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**DEFYING THE ODDS:
CHARACTERISTICS OF HIGHER PERFORMING, HIGHER POVERTY
ELEMENTARY SCHOOLS**

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Applied Research, and Evaluation**

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Defying the Odds: Characteristics of Higher Performing, Higher Poverty Elementary Schools

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Maine educators have the supreme goal of preparing our children for success in higher education, work, and personal achievement. There are success stories pouring out of our schools every day. Many schools, however, are searching for the style, technique, or approach that will help them to reach and motivate all of their students. For schools with high poverty levels, this is generally a greater challenge. However, there are schools that are defying the odds, and a closer look at their strategies may provide us with information that will help all of Maine's students achieve.

In an initiative designed to develop common educational goals and standards for school performance, the Maine legislature adopted the *Learning Results* in 1996. Without specific guidelines on curriculum or instruction, the *Learning Results* outline general knowledge and skills to be achieved by Maine students, and “challenge communities, schools and teachers to work together in implementing effective instructional strategies to achieve high expectations for all students” (Maine Department of Education, 1997). This document states our commitment to improving public education for *all* students, regardless of geographic location, economic conditions, or family background.

In a national effort to increase accountability and student achievement, President Bush signed into law his education reform plan, the *No Child Left Behind Act of 2001*. The four main principles of this document are stronger accountability for results, increased flexibility and local control, expanded choice for parents, and an emphasis on proven teaching methods. The first title of the Act, “Improving the Academic Achievement of the Disadvantaged,” defines its purpose as ensuring that “all children have a fair, equal, and significant opportunity to obtain a high-quality education” (U.S. Department of Education, 2001). The act requires that our schools set clear academic standards and develop means by which to identify progress made by students and schools. Those schools that fail to meet adequate yearly progress towards certain educational benchmarks will be subject to corrective or restructuring measures. The statewide Maine Educational Assessment (MEA) scores are currently used to identify schools that need improvement or that meet the standards of adequate yearly progress.

In Maine, like many states, it is a challenge to keep all children, particularly disadvantaged or at-risk students, at or above the required performance benchmarks. “The effects of poverty on children’s education are well documented. Children from poor families have lower than average achievement and higher than average dropout rates” (U.S. Department of Education, 1996). It is essential that Maine educators and policy-makers find ways of ensuring that *all* children receive the opportunities and support they need to achieve. The purpose of this study was to examine the characteristics of higher performing, higher poverty elementary schools in Maine, and to identify school, staff, or instructional trends that set these schools apart from higher poverty schools with lower levels of performance. By identifying those schools that are performing above the state average on the MEA, despite higher levels of poverty, certain characteristics may emerge that contribute to their success. Furthermore, these could be applied to lower performing schools, in an effort to help all children succeed in school.

Sample

This study examined fourth grade academic achievement, as measured by the MEA, in high poverty level schools in Maine. Eligibility for free and reduced priced lunches is a widely available and comparable indicator of school poverty levels. Elementary schools with at least 50% of students eligible to receive free or reduced price lunch were identified as higher poverty level schools. Out of 374 public schools serving fourth grade students in Maine, 116, or 31% qualified as high poverty level. Higher performing schools were identified on the basis of Maine Educational Assessment scores in reading, writing, mathematics, and science, for the years 2000-2001 and 2001-2002. Schools were selected that had an average scale score on the MEA at least ½ standard deviation (SD) above the state average, in at least two subject areas, for the past two school years. Of the 116 high poverty level schools in Maine, eight (6.9%) were identified as meeting criteria for higher performing status. Of these, three are located in Aroostook County, one in Franklin, one in Penobscot, and three in Washington County. Although schools only needed to excel in two content areas, five of the schools performed ½ SD above average in at least three content areas, and five schools performed one SD above average in two content areas. Lower performing schools were identified using the same criteria, but scoring ½ SD below the state average. Twenty-five (21.6%) of the high poverty level schools met these criteria.

The sample was then divided by performance in a given content area of the MEA, in order to identify school traits and practices that may contribute to student achievement in a specific subject. Higher and lower performing schools were identified in mathematics, reading, and science by subject scores $\frac{1}{2}$ SD above or below the state average, respectively, for the past two years. Schools in each subject area were then matched by school size and percentage of free and reduced lunch. In reading, the matched sample had eight schools in each of the higher and lower performing groups. Nine schools comprised each of the matched mathematics groups, and the matched science sample had six in each of the higher and lower performing groups.

Average MEA Scores, 2001-2002

Reading Scale Scores			Math Scale Scores			Science Scale Scores		
State of Maine	Higher Reading Performing	Lower Reading Performing	State of Maine	Higher Math Performing	Lower Math Performing	State of Maine	Higher Science Performing	Lower Science Performing
538	544	531	529	538	520	526	532	519

Data

Data was collected from four primary sources: The Maine Department of Education, the Maine Public School Census Survey, the Maine Educational Assessment, and phone interviews with school principals. The Maine Department of Education provided information on the percentages of free and reduced price lunch, per pupil operating costs, staff characteristics, school size, student-teacher ratios, and all day kindergarten and pre-school programs.

The Maine Public School Census Survey is created by the Maine Education Policy Research Institute, and is administered to school principals. Data from the 2001-2002 surveys was available for 17 out of the 31 schools in the matched sample, and contained information on instructional time, athletic and co-curricular activities, school attendance, staff training and characteristics, and special services.

The MEA is an annual test administered to fourth, eighth, and eleventh graders, and covers six content areas. MEA scores are used to evaluate schools' progress towards achievement of the *Learning Results*. Student and principal surveys are also administered at the time of the test. Survey questions were related to MEA preparation, instructional and assessment methods, availability and use of technology, and staff development. This study examined scaled scores and survey responses for higher and lower performing schools.

Phone interviews were conducted with school principals at seven of the eight higher performing, high poverty level schools. Interviews covered topics of community and parent

involvement, instructional methods, student monitoring, special services, MEA preparation, discipline problems, professional development, and school climate.

Findings

This study aimed to identify characteristics of higher poverty level schools that were achieving above state averages on the MEA, and to explore possible explanations and factors contributing to their success. Phase I of the analysis entailed an examination of quantitative data on school, student, and staff characteristics. As Table 1 indicates, the Maine Department of Education data on teacher characteristics and per pupil expenditures revealed no statistically significant differences between the higher and lower performing schools.

Table 1: Maine Department of Education Data for 2001-2002

Variable	Higher Performing/Higher Poverty Level Schools		Lower Performing/Higher Poverty Level Schools	
	Average	Standard Deviation	Average	Standard Deviation
Teacher years experience	14.92	(1.85)	15.71	(4.23)
Percent of teachers with Masters Degree	14.12	(14.02)	21.83	(14.27)
Teacher average salary	32,638	(2,237)	34,016	(4,626)
Per pupil operating cost	6737.35	(930.35)	6960.81	(1780.03)

School surveys revealed no significant differences in the use of mentors for beginning teachers, but schools that are lower performing in math and reading tend to conduct fewer observations of experienced teachers. In Table 2, school size and student teacher ratio were examined after removing the effect of matching for size. The lower performing schools range in size from 28 to 861, and the size of the higher performing schools fall between 28 and 278. The only significant difference was in school size between the higher and lower *reading* performing schools ($p < .05$). Schools that are higher performing in reading have an average of 95 students, while the lower performing schools in reading serve 210 students on average. Neither of these variables revealed statistically significant differences between the higher and lower performing schools in the other subject areas, although on average, the higher performing schools across subjects were smaller and had a smaller student teacher ratio.

Table 2: Maine Department of Education Data for 2001-2002

Variable	Reading		Math		Science	
	Higher Performing	Lower Performing	Higher Performing	Lower Performing	Higher Performing	Lower Performing
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
School Size	95 (38)	210 (132)*	130 (76)	171 (120)	99 (58)	228 (188)
Student Teacher Ratio	12.1 (2.0)	14.0 (5.4)	12.9 (4.7)	14.3 (4.6)	11.7 (2.3)	12.5 (3.1)

The percentage of schools that have all day kindergarten programs and four year-old or early kindergarten programs are listed in Table 3. The greatest difference is in early kindergarten or four year-old programs for high and low reading schools. Significantly more schools that are high performing in reading have early kindergarten programs ($p < .05$).

Table 3: Maine Department of Education Data, 2001-2002

Variable	Reading		Math		Science	
	Higher Performing	Lower Performing	Higher Performing	Lower Performing	Higher Performing	Lower Performing
All day Kindergarten	75%	50%	77.8%	55.6%	66.7%	66.7%
4 Year-old Program	62.5%	12.5%*	44.4%	55.6%	50%	16.7%

A series of independent t-tests were conducted on survey responses to assess between-group differences. The survey items from the Maine Public School Census Survey identified no significant results between higher and lower performing schools. This data was analyzed across subject areas, for all schools in the higher and lower performing groups. Selected items related to student attendance, volunteers, and instructional times are shown in Table 4.

Table 4: Maine Public School Census Survey, 2001-2002

Variable	Higher Performing Schools	Lower Performing Schools
What percentage of students in your school are absent on an average day?	1.50	1.86
How many volunteers work in your school in a typical week?	3.6	3.3
In 4 th grade, approximately how many minutes per week are students taught:		
English Language Arts	615	484
Mathematics	279	293
Science & Technology	186	252

The following three tables contain information from the MEA student surveys by content area. Table 5 reports data from the higher and lower reading performing schools on questions related to reading activities. The number of books read was stable across groups, with the majority of students in each group having read five or more books in the previous two months. In the second question, the frequency that students reported searching for and reading information on a computer was significantly higher for the higher performing schools ($p < .05$). The most common response for students in the higher performing groups was “two or more times a week” (29.1%), while “never” was the most common response for students in the lower performing schools (36.1%).

Table 5: MEA Student Questionnaire, 2001-2002

Variable		None	1	2-4	5 or more
How many books have you read in the past 2 months?	Higher Performing Reading Schools	3.9%	7.8%	24.3%	57.3%
	Lower Performing Reading Schools	2.5%	7.6%	23.5%	63.0%
		Never	Once a month	Once a week	2 or more times/week
How often do you search for and read information on a computer?	Higher Performing Reading Schools	19.4%	20.4%	23.3%	29.1%
	Lower Performing Reading Schools	36.1%	23.5%	10.9%	26.9%

Table 6 shows survey results from the higher and lower mathematics performing schools. Both findings reported below were statistically significant between groups ($p < .01$). Students in higher performing schools reported more frequent use of calculators in math classes and use of computers for math activities.

Table 6: MEA Student Questionnaire, 2001-2002

Variable		Mean (SD)	Almost every day	2 or 3 days a week	2 or 3 times a month	Never
How often do you use calculators in mathematics class?	Higher Math Performing	2.31 (.97)	14.9%	19.6%	40.5%	19.6%
	Lower Math Performing	2.05* (.73)	5.6%	11.1%	62.5%	17.6%
How often do you use a computer in school to work on mathematics activities?	Higher Math Performing	1.65 (1.01)	9.5%	9.5%	14.3%	62.5%
	Lower Math Performing	1.38* (.81)	5.1%	5.1%	11.6%	75.0%

Student responses in the higher and lower science performing schools are reported in Table 7. Findings indicate that fourth grade science classes in high performing science schools have covered more of the curriculum than classes in the lower performing schools ($p < .01$). Eighty-one percent of students in the higher performing science schools said they had covered all of the curriculum topics listed, while almost 65% of students in the lower performing science schools had not learned about the topics of motion, energy, and matter. The second question relates to science instruction, and responses remain stable across groups, indicating that both groups experience a variety of classroom activities in science.

Table 7: MEA Student Questionnaire, 2001-2002

Variable		Nature, plants, & animals	Nature, plants, & animals, Earth, rocks, & minerals	I have learned about the things listed in B and also about motion, energy, & matter.	
What things do you learn about in your 4 th grade science classes?	Higher Science Performing	8.9%	5.1%	81.0%	
	Lower Science Performing	9.5%	55.4%	33.8%	
		I mostly read a text book & answer questions &/or take notes & do assignments	I use science kits for demonstrations and experiments	I work in groups to design & conduct experiments	I do a combination of A, B, & C
Which statement best describes how you learn science and technology?	Higher Science Performing	25.3%	19.0%	19.0%	30.4%
	Lower Science Performing	27.0%	13.5%	21.6%	35.1%*

Another factor that appears to contribute to a school's achievement on the MEA is how closely the curriculum is aligned with MEA content and the impact that MEA scores are believed to have on a school. Significantly more students in high performing mathematics and science schools than in the lower performing schools report that questions in the MEA mathematics and science sections match what they have learned in their mathematics and science classes, respectively ($p < .01$). High performing schools in all subjects were more likely to consider the impact of the MEA on their school as high stakes, and lower performing schools were more

likely to characterize the stakes as moderate. More students in high performing reading schools reported feeling somewhat nervous about taking the MEA (22.3%), compared to students in lower performing reading schools (5.9%), while 44.5% of students in the lower performing schools report not getting nervous at all ($p < .05$). Table 8 reports student responses about how prepared they feel to answer MEA questions in each content area.

Table 8: MEA Student Questionnaire, 2001-2002

Variable		It is true about me.	It is not true about me.	I am not sure.
How do you feel about the following statement? "In school I learn most of what I need to know to answer the MEA reading questions."	Higher Reading Performing	55.3%	2.9%	30.1%
	Lower Reading Performing	45.4%	3.4%	44.5%
How do you feel about the following statement? "In school I learn most of what I need to know to answer the MEA mathematics questions."	Higher Math Performing	76.8%	2.4%	15.5%
	Lower Math Performing	55.6%	12.5%	26.9%
How do you feel about the following statement? "In school I learn most of what I need to know to answer the MEA science questions."	Higher Science Performing	64.6%	3.8%	26.6%
	Lower Science Performing	25.7%	17.6%	54.1%

According to the data presented above, there are no significant differences in spending, teacher education or experience, instructional time, or student teacher ratio between higher and lower performing schools. Pre-kindergarten programs and smaller school size seem to have a positive impact on reading performance. Other factors identified through MEA surveys indicate instructional and curricular differences between groups. The Phase I analysis raised questions about the teaching and learning process and school climate, to be explored further in principal interviews.

In the second phase of this study, interviews were conducted to explore some of the underlying themes emerging in this analysis, but that are not quantifiable. An examination of the seven interviews with school principals revealed several common threads among higher poverty level, higher performing schools. All but one of the schools utilize Title I services, and those teachers provide specialized individual help and may also be integrated into the regular classroom. Several of these schools have a Reading Recovery or Gear Up program as well.

Schools provide newsletters, open houses, and flexible scheduling to foster open communication with parents and high attendance rates at parent conferences. About half of the principals achieve close to 100% parent attendance. There is a variety of community and extracurricular activities, such as reading to senior citizens, science fairs, music concerts, and art exhibits. Teachers in most of these schools are offered a choice of professional development opportunities, although there seems to be a desire to find training in areas relevant to the school's specific goals. "The teachers are utilizing (professional development) in a more efficient way by looking at data and seeing what they as teachers need improvement on and really concentrating on that." Curriculum development has been a popular topic for staff training in many of these schools. About half of the schools have sent teachers to participate in scoring the writing samples of the MEA, as an opportunity to learn the expectations of that portion of the test.

There are several other ways schools have prepared their teachers and students for the MEA. One trend is in analyzing data from previous MEAs and using the results in curriculum planning. The scores provide information on student strengths and weaknesses, allowing the schools to target areas of need. Another goal of curriculum planning among several of the higher performing schools is alignment with the *Learning Results*, because they outline the material tested by the MEA. One principal recognized the challenge in this, stating, "There's so much required in the *Learning Results* that it's very difficult to get everything in." In one school, teachers list all their learning results in their plan books each week, to keep track of which learning results they have and have not covered.

Another common practice is applying the released items from the MEA in the classroom. This way, students become familiar with the type of questions asked on the MEA. Writing is seen to be another important activity that contributed to MEA achievement in the higher performing schools. There is special attention to the writing process, "writing across the curriculum," and "more and more writing." Other strategies include motivational tactics such as rewarding student effort with pizza and outside activities, providing good nutrition and physical activity prior to the test, and requiring students to use the full time allotted for test taking. All of the principals recognized that these strategies require a team effort. "Our teachers take the MEA very seriously, and I think you have to have everybody on board in order to be a successful team with the MEA."

Survey questions did not identify significant differences between schools on instructional methods. A common theme that surfaced in the interviews was that principals embrace a variety of teaching techniques and classroom activities to match teacher strengths and student learning styles. When asked about instructional methods that seemed most common or most effective, every principal responded by recognizing the individual strengths of their teachers. One principal credited teacher talent for the success of their integrated curriculum. “I have a teacher who is superior in science and a teacher who does wonderful work with art and music, so they often times get together and provide information to the children in a different manner.” In most of these schools, the approach to teaching seems to mirror the diversity of student needs. “I think it’s important that the kids are learning in a variety of different ways.” Some methods that were mentioned included hands-on activities, reading aloud, textbook exercises, long-term projects, white board instruction, journal writing, science experiments, reading and writing across the curriculum, and computer software to supplement the regular curriculum. “Nothing stands out alone, because you need it all. You need to come at the children in multiple facets so that everybody gets it.” In most of these schools, instruction is driven by ongoing assessment. Re-teaching based on student assessment is also encouraged, so that children have every opportunity to learn. “The idea is not so much to achieve grades. We don’t put a lot on grades; we put a lot on knowledge.”

School size and class structure were also not identified as significant variables, although the principals who had small class sizes and multi-grade classrooms spoke of their benefits. “One of the greatest strengths for our school is we’re so small we have lower class sizes for one, and for two, we have our students for two years in a row.” Combining first and second grades, and third and fourth grades together is thought to provide consistency and stronger relationships between teachers and students. It also allows for more variety and depth of the curriculum, as topics can be covered for two years with two or three different approaches. Combining grades in the classroom provides opportunities for students above grade level to extend their learning and challenge themselves, and students who are at a lower level benefit from re-teaching and help from other students. “We’re able to tend to strengths and weaknesses quite easily in the multi-grade classroom.” The ability to accommodate different levels and provide individualized attention is better achieved in smaller classes. “The number one characteristic that sets us apart is student teacher ratio. It’s excellent, probably 1:5 when we include Title I, special ed, ed techs,

and classroom teachers.” Another advantage of small class size is increased teacher awareness and communication with the students. “We are small, so students don’t tend to slip through the cracks.” Not surprisingly, smaller schools seem to foster a closer sense of community, sometimes described by their principals as a family oriented place.

Another factor common to many of the higher performing schools is what principals described as a positive, friendly, open, or safe school climate. “I think it is the hub that the wheel turns around, because everything else is related to school climate.” The overall culture and climate of the school is a piece that principals seemed proud to share, with examples of what it looks like. Cooperation and communication among staff is an important aspect. “It is probably the most positive staff that I’ve ever worked with. And it shows. We’re getting along. We come to consensus. If there’s a problem, we work it out. We all take ownership of making our school a better place to be.” Teachers are willing to help each other, and “children see those kinds of interactions, and it’s contagious. I think a school is only as good as they people that are in it.” All of the principals expressed appreciation for their teachers, whether it is for a special talent in one subject area, for being committed to the students and generous with their free time, or for being lifetime learners.

A good relationship between teachers and students is also seen as a valuable part of school climate. “We have a staff that’s very caring, and I think the parents and students know that, and I think that’s why we have a good team.” Some of the ways this is achieved is through positive reinforcement, building self-esteem, setting clear expectations, and encouraging students to “reach for the stars.” It is also achieved outside of the classroom, as many teachers participate in community and sporting events, or provide after-school tutoring. As a result, “Sometimes they see a side of a child they might not see in their regular classroom.” Among these seven principals, there is a consistent sense of pride and belief in their students. One principal tells the students, “Each and every one of you is special and you have positive traits and you need to use your strengths to achieve whatever it is you are going after,” and another clearly states, “I wouldn’t trade my kids.”

Discussion

This study examined characteristics of higher performing, higher poverty level elementary schools to identify best practices for helping all students achieve. In a comparison to higher poverty, lower performing schools, several significant differences were found and several variables were ruled out. Higher performing schools use MEA results to evaluate and plan student programs, and students in these schools are more likely to feel prepared to answer the questions on the MEA. Schools high performing in mathematics use more hands-on materials and computers in the classroom. Higher performing schools in science have made more progress in the science curriculum, and tend to provide more active, engaging, hands-on work in the classroom, though this was not at a significant level. High reading performing schools have smaller student teacher ratios and are more likely to have early kindergarten and four year-old programs. This finding may lend support to the importance of early literacy efforts and individual attention in learning to read.

No significant differences were found for teachers' education level, salary, or experience, per pupil spending, classroom structure, availability of summer school programs, instructional time, and school size. Higher performing schools tend to be smaller in size, although there is marked variation in both groups. There are small schools in the lower performing group, and large schools that are higher performing. Teaching style and school culture in the higher performing schools may be facilitated by a small size, making it easier to build relationships and meet individual student needs.

The second phase of this study provided a more in-depth look at some of the underlying themes common to higher performing schools. Interviews were only conducted with principals from the higher performing schools, so some of these characteristics may also be found in lower performing schools. This would be an area for further comparative research. Overall, these factors were less related to the input in terms of staffing and spending, and had more to do with school processes, such as classroom strategies, rapport between teachers and students, and school culture. Higher performing schools seem to convey high expectations that are backed up with support services, caring and dedicated teachers, and a positive atmosphere. There is a sense of flexibility in these schools, from a choice of professional development opportunities to a variety of teaching methods and talents. The principals and teachers see the MEA as high stakes, and strive to provide the knowledge, experience, and motivation for their students to excel.

Community and parent involvement was seen by school principals as an important goal, although it is achieved in different ways. Events such as holiday celebrations and student performances draw support and attendance in all of these communities. Some schools have taken community involvement to another level, by arranging student service projects, organizing a community ski day, and recruiting guest speakers and volunteers for special school events. Some schools have parents and grandparents who regularly volunteer in the library and classrooms. In schools where this does not occur, principals still value open communication and receive parental support in other ways. While the number of volunteers did not vary between higher and lower performing schools, the type and quality of support may have an impact. This would be an interesting topic to examine more thoroughly.

The findings presented here offer a window into the practices and attitudes in higher performing, higher poverty schools. They offer hope for other higher poverty level schools by suggesting that steps to student success can be made inside school walls. While this study cannot create a formula for student success, it describes some characteristics that are common to higher performing schools. Additional research is needed to examine individual student performance, to gather observational data on classroom techniques, and to develop strategies for fostering a positive school climate.

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