations, many of which are consistent across education research. To ensure data

validity, the study excluded any schools and districts which did not participate at or above the established reporting thresholds for each of the instruments. For the TELL Survey, participant districts had to exceed the instrument's participation threshold of 35% of licensed district staff including at least 20 total participants. Individual schools had to exceed a 40% participation rate among licensed staff for inclusion. Districts and schools not meeting this participation threshold for each of the three TELL administrations were excluded from the study. For the Smarter Balanced Assessment, study participants were included if participation rates were above the state required 94.5% participation threshold. Consequently, the study includes only 22% of Oregon schools. There may be schools and districts that would demonstrate the correlations between SBA and TELL results had they participated at sufficient levels for reporting or participated in all administrations of the instruments. The existence of such schools is, however, speculative because this is a hypothesis contrary to fact. Without participating in the measurement by the instruments, correlations cannot be observed. Consequently, identifying schools that might be outlier cases was both beyond the scope of this study and would require a different investigative approach given the lack of relevant data. Participation varied across the state based on a variety of local conditions including the voluntary nature of the TELL and local politics around opting out of the SBA, which impacted some districts more than others during the study period (Bennet, 2016). A subsequent study relaxing these participation thresholds and instead designing additional controls for data validity could address this limitation and explore this possibility more fully. One such example of this is the approach used by

Ingersoll (2017) which adjusted the sample size on a per calculation basis, removing individual schools without sufficient data from individual analyses rather than from the study sample as a whole. This complicates the comparability of analyses within the study but does allow for broader inclusion of schools with incomplete participation.

Implementation time and mobility are two additional limitations of this study that impact the data and analyses. Loucks and Hall (1979) qualify their discussion of the concerns-based adoption model by indicating that even when professional development addresses teacher concerns—an approach making the professional learning more relevant and consequently more likely to be implemented by the teacher in the classroom—the implementation of that learning requires time and practice and can result in an implementation dip in student achievement. The data considered in this study reflect contemporaneous measures of professional development and student achievement. That is, teacher learning and student learning were measured simultaneously for the study period rather than sequentially with measurements of student learning following measurements of teacher learning. This latter approach, though consistent with the logic of teacher learning impacting student learning, would be complicated by numerous external factors. Mobility for both teachers and students stands out as a particularly confounding interferon with this approach (Ingersoll, Scamman, & Eckerling, 1989; New Teacher Center, 2014). In the present study, change scores were calculated to help address issues of time. The calculated change scores control for the challenges of synchrony somewhat by accounting for changes across the study period. RM-ANOVA also accounted for impacts of time, but

ultimately future student achievement data may be a better measure of the positive changes in professional development observed during the study period insofar as future student achievement will continue to be influenced by contemporary teacher learning. Furthermore, because all study data are considered with the school as the smallest unit of analysis, a limitation imposed by the publicly available data themselves, it was impossible for this study to account for the impacts of student, teacher, and administrative mobility. Each of these have bearing on the data subjected to analysis: student mobility has been shown to impact student achievement negatively (Ingersoll, Scamman, & Eckerling, 1989), as has teacher mobility and turnover (New Teacher Center, 2014), and administrative turnover or leadership change in schools and districts (Elmore, 1997). In each of these instances, the present study could not control for changes at the individual teacher and student level. Future studies considering teacher professional development data at the individual practitioner-level and which also connect to that teacher's students' achievement data may tell a very different story than do these school-level data.

Future research needs

The study data suggest numerous next steps in researching the relationship between teacher professional development and student achievement. As discussed in the limitations section above, further study with finer granularity would be particularly interesting. Consideration of matching individual teacher learning in relationship to their students' performance, especially longitudinally, would assist in calculating correlation coefficients and be an especially fruitful further consideration of the

research questions posed here. Additionally, examination of student data after more time for implementation of professional learning may be revelatory of relationships that may be masked by struggles with implementation in the current study (Guskey, 2000; Kennedy, 2016; Blank & de las Alas, 2009).

Another interesting avenue of this research might be to examine the data on a cohort basis while holding constant the school as a unit of analysis for professional development. This approach is predicated upon the notion that staff stay relatively stable at a school and consequently may learn over time practices that could positively impact student achievement, but those improvements may have elided in the current study by not considering students as cohorts for comparison (Guskey, 2000; Blank & de las Alas, 2009). In this approach, a study might examine the growth of student cohorts across years as they relate to changes in teacher professional development. This would contrast with the present study's application of a school-based unit of analysis for both teacher and student data.

Within this study there are a handful of individual schools or districts that were outliers in the data and demonstrated strong positive change in both professional development and student achievement on the SBA. Individual school's results did not have sufficient statistical power for analysis using this study's methodology, because the analyses conducted were designed to explore the statistical significance and strength of correlations across the sample and among disaggregate groups. Consideration of an individual school's achievements when not part of a larger statistically significant correlation could be the result of random differences among the

sample schools (Warner, 2013). While a deeper and individual examination of these outlier cases remained outside the purpose and scope of this study, some of these individual schools and districts may warrant additional investigation for promising practices and strategies that could be revelatory of the sought-after relationship between teacher and student learning. Similarly, further study of schools that did not meet the sampling criteria here may be fruitful in this regard.

Finally, and perhaps most importantly, this study reinforces the call Guskey (2000) makes for explicitly connecting measures of professional learning to student achievement as a design feature of the professional development itself. While the TELL effectively measures professional development generally, it does not provide insight into the character and content of that learning, nor does it explicitly connect its examination of the professional learning to specific measures of student learning. Kennedy (2016) also highlights this deficit in most evaluations of professional development characterizing them as overly general and lacking explicit understandings and definitions of efficacious approaches to professional learning and its subsequent implementation in the classroom with students. Suffice it to say, more study of professional development's relationship to student achievement in both imperative and urgent.

Implications and conclusion

While this study did not demonstrate a strong relationship between teacher professional development and student achievement, its core purpose is no less essential given the findings. Serious endeavors to improve student outcomes rely on

the appropriate management of scarce resources (Hargreaves & Fink, 2003) including both dollars and educators' time. As discussed earlier, billions of dollars, not to mention countless hours, are dedicated to professional development. In light of that investment in a context of resource scarcity, educators must do a better job of identifying the relationship between changes in teachers' professional learning conditions and changes in student achievement. The last mile of package delivery proves to be the most logistically demanding and consequently is the most expensive mile (Mullainathan, 2009). So too, implementing professional learning in ways that positively impact student learning proves to be the most difficult to demonstrate and to replicate at scale.

Understanding and articulating the relationship between what staff need to learn, are learning, and have learned; and the attendant changes that their adult learning has on student learning could justify the value and importance of professional development time and dollars. Understanding of this kind would also focus that time and those dollars on truly effective professional development practices that are supported and guided by robust data which is currently lacking (Yoon, Duncan, Lee, Scarloss, & Shapley, 2007). This kind of understanding would have the effect of solving education's last mile problem, moving effective research-based best practices from the realm of knowledge about what works for student learning into the practice of what works for student learning at scale.

Continued study of and attention to teachers' professional learning conditions and the implementation of their learning has transformative potential. All students should

be taught by teachers who benefit from effective, timely, concerns-based professional learning that they can implement in their daily classroom practice. We must continue to seek ways to better demonstrate the significance of this understanding so that we can more effectively deliver on the promise of learning for all, teachers and students alike.

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Appendix I

TELL Oregon Survey 2018

Thank you in advance for your time and willingness to share your views on working conditions in your school.

Access Code
You have been assigned an anonymous access code to ensure that we can identify the school in which you work and to ensure the survey is taken only once by each respondent. The code can only be used to identify a school, and not an individual. No demographic information that could be used to identify an individual will be reported or shared.

The effectiveness of the survey is dependent upon your honest completion. While you can submit the survey without completing all questions, we hope you will take the opportunity to share your views.

Thank you in advance for your time and all that you do to help children every day.

Introduction

Please indicate your position:

- ❑ Teacher (including instructional coaches, department heads, vocational, literacy specialist, etc.)
- ❑ Principal
- ❑ Assistant Principal
- ❑ Other Education Professional (school counselor, school psychologist, social worker, etc.)

How many total years have you been employed as an educator?

- ❑ First Year
- ❑ 2 - 3 Years
- ❑ 4 - 6 Years
- ❑ 7 - 10 Years
- ❑ 11 - 20 Years
- ❑ 20+ Years

How many total years have you been employed as a teacher?

- ❑ First Year
- ❑ 2 - 3 Years
- ❑ 4 - 6 Years
- ❑ 7 - 10 Years
- ❑ 11 - 20 Years
- ❑ 20+ Years

How many total years have you been employed in the school in which you are currently working?

- ❑ First Year
- ❑ 2 - 3 Years
- ❑ 4 - 6 Years
- ❑ 7 - 10 Years
- ❑ 11 - 20 Years
- ❑ 20+ Years

Time

Please rate how strongly you agree or disagree with the following statements about the use of time in your school.

	Strongly disagree	Disagree	Agree	Strongly agree	Don't know
a. Class sizes are reasonable such that teachers[1] have the time available to meet the needs of all students.	❑	❑	❑	❑	❑
b. Teachers have time available to collaborate with colleagues.	❑	❑	❑	❑	❑
c. Teachers are allowed to focus on educating students with minimal interruptions.	❑	❑	❑	❑	❑
d. The non-instructional time[2] provided for teachers in my school is sufficient.	❑	❑	❑	❑	❑
e. Efforts are made to minimize the amount of routine paperwork[3] teachers are required to do.	❑	❑	❑	❑	❑
f. Teachers have sufficient instructional time to meet the needs of all students.	❑	❑	❑	❑	❑
g. Teachers are protected from duties that interfere with their essential role of educating students.	❑	❑	❑	❑	❑

[1] Teachers means a majority of teachers in your school.
[2] Non-instructional time includes any time during the day without the responsibility for student contact, including collaboration planning, meetings/conferences with students and families, etc.
[3] Routine paperwork means both electronic and paper forms and documentation that must be completed to comply with school, district, state, and federal policies.

In an AVERAGE WEEK, how much time do you devote to the following activities during the school day (i.e., time for which you are under contract to be at the school)?

	None	Less than or equal to 1 hour	More than 1 hour but less than or equal to 3 hours	More than 3 hours but less than or equal to 5 hours	More than 5 hours but less than or equal to 10 hours	More than 10 hours
a. Individual planning time	❑	❑	❑	❑	❑	❑
b. Collaborative planning time[1]	❑	❑	❑	❑	❑	❑
c. Supervisory duties[2]	❑	❑	❑	❑	❑	❑
d. Required committee and/or staff meetings	❑	❑	❑	❑	❑	❑
e. Completing required administrative paperwork[3]	❑	❑	❑	❑	❑	❑
f. Communicating with parents/guardians and/or the community	❑	❑	❑	❑	❑	❑
g. Addressing student discipline issues	❑	❑	❑	❑	❑	❑
h. Professional development[4]	❑	❑	❑	❑	❑	❑
i. Preparation for required federal, state, and local assessments	❑	❑	❑	❑	❑	❑
j. Delivery of assessments	❑	❑	❑	❑	❑	❑
k. Utilizing results of assessments	❑	❑	❑	❑	❑	❑

[1] Collaborative time includes time spent working with other teachers within or across grade and subject areas as part of a Professional Learning Community to plan and assess instructional strategies.
[2] Supervisory duties include hall monitoring, recess, bus and cafeteria coverage, etc.
[3] Paperwork means both electronic and paper forms and documentation that must be completed to comply with federal, state and local policies.
[4] Professional development includes all opportunities, formal and informal, where adults learn from one another including graduate courses, in service, workshops, conferences, professional learning communities and other meetings focused on improving teaching and learning.

In an AVERAGE WEEK of teaching, how many hours do you spend on school-related activities outside of the regular school work day (before or after school, and/or on weekends)?

- ❑ None
- ❑ Less than or equal to 1 hour
- ❑ More than 1 hour but less than or equal to 3 hours
- ❑ More than 3 hours but less than or equal to 5 hours
- ❑ More than 5 hours but less than or equal to 10 hours
- ❑ More than 10 hours

Facilities and Resources

Please rate how strongly you agree or disagree with the following statements about your school facilities and resources.

	Strongly disagree	Disagree	Agree	Strongly agree	Don't know
a. Teachers[1] have sufficient access to appropriate instructional materials[2].	❑	❑	❑	❑	❑
b. Teachers have sufficient access to instructional technology, including computers, printers, software and internet access.	❑	❑	❑	❑	❑
c. Teachers have access to reliable communication technology, including phones, faxes and email.	❑	❑	❑	❑	❑
d. Teachers have sufficient access to office equipment and supplies such as copy machines, paper, pens, etc.	❑	❑	❑	❑	❑
e. Teachers have sufficient access to a broad range of professional support personnel[3].	❑	❑	❑	❑	❑
f. The school environment is clean and well maintained.	❑	❑	❑	❑	❑
g. Teachers have adequate space to work productively.	❑	❑	❑	❑	❑
h. The physical environment of classrooms in this school supports teaching and learning.	❑	❑	❑	❑	❑
i. The reliability and speed of Internet connections in this school are sufficient to support instructional practices.	❑	❑	❑	❑	❑

[1] Teachers means a majority of teachers in your school.
[2] Instructional materials include items such as textbooks, curriculum materials, content references, etc.
[3] Professional support personnel includes positions such as school counselors, nurses, school psychologists and social workers, library media specialists, etc.

Community Support and Involvement

Please rate how strongly you agree or disagree with the following statements about community support and involvement in your school.

	Strongly disagree	Disagree	Agree	Strongly agree	Don't know
a. Parents/guardians are influential decision makers in this school.	❑	❑	❑	❑	❑
b. This school maintains clear, two-way communication with the community.	❑	❑	❑	❑	❑
c. This school does a good job of encouraging parent/guardian involvement.	❑	❑	❑	❑	❑
d. Teachers[1] provide parents/guardians with useful information about student learning.	❑	❑	❑	❑	❑
e. Parents/guardians know what is going on in this school.	❑	❑	❑	❑	❑
f. Parents/guardians support teachers, contributing to their success with students.	❑	❑	❑	❑	❑
g. Community members support teachers, contributing to their success with students.	❑	❑	❑	❑	❑
h. The community we serve is supportive of this school.	❑	❑	❑	❑	❑

[1] Teachers means a majority of teachers in your school.

Managing Student Conduct

Please rate how strongly you agree or disagree with the following statements about managing student conduct in your school.

	Strongly disagree	Disagree	Agree	Strongly agree	Don't know
a. Students at this school understand expectations for their conduct.	❑	❑	❑	❑	❑
b. Students at this school follow rules of conduct.	❑	❑	❑	❑	❑
c. Policies and procedures about student conduct are clearly understood by the faculty.	❑	❑	❑	❑	❑
d. School administrators consistently enforce rules for student conduct.	❑	❑	❑	❑	❑
e. School administrators support **teachers'**[1] efforts to maintain discipline in the classroom.	❑	❑	❑	❑	❑
f. Teachers consistently enforce rules for student conduct.	❑	❑	❑	❑	❑
g. The faculty work in a school environment that is safe.	❑	❑	❑	❑	❑

[1] Teachers means a majority of teachers in your school.

Teacher Leadership

Please rate how strongly you agree or disagree with the following statements about teacher leadership in your school.

	Strongly disagree	Disagree	Agree	Strongly agree	Don't know
a. Teachers[1] are recognized as educational experts.	❑	❑	❑	❑	❑
b. Teachers are trusted to make sound professional decisions about instruction.	❑	❑	❑	❑	❑
c. Teachers are relied upon to make decisions about educational issues.	❑	❑	❑	❑	❑
d. Teachers are encouraged to participate in school leadership roles[2].	❑	❑	❑	❑	❑
e. The faculty has an effective process for making group decisions to solve problems.	❑	❑	❑	❑	❑
f. In this school we take steps to solve problems.	❑	❑	❑	❑	❑
g. Teachers are effective leaders in this school.	❑	❑	❑	❑	❑

[1] Teachers means a majority of teachers in your school.
[2] School leadership roles may include formal roles such as department chair, an elected member of the School Improvement Team, mentor, coach or leader of a professional learning community, etc.

Please indicate the role teachers[1] have at your school in each of the following areas.

	No role at all	Small role	Moderate role	Large role	Don't Know
a. Selecting instructional materials and resources	❑	❑	❑	❑	❑
b. Devising teaching techniques	❑	❑	❑	❑	❑
c. Setting grading and student assessment practices	❑	❑	❑	❑	❑
d. Determining the content of in-service professional development programs	❑	❑	❑	❑	❑
e. Establishing student discipline procedures	❑	❑	❑	❑	❑
f. Providing input on how the school budget will be spent	❑	❑	❑	❑	❑
g. The selection of teachers new to this school	❑	❑	❑	❑	❑
h. School improvement planning	❑	❑	❑	❑	❑

[1] Teachers means a majority of teachers in your school.

Teachers[1] have an appropriate level of influence on decision making in this school.

- ❑ First Year
- ❑ 2 - 3 Years
- ❑ 4 - 6 Years
- ❑ 7 - 10 Years
- ❑ 11 - 20 Years
- ❑ 20+ Years

[1] Teachers means a majority of teachers in your school.

School Leadership

Please rate how strongly you agree or disagree with the following statements about school leadership in your school.

	Strongly disagree	Disagree	Agree	Strongly agree	Don't know
a. The faculty and leadership have a shared vision.	❑	❑	❑	❑	❑
b. There is an atmosphere of trust and mutual respect in this school.	❑	❑	❑	❑	❑
c. Teachers[1] feel comfortable raising issues and concerns that are important to them.	❑	❑	❑	❑	❑
d. The school leadership[2] consistently supports teachers.	❑	❑	❑	❑	❑
e. Teachers are held to high professional standards for delivering instruction.	❑	❑	❑	❑	❑
f. The school leadership facilitates using data to improve student learning.	❑	❑	❑	❑	❑
g. Teacher performance is assessed objectively.	❑	❑	❑	❑	❑
h. Teachers receive feedback that can help them improve teaching.	❑	❑	❑	❑	❑
i. Teachers in this school receive feedback about their teaching on an ongoing basis.	❑	❑	❑	❑	❑
j. The procedures for teacher evaluation are consistent.	❑	❑	❑	❑	❑
k. Teachers in this school are evaluated by someone who is well prepared to use the district's evaluation tool.	❑	❑	❑	❑	❑
l. The school improvement team provides effective leadership at this school.	❑	❑	❑	❑	❑
m. The faculty are recognized for accomplishments.	❑	❑	❑	❑	❑

[1] Teachers means a majority of teachers in your school.
[2] School leadership is an individual, group of individuals or team within the school that focuses on managing a complex operation. This may include scheduling; ensuring a safe school environment; reporting on students' academic, social and behavioral performance; using resources to provide the textbooks and instructional materials necessary for teaching and learning; overseeing the care and maintenance of the physical plant; or developing and implementing the school budget.

The school leadership[1] makes a sustained effort to address teacher concerns about:

	Strongly disagree	Disagree	Agree	Strongly agree	Don't know
a. Leadership issues	❑	❑	❑	❑	❑
b. Facilities and resources	❑	❑	❑	❑	❑
c. The use of time in my school	❑	❑	❑	❑	❑
d. Professional development	❑	❑	❑	❑	❑
e. Teacher leadership	❑	❑	❑	❑	❑
f. Community support and involvement	❑	❑	❑	❑	❑
g. Managing student conduct	❑	❑	❑	❑	❑
h. Instructional practices and support	❑	❑	❑	❑	❑
i. New teacher support	❑	❑	❑	❑	❑

[1] School leadership is an individual, group of individuals or team within the school that focuses on managing a complex operation. This may include scheduling; ensuring a safe school environment; reporting on students' academic, social and behavioral performance; using resources to provide the textbooks and instructional materials necessary for teaching and learning; overseeing the care and maintenance of the physical plant; or developing and implementing the school budget.

Professional Development

Please rate how strongly you agree or disagree with the following statements about professional development in your school.

	Strongly disagree	Disagree	Agree	Strongly agree	Don't know
a. Sufficient resources are available for professional development[1] in my school.	❑	❑	❑	❑	❑
b. An appropriate amount of time[2] is provided for professional development.	❑	❑	❑	❑	❑
c. Professional development offerings are data driven.	❑	❑	❑	❑	❑
d. Professional learning opportunities are aligned with the school's improvement plan.	❑	❑	❑	❑	❑
e. Professional development is differentiated to meet the needs of individual teachers[3].	❑	❑	❑	❑	❑
f. Professional development deepens teachers' content knowledge.	❑	❑	❑	❑	❑
g. Teachers are encouraged to reflect on their own practice.	❑	❑	❑	❑	❑
h. In this school, follow up is provided from professional development.	❑	❑	❑	❑	❑
i. Professional development provides ongoing opportunities for teaches to work with colleagues to refine teaching practices.	❑	❑	❑	❑	❑
j. Professional development is evaluated and results are communicated to teachers.	❑	❑	❑	❑	❑
k. Professional development enhances teachers' ability to implement instructional strategies that meet diverse student learning needs.	❑	❑	❑	❑	❑
l. Professional development enhances teachers' abilities to improve student learning.	❑	❑	❑	❑	❑
m. Professional development in this school supports teachers in developing formative assessments aligned to standards.	❑	❑	❑	❑	❑

[1] Professional development includes all opportunities, formal and informal, where adults learn from one another including graduate courses, in service, workshops, c
★ [2] An appropriate amount of time includes regular, job-embedded time for professional learning.
[3] Teachers means a majority of teachers in your school.

★ Indicates new item for this year.

In which of the following areas (if any) do you need professional development to teach your students more effectively?

	Yes	No
a. Your content area	❑	❑
b. Common Core Standards	❑	❑
c. Student assessment	❑	❑
d. Differentiating instruction	❑	❑
e. Special education (students with disabilities)	❑	❑
f. Special education (gifted and talented)	❑	❑
g. English Language Learners	❑	❑
h. Closing the Achievement Gap	❑	❑
i. Methods of teaching	❑	❑
j. Reading strategies	❑	❑
k. Integrating technology into instruction	❑	❑
l. Classroom management techniques	❑	❑
m. Using culturally responsive curriculum and pedagogy	❑	❑
n. Using strategies to involve families and other community members as active partners in education	❑	❑

In the past 2 years, have you had 10 clock hours or more of professional development in any of the following areas?

	Yes	No
a. Your content area	❑	❑
b. Common Core Standards	❑	❑
c. Student assessment	❑	❑
d. Differentiating instruction	❑	❑
e. Special education (students with disabilities)	❑	❑
f. Special education (gifted and talented)	❑	❑
g. English Language Learners	❑	❑
h. Closing the Achievement Gap	❑	❑
i. Methods of teaching	❑	❑
j. Reading strategies	❑	❑
k. Integrating technology into instruction	❑	❑
l. Classroom management techniques	❑	❑
m. Using culturally responsive curriculum and pedagogy	❑	❑
n. Using strategies to involve families and other community members as active partners in education	❑	❑

Instructional Practices and Support

Please rate how strongly you agree or disagree with the following statements about instructional practices and support in your school.

	Strongly disagree	Disagree	Agree	Strongly agree	Don't know
a. State assessment[1] data are available in time to impact instructional practices.	❑	❑	❑	❑	❑
b. Local assessment[2] data are available in time to impact instructional practices.	❑	❑	❑	❑	❑
c. Teachers[3] use assessment data to inform their instruction.	❑	❑	❑	❑	❑
d. The curriculum taught in this school is aligned with Common Core Standards.	❑	❑	❑	❑	❑
e. Teachers work in professional learning communities[4] to develop and align instructional practices.	❑	❑	❑	❑	❑
f. Provided supports (i.e. instructional coaching, professional learning communities, etc.) translate to improvements in instructional practices by teachers.	❑	❑	❑	❑	❑
g. Teachers are encouraged to try new things to improve instruction.	❑	❑	❑	❑	❑
h. Teachers are assigned classes that maximize their likelihood of success with students.	❑	❑	❑	❑	❑
i. Teachers have autonomy to make decisions about instructional delivery (i.e. pacing, materials and pedagogy).	❑	❑	❑	❑	❑
j. Teachers believe almost every student has the potential to do well on assignments.	❑	❑	❑	❑	❑
k. Teachers believe what is taught will make a difference in students' lives.	❑	❑	❑	❑	❑
l. Teachers require students to work hard.	❑	❑	❑	❑	❑
m. Teachers collaborate to achieve consistency on how student work is assessed.	❑	❑	❑	❑	❑
n. Teachers know what students learn in each of their classes.	❑	❑	❑	❑	❑
o. Teachers have knowledge of the content covered and instructional methods used by other teachers at this school.	❑	❑	❑	❑	❑

[1] State assessments include end of course and end of grade tests.
[2] Local assessments are standardized instruments offered across schools within the district and can include any norm or criterion referenced tests, diagnostics, or local benchmarks.
[3] Teachers means a majority of teachers in your school.
[4] Professional learning communities include formalized groupings of teachers within or across grade and subject areas that meet regularly to plan and assess instructional strategies for student success.

Overall

Which of the following best describes your immediate professional plans? *(Select one.)*

- ❑ Continue teaching at my current school
- ❑ Continue teaching in this district but leave this school
- ❑ Continue teaching in this state but leave this district
- ❑ Continue working in education but pursue an administrative position
- ❑ Continue working in education but pursue a non-administrative position
- ❑ Leave education entirely

[1] Administrative positions include principal or assistant principal.
[2] Non-administrative positions include, but are not limited to, guidance counselor, curriculum specialist, instructional coach.

Which aspect of your teaching conditions most affects your willingness to keep teaching at your school? *(Select one.)*

- ❑ Time during the work day
- ❑ Facilities and resources
- ❑ Community support and involvement
- ❑ Managing student conduct
- ❑ Teacher leadership
- ❑ School leadership
- ❑ Professional development
- ❑ Instructional practices and support

Which aspect of your teaching conditions is most important to you in promoting student learning? *(Select one.)*

- ❑ Time during the work day
- ❑ Facilities and resources
- ❑ Community support and involvement
- ❑ Managing student conduct
- ❑ Teacher leadership
- ❑ School leadership
- ❑ Professional development
- ❑ Instructional practices and support

Overall, my school is a good place to work and learn.

- ❑ Strongly disagree
- ❑ Disagree
- ❑ Agree
- ❑ Strongly agree
- ❑ Don't know

In this school, we use the results of the TELL Oregon survey for school improvement planning.

- ❑ Strongly disagree
- ❑ Disagree
- ❑ Agree
- ❑ Strongly agree
- ❑ Don't know

★ **Which of the following should be Oregon's HIGHEST PRIORTIY to strengthen recruitment, preparation, induction, advancement, and support of educators?** *(Select one.)*

- ❑ Support all novice teachers and school administrators with induction and mentoring supports during their first two years
- ❑ Require state and federally funded professional learning to be equity-driven, designed with practitioner involvement, and adhere to state adopted standards for professional learning
- ❑ Expand models statewide that engage teachers and administrators working together to design and implement professional learning to improve student outcomes
- ❑ Ensure the voices of classroom teachers are included on a regular basis in decision-making regarding professional learning priorities, educator supports, and policies impacting teachers at the school, district, region, and state levels
- ❑ Create opportunities to develop, enhance, and recognize teacher leadership

★ Indicates new item for this year.

New Teacher Support

[Note: This section is offered to individuals who indicate they are a teacher and have been employed as a teacher for 1-3 years.]

★ **How long have you been in the teaching profession in Oregon?**

- ❑ First Year
- ❑ Second Year
- ❑ Third Year

★ **As a new teacher, which of the following best describes your experience?**

- ❑ Currently or in the past three years was a mentee in the Oregon Mentor Project
- ❑ Currently or in the past three years was part of my school, district, or ESD mentor services
- ❑ Currently or in the past three years did not receive any formal mentoring from the state, district, or school

As a beginning teacher, I have received the following kinds of supports.

	Yes	No
a. Formally assigned mentor	❑	❑
b. Seminars specifically designed for new teachers	❑	❑
c. Reduced workload	❑	❑
d. Common planning time with other teachers	❑	❑
e. Release time to observe other teachers	❑	❑
f. Formal time to meet with mentor during school hours	❑	❑
g. Orientation for new teachers	❑	❑
h. Access to professional learning communities where I could discuss concerns with other teacher(s)	❑	❑
i. Regular communication with principals, other administrator or department chair	❑	❑
j. Other	❑	❑
k. I received no additional support as a new teacher.	❑	❑

On average, how often did you engage in each of the following activities with your mentor?

	Never	Less than once per month	Once per month	Several times per month	Once per week	Almost daily
a. Developing lesson plans	❑	❑	❑	❑	❑	❑
b. Being observed teaching by my mentor	❑	❑	❑	❑	❑	❑
c. Observing my mentor's teaching	❑	❑	❑	❑	❑	❑
d. Analyzing student work	❑	❑	❑	❑	❑	❑
e. Reviewing results of students' assessments	❑	❑	❑	❑	❑	❑
f. Addressing student or classroom behavioral issues	❑	❑	❑	❑	❑	❑
g. Reflecting on the effectiveness of my teaching together	❑	❑	❑	❑	❑	❑
h. Aligning my lesson planning with the state curriculum and local curriculum	❑	❑	❑	❑	❑	❑
i. Other	❑	❑	❑	❑	❑	❑

★ Indicates new item for this year.

How much did the support you received from your mentor influence your practice in the following areas?

	Not at all	Hardly at all	Some	Quite a bit	A great deal
a. Instructional strategies	❑	❑	❑	❑	❑
b. Subject matter I teach	❑	❑	❑	❑	❑
c. Classroom management strategies	❑	❑	❑	❑	❑
d. Using data to identify student needs	❑	❑	❑	❑	❑
e. Differentiating instruction based upon individual student needs and characteristics	❑	❑	❑	❑	❑
f. Creating a supportive, equitable classroom where differences are valued	❑	❑	❑	❑	❑
g. Enlisting the help of family members, parents and/or guardians	❑	❑	❑	❑	❑
h. Working collaboratively with other teachers at my school	❑	❑	❑	❑	❑
i. Connecting with key resource professionals (e.g., coaches, counselors, etc.)	❑	❑	❑	❑	❑
j. Complying with policies and procedures	❑	❑	❑	❑	❑
k. Completing administrative paperwork	❑	❑	❑	❑	❑
l. Providing emotional support	❑	❑	❑	❑	❑
m. Other	❑	❑	❑	❑	❑

Please indicate whether each of the following were true for you and your mentor.

	Yes	No
a. My mentor and I were in the same building.	❑	❑
b. My mentor and I taught in the same content area.	❑	❑
c. My mentor and I taught the same grade level.	❑	❑

Overall, the additional support I received as a new teacher improved my instructional practice.

- ❑ Strongly disagree
- ❑ Disagree
- ❑ Agree
- ❑ Strongly agree
- ❑ Don't know

Overall, the additional support I received as a new teacher has helped me to impact my students' learning.

- ❑ Strongly disagree
- ❑ Disagree
- ❑ Agree
- ❑ Strongly agree
- ❑ Don't know

Overall, the additional support I received as a new teacher has been important in my decision to continue teaching at this school.

- ❑ Strongly disagree
- ❑ Disagree
- ❑ Agree
- ❑ Strongly agree
- ❑ Don't know

Thank you for time. Please submit your responses.