# High School Best Practices: Results from Cross-Case Comparisons

Kristen Campbell Wilcox, Ph.D.
University at Albany
kwilcox1@uamail.albany.edu

Janet Ives Angelis
University at Albany
jangelis@uamail.albany.edu

*Identifying what commonalities exist in high schools where students consistently outperform other demographically similar students is of particular interest to administrators and practitioners looking to increase graduation rates among all students. Schools that particularly improve the performance of students with special needs and those from diverse backgrounds have become a top priority in recent years. For this study, a set of schools whose students consistently performed better than a demographically similar set of schools was identified and compared. The study employed a multiple case study methodology, with interview and document collection in each of the fifteen schools. Findings suggest that four interrelated practices distinguish higher-performing schools from their average performing counterparts. These practices are a well-defined and enacted focus on rigor, capacities to innovate, open and transparent communication within the school and with the broader community, and the willingness and capability to use a variety of evidence to make strategic decisions.*

Over the past decade, researchers, educators, policymakers, business leaders, and citizens have increasingly expressed concern that the high school completion rate is too low to meet the nation's needs; some among them have also condemned schools' failure to adequately prepare students to lead fulfilling lives and compete in the global workforce (Hoffman, Vargas, Venezia, & Miller, 2007; Kaser & Halbert, 2009). In the latter group, in particular, are those who argue about society's responsibilities to American youth from a moral and ethical stance rather than an economic one. Nevertheless, the failure to prepare students to succeed in high school has also been linked to economic implications for both student and society (Belfield & Levin, 2007).

American high schools have also been the target of critique for inequitable outcomes for particular groups of students. For example, in 2008, Balfanz and colleagues identified high schools that they classified as having "weak promoting power" (i.e., those schools likely to graduate less than 75% of their students). According to their analysis, these schools number approximately 2000, exist in every state in the union, and serve 18% of all high school students. Those students are primarily minority students living in poverty (38% of all African-American students, 33% of all Latino students, and 8% of all white students). About half the schools are in cities and the other half in rural areas. Together they account for half the nation's dropouts, including 81% of Native American dropouts, 73% of African-American dropouts, 66% of Latino dropouts, and 34% of white dropouts (Balfanz, 2008). Such schools show evidence of producing persistent and widespread achievement gaps between majority

and minority students, impacting in turn lifelong disparities in earnings (Brand & Xie, 2010) and other measures of adult success such as employment and lack of incarceration (Belfield & Levin, 2007; Sum, Khatiwada, & McLaughlin, 2009).

Although ethical and economic justifications for reform have been compelling in and of themselves, in 2010, a provision of the 2001 No Child Left Behind Act (NCLB) added a legal dimension to arguments for improving high school outcomes. These regulations require the federal government to make graduation rate calculations comparable across states and hold states and districts accountable for setting and meeting targets to improve performance. Under these regulations, high school educators are held accountable for every student who enters, whether the student is continuously enrolled or not. In addition, as the law has done for mandatory assessments in grades three through eight, the law also requires disaggregating graduation data by subgroups and including graduation rates in Annual Yearly Progress (AYP) calculations based on the rate for all students as well as for subgroups (Schwartz, 2009). The federal government hopes that the laws increase the urgency for high schools across the U.S. to do a better job of preparing more students to graduate from high school in four years prepared to succeed in the world of work or in higher education.

In response, according to a report from the Center on Education Policy (Dietz, 2010), an increasing number of states are requiring either exit exams and/or end-of-course exams for high school students. In New York State, where the research discussed in this article was conducted, the Board of Regents, the governing body for all schools in the state, raised the bar for high schools by increasing graduation requirements in 2000. In 2005, it began phasing in the requirement that all students must pass five state assessments in English, mathematics, and natural and social sciences. These and other requirements are necessary to qualify for the more rigorous, state-sanctioned diploma (as opposed to the previous option of a "local" diploma). By 2008, this requirement applied to all students entering grade 9, the only exceptions being students with disabilities whose failure is followed with a corresponding competency test in order to earn a diploma (New York State Education Department, 2007). Although the Board of Regents has been administering examinations as a standard for high school graduation since 1877, until 2001 the requirements for taking and passing those exams had been fairly flexible and allowed for students to earn a local or the state diploma (New York State Education Department, n.d.). Thus high schools in New York were grappling with increasing accountability for all their students well before the NCLB regulations or, now, the Common Core State Standards adopted by a majority of states, including New York.

Whether approached from an ethical, economic, or legal standpoint, the arguments for making improvements in U.S. high schools are persuasive. With raised accountability coming from the national and state levels and changing demographics, research identifying those practices that correlate with higher graduation rates and higher academic achievement is of interest. This is especially important for schools with increasing numbers of ethnically and linguistically diverse students and students living in poverty - groups that typically have higher drop-out rates and lower academic achievement overall.

**Chaos and Complexity**

In order to take into account the contextual factors of state and national policy changes that effect high school educators' approach to their work within districts, schools, and classrooms, this study uses chaos and complexity theories. These theories as applied to educational contexts draw attention to the ways that the components within non-linear systems influence and are influenced by internal and external forces (e.g., Fullan, 2005; Gleick, 1987; Senge, 1990). In the related literature regarding learning-centered leadership, learning communities are seen as groups of teachers that promote "an atmosphere of personal inquiry with a focus on collaboration and shared decision making" (Kiltz, Danzig, & Szecsy, 2004, p. 136). Through these lenses, some of what happens in schools may be seen as effects of climate and collaborative

practices, but the theoretical frameworks emphasize that schools are also inevitably impacted by forces beyond the control of those within the school system – forces that may appear unpredictable and threatening (e.g., changes to the content of state-required assessments, core curricula, and standards) (Hannay, Smeltzer Erb, & Ross, 2001).

This study sought to identify the processes and practices at the district, school, and classroom levels that distinguish schools whose students consistently outperform students from demographically comparable schools with at least average challenges. Specific sub-questions of this study were rooted in previous research on school performance (e.g., Adelman, 2006; Daniels, Bizar, & Zemelman, 2001; NCEA, 2007; Sizer, 1996) and were encompassed in five major themes that provided the framework for evidence collection. These included: curriculum and academic goals; staff selection, leadership and capacity building; instructional programs, practices, and arrangements; monitoring, compilation, analysis and use of data; and recognition, intervention and adjustments.

## Method

*School Selection*

A multiple case study method was used for this research whereby schools with comparable demographics, yet differing student performance, were compared (Yin, 2005). The measure of student performance used was results from the five state assessments required to earn a Regents Diploma, namely evaluations of English, mathematics, science, global history, and U.S. history. Publicly available performance data for these exams for the percent of each cohort of students entering high school in 2000, 2001, and 2002 who met or exceeded the state standard on each of these exams within four years of entering high school were analyzed. To be considered higher performing, a school's performance across exams and cohorts had to average at the $69^{th}$ percentile or above after regression analyses adjusted for school size, ethnicity, free and reduced-price lunch, and proportion of second language students.

After adjusting for background variables, residuals representing school performance were calculated for each of these regressions. The mean and standard deviation of the standardized residuals were then calculated, yielding an average z score that reflects the performance of each school relative to other schools in New York State (after adjusting for background factors). As shown in Table 1, ten higher-performing schools were selected based on average z scores of at least +.5, with 7 out of 10 schools averaging +1 or greater; and five average-performing schools were identified to closely match demographic characteristics of the higher-performing set, with average z scores less than + or – 0.1.

All schools included in the study had per pupil expenditures clustering near the state average (to control for factors of community wealth) and open admissions policies; at least half of the sample had from one-third to three-quarters of students receiving free or reduced-price lunch, compared to the state average of 45% (to account for student poverty levels). Within the higher-performing school set, half are in districts classified by the state as being in the top quartile in terms of need (i.e., they serve students with challenges based on poverty and English language proficiency but have limited resources to meet those needs). Of these five schools, one is also large: Saunders Trades & Technical High School in Yonkers serves 1300 students, approximately 18% of all students in the fourth largest city in the state. The others — Batavia, Greene, South Kortright, and Warrensburg — serve from 125 to 825 students in economically stressed, rural areas of the state. Four of the higher-performing schools are classified by the state as having average needs to resources ratios. Two of these schools serve as the single comprehensive high school for their cities — Huntington (1200 students) and White Plains (2200 students); both cities are within commuting distance of New York City. One, Honeoye Falls-Lima, serves suburban and rural areas not far from Rochester, New York's third largest metropolitan area, and one, Cambridge, is in the rural northeastern part of the

Table 1: The Schools

| School | Enrollment 2006 | Need/ Resources | % Eligible for F/RL 2006 | Z Mean, 2004–6 |
|---|---|---|---|---|
| Higher-Performing Schools | | | | |
| Saunders Trades & Technical HS | 1395 | High | 76 | +2.9 |
| South Kortright Central School | 126 | High | 52 | +.5 |
| Greene HS | 453 | High | 44 | +1.1 |
| Warrensburg Junior-Senior HS | 381 | High | 38 | +.7 |
| Batavia HS | 819 | High | 30 | +1.0 |
| Cambridge Junior-Senior HS | 303 | Average | 25 | +.7 |
| Huntington HS | 1175 | Average | 25 | +1.1 |
| White Plains Senior HS | 2164 | Average | 25 | +2.0 |
| Honeoye Falls – Lima Senior HS | 840 | Average | 7 | +1.5 |
| MacArthur HS | 1347 | Low | 7 | +.9 |
| Average-Performing Schools | | | | |
| Beltran HS | <500 | High | 42 | .0 |
| Roskill HS | 1000–1500 | High | 35 | –.1 |
| Riverview HS | <500 | High | 38 | .0 |
| Seden HS | 500–1000 | Average | 7 | .0 |
| Dettison HS | 500–1000 | Low | 6 | +.1 |

state. Only General MacArthur High School in Levitttown is considered a low needs school; its 1500 students represent half of those in this suburban town on Long Island.

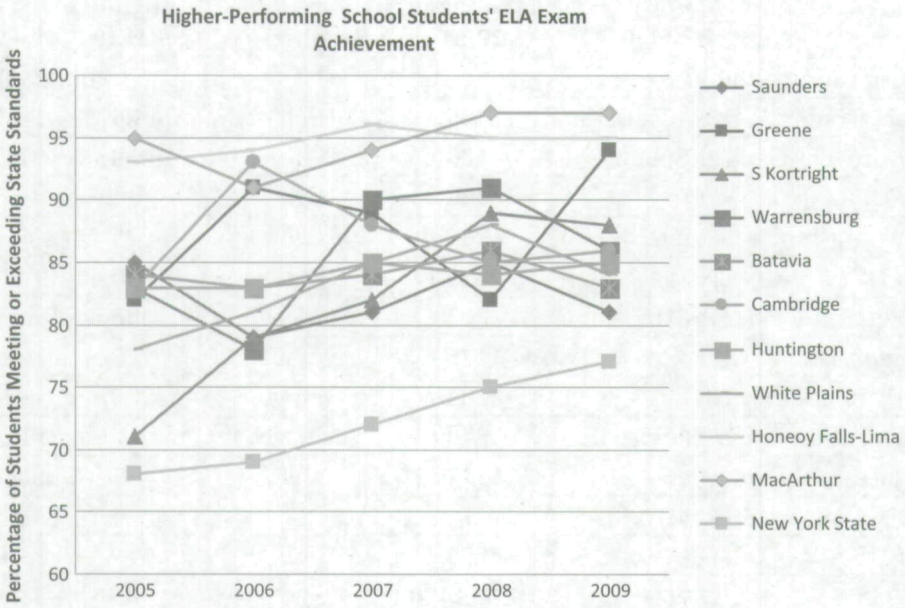
Table 1 shows enrollment and poverty data for the schools as well as performance of the three cohorts on the five exams. The average-performing schools have been promised anonymity; therefore, pseudonyms have been assigned to each and only ranges of enrollment provided. Figure 1 shows an example of the performance of the students in the higher-performing schools on the English assessment over time (2005–9), compared with the state average. This example is representative of the performance of the higher-performing schools on state assessments in core content areas.

*Data Collection and Analysis*

Once schools were selected and agreed to participate using IRB-approved consent, two-person research teams conducted the fieldwork through face-to-face interviews. Before and during site visits, researchers also collected samples of documentary evidence (e.g., strategic plans, curriculum maps, lesson plans) as well as artifacts from publicly available materials on schools' websites. Within each school, teams interviewed two to five administrators (the school principal, district superintendent, and other administrators who chose to participate) and five to ten teachers (representing different grade levels, subject areas, and special services). The interview format followed a semi-structured protocol that had been established and tested in prior studies, both by the authors (2007, 2008) and others (NCEA, 2007); it included questions regarding each of the five major themes of the framework. The research team audio recorded each interview and simultaneously collected written and typed field-notes. Each team also recorded interpretive memos after the first and second day of interviews.

Following each visit, the lead researcher for each site wrote an 8–12 page case report drawing on interviews, documentary evidence, and interpretive memos. Each case report characterizes

Figure 1: Higher-Performing School ELA Performance over Time




the practices that administrators and teachers in the higher-performing high schools identified as most salient to their success. The next stage of data analysis employed qualitative database management software (HyperResearch) and the constant-comparison method for the coding and categorization of data of all fifteen case study data sets (Miles & Huberman, 1994). Data were coded in the aforementioned themes (e.g., curriculum and academic goals) and in vivo codes were also used when appropriate. Coded data were then sorted and organized into categories, with those categories most saturated and most salient (defined here as emphasized as crucial to higher student performance) in higher-performing schools compared to data from average-performing schools. This process included coding 177 interview transcripts resulting in 96 codes. A matrix was developed to record whether particular practices were present, absent, or "in process," and memos were taken throughout this analysis regarding developing interpretations.

Data triangulation (through documentary evidence, interview, and researcher memos), investigator triangulation (through the use of multiple site teams and member checking with participants of both individual case studies and the cross-case analysis of best practice), methodological triangulation (through documentary evidence collection and interviews), triangulation in time and space (multiple years of student performance data, multiple locations for site study), and theoretical triangulation (employing chaos and complexity theories to interpret the data) were utilized to increase validity of the cross-case analysis.

## Findings

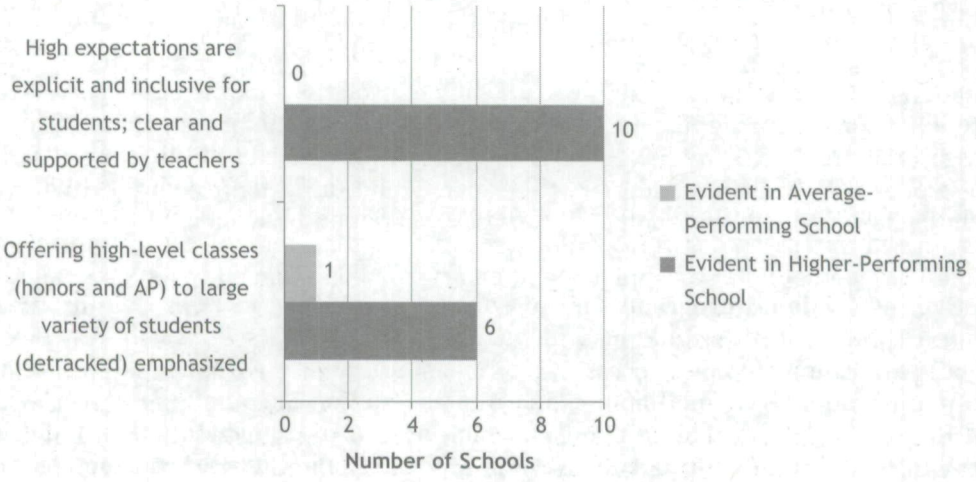
### *The Best Practice Elements*

**Rigorous curriculum and expectations.** Like some previous studies of high schools, this study identified a focus on creating and nurturing "rigor" as key to schools' success (e.g., Darling-Hammond & Friedlaender, 2008; Rourke, 2007). Earlier studies also confirm that rigor and high expectations are important for closing achievement gaps (National High School Alliance, 2005; Colvin, 2001; Rourke, 2007; Whitman, 2008). Those who have examined differences in curriculum, instruction, and expectations between high and low tracks (e.g., Carbonaro & Gamoran, 2002; Oakes, 1985, 2005) or compared student performance on international

measures (e.g., Stigler, Gonzales, Kawanaka, Knoll, & Serrano, 1999) have found correlations between a rigorous curriculum and student performance across the core subjects of secondary schools. However, there is growing recognition that rigor without support will not achieve the gap-closing goal of policies such as No Child Left Behind (Mazzeo, Allensworth, & Lee, 2010).

Rigor, as described in this study, refers to an intense, focused ethic of striving to do the very best one can do. Although rigor could be perceived as rigid and inflexible, in higher-performing schools any rigidity is balanced by other elements that encourage fluid exchange of ideas and avenues for innovative action. It is embedded in a climate of high expectations for performance and behavior by all members of the community, both students and adults. It also includes an explicit focus on providing typically lower-performing students with opportunities to succeed in higher-level (honors and Advanced Placement [AP] or other college-credit-bearing) courses. Some of the higher-performing schools have removed entry requirements for such courses. For example, six out of the ten higher-performing schools have "detracked" and are including students classified for special education in mainstream classes, with appropriate support, including differentiated instruction; in contrast, just one of the average-performing schools has done so (see Figure 2). Although some researchers and policy institutes (e.g., Brookings, Fordham) question whether taking AP courses is "good for everyone," in the higher-performing schools in this study encouraging more students to at least try those courses was seen as helping to foster an ethos of rigor and raised expectations, contributing to the schools' overall success. As an educator in Honeoye Falls-Lima stated it, "We want students to take the challenging classes and then if they need support, they get it."

Figure 2: Rigor in Higher- vs. Average-Performing Schools




In the higher-performing schools, meeting state-determined AYP targets and standards was perceived as insufficient. Rather, exceeding those targets for performance is the focus. All were explicit about their expectations for behavior and academic performance, with some, like Warrensburg and Cambridge, requiring 70 as the minimum passing grade. All clearly delineate and follow policies that spell out the consequences for students who fail to meet those expectations (e.g., ineligibility to participate in athletics or social events, requirements to attend after-school, Saturday classes or clinics). In contrast, although educators in the average-performing schools also reported being focused on student performance, their focus is on state-set targets and mandates rather than more ambitious goals. Their impetus for action is external rather than intrinsic; in terms of chaos and complexity theory, there is an imbalance

between external and internal forces, with external forces having the greater influence, contributing to disequilibrium.

Overall, rigor was clearly defined in a variety of domains of teaching and learning, instructional design, assessment and evaluation, research, mentoring, and high expectations of all students, regardless of life circumstances. Educators in the higher-performing schools believe that rigor is different for every student and pointed to how they promote a view of rigor that is defined by "promoting students' involvement as much as" possible, through opportunities to have a "voice," express a talent, and take part in service projects in their communities. They challenge all students to seek opportunities that allow them to contribute to the larger society and fulfill their own potentials in high school and beyond. In contrast, in the average-performing schools, expectations were implicitly lower; the idea that students come with significant challenges and are limited by life circumstances was broadly shared and guided teachers' expressions of beliefs about student potential. In these schools, the program may be rigorous for some students, but for others a rigorous course remains beyond reach. Table 2 shows major contrasts between study schools on this finding.

Table 2: Differences between Average- and Higher-Performing Schools in Regard to Rigor

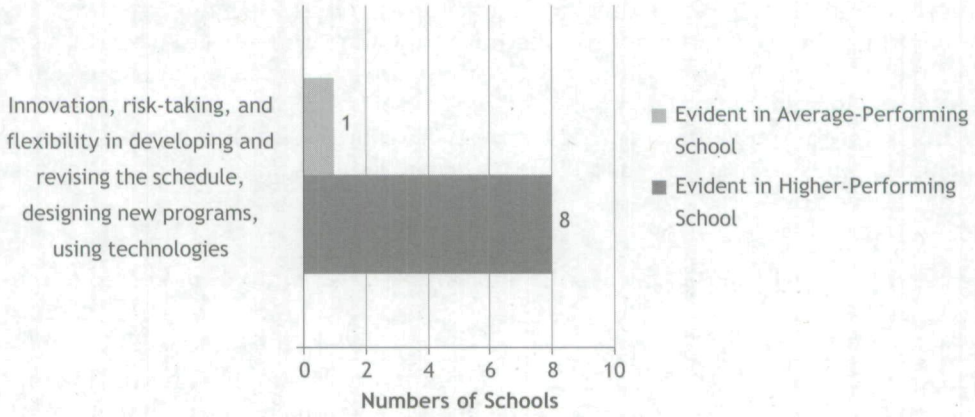
| Average-Performing High Schools | Higher-Performing High Schools |
|---|---|
| Focus on meeting state-determined targets for performance. | Meeting state-determined targets for performance seen as not sufficient; exceeding state-determined targets for performance the goal; "rigor" drives practice. |
| Tracking and self-contained classrooms prevalent. | Emphasis on offering higher-level classes (honors and AP) to larger variety of students and providing more inclusion classrooms. |
| Expectations implicitly lower – the idea that students come with significant challenges and are limited by life circumstances widely shared and guides teachers' beliefs about student potential. | High expectations explicit and pervasive for all students; all students challenged to seek opportunities for contribution to the larger society and fulfill their own potentials in high school and beyond. |

**Innovative instructional programs and practices.** In addition to clear definitions of rigor and how to achieve it, this study also identified an innovative school culture as central to the higher-performing schools' success. As in other studies that have examined workplace productivity, innovation is defined here as the implementation of something new (West, 2002; West & Richter, 2008) or combining old ideas in new ways (Hargadon, 2008; Weick, 1979), generally to serve a particular purpose (Pirola-Merlo & Mann, 2004). For example, with the clear purpose of needing to differentiate instruction to better support all students, teachers in the higher-performing schools reported being encouraged to "come up with ideas, be creative, go to administration about problems" (South Kortright teacher), even to fail. "My failure is not negative," claimed a White Plains teacher, "it can be my greatest teacher. By encouraging teachers to experiment and not to be afraid to fail, we become much better teachers."

Such risk taking relies on a foundation of trust, which is essential for an innovative environment (Louis, 2007). Higher-performing schools promote a climate of trust in which risk taking is encouraged through open dialogue and administrative support. Like other complex processes, innovation is not directional and linear but intersectional and dynamic, influenced by interactions within and with the environment. Where thinking of new ideas is responded to with openness and willingness to make changes, teachers and administrators are inspired to

innovate even more and are willing to not only sacrifice routine but also work harder to support change. This becomes a self-reinforcing or "virtuous" cycle (Ormerod, 2000). This study found less collaboration in the average performers and little incentive to think beyond traditional structures and arrangements, as indicated by finding only one incidence of this element in the average-performing school set, contrasted with eight in the higher-performing school set (see Figure 3).

Figure 3: Innovation in Higher- vs. Average-Performing Schools




Focus on their strategic goals helps educators in higher-performing schools be purposeful about those "risks," their reasons, and their intended result. So, for example, the adoption of new technologies is carefully considered and training provided before implementation in the classroom. Teachers in White Plains, for example, do not receive interactive white boards until they have had training in their use. In contrast, teachers in the average performing schools had access to new technologies but had been left more to their own devices to figure how best to use them in instruction.

Innovation in the higher performing high schools is both expansive and disciplined, an interplay of freedom and focus. Freedom refers to the way teachers and administrators reported feeling free to ask and respond to "What if?" questions so that new ideas are discussed openly and frequently, weaving a web or network across which ideas can spread. Focus refers to the structures and expectations that are in place to ensure that new ideas are vetted against goals for student achievement. Educators do not haphazardly experiment with new schedules, programs, instructional strategies, or instructional technologies. Rather, they promote innovation within and seek out new ideas and approaches to meet challenges that are critically important to meeting their district goals. They practice "disciplined innovation" (Authors, 2011). The "Strategic Delimiters" outlined in White Plains' District Strategic Plan may capture best this attitude.

We will not adopt any new program or service unless it is:

- consistent with and contributes to our mission;
- accompanied by an analysis of the resources and the staff development needed for its effectiveness;
- accompanied by a plan to assess its ongoing effectiveness. - Adopted Dec. 3, 2007

Among the many innovations found in the study, one that is common to several of the higher-performing schools is an additional period in the schedule that provides an opportunity to

support students taking more challenging courses; another is variations on the block schedule that give English and social studies teachers the longer blocks of time they seek and language, math, and science teachers, the shorter, more frequent blocks they generally prefer. According to an administrator in Cambridge, in that high school they "insist on maintaining flexibility with the master schedule. When we need to move kids around and reassign teachers midyear, we have done it. We weigh a number of factors before we make this decision. Do the students need this? If the answer is yes, we will do it ... The master schedule is organic and living. It can change weekly."

Researchers who have examined the links between individual creativity and organizational innovation concur that "[i]t is easier to enhance creativity by changing conditions in the environment than by trying to make people think more creatively" (Csikszentmihalyi, 1996, p. 1) and that "[i]f the bandwidth for originality is too narrow in a climate of conformity, important ideas may be neutralized before they emerge" (Richards, 2000–1, p. 260). In some studies, innovative norms within an organization have been found to be the single best predictor of effectiveness (Russell & Russell, 1992). Table 3 shows major contrasts between study schools on this finding.

Table 3: Differences between Average- and Higher-Performing Schools in Regard to Innovation

| Average-Performing High Schools | Higher-Performing High Schools |
|---|---|
| Inflexible schedule based on "how it's always been done." | Flexibility in developing and revising the schedule and allocating resources in time and staffing where data show the most need; thinking outside of the box in matching students' needs to resources. |
| Work from failure backward; traditional intervention programs offered after failure. | Innovative and proactive interventions focused on keeping students on-track before AIS is needed; use of grants and outside resources. |
| Technology available, but without adequate training or guidance in how to use it for instruction. | Technology available, supported with training, and integrated into the school in a variety of ways. |

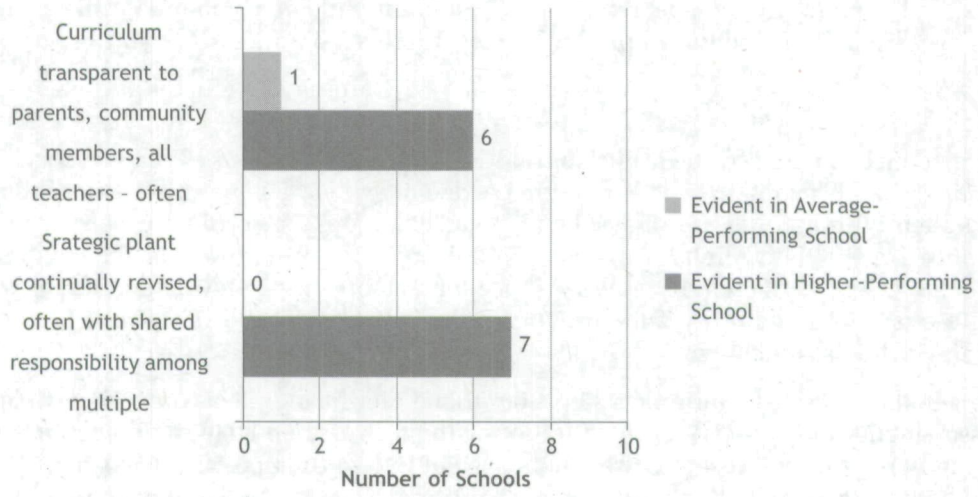
**Transparent communications.** Trust is also essential to and intertwined with transparency in the higher-performing schools in this study. The two are reciprocal and dependent on cooperative, ongoing dialogue around issues important to the success of students and the school. Dialogue builds trust, and as trust builds, the willingness to be transparent about successes and challenges also grows. This dynamic, positive-reinforcing cycle (Ormerod, 2000) helps create a sense of shared ownership in meeting challenges and devising solutions. Sociologists and psychologists tell us that trust requires relationships that are predictable and reliable (Kaser & Halbert, 2009) – the people involved act as others expect them to act given their roles and responsibilities within the relationship, helping to provide stability within a chaotic and complex environment. As research by Bryk and Schneider (2002) has found, this is "especially important for organizations that operate in turbulent environments, that depend heavily on information sharing for success, and whose work processes demand effective, decentralized decision-making" (p. 21).

Bryk and Schneider (2002) further characterize schools as networks of relationships with "mutual dependencies" among all the actors, including educators, students, and parents (p. 20). From these dependencies can come feelings of vulnerability, which are moderated

by relational trust (Kaser & Halbert, 2009). Although there are vulnerabilities on all sides, in any school it is likely that most parents are in a position of greater vulnerability than most educators. However, in the higher-performing schools in this study, educators described being open and honest about challenges – allowing themselves to be vulnerable when things go wrong. For example, a teacher in Honeoye Falls-Lima reported, "We have parents at the table with [the instructional support teams] at the very first sign of a problem ... It builds an inclusive, collaborative mind-set ...We acknowledge our mistakes but focus on course correcting and move ahead ... Teachers admit they may need help in meeting a child's needs."

According to Putnam, interpersonal connections allow for the building of trust and social capital, which he defines as the "networks, norms, and trust that enable participants to act together more effectively to pursue shared objectives" (Putnam, 1995, pp. 664–5). And the denser the networks - the more multiple connections between people - the better (Mitchell, 2009). Furthermore, building bridging connections between unlike groups requires more effort than building bonding connections between people with recognized similar interests (Putnam & Feldstein, 2003). Although one might argue that parents and educators have similar interests, in this study, interviewees in high schools in all settings – urban, suburban, and rural – reported facing the challenge of convincing students and their parents of the need to increase rigor and raise the expectations and aspirations of students. It was, in part, the relational trust that educators in the higher-performing schools had built and maintained over the years that they said enabled them to make that case and successfully raise student aspirations and performance. Figure 4 shows some of the gaps in community relations between the average and higher performers.

Figure 4: Transparency in Higher- vs. Average-Performing Schools




Another factor found in this study that contributes to open and transparent communications in the higher-performing schools is the coherence of their vision for success. In those schools teachers and administrators described success in similar terms; they are very much in alignment when it comes to the school's mission and goals– in large part because they have taken part in the development of those goals with their boards and communities. In the average performers, in contrast, definitions of success varied from one interviewee to another, and interviewees described the development of the vision and mission as having been developed by administrators and "handed down." In none of the average performers was there even a

nascent effort to involve stakeholders in the process. Furthermore, they saw this way of operating as a "necessity." Similarly, in the higher performers, the curriculum has been mapped by teachers and administrators, is widely shared both within the school and with the broader community, and is a living document. Those in the average performers, if their curricula had been mapped, saw those documents as internal, for teacher and department use rather than for sharing with students, parents, and the public (see Table 4).

Table 4: Differences between Average- and Higher-Performing Schools in Regard to Transparency

| Average-Performing High Schools | Higher-Performing High Schools |
|---|---|
| Top-down approach to the development and articulation of goals and vision for school and district, generally not based on input from broad spectrum of school and community. | Consistent dialogue around goals and vision; breadth of input in developing and articulating a shared vision for student success. |
| No curriculum map, just starting process of mapping, and/or just beginning to share the curriculum map within schools and with community; little transparency with public and within school of curriculum and academic goals across departments and grade levels. | Curriculum transparent to parents, community members, and teachers, often provided on-line and seen as "living." |
| School role in community ceremonial; lack of processes to include students, parents, and community members in productive discussions around improving the school. | School the heart of the community, a place that provides students, parents, and community members abundant information regarding school initiatives and invites them into discussions and processes to improve. |

**Varied evidence to make strategic decisions.** Viewed through the lens of chaos theory, higher-performing schools maintain the momentum needed to evolve, even within a volatile accountability system, through the use of systematic feedback loops. According to Ford, a physicist and pioneer in the field of chaos theory, "Evolution is chaos with feedback" (as quoted in Gleick [1987], p. 314). To clarify how these feedback loops impact decision making and the ability to adapt to community and student needs, it is helpful to first look at the average-performing schools for contrast.

Teachers in the average-performing schools described their main role as preparing students for state assessments and equated this preparation with meeting their state standards. In the same breath many referred to the state assessment system in less than positive ways (e.g., pointing out errors in the tests, delays in getting scores back from the state, tests as inadequate measures of the standards). Although aware that they may have narrowed their instruction to what is expected on the assessments and seeing this as undesirable, they conceded that their work needs to be focused this way to help students succeed in what matters to the state.

They described how they use a variety of their own classroom assessments, school or district benchmark assessments, and state assessments to analyze what works for the curriculum they teach and their instruction. However, they talked about these sources of data, as well as the collection, analysis, and interpretation of them, as a primarily solitary activity. If they had been asked to develop goals related to these data, they typically developed individual goals, not often related to other teachers' goals in their department, school, or district. Reporting of

support in achieving goals, whether from professional development efforts or from allotted time for discussion and guidance about how to engage in robust, productive dialogue among teachers and administrators around data and associated goals, was scarce.

Compared with average-performing schools, the degree to which systematic analysis and interpretation of a variety of data have become widely accepted and even embraced in higher-performing schools is significant. Participants reported that by around 2008, negative feelings toward looking at data to inform practice associated with NCLB and state reporting requirements had largely shifted. This shift was related to a broadening in the scope of the definition of "evidence" to more than test score data. To inform their own work, educators in higher-performing schools collect and use data such as survey data from teachers and community members, exit interviews with seniors, and interviews with graduates to learn about the adequacy of their preparation for demands beyond high school.

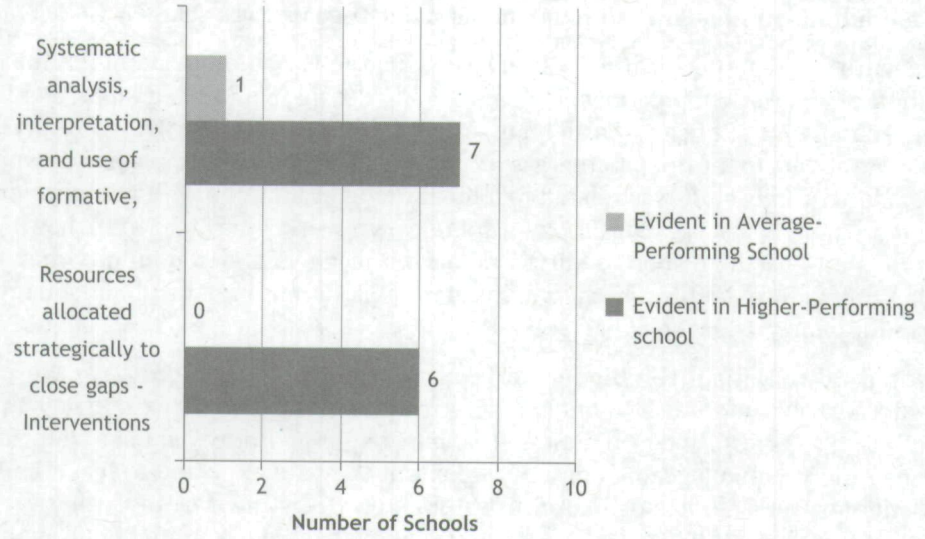
Also strikingly different in the higher-performing schools in the study are the processes teachers and administrators use to analyze and use data. Together they interpret the variety of data collected to inform focused action. Teachers explained how data can help them cope with the seemingly unmanageable amount of content they are expected to teach and prepare their students for the state exams. Administrators work to refine the ways they disseminate performance data and do it in a way to promote cooperative dialogue around continual improvement. As a Honeoye Falls-Lima administrator advised, "Use data to inform decision making, and get broad-based input for decision-making... Have all parties at the table." Keeping "an eye on data, state assessments, and getting teachers' feedback on what went well" are all sources of evidence to guide practice. Seven out of ten higher-performing schools were using a combination of classroom formative, school, and district benchmark and state assessments to inform their instruction while only one average performing school showed evidence of this.

Higher performing schools are also distinctive in their proactive targeting of resources to where they are most likely to have the greatest effect on student performance in the future. New initiatives to target resources where most needed are not only about alleviating existing weaknesses, but are based on looking at trends (e.g., demographic and economic development trends in the community) to head off issues before they arise, thus maximizing potential growth in performance. For example, educators in the higher-performing high schools have taken the initiative to identify characteristics of at-risk students in earlier grades and are working with elementary and middle schools to develop programs to increase the likelihood of high school success for these students. In Honeoye Falls-Lima and White Plains, a "continuous improvement model" "where you are relentless and never satisfied, but are always looking to build and improve upon it" drives the allocation of resources. A proactive and constantly revitalizing spirit supports their ongoing higher performance. This kind of thinking impacts curriculum revision, the focus of professional development, staffing, and a multitude of other decisions so that efforts address students' and teachers' needs and are coherent with the district's and school's goals and plans (see Figure 5).

Making sure that resources are targeted to where they will have the greatest effect begins with teachers. In higher-performing schools, pains are taken to match teachers with students in a way that optimizes their positive impact on student performance, particularly for those students at risk and those with special needs. Systematic analysis and interpretation of a variety of evidence helps facilitate shifts toward offering more inclusion classrooms taught by the most qualified teachers as well as implementation of tutorial sessions and "labs" headed up by the teachers who can best help the students who need these extra supports.

Like their counterparts in average-performing schools, educators in higher performing schools align their instruction with the state curricula; however, they enrich and enhance the clarity of curricula through continual revision across grade levels, oftentimes through the

Figure 5: Strategic Decision Making in Higher- vs. Average-Performing Schools




use of electronic mapping software and availability of web-based supplementary resources for students, parents, and other teachers. Also, although they reported at times drawing on outside resources that offer packaged professional development programs, they balance what outside resources can offer and what the professionals in their own buildings identify as needed to help students learn.

Those in both average- and higher-performing schools typically base their actions on some kind of evidence; however, key to higher performance is the shared belief that using a variety of evidence to inform strategic action rooted in clear goals is worthwhile and effective. Consistently asking, "What are we doing well?" "What trends do we see in our students' performance?" and "How can we do better?" guide the kinds of data that are gathered, how they are analyzed and disseminated, and to what effect. When linked to clear goals and strategic plans, this kind of inquiry-based thinking and acting promotes a kind of synergy and momentum that builds on itself and helps counter feeling buffeted by external forces. However, it is at the same time outwardly focused, asking, "What are the state and other effective schools defining as success?" while also (and quite importantly) inwardly focused, asking, "What do we think counts as success and how can we use what resources we have to achieve more of it?" Without this belief that evidence can inform better practice, numbers related to student performance can be perceived as signs of failure and result in narrowed visions of success and stifled dialogue around improving schools (see Table 5).

**Discussion**

The findings of this study make clear that achieving consistently higher performance at the high school level is rooted in the interplay of rigor, innovation, transparency, and use of evidence for strategic action. In all of these aspects, the most successful schools in this study have found a way to adapt and thrive within chaotic and complex environments. They manage to strike a balance between structuring their activity to meet changing requirements coming from outside their districts and providing opportunities for growth and change within. They focus on what will make the most impact on student performance defined within their schools, districts, and by the state, but also exploit their freedom to challenge, innovate, share, and use a variety of sources of evidence to inform improvements in their processes and practices. These findings show that there are some common characteristics of schools that

Table 5: Differences between Average- and Higher-Performing Schools in Regard to Varied Evidence to Strategically Target Resources

| Average-Performing High Schools | Higher-Performing High Schools |
|---|---|
| Data primarily analyzed by administration. | Close analysis and discussion of data among teachers and administrators. |
| No particular professional development agenda associated with evidence; professional development offerings seen by many teachers as of little use. | Professional development foci informed by teachers' needs. |
| Resistance to evidence-based decision making. | Embrace of the use of a variety of evidence to inform practice. |
| Use of data to inform specific interventions and other reforms not systematic. | Close analysis, clear dissemination, and strategic use of data to target interventions and develop and implement other reforms to improve student performance. |
| Lack of continuity and clarity of priorities and vision; articulation of goals and strategic plans top-down and generally not shared with a broad spectrum of school and community. | Consistent dialogue around vision; clarity and breadth of input in developing and articulating a shared vision for student success and strategic plans. |

consistently produce higher academic achievement among their most challenged student populations and reflect other recent research findings on this topic (e.g., RMC Research Corporation, 2008; Harris, 2006; Hawley, 2007).

Relating these findings to chaos and complexity theories, one of the implications for high school educators, then, is to be less brittle and more flexible — like living systems that are dynamic enough to balance stabilizing and destabilizing forces. In the schools studied, educators strike a balance between teaching knowledge and skills defined in their curricula and standards and making available opportunities to adapt to students' needs in the moment; between staying focused on the goals of successful high school completion for all and meeting the needs of the individual; between keeping stable necessary system supports and innovating in a disciplined and dialogic way; between providing enough structure to collect and use the data they need to meet specific goals while fostering individual responsibility for collecting data that matters to them; and between preparing students for the world they are about to enter — whether college or work – while encouraging them to develop individual interests in the moment.

Although the elements of best practice identified in this study were found to be salient and well-embedded in higher-performing schools, this is not to say that the practices seen in these schools were completely absent in all of the average-performing schools. Rather, some of the average-performing schools showed signs of moving in the direction of best practice found in the higher-performing schools but had not quite put all of the elements into place yet. This highlights another important note regarding the findings in this study: all of the best practices were found to be interdependent. A single strength (for example, a well-embedded focus on rigor without evidence-based decision making connected to district and school goals) did not correlate with consistently higher student achievement; rather, a combination of all of the elements of best practice discussed here distinguish the average from the higher-performing schools. Finally, the implications of this study are inevitably limited by the contexts studied, as is inherent to case study research.

Further research on the strategies used to develop the qualities of higher-performing schools is needed to assist high school educators struggling to increase graduation rates and raise achievement among all students, but particularly those who are typically lower-achieving. Research investigating ways successful high school educators are integrating rigor and innovation into instruction and planning, incorporating protocols for open, dialogic, and productive communication, and promoting systematic, yet flexible and proactive methods, for using data to inform district- and school-level strategic planning aligned to classroom instruction will be of interest.

## References


Adelman, C. (2006). *The toolbox revisited: Paths to degree completion from high school through college.* Washington, DC: U.S. Department of Education.

Balfanz, R. (2008, March). *Do dropout factories really exist and if so what can be done about them?* Paper presented at the American Educational Research Association Annual Meeting, New York.

Belfield, C. R., & Levin, H. M. (Eds.). (2007). *The price we pay: Economic and social consequences of inadequate education.* Washington, D.C.: Brookings Institution Press.

Brand, J. E., & Xie, Y. (2010). Who benefits most from college? Evidence for negative selection in heterogeneous economic returns to higher education. *American Sociological Review, 75*(2), 273–302.

Bryk, A., & Schneider, B. (2002). *Trust in schools: A core resource for improvement.* New York: Russell Sage Foundation.

Carbonaro, W. J., & Gamoran, A. (2002). The production of achievement inequality in high school English. *American Educational Research Journal, 39*(4), 801–827.

Colvin, R. S. (2001). School reform hinders learning, crusader argues. In W. M. Evers, L. T. Izumi & P. A. Riley (Eds.), *School reform: The critical issues* (pp. 3–8). Stanford, CA: Hoover Institution Press.

Csikszentmihalyi, M. (1996). *Creativity: Flow and the psychology of discovery and invention.* New York: Harper Collins.

Daniels, H., Bizar, M., & Zemelman, S. (2001). *Rethinking high school: Best practice in teaching, learning, and leadership.* Portsmouth, NH: Heinemann.

Darling-Hammond, L., & Friedlaender, D. (2008). Creating excellent and equitable schools. *Educational Leadership, 65*(8), 14–21.

Dietz, S. (2010). *State high school tests: Exit exams and other assessments.* Washington, DC: Center on Education Policy.

Fullan, M. (2005). *Leadership and sustainability: Systems thinkers in action.* Thousands Oaks, CA: Corwin Press.

Gleick, J. (1987). *Chaos: Making a new science.* New York: Penguin.

Hannay, L. M., Smeltzer Erb, C., & Ross, J. A. (2001). Building change capacity within secondary schools through goal-driven and living organisations. *School Leadership & Management, 21*(3), 271–287.

Hargadon, A. (2008). Creativity that works. In J. Zhou & C. E. Shalley (Eds.), *Handbook of organizational creativity* (pp. 323–343). New York: Lawrence Erlbaum Associates.

Harris, S. (2006). *Best practices of award-winning secondary school principals.* Thousand Oaks, CA: Corwin Press and National Association of Secondary School Principals.

Hawley, W. D., Ed. (2007). *The keys to effective schools: Educational reform as continuous improvement.* Thousand Oaks, CA: Corwin Press and the National Education Association.

Hoffman, N., Vargas, J., Venezia, A., & Miller, M. S. (Eds.). (2007). *Minding the gap: Why integrating high school with college makes sense and how to do it.* Cambridge, MA: Harvard Education Press.

Kaser, L., & Halbert, J. (2009). *Leadership mindsets: Innovation and learning in the transformation of schools.* New York: Routledge.

Kiltz, G., Danzig, A., & Szecsy, E. (2004). Learner-centered leadership: A mentoring model for the professional development of school administrators. *Mentoring & Tutoring: Partnership in Learning, 12*(2), 135–153.

Louis, K. S. (2007). Trust and improvement in schools. *Journal of Educational Change, 8*(1), 1–24.

Mazzeo, C., Allensworth, E., & Lee, V. (2010, April 28). College prep for all? What we've learned in Chicago. *Education Week*, pp. 25–26.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis.* Thousand Oaks, CA: Sage Publications.

Mitchell, M. (2009). *Complexity: A guided tour.* New York: Oxford University Press.

National Center for Educational Accountability (2007). Just for the Kids best practice studies and institutes: Findings from 20 states. Retrieved from http://www.just4kids.org/en/twenty_states.cfm.

National High School Alliance. (2005). *A call to action: Transforming high school for all youth.* Washington, DC.: Institute for Educational Leadership.

New York State Education Department (2007). *General education & diploma requirements.* Retrieved from http://www.emsc.nysed.gov/ciai/gradreq/GradReq3columnStyle7_1.pdf.

New York State Education Department (n.d.). History of elementary, middle, secondary & continuing education. Retrieved from http://www.regents.nysed.gov/about/history-emsc.html.

Oakes, J. (1985, 2005). *Keeping track: How schools structure inequality.* New Haven: Yale University Press.

Ormerod, P. (2000). *Butterfly economics: A new general theory of social and economic behavior.* New York: Basic Books.

Pirola-Merlo, A., & Mann, L. (2004). The relationship between individual creativity and team creativity: Aggregating across people and time. *Journal of Organizational Behavior, 25*(2), 235–257.

Putnam, R. (1995). Tuning in, tuning out: The strange disappearance of social capital in America. *PS: Political Science & Politics, 28*(4), 664–683.

Putnam, R. D., & Feldstein, L. M. (2003). *Better together: Restoring the American community.* New York: Simon & Schuster.

Richards, R. (2000–1). Millennium as opportunity: Chaos, creativity, and Guilford's Structure of Intellect Model. *Creativity Research Journal, 13*(3&4), 249–265.

RMC Research Corporation (2008). *Achieving graduation: New York benchmark high schools.* Portsmouth, NH: Author.

Rourke, J. R. (2007). Leveraging resources to close the divide. *Principal Leadership, 8*(3), 24–25.

Russell, R. D., & Russell, C. J. (1992). An examination of the effects of organizational norms, organizational structure, and environmental uncertainty on entrepreneurial strategy. *Journal of Management, 18*(4), 839–856.

Schwartz, I. (2009, July). *Update on accountability: The times they are a changing.* Paper presented at the Data Analysis Technical Assistance Group Annual Conference, Saratoga Springs, NY.

Senge, P. M. (1990). *The fifth discipline: The art and practice of the learning organization.* New York: Doubleday.

Sizer, T. R. (1996). *Horace's hope: What works for the American high school.* Boston: Houghton-Mifflin.

Stigler, J. W., Gonzales, P., Kawanaka, T., Knoll, S., & Serrano, A. (1999). *The TIMSS videotape classroom study: Methods and findings from an exploratory research project on eighth-grade mathematics instruction in Germany, Japan, and the United States* (No. NCES 99-074). Washington, D.C.: U.S. Government Printing Office.

Sum, A., Khatiwada, I., & McLaughlin, J. (2009). *The consequences of dropping out of high school.* Boston: Center for Labor Market Studies, Northeastern University.

Weick, K. E. (1979). *The social psychology of organizing.* Reading, MA: Addison-Wesley.

West, M. A. (2002). Sparkling fountains or stagnant ponds: An integrative model of creativity and innovation implementation in work groups. *Applied Psychology: An International Review, 51*(3), 355–387.

West, M. A., & Richter, A. W. (2008). Climates and cultures for innovation and creativity at work. In J. Zhou & C. E. Shalley (Eds.), *Handbook of organizational creativity* (pp. 211–236). New York: Lawrence Erlbaum Associates.

Whitman, D. (2008, Fall). An appeal to authority: The new paternalism in urban schools. *Education Next, 8*, 52–58.

Yin, R. K. (2005). *Case study research: Design and methods* (3rd ed.). Thousand Oaks, CA: Sage.