This paper considers the relationship between the nature and levels of student engagement in elementary schools with corresponding standardized test performance levels. While both higher and lower-order student achievement levels are theorized to impact standardized test performance, the extent of this relationship may not be the same for different types of classroom behaviors. More specifically, this paper will address whether the standardized testing instruments, and the basic content that tests rote memorization, is as impacted by higher-order forms of thinking and learning. Conversely, lower order student thinking and classroom disengagement, classroom behaviors which place students at a great disadvantage as they are tested on factual recall items associated with standardized testing, was expected to decrease test score more markedly than the gains that follow gains in higher order and critical thinking. As theorized, a statistical consideration of the student engagement and standardized achievement relationship was telling: while higher-order student engagement enhancements lead to marginal increases in standardized achievement, lower-order thinking levels detrimentally impact student learning at more pronounced rates.

Introduction

Elementary schools are the starting point of an educational journey for the nation's public school students. Not unexpectedly, a child's earliest exposure to public education can dictate their future academic success for many years to follow. Student learning styles, teachers' instructional techniques, and administrators' expectations differ from what is found at the middle

and high school levels. Still, the research on educational quality, student engagement, and student learning is as applicable to the elementary school setting as it is elsewhere.

Exploring the linkage between student engagement and resulting standardized test scores requires more than a straightforward mathematical consideration of these two variables. Instead, structuring an empirical study in a manner that focuses on the nature of classroom instructional quality also provides for an explanatory foundation upon which to discuss current and future student engagement behaviors across school buildings. Contained in this paper, and offered from both theoretical and quantitative angles, is a more in-depth explanation of the classroom behaviors that influence student learning and achievement. As importantly, those student engagement activities which depress learning are also addressed more completely in the pages that follow. This allows instructional leaders to grasp what works in this quest to promote more excellent forms of learning and instruction. Simultaneously, educators can identify classroom methods to be avoided by elementary school educators.

Finally, student learning is considered in both the practical sense of the meaning, but also according to the more tightly defined measurement of standardized test score levels. To be sure, the relationship of test score growth with the corresponding student engagement behaviors is likely to be of great interest to a great many educators. This is especially the case as the composite profile of such classroom behavioral types is quantified with greater precision. From such a relationship, the path which connects educators' initial attempts at bolstering instructional quality with the ultimate achievement outcomes posted in the face of these improvement efforts is made clearer under such a comprehensive framework.

Literature Review

Instructional Quality

As an initial matter, it is helpful to consider what excellent instructional quality looks like within today's elementary school classrooms. Research on teacher quality and effectiveness can be valuable in informing elementary school faculty and administrators of those desirable and undesirable instructional characteristics. Heistad (1999) conducted a study of exceptional teachers and found that such educators endorsed more teacher-directed activities, more development of word attack strategies and more use of individual student oral reading (Heistad, 1999). Heistad (1999) notes that exceptional teachers commonly 1) model reading to students on a daily basis, 2) engage in the practice and repetition of isolated skills, 3) engage in a combination of group work and individual work, 4) assign pairing of work, 5) integrate reading into the curriculum, and 6) continuously monitor and promote student self-regulation. Additionally, Druian and Butler (1987) found that outstanding teachers 1) possess good time management skills, 2) assign student work at the appropriate difficulty levels, and 3) use positive reinforcement with students. The importance of communication and relationship building among school personnel is also well-documented in the current literature (Dozier, 2007).

The consequences of instructional quality have also been addressed in great substantive depth in the educational research to date. Teacher quality has been demonstrated to exhibit substantial effects on student learning, as well (Druian & Butler, 1987). Not surprisingly, the importance of the teacher's role in the educational process is central in providing a quality education to students (Lewis, 1978). Teachers who employ the Socratic method of conversation-stimulating questions to challenge students to elaborate on their assumptions and interrogate their

own thought processes were found to be highly effective (Cotton et al., 1989). Nevertheless, elementary educators must remain mindful that not all "why" questions elicit higher-order thinking (Lewis & Smith, 1993). In sum, the research to date has established that it is not too early to impress upon elementary school students the skill sets that undergird certain active, critical thinking mannerisms. When steadily cultivated, these competencies empower students to successfully progress from one grade level to the next.

Curricula Formation

Much of the daily classroom methods and routines that contribute to instructional quality are guided by the curricula adopted by the elementary school faculties. The goal of formal education is to create independent thinkers (Lewis, 1978). For elementary school leaders to strike an appropriate balance between adopting innovative and challenging curricular initiatives while also focusing on traditional test preparation goals involves a certain degree of difficulty. Educational research is replete with evidence that demonstrates that teachers who provide students with basic factual content and who also encourage them to frequently recite such knowledge translates into more effective standardized test performance (Cotton et al., 1989). Not surprisingly, basic end-of-the-year objectives oftentimes lead to lackluster educational provision. Hence, a simple test score proficiency metric is not without controversy, as it encourages not only these tracking practices, but it also promotes a myopic focus on test preparation among students that is narrowly conceived. Any researcher should additionally note that instruction that includes actively engaged student learning need not be reserved for only middle and high school grade levels.

Without question, quality instruction entails the provision of rudimentary background knowledge to students (Thum & Bhattacharya, 2001). It is more ambiguous as to whether classroom instruction that incorporates components of teaching students how to think is ultimately desirable. Nevertheless, the teaching of thinking has become quite popular among educators (Marzano, 1993). Other common pedagogical techniques to enhance student thinking include questioning techniques, writing techniques, and general information processing strategies (Marzano, 1993). Weast (1996) further notes that "students can learn to think more 'critically, logically and scientifically if they [take] course work having that task as an explicit goal' (p.189). Indeed, in elementary settings, social studies instructors were commonly found to emphasize student personal development, knowledge of the contemporary world, basic information gathering, critical thinking, and decision-making skills that were incorporate in interdisciplinary instruction (Brophy, 1990). Laying the sorts of foundational structures for student learning should not be mistaken for loose or non-higher order instructional practices. Though the place for critically engaged students in elementary schools is as fitting as for other settings, it is during this time that these children are initially acquainted with these classroom learning techniques.

Gleaned Insights from the Literature: Instructional Quality

As the youngest of the K-12 learners, elementary school students are required to steadily accumulate a broad knowledge base under a tightly compressed time horizon. All the while, students must be educated in ways that ensure their attentiveness to, and interest in, a broad range of subject matter. Defining what it means to establish and provide for a quality elementary school instructional environment becomes a crucial first step of the engagement-achievement inquiry. Thereafter, the paper turns to an explanation of what instructional methods

are most desirable in educating today's elementary school children. Moreover, how these instructional behaviors are given structure by curricular design is explored and explained in the first part of the paper. Student engagement behaviors are not transformed by school mission statements or administrative reform visions alone. Instead, the nuts and bolts of the teaching craft must be interrogated, reformed, and further refined over time before improvements in student engagement behaviors and test score progress are evidenced across the nation's elementary school classrooms.

Critical Thinking

Before considering how to best stimulate critical thinking in classrooms, it is important to determine what constitutes both student thinking and critical thinking across elementary school learning environments. Geertsen (2003) defines thinking as "a mental process in which something is turned over in the mind to make sense out of experience" (Geertsen, 2003**,** p. 1). Critical-thinking skills are not innate to elementary school students. In fact, the development of students' critical thinking skills takes several years, as it involves the development of cognitive dissonance, reflection, and repetition (Webster, 1990). Differential levels of student critical thinking also vary based upon the student's grade level. The elementary school years were found to be an influential period in the growth of student learning, as students develop and improve their thinking skills (Webster, 1990).

While it is not always feasible for elementary school teachers to provide fully differentiated instruction to students, it is nevertheless the case that students will continue to demonstrate distinctive and idiosyncratic learning needs. All children benefit, however, from access to a classroom environment that is conducive to enabling students to engage in critical

analysis and intellectual exploration (Cotton, 1989; Pogonowski, 1987; Webster, 1990). Furthermore, the personal experiences of students matter in how those students continue to learn. Underbakke, Borg and Peterson (1993) note that "the most powerful predictor of how much students learn is what they know prior to entering the classroom" (p.138).

Underbakke, Borg and Peterson's (1993) suggestion reminds the educational research community that students' previous teachers are impactful on their current ability level. Indeed, as a student enters the classroom of a given teacher for the first time, the educational history and prior instructional quality of the student represent an influential factor in determining the demanding nature of the instructional task at hand. Teachers are entirely capable of controlling the nature and quality of their current classroom environments, however. Unfortunately, it is common to find students who remain unchallenged in classrooms. Off-task students are typically those who display inattentive body language, a lack of eye contact, and a lack of nonverbal listening. While troubling, this is not surprising, as Freeman (1989) notes that "the bulk of instructional time finds students listening to teachers talk, working on tasks that require little application of concepts, imagination or serious inquiry" (p. 417). Allowing such behaviors to take shape in the elementary school set a harmful precedent for young learners at the very earliest stages of their educational careers. Ultimately, it is within the elementary school teacher's control to dictate the nature of their pedagogical practices and other classroom activities that actively facilitate such higher-order thinking.

Proven Instructional Strategies

Changing instruction for the better across elementary schools requires instructional leaders to identify and spell out in full detail what works in most effectively educating these

students. Be it on standardized tests or in their professional lives, students will be challenged to think critically and creatively, and they must be educated accordingly. Teachers who seek to impart effective analytic strategies and skills to their students can do so by employing explicit pedagogical techniques (Marzano, 1993). Explicit instruction that involves teaching thinking includes engaging students in the practice of identifying component parts and articulating the relationships among the parts (Marzano, 1993). This can be accomplished in a more knowledge-free fashion, in which a student's learning capability is not dependent upon his or her current content knowledge base (Nickerson, 1988; Webster, 1990). In short, it is important that teachers avoid didactically conveying factual information to students (Heistad, 1999).

Also of vital importance is students' ability to adroitly problem-solve at any early age. Consequently, teacher instruction that incorporates problem-solving skills will be of great value to students. Student problem solving often involves a process of students': a) becoming aware of the problem, b) gathering data, c) forming hypotheses, d) testing these hypotheses, and e) reaching conclusions (Brophy, 1990). Brophy (1990) convincingly argues that "Obviously, little or no higher-order thinking would be involved in a purely directive…approach to values education," (p.382). This leaves the reader to conclude that teacher pedagogy that is more interactive than simple teacher-directed instruction is irrefutably more beneficial to elementary school students.

Teachers should further strive to improve the three highest levels of listening: a) interpretation, b) evaluation, and c) response (Molina, Steurer, Twardy, & Young, 1997). This invariably entails a certain amount of teacher-led instruction, which can be used to provide a

basis upon which students might then be asked to critically expand and expound upon such knowledge. It is important that educators not mistake this higher-order pedagogy as being comprised of long, vague, abstract complex sentences, as this sort of pedagogy can become more difficult for students to understand (Molina et al., 1997). To help gauge the nature of their instruction, teachers can incorporate their students' evaluations and judgments in their classroom instruction to facilitate higher-order questioning, as these are key components associated with higher-order learning (Lewis, 1978; Lewis & Smith, 1993). It must be stressed, however, that asking a higher-order question does not guarantee a higher-order result (Cotton et al., 1989).

As elementary school teachers seek to guide and stimulate student thinking in young learners, this is not an uncomplicated enterprise. Indeed, thinking lacks a singular definition, as technical skills, strategic thinking, and conceptual understanding are all important components associated with the practice (Greeno, 1997). Teachers who emphasize student decision making over problem solving, as well as deliberate instruction that encourages student generation of knowledge through discovery and experimentation (Brophy, 1990) are oftentimes more effective in teaching students to think by actively engaging students in the process of thinking (Greeno, 1997). Though their methods can vary, elementary school teachers should remain focused on teaching students in ways that foster heightened levels of higher order and critical thinking.

Gleaned Insights from the Literature: Student Engagement

The manner in which elementary school students are engaged in learning matters for a broad host of reasons. In the accountability era, the focus on test performance remains as intense in elementary schools as is the case for other building types. Though other important student outcomes, such as graduation rates and college attainment levels, are likely influenced by student

engagement behaviors, the direct link with test scores allows the importance of classroom behaviors to be exactly quantified, targeted, and traced by instructional leaders over time.

Determining the nature of the relationship between student engagement behaviors and resulting standardized achievement levels has important implications for elementary school instructional leaders. A critical first step of the inquiry involves defining and delineating those classroom behaviors which are desirable in fostering public education from those that depress meaningful learning. It then becomes possible for the quantitative relationship between classroom behaviors and resulting test scores to be versed in measurable student engagement types. The school improvement dialogue is, therefore, resituated according to more practical and readily observable criterion. The ultimate goal of elementary school leaders is to maximize classroom learning as well test score growth. The student engagement behaviors targeted by instructional reforms in these settings must be understood in direct connection to instructional quality before educators' focus can usefully shift to more optimal growth in those classroom behaviors that are shown to enhance student learning and test scores. Arriving at these objectives by focusing on the internal mechanics of excellent instruction is a critical piece of the reform puzzle. Unfortunately, this vital stage in the reform process is dismissed from the outset during too many reform attempts.

Student Learning

Though the label is clear-cut in appearance, determining what outcomes capture the extent of student learning is not likely to be without debate among elementary school leaders. Rarely is student learning thought of as a dynamic, fluid, and continuous process in which student interaction with the learning environment guides their intellectual inquiry (Applebee et al., 2003). Nevertheless, students are believed to possess cognitive maps in their minds, in which

current knowledge and understanding guides future inquiry and exploration (Cooper, 1989). This being the case, distinctive value might be derived from expert scaffolding of teacher pedagogy, in which conceptual content material and ideas are incorporated with one another in a planned way, which can fill learning gaps for distinct children (Cooper, 1989). When students engage in higher-order thinking, such thinking skills become applicable across a wide range of disciplines. Structured educational environments can serve to support such broad-based learning (Brophy, 1990). Students derive benefit from participation in classrooms where learning to think thrives (Greeno, 1997). Unfortunately, inadequate teacher training, and the oftentimes misguided teaching initiatives that are associated with the standardized test movement, has greatly impeded elementary school teachers' abilities to effectively educate their students.

The teaching of thinking should be a fundamental goal of education, as it will best equip students to be effective not only in the classrooms but when they enter the highly demanding workforce (Nickerson, 1988). Research has been encouraging, as students reveal that they are highly desirous of actively engaging in inquiry and sense-making, and effective student engagement and learning incorporates content that is of relevance to students' current and future personal lives (Greeno, 1997). Nickerson (1988) suggests that as teachers engage students in strategic thinking activities, this enables these students to become conscious of their own thinking and learning. This student ownership of his or her learning becomes an empowering feature of the student's educational experience, remaining with the student long after he or she leaves the classroom (Nickerson, 1988). Similarly, reflective thinking helps students consolidate and extend their knowledge base (Brophy, 1990). The teacher-student dialogue should include learning application opportunities, as well (Brophy, 1990). When students become active

participants in their own assessments, they ultimately develop a sense of responsibility that is required not only of capable students, but of capable citizens (Greeno, 1997).

Gleaned Insights from the Literature: Student Outcomes

Instructional improvement initiatives are not launched for the stake of trying something new within the nation's elementary schools. Instead, instructional leaders in these settings are under pressure to show relatively rapid and steep growth in classroom learning and outcomes. Standardized test score progress has been intensely monitored for the better part of a decade. Student engagement levels can now be measured with a degree of specificity and reliability that signals the nature of, and growth in, the instructional quality of elementary school classrooms over time. Research efforts to link students' learning behaviors to test scores in strictly quantitative terms has been almost entirely non-existent to date, however. It is fitting, therefore, to consider the broader concept of instructional improvement in elementary schools by linking the specific nature of student engagement behaviors across all classrooms with bottom line achievement fluctuations for the respective school buildings.

Methodology

The Instructional Practices Inventory

The Instructional Practices Inventory (IPI) coding rubric is an instrument utilized by classroom observers to ascertain the nature of student engagement across classrooms within a school. The IPI is comprised of "a set of observational categories complex enough to provide substantive data grounded in the knowledge of best practice (valid) yet easily understood and interpreted" (Valentine, 2007). The IPI instrumentation allows a trained classroom observer to

collect approximately 100-150 observational codes that capture student engagement behaviors for each school. The observation categories included in the IPI observation protocol are: (1) student disengagement, (2) student engagement in non-higher order activity without teacher participation, (3) student engagement in non-higher order activity with teacher support, (4) teacher-directed instruction, (5) student engagement in higher-order classroom discussion, and (6) all other higher-order student learning.

The IPI process focuses on student engagement and cognitive thinking rather than teacher or student behavior. The resulting IPI profile data can be used to foster teacher engagement in whole-faculty and small-group collaborative analysis, reflection, and decision-making of the profile data. The IPI instrumentation, and the accompanying building-level instructional processes, can ultimately provide telling and comprehensive school-wide data that allow teachers and administrators to continuously monitor and refine their pedagogical practices. These components of the IPI process support continuous change and collectively foster organizational learning (Valentine, 2007).

The IPI categorizes student engagement levels on a continuum from 1 to 6, which is designed to account for the spectrum of student engagement that one can expect to find in any given classroom at a particular moment. Table One offers an explanation of each of the six coding categories. It is important to note that the higher-order categories ("5" and "6") represent desirable forms of student learning, whereas the lower-order categories ("1" and "2") represent less effective and generally undesirable, indefensible forms of student activity within classrooms. It is not always possible, nor desirable, for students to be engaged solely in higher-order activities, however. As such, categories "3" and "4" account for those moments during

classroom instructional time when the teacher is primarily involved in informing and directing the students' activities in the classroom, as student engagement becomes mostly passive and inactive. This might come in the form of teachers informing students of certain tasks or logistical considerations or teacher-directed learning, both of which are inevitable components of effective teacher pedagogy and student learning.

Insert Table 1 approx. here

Statistical Model Configurations

Hierarchical Linear Modeling represents an especially attractive methodology upon which to address the theoretical concerns underlying the incorporation of the Instructional Practices Inventory (IPI) in school settings of all kinds. The structurally and spatially nested nature in which student learning and school processes are configured can be duly accounted for by HLM Modeling.

For the purposes of the present study, the engagement within classrooms among schools that have incorporated the IPI process will be used as a starting point to accumulate the data needed to address the extent to which student engagement levels are altered as a result of IPI implementation, while also investigating the student engagement and standardized test performance relationship. To adequately account for the nesting of student engagement within classrooms in a greater environmental context, the introduction of a third level to the model that incorporates the region level (level three) can additionally be considered by the researcher as he attempts to account for the structure inherent in student learning.

Level-One School-wide engagement : Level-One of the HLM models employed in the study contained the variable that captured the student engagement levels within the elementary school classrooms. Raw percentage breakdowns are computed for each school type that provided three or more IPI classroom data profiles, in the form of singular disengagement codes for core and total classrooms (C1, T1 and C2, T2), and an aggregated metric of distinctive higher order categories (T56 and C56). As multiple classrooms observations are coded for each classroom within the building, over the course of a school day, a statistically representative depiction of student engagement levels within each school setting can be introduced into the multilevel statistical study at Level One of the HLM models. The assignment of student engagement levels as dependent variables in the model to test against the corresponding IPI practices and processes, as captured by coded IPI survey responses, has been emphasized at this level.

Other important building-level school inputs are also imbedded in this level of the HLM models. The proportion of teachers with master's degrees (Tchr_mast), the proportion of students eligible for free and reduced lunch (FRL1), and the student teacher ratio (stu_tchr) are accounted for at Level One. Each of these variables, to varying degrees, coincide with student engagement behaviors in dictating both the nature of student learning in the classroom and on standardized tests.

Level-Two School Districts: School districts comprise the second level of the multilevel statistical study that incorporates student engagement data from within and across classrooms. The schools that provided IPI classroom data were located within Missouri school districts in all corners of the state. While not categorically the case, anecdotal evidence and more cursory observations suggest that school districts exhibit a pronounced and inescapable influence on the

health and effectiveness of the schools that operate within them. The demographic data provided by Missouri's Department of Elementary and Secondary Education are quite exhaustive. For the purposes of this study, traditional socioeconomic, and controllable and uncontrollable educational resources and input factors were collected and recorded for the corresponding school districts containing the schools that provided data for the current research undertaking. More specifically, the per pupil expenditure levels (PPE), the percentage of minority students (Pct_min), the free and reduced lunch rate at the district level (FRL), the percentage of families that have remained in the district the last five years (PCT_not) and the proportion of married families (Now_married) are included at Level Two. These variables, both in isolation and acting in concert, can govern both student engagement and standardized achievement levels with considerable impact at times.

Level-Three Regional Professional Development Centers: Not unlike many states across the nation, Missouri is comprised of several disparate regions. Impoverished urban centers in Kansas City and St. Louis are surrounded by more affluent suburban districts that post standardized test performance levels that are reflective of these socioeconomic and demographic endowments. In addition to the two metropolitan centers, surrounding areas of the state are often comprised of rural regions and small towns/cities. In the technical sense, these RPDC regions are artificial constructs that assume the form of the district averages of several demographic and achievement variables. As many of the RDPC's across the state are represented by several dozen districts, this district average that comprises the RPDC construct amounts to more than a redundant demographic layer upon which to analyze by employing Hierarchical Linear Modeling. The several districts within the study were nicely dispersed across the region,

creating averages that are statistically representative of regional demographic, controllable and uncontrollable inputs, and student achievement. The geography and economic makeup of these areas are disparate, providing meaningful across-region differences which can be methodologically captured. Here, the FRL rates of regions were included in Level Three of each model.

A student engagement outcome of great interest for this study is the percentage of higher-order student engagement in core content area classrooms coded as a "5" or a "6" (AV_C56), was assigned as the dependent variable in both the two and three level models. As importantly, though, the non-higher order student engagement levels were also tested as dependent variables, to ascertain not only fluctuations that result from independent variable manipulations, but to compare any fluctuations to their higher-order counterparts. To test this theoretical proposition, the percentage of classrooms coded as either a "1", "2", (either student disengagement (AV_C1 or teacher inattentiveness, AV_C2, within core classrooms) was assigned to be the dependent variable in HLM Model. Ultimately, the student engagement and achievement relationship can be more thoroughly and holistically explored by testing data under a HLM statistical framework. Simply put, the HLM models enable the researcher to determine the extent to which the IPI more directly influenced student engagement levels, which might, in turn, also exhibit influence on standardized test score levels of public elementary schools across the nation.

Explanation of Population Sample and Descriptive Data

The population of this study met two basic criteria. First, only Missouri public schools are included in the data set. Second, school leaders in the study group must have attended an

Instructional Practices Inventory (IPI) workshop and subsequently employed the IPI methodology within their schools. (Valentine, 2005; 2007; 2008).

In 2005, numerous schools across Missouri and the nation began to conduct IPI classroom walkthroughs. These walkthroughs enable the level of student engagement in each classroom within a school to be captured and documented by a trained observer. At the time of this study, approximately 300 Missouri public school utilize the Instructional Practices Inventory with some degree of fidelity. The eventual population size of 242 schools, dispersed relatively evenly across elementary, middle, and high school types, offers evidence of a robust response rate to the electronic data collection period.

Data Collection Procedure

To collect IPI data, a certified data collector moves continuously from classroom to classroom throughout the school day, observing student engagement in learning and coding that engagement on a data coding form. Two points are to be stressed at this point as it relates to the trained IPI classroom observers who conduct classroom walkthroughs: First, teacher and school leaders other than principals are designated as data collectors to diminish the possibility of bias in data collection or concern about the instrument as a mechanism for supervision or evaluation. Second, all IPI data collectors are to have an IPI reliability measure of .90 on a post-workshop assessment. In addition, inter-rater reliability is established during each IPI workshop, affirming that all trained data collectors from a given school (and across schools) provide reliable classroom observation data. As such, the uniformity and standardization associated with the classroom coding procedure is not called into question. Generally, 120 to 170 data points are collected during a typical school day. These observations provide a comprehensive, empirical representation of the nature and level of student within the population sample of schools in the

study. For the purposes of this study, the coded student engagement percentages associated with the IPI classroom observations were analyzed and incorporated as measurable independent variable metrics, introduced in the form of predictors in the HLM models.

Discussion of Data

The elementary schools represented in this study comprise a diverse array of urban, rural and suburban educational settings. As revealed in Table Two, the average percentage of students who receive free and reduced lunch (FRL) within the population sample of elementary schools was nearly 53%, while the average percentage of African American students within these schools was just over 18%. The standardized test passage rate for these elementary schools on both the Mathematics and Communication arts tests was just under 44% in both of these content areas.

The findings reveal that across classrooms within the population sample of 105 elementary schools, 3.1% of the classrooms were found to evidence student disengagement ("T1") with an additional 6.1% demonstrating non-higher order thinking with teacher disengagement. All told, 10% of all classroom observations were suggestive of lower-order student engagement at the time of the schools' student engagement observations. Furthermore, 5.39% of elementary school classrooms contained higher-order student engagement, while 14.89% of the 105 elementary school classrooms contained students engaged in higher-order activities at the time of classroom observation. In total, 20.18% of elementary school student engagement across all classrooms is compromised of higher order thinking.

Insert Table 2 approx. here

Data from the district-level is provided in Table Three. The per pupil expenditure (PPE) was found to average $8,188, while 78% of families had remained in the district within the last five years. Also, 59% of students resided in households comprised of married couples.

Insert Table 3 approx. here

Data from all nine regions of the state in which the schools are located is provided in Table Four below. The descriptive output too closely approximates the schools represented in the study to warrant further discussion.

Insert Table 4 approx. here

The output associated with the two-level models tested in the study were highly compelling on several counts. Among the findings included in Table Five below are the slope magnitudes associated with the lower-order student engagement variables. These values were considerably greater than was the case for higher order thinking. More specifically, these slope magnitudes were between three to four times as great as the higher-order thinking independent variables.

Also interesting were the findings associated with the racial and socioeconomic composition of the schools. The FRL independent variable was only significant at level one of the model, with slopes ranging from -.15 - -.23. Not only did the level two FRL independent variable yield insignificant findings, but so too did the construct capturing the percentage of minority students. Furthermore, the percentage of teachers who possess master's degrees, the

student-teacher ratio, per pupil expenditure levels, and the percentage of families who have remained within the district for the last five years were all found to be statistically significant.

Insert Table 5 approx. here

The findings from the three-level model were very similar to the two-level model output. While no meaningful distinctions can be made between the output, it is provided below in Table Six to reveal the similarities with the output from the two-level models.

Insert Table 6 approx. here

Drawing Conclusions from the Data

Improving the instructional quality of public elementary schools is no easy task. Neither is such an enterprise impossible, show the data. Instead, framing the discourse of instructional improvement initiatives according to the manner in which these reform aims are undertaken at the building level can allow instructional leadership teams to appreciate not simply their end goals, but the practices and processes required to power such progress over time. This paper begins by exploring the impact that instructional quality exhibits on the nature of student learning in the elementary school setting. With a newfound appreciation of pedagogical practices as they relate to resulting student engagement behaviors, later exploration of the statistical connection of discrete student engagement behaviors to resulting achievement levels allows for a more conclusive determination of the extent of a key relationship that has long been suspected by elementary school educators to be appreciable.

Of course, statistical data on both engagement and corresponding test scores are required to launch such an empirical analysis. The findings of the study prove to be highly compelling on a number of counts. In more general terms, elementary school leaders' focus on promoting heightened levels of higher order thinking are responsible for resulting test score growth within their buildings. Conversely, and as is brightly illustrated by the data, student disengagement in elementary school classrooms exacts a much greater depressive effect on test score declines. As both desirable and undesirable engagement behaviors can appreciably sway test score levels, more specific discussion of student engagement numbers, in terms of their meaning as well as magnitude, becomes the final focus of this paper. Armed with such information, elementary school instructional leaders will better appreciate the need for change, understand how to go about implementing these new instructional courses, and possess fuller knowledge of the outcomes results they can expect to enjoy in return.

The findings from this study of 105 Missouri public elementary schools should be of great interest to public school educators. Perhaps most noteworthy is the influential relationship between lower order student engagement and standardized test achievement. Such a relationship was revealed to be fully four times as impactful on student test taking as higher order student achievement. Indeed, several findings associated with the lower-order thinking are underscored most compelling by referencing their impact in terms of bottom-line achievement declines. Were student disengagement to be entirely eliminated in the elementary schools included in this sample set, for example, Communication Arts student achievement levels would increase by four percentage points. Such a finding is easily underestimated if given only a passing glance by the

reader. Because student disengagement levels tend to be low, the eradication of such behaviors requires only small declines in these sorts of distracting and detrimental classroom behaviors.

Of course, not all elementary schools are places of instructional excellence. In fact, in some of these educational settings, student disengagement levels can comprise a disturbingly large slice of the composite engagement pie. Quite sobering is the impact that these differences in student disengagement behaviors have on state standardized test score discrepancies across public elementary schools. When lower-order thinking levels in the typically observed elementary school are compared to a building where 20% of all coded observational data evidences student disengagement, student achievement levels will be 12.72 percentage points lower in the elementary school whose disengagement numbers have been allowed to creep upward to one out of every five coded observations.

Though not as pronounced, disparate achievement outcomes can further be attributed to differences in teacher disengagement across classrooms, as well. Returning to our comparison of the typical elementary school in relation to a counterpart where 20% of all coded observations were non-higher order in nature, Communication Arts standardized achievement levels would decrease by 4.91 percentage points. In total, therefore, relatively modest lower-order student engagement enhancements could precipitate a 17.63 percentage point decline in Communications Arts proficiency levels.

Reducing student disengagement levels represents one surefire means of promoting test score growth across the nation's elementary schools. The instructional reform focus must not

end here, however. Also important are instructional leaders' efforts at enhancing higher order student disengagement levels within schools. Based on the findings provided in this study, it appears that the elementary school population sample revealed low levels of higher order student engagement. Though troubling, such findings also signal considerable room for test score growth. More specifically, were schools to enhance their higher-order engagement levels from 20 percent (current level) to a more optimal level of 60 percent, the accompanying standardized achievement gains are noteworthy. In particular, Communication Arts proficiency rates would increase by 6.38 percentage points were higher-order student engagement levels to rise to 60% of students' classroom behaviors. Similarly, Mathematics proficiency rates would increase by 5.56 percentage points in the event that higher-order student engagement levels were observed to comprise 60% of all coded observations. Finally, were to current levels of higher-order thinking to shrink to 0%, Communication Arts proficiency rates would decline by 3.25 percentage points, while Mathematics proficiency rates would decline by 2.84 percentage points.

Instructional leaders in today's elementary schools can rest assured that student engagement matters in determining how their students perform on standardized tests. From an instructional improvement standpoint, it is important for these educational leaders to appreciate that student engagement behaviors impact learning and achievement differentially. While higher order thinking gains must be robust and sustained to galvanize test score performance levels in elementary schools, a much stronger relationship is found between student disengagement levels and test score declines. As a result, even the smallest spurts of growth in lower order thinking levels over time can have a noticeably depressive impact on test score progress. The converse approach to this discussion is more promising. That is, as these student engagement behaviors

are entirely controllable, and can fluctuate quire noticeably over compressed time horizons, elementary school leaders can trigger test score spikes relatively quickly and inexpensively. As the data show, elementary educators are most wise to focus on ridding their classrooms of student disengagement while promoting far greater levels of higher order thinking throughout the course of the school day.

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