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Getting assessment right at the classroom level: using formative assessment for decision making

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Abstract Current high-stakes accountability mandates emphasize data use for school improvement. However, teachers often lack training for effective data use, and data is often too far removed from students to actually influence instructional practice. This qualitative case study was designed to gain a better understanding of a district-wide, teacher-centered approach to data use. Findings suggest that when data is used to "inform" instruction rather than "evaluate" instruction, teachers begin to practice reflective teaching. A common language emerged across grade levels facilitating a collaborative approach to data use. Using the theoretical framework of Self-Determination Theory, we propose a data informed instructional theoretical model that stakeholders in K-12 education systems can use to enhance instruction and learning at the classroom level. This teacher-centered model is of particular importance as a framework to build collective capacity by meeting psychological needs of teachers of autonomy, competence, and relatedness.

Keywords Accountability · School reform · Formative assessment · Data use · Data-informed decisions

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Recent educational reform movements in the United States focus on data use as a tool to drive school improvement. Louis et al. (2010) explain that over the past decade "both the federal government and states have played an active role in developing policies and framework to stimulate local education agencies to become more focused on accountability and standards" (p. 328). This focus on accountability and standards has increased primarily through measures outlined in the *No Child Left Behind* (NCLB) Act of 2001. Under NCLB, districts are required to report student summative data collected through mandated high-stakes tests. Data collected within this high-stakes environment is to be utilized to signal to all public school constituents the strengths and weakness of districts, schools, teachers, and students (Herman 2004).

As a result of this legislation, a high-pressure, high-stakes accountability environment has developed, and using data effectively is considered a "must" for school improvement (Wayman 2005). Murray (2013) suggests that the phrase "data-informed decision making" has become part of the lexicon of the American educator and is now "taken for granted as an essential component of any educational improvement process" (p. 169). In fact, school district superintendents consistently report data use as the most important strategy for meeting the demands of Federal and State accountability systems and dealing with the constant pressure to improve student achievement (Coburn and Talbert 2006; Means et al. 2009). Despite the fact that legislation has changed, and waivers from NCLB have been granted to states, the need for the skillful use of data continues. For example, the requirement of differentiated accountability systems and college and career ready standards and assessments outlined in the Race to the Top (RTT) (U. S. Department of Education 2009) initiative increases the need for successful educational leaders of the twenty-first century to possess skills needed to analyze data effectively, set achievement goals based upon data analysis, and communicate effectively with stakeholder groups.

1 Data informed decision-making defined

Marsh et al. (2006) define data-informed decision-making (DIDM) in education as "the practice of teachers and administrators systematically collecting and analyzing a variety of data to guide instructional decisions and advance the performance of students and schools" (p. 3). The general idea behind DIDM is that more data should lead to better decisions and, in turn, to new and improved educational opportunities and practices. In theory, advances in technology that provide access to useful information in unprecedented amounts whenever it is needed should assist with effective data use (Means et al. 2009). If used skillfully, primary by-products of this data proliferation should be superior teaching, improved student performance, and better communication practices.

2 Advantages of high-stakes accountability measures

Proponents of this type of accountability argue that data from once a year summative assessments can be used to "strengthen the accountability aspects of the system" (Herman 2004, p. 142) by establishing consequential outcomes for schools, teachers, and students ranging from school funding decisions, labeling of school as a success or

failure, teacher evaluations, and to even decisions regarding student promotion or retention. Additionally, results of summative assessments are useful to parents as they evaluate progress of their children and the overall performance of the school in meeting educational objectives. Furthermore, high-stakes testing primarily focused on reading and mathematics leads Rothstein et al. (2008) to claim that perhaps an accountability-driven shift in prioritizing reading and math over other subjects will help provide schools a greater incentive to focus on basic skills instruction and use instructional time more efficiently.

3 Problem

This increased emphasis on yearly, high-stakes testing results in schools and district leaders being led to "systematically collect, interpret, and use data, particularly student test data, for instructional decision-making" (Daly et al. 2014, p. 146). Yet, the result of "instructional decisions" being made based off of high-stakes testing data is controversial. Many researchers (Darling-Hammond 2010; Mintrop and Sunderman 2009; Rothstein et al. 2008) argue that there are limits to the information that can be gained from single measure, multiple-choice tests. "Measurement experts advise that good assessments systems really need to include multiple measures to assess the ranges of knowledge and skills we really want children to achieve" (Herman 2004, p. 144). Stiggins (2002) argues that student achievement requires day-to-day assessments of student learning which can only be done by a teacher in a classroom. However, "the problem is that teachers are unable to gather or effectively use dependable information on student achievement each day because of the drain of resources for excessive standardized testing" (Stiggins 2002, p. 759). Without massive policy changes at the state and federal levels, requirements for summative assessments are likely to remain; consequently, schools need to find a way to enhance data use practices by effectively gathering data and utilizing it in a way that leads to improvement in teaching and learning, meeting the demands of external stakeholders while authentically enhancing instruction/learning toward sustained student achievement.

Specifically, schools struggle to identify a balance between finding a measure of student progress that is also meaningful to the daily roles and functions of teachers (Hanks 2011). Obstacles to successfully using high-stakes summative data include difficulty in accessing relevant data despite technological advances, inability to decipher meaning from data, and data that is too far removed from students to be useful (Kroeger et al. 2000; Hamilton et al. 2009). Additionally, Coburn and Talbert (2006) and Cosner (2011) found that principals and teachers often lack the skills and knowledge to use available summative data to effectively improve teaching and learning at the classroom level. These factors leave educators feeling exasperated, and teacher motivation for goal pursuit wanes as they attempt to implement and fulfill accountability policies.

4 Purpose

Because data-informed instruction is recognized as an essential practice for improving student achievement (Massell 2001) and because legislation that requires high-stakes

accountability based on summative data will likely remain in place, it is essential to gain a better understanding of enhancement of data use practices that can enhance productivity and learning for teachers and students (Hamilton et al. 2008). The types of data that are collected and what is done with the data (e.g., how it is interpreted, analyzed and used for modifications to instruction) are what matter most for student achievement (Hanks 2011; Young and Kim 2010). Therefore, a framework for data use that is connected to current accountability policies for student performance with specific connections to curriculum, instruction, acceleration, remediation, teacher professional development, and the allocation of fiscal and human resources offers promise for an efficient and effective method of goal attainment (Murray 2013).

This qualitative case study is designed to gain a better understanding of a district-wide, teacher-centered approach to formative data use (described as daily observations, anecdotal notes, and records resulting from daily practice with students) in a mid-sized suburban public school district in the Midwest. This teacher-centered approach was implemented to ultimately promote performance on yearly summative assessments. Using Self-Determination Theory as a theoretical framework, we analyzed the influence of a teacher-centered data driven instructional model on teacher motivation and instructional practices at the classroom level. This model is of particular interest as a means to build collective capacity for effective data use in educational contexts, institutions, and organizations.

5 Research questions

1. How does formative data use influence teaching and learning in this building?
2. What conditions are necessary to support formative data use at the classroom level?
3. How does formative data use support teacher motivation to persist in reaching educational goals?
4. Is the formative process having any impact on student outcomes? Specifically, how are students in this school district doing on high-stakes, summative assessments?

6 Methods

Data for this qualitative case study were collected in a mid-size suburban public school district in the Midwest. The district employed 529 teachers in 2013–2014 and had a student enrollment of just over 10,000 in nine school sites (three elementary, two intermediate, one middle, one freshman academy, and one high school). Purposeful sampling was used because this district was identified as emphasizing a formative, teacher-centered approach to data generation and utilization at the classroom level to enhance instructional practices and student performance outcomes.

A case study design was used because we sought to understand how support measures provided by the district facilitate data use and how formative data use facilitates teacher motivation to persist in reaching educational goals. Case study research involves “the study of an issue explored through one or more cases within a bounded system” (Cresswell 2007, p. 73). Purposeful sampling was used. Patton (2002) suggests, “The logic and power of purposeful sampling lies in selecting

information-rich cases for study in depth" (p. 230). This district provided an opportunity to collect rich data because of the commitment to formative data collection and the structural and organizational supports provided by the district for effective data use.

Data was derived from interviews, field notes, observations, and document analysis. Interviews lasting approximately 1 h were conducted with the district Associate Superintendent for Curriculum and Instruction, one building level leader, two reading specialists (classroom teachers), and two third grade classroom teachers. The reading specialists actually function as classroom teachers working with other classroom teachers to promote student growth in reading skills. Second and third grade reading specialists were chosen because State testing begins in third grade in this state, and formative data use is emphasized in this district beginning at the second grade level. Reading specialists were chosen because the researchers sought to understand how data was generated and shared between classroom reading specialists and regular classroom teachers. Focusing on reading specialists allowed us to gain a better understanding of student outcomes for students who are struggling academically, the students who are most often targeted for intervention strategies. Another reason that we chose to focus on reading data was that this state has recently passed legislation that will require retention of students who are not reading at grade level at the end of the third grade beginning in spring 2014. This new retention law has caused considerable concern among all stakeholders in the district: administrators, parents, and community members.

7 Data analysis

Data was derived from interviews, field notes, observations, and document analysis. All interviews were recorded and were carefully transcribed into computer files. Transcripts were sent to participants for member checking. Open code procedures were used to create information categories from all collected data. Regarding interviews, examples of participant's words were recorded and properties of each code were identified. After the completion of open coding, axial coding techniques were used to identify relationships among the codes and to develop coherent categories of major and minor themes that emerged (Strauss and Corbin 1998). Seven category headings were generated from the data, and under these headings, all of the data were accounted for.

Triangulation of data sources was also used. Observations of interactions between reading specialists, between reading specialists and classroom teachers, and between reading specialists, teachers, and administrators were carefully documented. Observations were made during informal exchanges during a typical school day, during common planning times across grade levels, and during building level collaboration. Document analysis consisted of careful reading of letters sent home to parents, email correspondence between reading specialists and classroom teachers, and analysis of formative and summative student data. Student data over a 3-year period was collected to gain a better understanding of how formative data use influences student scores on state tests. Analyzing formative data (second, third, and fourth grades) and achievement results on state mandated tests for students (third and fourth grades) allowed the researchers to observe student progress over a 3-year period, and it also allowed researchers to gain a better understanding of how reading specialists and classroom teachers work together to use data to enhance student outcomes. Third and fourth grade

State Core Curricula Test scores (summative state assessments) were analyzed for this cohort of students. A paired *t* test was performed with third and fourth grade reading scale scores as the dependent variable for the cohort of students. In accordance with Anfara and Mertz's (2006) work on using theory in qualitative research, Self-Determination Theory criteria were applied ex post facto to the findings.

The conceptual framework of Self-Determination Theory was used to explain the theoretical relationship between district support for formative data use and teacher motivation to use data to enhance student outcomes. Self-Determination Theory provides a framework to understand how district structures for formative data use enhance a climate that supports teacher psychological needs of competence, autonomy, and relatedness.

8 Theoretical framework

Self-Determination Theory (SDT) posits that a critical issue in goal pursuit and attainment is the degree to which people, teachers in this case, are able to satisfy their basic psychological needs as they pursue and attain outcomes (Deci and Ryan 2000). According to SDT, individuals have a natural tendency toward enhancing their human potential when basic psychological needs of autonomy, competence, and relatedness are met (Fig. 1). In other words, it is part of the "adaptive design of the human organism to engage in interesting activities, to exercise capacities, to pursue connectedness in social groups and to integrate interpersonal experiences into a relative unity" (Deci and Ryan 2000, p. 230). Environmental conditions that allow satisfaction of these basic needs can be a key predictor of whether or not people will display vitality and motivation to pursue

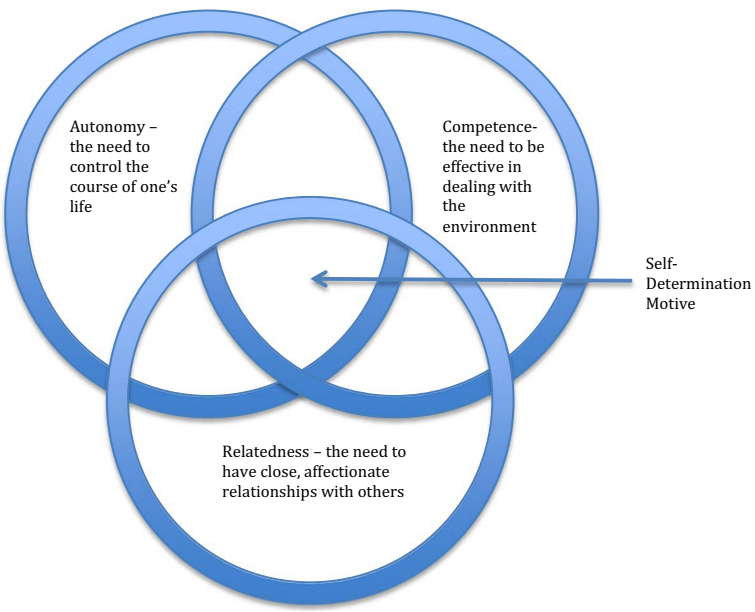

Fig. 1 Three innate psychological needs comprise the Self-Determination Theory of Motivation

goals (Deci and Ryan 2000, p. 231). SDT posits that people will pursue goals, domains, and relationships that support need satisfaction, and to the extent that they are successful in finding such opportunities, they will experience positive psychological outcomes resulting in self-regulated behavior (Deci and Ryan 2000).

9 Findings

Seven category headings were identified during data analysis: (1) administrator support for formative data use including scheduling and confidence in teacher ability, (2) teacher autonomy in academic goal setting, (3) a transparent approach to data use including the collaborative use of data, (4) data used to inform instruction, (5) student motivation to participate in goal setting, (6) development of "a sense of community" regarding data use including enhanced relationships with parents, and (7) data use as a skill that must be developed. These categories address the first two research questions of this study.

9.1 Administrator support

Findings confirmed building and district administrator support for formative data use through structural and organizational mechanisms. A common approach to formative data use across elementary schools in this district began in 2008 as a response to accountability mandates that district leaders described as "heavy handed, State and Federal mandated approaches to data use." The process began with district efforts to include teachers in planning an initiative to utilize data to enhance student performance on state tests. Before a common framework for formative data use in the district was implemented, classroom teachers were encouraged to submit initial ideas and proposals for data use. Teachers stated that inclusion in the decision-making process emphasized that district leaders had confidence in them, and it provided momentum and support for the new initiative. Teachers appreciated the opportunity to "have a voice" in decisions that would directly influence classroom practices. Teachers met to discuss ideas for formative data use, and they presented a proposal to district level leaders, providing a foundation from which current practices were adopted across elementary schools throughout the district.

One means of district support for data generation and analysis at the classroom level was a flexible schedule that allowed for common planning times and monthly meetings. Building schedules were structured so that teachers were able to meet by grade level each week to discuss student progress and set student learning goals. Additionally, the district set aside 2 h each month during the school day so that teachers across grade levels could meet to discuss student progress based on data that had been collected the month before.

Administrators expressed trust in teachers to generate and analyze their own data. Teachers stated that they felt competent to generate data that could enhance classroom instruction. Their competence to gather data and, subsequently, adjust instructional practices was reflected in statements such as, "Data are used in this district to *inform* instructional practices rather than *evaluate* instructional practices." Teachers expressed that this approach to data use communicates to them that they are "being treated like a professional."

9.2 Teacher role in academic goal setting

Closely related to the first finding, teacher autonomy in academic goal setting was evident. Teachers expressed deep appreciation for the fact that they are "treated as professionals" as they explained that they are trusted to make competent decisions for instruction. One stated,

> The focus is on what's best for kids. We can do that however we feel is necessary. A lot of freedom is given to us as long as our focus is student learning and as long as we can justify what it is that we are doing.

One district level administrator agreed in her statement,

> It is amazing what some of our classroom teachers come up with as far as assessments. There are quite a few things that teachers have done that have become district assessments. They weren't generated because anyone told them to do so. They do so because they have the freedom to do it, and they love kids. They want what's best for kids.

9.3 A transparent approach to data use including the collaborative use of data

Educators at both district and classroom levels emphasized the district's emphasis on a collaborative approach to formative data use between and across district, building, and classroom levels. Evidence included common planning times within grade levels designed so that teachers and reading specialists could meet together informally to discuss student progress. Reading specialists described the practice of "pushing into" classrooms each week to work cooperatively with classroom teachers. Additionally, weekly meetings were held across grade levels to facilitate collaboration among classroom teachers and reading specialists. Discussions during these meetings focused on formative data that teachers and reading specialists had collected during the week to assess student progress. During these meetings, teachers discussed individual student progress, and, collaboratively, they set short-term reading goals for students. Teachers described the process as a very "transparent" process. One teacher stated,

> We keep it very collaboratively focused, not someone speaking at us. We sit at tables working together. As we have evolved in this process, it has become a time to share what is working well and where our challenges are. *It is a very transparent process.*

Administrators confirmed that the purpose of monthly meetings was to facilitate a collaborative approach to data use through teacher-initiated conversations regarding formative student data. Teachers stated that they felt free to engage in open and honest discussion of student progress, and they appreciated the opportunity to collaboratively set short-term learning goals for students. Teachers also felt freedom to express concerns, and they worked collaboratively to creatively and effectively address student progress toward learning goals.

9.4 Data used to inform instruction

Teachers stated that a benefit of this "non-threatening, transparent approach" to data use was that it encouraged teachers to continually evaluate their own instructional practices and adjust those practices to more closely meet student needs. Teachers described their practice as "reflective teaching" and emphasized that, as teachers in this district gain expertise in data generation and interpretation, they learn to more effectively utilize data to adjust teaching practices to meet student needs. One classroom teacher stated,

> I no longer spend all of my time planning lessons. I have learned to assess students in the middle of a lesson. I work on plans as we are going. I have found that my teaching is much more effective and directed to students' needs.

The ability to adjust instruction based on the needs of students was described as one of the primary focuses of data use in the district, and, again, teachers described this process as "being treated like a professional." Administrators stressed that making adjustments while working with students had the benefit of "taking advantage of that moment to do something different and respond to the needs of kids." Classroom teachers described the process as "very empowering" for both teachers and students.

9.5 Student motivation to participate in goal setting: a common language emerges

The practice of consistent goal setting and goal revision not only motivated teachers but it also helped the student accept some "ownership" of learning goals and encouraged students to become actively involved in setting increasingly challenging goals. Teachers stated that, even as early as second grade, as the student becomes more familiar with the process and with the language associated with goal setting, the student is given a voice in the goal setting process. At the beginning of second grade, teachers set short-term reading goals for each student. However, as the year progressed, students became more involved in setting their own goals. A reading specialist stated,

> By second semester (of the second grade), most of them are doing a good job of saying, "I think I need to work on my fluency when I read because I am reading way too slow," or "I am really struggling to figure out words, so my goal is going to be to work on 'read-skip-read' when I come to something I don't understand."

Classroom teachers and reading specialists emphasized the fact that a common language emerges that helps both teachers and students, and it also provides benefits that extend beyond grade levels. For example, teachers in the next grade level spoke positively about lower grade teachers teaching students to assist in setting their own goals and "naming strategies." One teacher added, "We are amazed at how well these kids are doing at naming strategies. There's continuity (between grade levels). It has been very helpful."

9.6 Sense of community

Both administrators and classroom teachers recognized the "sense of community" that had evolved as a result of using data to set student goals and evaluate student progress.

One district leader stated, "At the beginning, we had a couple of 'nay-sayers' of course. But it has developed into a really strong community. We have a great community of teachers who are in it for the kids." A sense of community was evidenced when classroom teachers, reading specialists, and district and building level leaders openly expressed their confidence in and their dependence on other teachers' abilities across the building to generate and use data to guide instruction. Teachers stressed that using formative data as the focus of conversations during meetings enhanced relationships among teachers as teachers worked closely together to assess student progress and set learning goals.

Enhanced relationships with parents Evidence from this study suggests that a collaborative approach to goal setting, using common language, and utilizing formative data facilitates relationship building by incorporating parents into the process as well. Data is shared with parents, and parents are invited to assist in goal attainment, thereby fostering stronger partnerships between the home and the school. Classroom teachers stressed that parents become more actively involved when teachers share specific information about student progress with them. One stated,

> We will share with parents where the child is and where 'on target' would be. We talk about what it takes to get them there. We tell them that it takes a lot of reading and knowing their strategies. These parents assume quite a bit of motivation for their learning.

Further, this district provides opportunities for collaboration between teachers and parents through curriculum nights or reading nights. When asked about benefits of those events, one classroom teacher stated,

> Our attendance on those nights, where it is interactive between teacher, student, and parent, is much, much higher than Back to School Nights or Meet the Teacher Night. It helps us to communicate to parents that (education) is a shared responsibility. It's not that we talk to them and say, "this is what we are doing." Instead, it's an attitude, an approach. Our approach is "we are going to partner with you in this." We use data as a means to communicate with parents about student progress.

9.7 Data use: a skill that must be developed

Teachers emphasized that data use is a skill that must be developed, and they stressed that mentoring relationships among faculty are essential to facilitate the development of necessary skills. Teachers stated that successful data use "comes with experience" and that learning to adjust instruction to meet student needs is a skill that is best learned in relationship with other teachers. One classroom teacher explained,

> In the beginning, a new teacher focuses on what he/she needs to get done. New teachers are often overwhelmed by it all. Data use comes with experience. We work with new teachers to develop their skills; as they learn, they become more reflective in their teaching and learn to adjust instruction in the moment.

9.8 Findings through the lens of Self-Determination Theory

We address the third research question through the theoretical framework of Self-Determination Theory. Following our analysis of the data, we applied Self-Determination Theory ex post facto as a theoretical lens to explain these findings. Specifically, we explain how this district's support for formative data use facilitates teacher motivation by meeting teacher needs of autonomy, competence, and relatedness.

9.9 Autonomy

Several findings from this study suggest that this formative approach to data use in this district supports teacher autonomy. For example, teacher discussions during grade level and building level meetings were focused on teacher-generated data. It was noted that administrators did not attend those meetings and that teachers set their own agendas and directed each meeting. Additionally, teacher comments such as "data is used to inform instruction rather than evaluate instructions" supports the conclusion that teacher autonomy is promoted in this model. Our findings further suggest that autonomy is provided and encouraged as teachers set increasingly challenging goals for student learning. This teacher-centered practice of generating and analyzing their own data and using data to set increasingly challenging short-term goals allowed teachers to adjust instruction to meet student needs. Most importantly, teachers described the process as "transparent" and "empowering" further supporting the conclusion that teachers feel a sense of autonomy in this method of data use. Further, these findings suggest that not only do teachers feel a sense of autonomy in setting goals for students but students also are granted autonomy as they participate in setting their own goals.

9.10 Competence

Teacher feeling of competence was emphasized in statements such as, "I am treated like a professional." Teachers were encouraged to participate in the planning stage of this formative approach to data use, and they stated that they were "given a voice" in decisions that would affect classroom instructional practices. Teachers and administrators expressed confidence in teacher ability to collect and analyze their own data with administrators commenting on the value of district level assessments that had resulted. Teachers also emphasized that the ability to collect and analyze their own data provided continual feedback to the teacher and student so that instructional decisions could be made on a daily basis. This feedback motivated both the teacher and the student to set increasingly challenging short-term goals to challenge students to strive to reach the next reading level further emphasizing the enhancement of both the teachers' and the students' sense of competence.

9.11 Relatedness

Regarding relatedness, a collaborative approach to data use was a consistent emphasis among teachers and administrators. Teachers explained that collaborative data use facilitates common understandings, alignment of instructional goals, and a common

language to guide discussions about student progress. Further, the collaborative approach to data use facilitated relationships among teachers, between teachers across grade levels, and between parents and teachers providing a strong foundation for meeting the teachers' psychological need of relatedness. Administrators and teachers described the "strong sense of community" that had developed since the implementation of the approach. This sense of community was contrasted to the pressure that teachers had experienced from "top-down" high stakes assessment policies.

9.12 Conditions necessary to support formative data use

Although our findings suggest that formative data use, where teachers generate, analyze, and utilize their own data to guide instruction, support an environment conducive to meeting teacher psychological needs of autonomy, competence, and relatedness, findings from this study further suggest that effective formative data use is dependent upon normative and structural conditions that must be in place for sustained effectiveness. Structural conditions include district level support and a consistent approach to data use. This support is evidenced in district provision of common planning times and blocks of time allowed monthly for collaborative efforts. Additionally, a common assessment framework across elementary grades enhanced the effectiveness of using formative data by giving teachers, students, and parents a common language and shared understandings of student progress. Reading specialists who worked cooperatively with classroom teachers by "pushing into" the classroom provided support and encouragement to persist in reaching educational goals. Additionally, the district also provided resources to support mentoring relationships among teachers to build teacher capacity for generation, analysis, and utilization of data. Mentoring relationships were especially important for new teachers as they developed skills to move from "covering content" to adjusting instruction "in the moment" to meet specific learning needs.

Normative conditions were also necessary to support effective formative data use and an environment that supported teacher needs of autonomy, competence, and relatedness. These conditions included a district level, collaborative approach to formative data use. Specifically, district level emphasis on collaboration among teachers to generate, analyze, and utilize data encouraged transparency among teachers and the use of data to "inform" instruction rather than "evaluate" performance. Together, these structural and normative conditions provided a foundation for teacher practices and promoted a school culture that enhanced the effectiveness of data use. Figure 2 outlines the normative and structural conditions evident in this district and the relationship between these conditions and the meeting of teacher psychological needs.

9.13 Student performance on summative assessments

We address our fourth research question by analyzing student performance on third and fourth grade State Core Curriculum Tests. The purpose of using formative assessments in this district is to, ultimately, enhance student performance on yearly State assessments. Therefore, an understanding of student performance is useful in assessing the effectiveness of this district's use of formative data. The paired *t* test results indicated

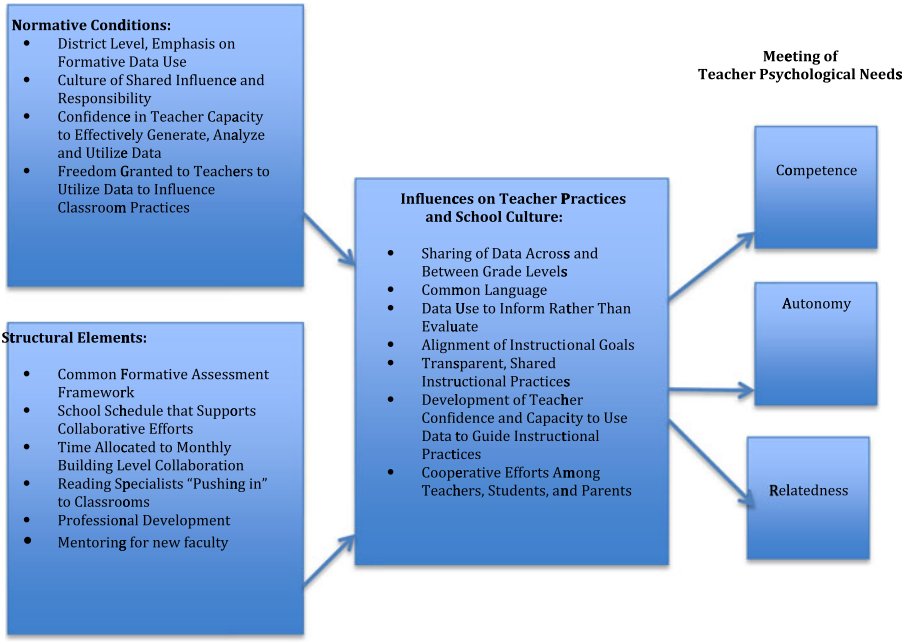

Fig. 2 Teacher-centered model for formative data use

there was statistical significance difference between third and fourth grades' Reading scales score [third grade M=700, SD=182 and fourth grade (M=741, SD=99) Reading scale scores; t (207)=−4.63, p=0.000]. The average scale score in Reading as assessed by SCCT (State test) at the third grade was 701 (N=208). This scale score translates to the lower bound of proficient level (700–890 is proficient band). The same cohort of students at fourth grade, their average scale score in Reading as assessed by SCCT (State Test) was 741 (N=208) even higher than the third grade average score. This value also translates to proficient level, but higher than the lower bound of proficient band. The results suggest a general increase in students' Reading scores as assessed by the SCCT.

10 Discussion

Given the fact that effective teachers are the single most important determinant of how students achieve (Darling-Hammond 2013; Moir et al. 2009), maximizing teacher expertise and teacher motivation to use data to inform instruction is essential. Teachers' perceptions about teaching and their motivation to enhance capacity have been found to influence all aspects of instructional practice (Young and Kim 2010), and their beliefs have been reported as the filter through which new techniques are interpreted and executed (Borko et al. 1997). In addition, the extent to which data effectively advance instructional practice in the classroom has been linked to teachers' assessment practices, pedagogical views, and the relevancy, usefulness, and accessibility of data (Young and Kim 2010).

A "bottom-up," teacher-centered approach, such as the one utilized in this district, which builds teacher capacity for effective data generation, collection, and utilization, offers promise for enhancing student achievement because it limits the space between assessment and the student, and allows the process to be used formatively so that instructional planning can more effectively promote student growth. It provides a structure for alignment of standards, assessment, and instructional practice on a daily basis at the classroom level, and it provides a more accurate reflection of student behavior, skills, and knowledge. Also, according to these findings, classroom-generated data encourages teacher and student self-reflection and provides the kind of information needed for teachers to assess their own practices leading to informed instructional techniques and enhanced goal setting. Further, formative data generated by classroom teachers on a daily basis provides multiple "snapshots" of student ability for a more accurate understanding of student skill development.

Our findings also suggest that this approach to data use may enhance a culture that motivates teachers for sustained effort toward goal attainment through the meeting of teacher needs of autonomy, competence, and relatedness. Considering the importance of competent teachers in promoting student learning, understanding a means to formulate accountability mandates that actually enhance teacher motivation could lead to meaningful, sustainable school reform. Educators in this study emphasized the use of formative data as one of the most important strategies that the district is using to reach student achievement goals. The fact that our analysis of quantitative data indicated an increase in student performance on State assessments suggests that this approach to data use may have a positive influence on state-mandated high-stakes assessments as well.

11 Implications for research and practice

Current reforms focused on summative assessments have become a standard within United States education accountability policy. Though many well-known public school advocates (Diane Ravitich and Linda Darling-Hammond) stridently speak out against high-stakes testing, Carnoy and Loeb (2004) argue that "testing is one component of a broader and deeper set of sustained changes necessary for education improvement to occur" (p. 192). Carnoy and Loeb (2004) further explain possible benefits of testing such as its ability to be used as a "gauge to increase standards, to assess curricula or to provide technical assistance" (p. 192). It can even be utilized as a "mechanism to allocate additional resources in order to improve outcomes" of specific student groups (Carnoy and Loeb 2004, p. 192). What this study suggests is that formative assessment may be used to complement the use of "high-stakes" summative testing resulting in increased motivation for teachers. We are not suggesting a specific program or method of formative data collection. As findings from this study indicate, allowing teachers to "have a voice" in those decisions may promote the "buy-in" and motivation for sustained practices. We also do not suggest that findings from this study can be generalized beyond this current district. Additional research is needed to understand if the use of formative, teacher-directed assessment has these same results in other districts. The small sample size of this study is a limitation. Replication of this study in other districts, grade levels, and in other subject areas could add to current

understandings about the use of formative data to promote teacher motivation and to support meeting of summative student outcome goals. Especially significant in these findings is the motivation of these teachers to persist in their efforts to reach achievement goals. Therefore, we conclude that a teacher-centered approach to data use that empowers teachers to generate, analyze, and utilize data at the classroom level to guide instruction has potential for motivating teachers to persevere in their efforts to enhance student outcomes.

We argue that developing a framework for data use that fosters teacher motivation is essential because current approaches often overlook the influence that "top down" policies have on teachers. According to Mintrop and Sunderman (2009), accountability reform initiatives mandated at the state and federal levels do not support educators' core professional norms, leading to "widespread frustration and demoralization" (p. 360). Current high-stakes accountability mandates may actually demotivate teachers by removing the teacher from the DIDM process, and they separate student outcomes from immediate instructional practices. Therefore, a model of data use that relates to the function or work of a teacher is essential to make data use meaningful and practical (Young and Kim 2010).

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