Case Study of Manor New Tech High School:

Promising Practices for Comprehensive High Schools

Prepared by E3 Alliance

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About E3 Alliance and the Origins of this Paper

The E3 Alliance is a regional collaborative to create a research-based "blueprint" that will allow us to align our education systems to better fulfill the potential of every citizen and in turn, increase economic outcomes for a stronger economic future for our region. Founded by partners the Austin Area Research Organization, The University of Texas at Austin, and Austin Community College District; the E3 Alliance acts as a catalyst for change, and is the P-16 Council for the Central Texas region. E3 Alliance is compiling and analyzing data never before available for any region of the state – and perhaps the country – in order to determine what factors across the education continuum can and should be addressed to drive systemic change.

The following paper culminates a year of research sponsored by the National Science Foundation and reports on promising practices observed and reported at Manor New Tech High School (MNTH), a recently launched Texas Science Technology Engineering Mathematics (T-STEM) high school in Manor Independent School District (ISD). Research partners included Austin Community College, Texas State University – San Marcos, and The University of Texas at Austin. Manor New Tech High School follows several high school redesign principles such as small learning communities and rigorous coursework with real-world applications, and is focused on Science, Technology, Engineering, and Mathematics (STEM) fields. Through a case study of MNTH centered on teacher surveys and interviews, E3 Alliance identifies a selection of practices that potentially apply to comprehensive high schools committed to improving student outcomes in STEM fields.

Preview of Report Components

This report consists of four sections. The first section describes the origins of this project and the research methods of the study. The second section reviews the research literature to date on findings and evaluations around the New Tech model of high school redesign as well as the extant literature around Project Lead the Way and student outcomes. The third section briefly describes MNTH and its programs over the past two years. The school's recent opening (2006-2007) limits research into overall student outcomes. However, to the extent possible, the section also describes student outcomes on standardized tests as well as teacher perceptions of student engagement.

The fourth section comprises the main focus of this paper and outlines a series of findings based on the surveys issued to faculty and the follow up interviews with a selection of teachers and master teachers. We identify three practices that show promise in improving student performance in STEM fields that can have potential application in a traditional comprehensive high school setting. We conclude in this section with a set of further research questions designed to validate or invalidate the recommendations we propose.

I) Central Texas Engineering Education Collaborative Overview

In 2008 the National Science Foundation (NSF) awarded E3 Alliance funds to establish the Central Texas Engineering Education Collaborative, designed to expand the engineering pipeline in the region from middle school through higher education. This expansion focused on four primary areas:

- Increasing the number and diversity of students interested in engineering in middle school and providing them with engineering coursework options in high school
- Improving the quality of STEM instruction via professional development for middle and high school teachers in order to build and maintain both rigor and student engagement and increase the capacity of well-qualified STEM teachers
- Providing seamless transitions for high school graduates to regional college engineering programs
- Identifying promising practices at the region's T-STEM High School (Manor New Tech High) that could be applied to a traditional comprehensive high school in order to improve student performance in STEM subject areas

The results of this inaugural year of the Central Texas Engineering Education Collaborative have been remarkable. Across our 9 partner school districts, 3 higher education institutions and our partner community organizations, the collaborative has achieved the following results:

1. Over 116 new middle school students of diverse backgrounds participated in FIRST LEGO League in 2008-2009, tripling the Central Texas FLL presence.
2. 123 high school students participated in a day-long Engineering Academy held on the campus of Texas State University, exceeding projections by 50%. About 40% of these students were young women, one of the underrepresented target populations in engineering fields. Applications to Texas State's Ingram School of Engineering increased 3 times in 2009. Departmental faculty attribute the engineering academy as one of the key factors in this increase.
3. 64 middle school and high school STEM teachers participated in professional development in summer 2009 ranging from 3-day to 6-week programs. These programs included Project Lead the Way training, Skillpoint Alliance Educator Institutes, and University of Texas at Austin's DTEACh[1] and UTeach Engineering Summer Institute for Teachers (ESIT) programs.
4. Support for Project Lead the Way (PLTW) engineering programs has helped to enable districts to increase regional participation from 1416 students to 2150 students in one school year!

These efforts have created tremendous momentum in the region toward strengthening STEM in K-12 and building effective bridges to higher education across our various school districts and high schools. We designed the research conducted at Manor New Tech High (MNTH) to help neighboring districts identify practices that appear to contribute to improved student performance in STEM and can be adapted to a comprehensive high school setting.

Research Question Description

Specifically, the NSF research effort focuses on three questions relating to improving student performance in STEM fields:

1. What are three promising practices from MNTH that have potential for implementation at traditional high schools?
2. What are advantages to the promising practices? What are the possible benefits to each of the practices? For each practice, what are the possible limits or constraints when implemented in a high school that is new to STEM?
3. In particular, in what ways does the PLTW program provide students entrée into college level coursework?

[1] The Design Technology and Engineering for America's Children (DTEACh) program is an outreach effort of the UT Austin Cockrell School of Engineering. The program conducts in-service professional development institutes to train K-12 teachers to teacher applied mathematics and science within the context of solving engineering design problems.

Methodology

Given the small scope of the study and that Manor New Tech High School has only just completed its second full school year; we opted to use a blended methodology that includes both quantitative and qualitative approaches. Specifically, we used teacher surveys (for a review of the survey see Appendix A), interviews with a selection of teachers representing the range of experience at MNTH and student performance data. The research began with observations of faculty meetings to learn more about their process in utilizing Teacher Advancement Program (TAP) professional development and mentoring. A survey of all 22 faculty followed and was staged at the beginning of the third trimester in order to provide new faculty at MNTH with enough time for reflective consideration in the survey responses.

Following the administration and review of the survey, six teachers were carefully selected to perform in-depth interviews that would enable us to elaborate on some key themes that emerged in the survey responses. Teachers were selected based on the following criteria:

1. Experience with the New Tech model
2. Experience with Project Lead the Way
3. UTeach alumni[2]
4. First year at Manor New Tech High
5. Held a previous career
6. New Teacher or Master Teacher

Interviews were conducted in the last few weeks of the school year to provide teachers with a chance to look back on their experience in 2009-2010. The focus on teacher perception of best practices is both deliberate – a belief that practitioners offer a unique and critically important purview into the practical application of certain approaches – and, pragmatic – due to the newness of Manor New Tech High, longitudinal data on student performance is not yet available.

Indeed, data collection on student performance has proven most challenging given the short tenure of the school's existence. As a result, as we identify promising practices, all recommendations are preliminary with suggestions for the direction of further research.

The focus of this research effort is to identify what teachers believe are effective practices with students and fellow teachers, in particular, their use of specific instructional strategies, peer interactions (both structured and unstructured), peer attitudes, teacher support, school leadership, and general school and district factors. Also, we explore factors that create challenges that teachers believe impede their effectiveness in delivering STEM content and skills to their students and, thereby, affect student academic performance. It is important to note given the methodological approaches, the findings will NOT be correlative or causative. Further research into these findings will help to validate or mitigate direct and indirect positive associations to positive student results. Given these parameters, we outline our research assumptions and limitations below.

Assumptions & Limitations

1. The Manor New Tech Model is achieving positive student outcomes at a greater rate than traditional comprehensive high schools. We have only limited access to student data proving this point.
2. Schools that have been around for many years face challenges to new program implementation not at issue for newly-launched schools – this reality will be a consideration when identifying those promising practices most likely to translate to a comprehensive high school.
3. While funding of programmatic changes may be a consideration in identifying those promising practices most likely to translate to a comprehensive high school, it will NOT eliminate recommendations that require additional financial support or reallocation of resources.
4. The limited scope of this study did not allow for researchers to conduct surveys or interviews of the following key populations or stakeholders:
    a. MNTH students
    b. MNTH administrative leadership
    c. Comprehensive high school teachers & administrators
    d. Parents of MNTH students

[2] The UTeach program was launched in 1997 at the University of Texas at Austin as a collaboration between the Colleges of Education and Natural Sciences. Students are provided intensive training in Project-based Learning and Problem-based Inquiry as the primary instructional approaches to teaching in STEM fields.

As a result of this scope, recommendations of promising practices will be paired with recommendations for further research that would allow us to test the validity of these findings.

II) Review of Literature: The New Tech Model in High School Redesign, Small Schools & Project Lead the Way

In 2003, noted education researchers Anthony Carnavale and Donna Desrochers published a seminal study mapping the economic reasons for education reform.[1] Specifically, Carnavale and Desrochers argue that the American education system is antiquated, obsolete and inadequate in preparing our youth for the education and career demands of the 21st century. The report, issued in the heat of debate around high school redesign, applauded efforts to improve rigor in "core subjects" such as English Language Arts, Mathematics, Science and Social Studies, but argued that significant changes were necessary to curricula that: integrated academic and applied approaches, aligned through higher education and to the set of "professional skills or soft skills" in highest demand across industries.[2]

New Tech Model

Four years earlier, supporters of the Napa New Tech High School, which was founded in 1996 expressly to address 21st Century Skills for 11th and 12th graders, launched the New Technology Foundation dedicated to a model of school reform that centered on project-based learning instructional strategies, integrated curriculum across core subjects, technology integration, and a selection of tools and materials designed to enhance instruction and student engagement.[3]

Since 1999, "New Tech" high schools have sprung up across the nation centered on seven critical principles:

- Small school size (not to exceed 400 for grades 9-12),
- Curriculum designed around collaborative learning environments and the project-based learning model,
- Integrated technology with a 1:1 student to networked computer ratio,
- Industry-School Partnerships designed to provide critical career awareness and professional skills to high school students,
- Professional development for teachers and staff that is on-going, diverse in content but focused on project-based learning instructional strategies,
- Staffing model that allows for the principal's autonomy in hiring, fully-dedicated faculty, a New Tech Foundation advocate on site, and an IT Administrator to support school systems, and
- Environment that is physically separated from other school models to create a unique identity and provide classrooms with diverse learning environments[4].

Despite tremendous growth in the New Tech high school movement that now includes model high schools in over 9 states across the country with concentrations in California, Indiana and North Carolina, there have been few objective, longitudinal evaluations of student outcomes. Much of the research has instead focused on case studies of the New Tech Model or on broader trends such as the small-schools initiative. Still, current literature show overall positive student outcomes in these case studies.

Studies of the New Tech model conducted via survey and classroom observation emphasized the positive effect on teaching. For example, in the fall of 2007, the Buck Institute for Education (BIE) conducted a national survey of high school reform and project based learning (PBL). The study included teachers from several major high school reform networks that emphasize PBL as an instructional approach: New Tech High, High Tech High, Edvision Schools, and Envision Schools. It also included a variety of other small high school reform sites and comprehensive high schools that were not formally associated with a specific reform model.[5]

Compared to other teachers in the study, teachers in New Tech schools more frequently:

- Had extensive professional development in using PBL
- Gave reasons for using PBL that included teaching skills beyond academics
- Conducted projects that specified content standards, used rubrics, and created a need to know prior to teaching the content
- Conducted PBL with fewer commonly-stated obstacles such as lack of time or subject-specific models
- Said teachers were involved in school decision-making and leadership
- Identified school-wide structures that supported PBL and integrated curriculum strategies
- Reported higher levels of student engagement

In general, teachers working in New Tech schools were satisfied even as they acknowledged that much of the work required a lot of planning and preparation prior to the start of any new class project.[6] Again, longitudinal studies focused on student achievement do not yet exist.

Small Schools

On the other hand, evaluations of smaller learning communities demonstrate mixed results in comparison to the more positive representation of teaching illustrated in the Buck Institute study. For example, a recently released study by the New School for Management on New York City's Small School reforms for their high schools illustrated that there were mixed results in the academic performance of small schools. The study found that while student attendance improved and graduation rates rose, small schools struggled with teacher turnover and with student attrition into the nearest comprehensive high school. In part, these challenges result from intractable problems that pre-dated the model. However, that the model only partially ameliorated such issues indicated that small schools can not be the only solution. Furthermore, comprehensive high schools experienced set backs with the draw of teachers and administrators to the smaller schools effort, including greater overcrowding, higher dropout rates, higher rates of "hard-to-reach" student populations, such as English Language Learners and those in special education.[7]

The study concludes with a series of ten recommendations that include suggestions to:

- Look beyond small school model as the only option for struggling students
- Find ways to support mid-size mixed ability schools that can offer a wider range of services and courses than a small school setting, but will not swallow up kids as large comprehensive schools risk doing
- Identify systemic strategies to support English Language Learner populations and students in special education programs [8]

Project Lead the Way

Another strategy that has been employed in high school redesign focuses on modifying core curriculum for more integration among the core subject areas and providing "real-world" applications of key concepts, particularly in STEM related subjects. Project Lead the Way (PLTW) is a program in engineering designed by the Rochester Institute of Technology and local school districts that strives toward such integration and application. The Southern Regional Education Board (SREB) *High Schools That Work* Division conducted a study to determine whether the *PLTW* engineering pathway provided participating students with higher quality learning experiences – and higher achievement – when compared to other non-participating students in the *High Schools that Work* network. These studies found that *PLTW* students showed significantly higher achievement in mathematics on nationwide assessments when compared to their peers in comparable career/technical fields. This outcome is true for *PLTW* students in mathematics, reading and science in comparison to students across all career/technical fields.[9]

Further, *PLTW* students were significantly more likely to complete four years of mathematics including Algebra I, Geometry, Algebra II, and one higher level mathematics course.[10]

An interesting critique of *Project Lead the Way* focuses on its learning objectives independent of other coursework a high school student may take. A National Science Foundation study conducted by researchers at the University of Wisconsin, Madison expressed concerns for students who relied on *PLTW* coursework exclusively to provide them with sufficient math skills to complete high school requirements. The study found that *PLTW* curriculum addresses "far fewer mathematics content and standards when compared to academic curricula" and therefore should not be considered an appropriate substitute for core mathematics classes. It should be noted that PLTW's role in Career and Technology Education prohibits these courses to stand in for core subject areas.[11]

A small study after graduation of *PLTW* students who enrolled in college found that about 40% were studying engineering and technology as compared to only 4.3% of their non-*PLTW* peers.[12] The scope of this study featured only 171 *PLTW* graduates and as a result should be considered preliminary in its findings.

Models Aside, What Changes Learning and Performance?

In the end, there is no "silver bullet." Every region of the country faces different community and demographic dynamics that require approaches to education change that may differ even within a given state.

Noted researcher, Richard Elmore, concurs that no single model is likely to serve all students well. Indeed, in his book, *School Reform from the Inside Out*, Elmore notes that there are three essentials to improving learning and performance in students regardless of the particular model adopted by a given school or district.[13] As he puts it, "the problems of the system are the problems of the smallest unit"[14], and require that change must occur in the classroom specifically by:

1. Increasing the knowledge and skill of teachers
2. Changing the content of what is taught to students
3. Changing the relationship of the student to teachers and the content[15]

He notes that each aspect cannot be treated independently; in fact all are interdependent and interconnected. Increasing both the knowledge and skills of teachers requires greater rigor in content and instructional approaches that serve many student learning styles. Connecting to students in a different way but with the same rigor demands that teachers have deep knowledge in their content and be able to address the range of learning styles and base knowledge of each student with adjustments or new thought models accordingly.

Manor New Tech High School, in many ways, represents a microcosm of many of these models of reform. It is a small school focused on the New Tech Model featuring STEM curriculum and using *Project Lead the Way* as a primary tool for providing students with relevant applications of key math, science and technology concepts. MNTH, with its model of teacher development and peer interactions, is also attempting to embody Elmore's three principles and to drive student achievement through the principles of high content knowledge of its teachers, rigorous teaching of content, and a new kind of teacher-student relationship.

III) Manor New Tech High Overview

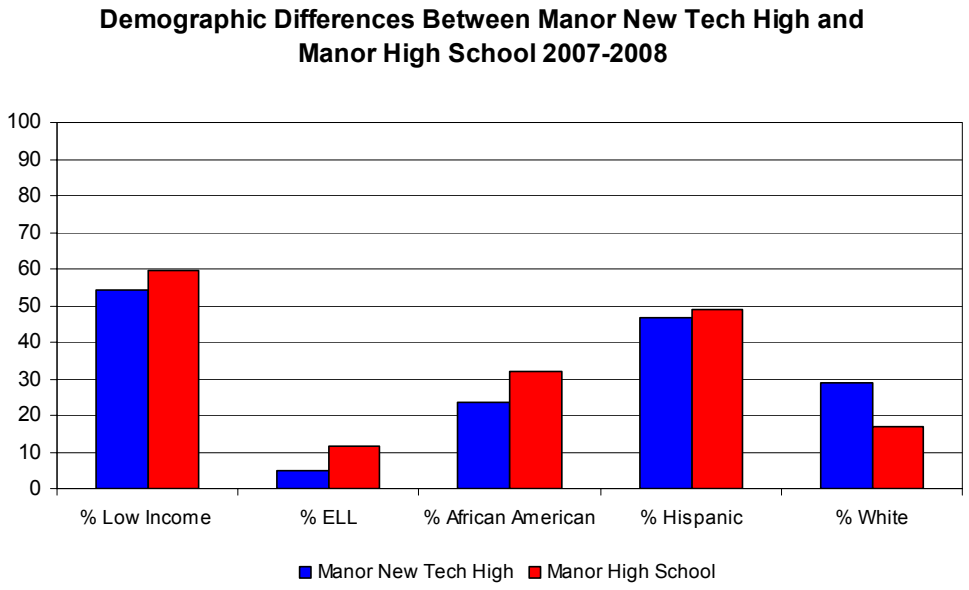
Manor ISD has undergone tremendous changes in its student population over the last several years. From 2004 through 2008 the district grew over 80% in its overall student population, over 10 times the rate of growth for the state as a whole. Students in Manor ISD are predominantly low income with close to 70% qualifying for Free and Reduced Lunch. In addition, the district's English Language Learner population has grown by 144% since 2004 (compared to the state's 17.3% growth).[16] As a result of these demographic shifts, Manor has struggled to reach certain student populations while trying to manage tremendous growth.

Manor New Tech High School launched in the 2007-2008 school year as one of only two of New Tech efforts in the State of Texas. With the support of the Texas High School Project, the school opened as an independent campus at the former Manor

Middle School and its layout was designed with close attention to the small school setting with an open environment and with integrated technology in every classroom. MNTH is a small school with 22 faculty in 2008-2009 and an additional 5 staff including administration. The number of students at MNTH for the 2008-2009 school year totaled 212. Manor New Tech High School's mission is, "MNTHS teachers and staff are committed to providing all students with rigorous learning and personalized relationships to ensure their success as responsible, globally-conscious citizens."

Students must fill out an application in order to attend MNTH, however, there are no admission criteria outside of completing the application and promotion to the 9th grade. Administrators then use a lottery system to select from the pool of applicants. As a result of this process, the ethnic and income demographic make up of MNTH is similar but not exactly aligned with the demographics of Manor High School, the district's comprehensive high school. Looking at the 2007-2008 comparison group demographic data, Manor High School has a somewhat higher proportion of low income students (59.7% compared to 54.1% at MNTH). In addition, a greater proportion of English Language Learners attend Manor High School (11.5% versus 5.1% at MNTH). Other variations show a higher proportion of white students at MNTH (28.7% versus 17.1% at Manor HS) and a lower proportion of African American students (23.6% versus 32.2% at Manor HS). **Figure 1** provides a breakdown of demographic differences based on the Texas Education Agency's definition of school "comparison groups," a method of categorizing schools with similar demographics in order to monitor comparable performance changes.[17]

Figure 1: Comparison of Manor New Tech High School and Manor High School based on TEA's "Comparison Group" Selected Demographics 2007-2008



In addition to the New Tech Model, MNTH implements several other programs in the school's operations supporting its mission to improve student outcomes particularly relating to STEM fields. These programs include:

- *Project Lead the Way*: As a STEM focused school, all students are required to take two courses in engineering under the PLTW curriculum. These courses are Introduction to Engineering Design and Principles of Engineering. Students can then choose to continue on in the engineering pathway or elect other math and science related courses.

- Teacher Advancement Program (TAP): is a comprehensive school reform system, nationally-deployed, that provides teachers with opportunities for career advancement, professional growth, instructionally focused accountability and competitive compensation based not only on student performance but on performance evaluations.

- FIRST Robotics: a high school robotics competition that is part of the FIRST international programs and holds regional, state and national competitions.

- Bob Pearlman Small School Consulting: focuses on helping to ensure that the critical components to small school success are implemented locally.

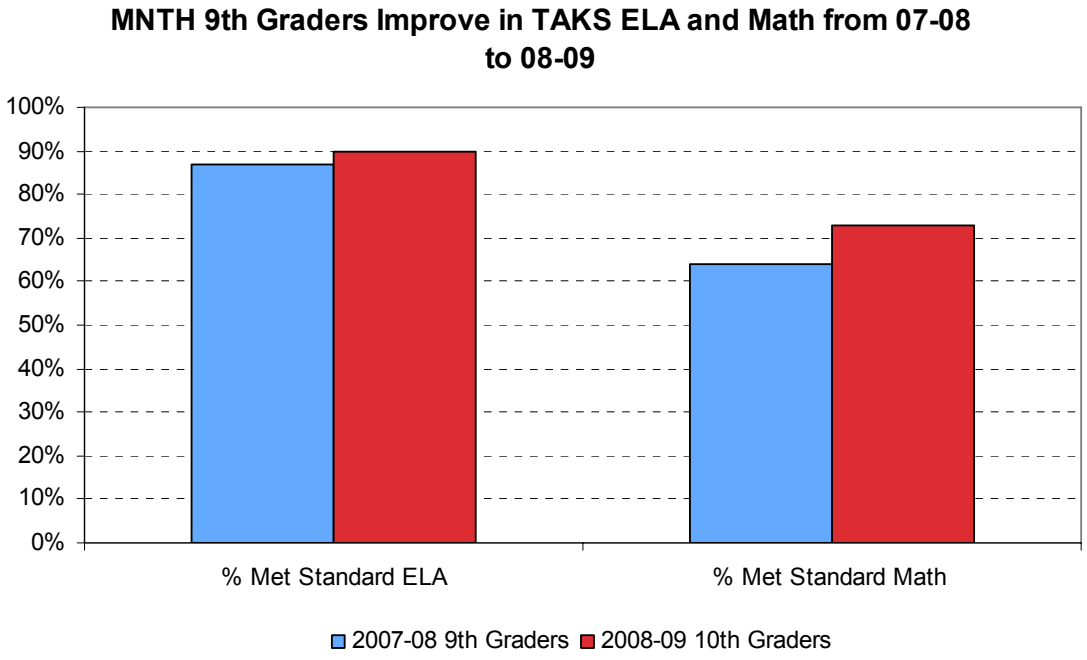
- Apple Classrooms of Tomorrow-Today (ACOT^2): Demonstration site for Apple's collaboration with the education community designed to help high schools get closer to creating the kind of learning environment this generation of students needs, wants, and expects so they will stay in school.[18]

Manor New Tech High School Student Outcomes

As stated earlier, student-based outcomes for Manor New Tech High School are limited in scope, short term, and primarily focused on student performance in state assessments and teacher perceptions of student learning or challenges related to those assessments. Because of the small size of each cohort of students small increases or decreases in passing rates may be the result of only three or four students.

Overall, MNTH 2008-2009 10th graders increased passing rates on English Language Arts (Reading in 9th grade) and Mathematics. Neither Science nor Social Studies TAKS exams are administered in the 9th grade, so there is no basis of comparison in performance for these two subjects. Figure 2 shows that passing rates in mathematics increased by 14 percentage points. It is important to note that while these mathematics scores demonstrate improved passing rates, the exams are not vertically aligned across grades. As a result, this outcome only *suggests* that last year's 9th graders had substantial improvement in their math learning in their 10th grade year.

Figure 2: Changes in Passing ELA and Mathematics TAKS Passing Rates for 2007-2008 9th Graders



Overall, passing and commended rates increased for MNTH students with some notable exceptions in student subpopulations. In mathematics, low income students increased in performance slightly from 2007-2008 to 2008-2009 (6 percentage points), as did Hispanic students (9 percentage points). Both African American students and White students slipped slightly in passing rates for mathematics from the 2007-2008 school year (4 percentage points; see Figure 3). White students saw small declines in passing rates in Science (6 percentage points; see Figure 4).

Figure 3: TAKS Mathematics Comparison

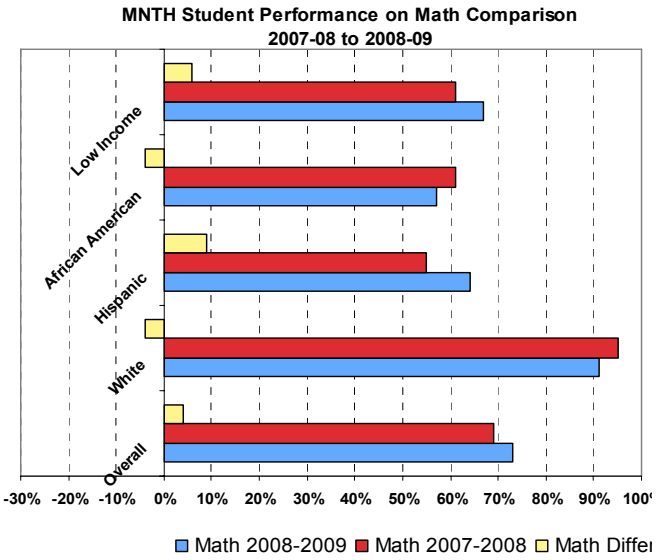
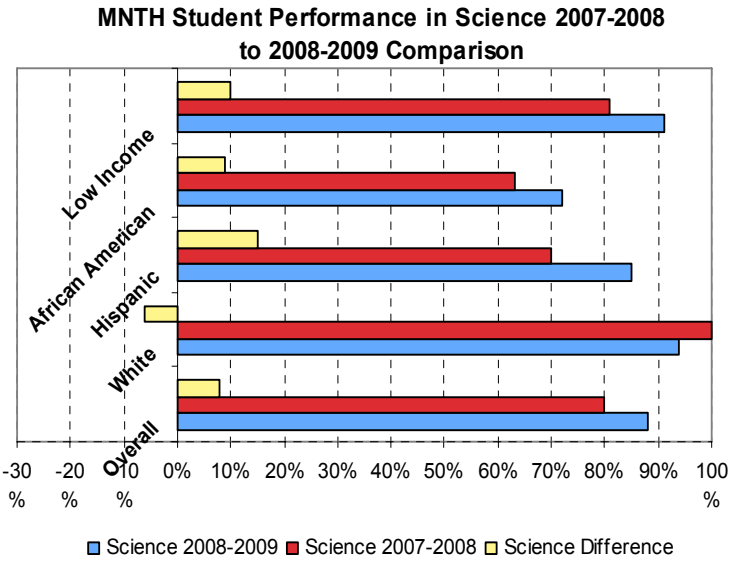


Figure 4: TAKS Science Comparison



A Texas Education Agency 2007-2008 comparison group report shows Manor New Tech High to be among the top 10, or top 25% of the 40 comparison schools, in average scale scores for English Language Arts and for Mathematics.[19] The 2008-2009 comparison group report is not yet available.

Graduation and college enrollment rates are not yet available for Manor New Tech High and therefore cannot be considered for this report.

VI) Findings from Survey and Interviews

The teachers at MNTH have certain unique qualities that distinguish them from typical comprehensive high schools. Of the 22 faculty, 9 teachers are experienced teachers with 5 or more years in teaching. All are certified in their subject areas, and all are teaching in their fields of certification. Six teachers come from a specialized teaching program developed at The University of Texas at Austin called UTeach. UTeach includes only students who major in a natural sciences field in their bachelor's program including courses in project-based learning and problem-based inquiry approaches to instruction in STEM fields. And, interestingly, half of Manor New Tech High teachers held some previous career before entering teaching. Finally, from the 2008-2009 to the 2009-2010 school year there was no faculty turnover.

As a result of these qualities, all teachers are qualified to teach in their subject areas according to both state and federal standards, as many as one-third of faculty come to MNTH already well-versed in project-based learning, and half can call upon previous careers to identify "real-world" applications to their subject matter – addressing the question of relevance that Carnavale, et al. assert is crucial to higher levels of student learning.

We administered the on-line survey in April of 2009 to all 22 teachers. Nineteen teachers responded. The timing was designed to allow new teachers to have time to reflect on their first year and also provide time to conduct interviews with a subset of the survey respondents to get a better understanding of their perception of effective practices at Manor New Tech High. The content of the survey focused on teacher experience, perceptions of effective instructional strategies, perceptions of effective professional development and student performance. (See Appendix A for the survey questions.) Interviews were subsequently conducted with six teachers or master teachers based on the six criteria listed above in order to capture the range of both experience and perception at the school.

The findings of both the survey and the interviews reveal some interesting and important perceptions about what works at Manor New Tech High. For example, one survey question focused on teacher perception of student performance and asked teachers to estimate the percentage of students who are *thriving, performing competently, getting by, struggling or other*.

The table below describes their responses:

Teacher Perceptions of Student Performance	Median %	Range
Thriving	23%	10%-70%
Performing Competently	50%	0-65%
Getting By	18%	0-30%
Struggling	10%	4-70%
Other	10%	4%-70%

The broad range of responses prompted us to select for interview some of the teachers who answered this question outside the norm. Typically, for those teachers who responded that a large number of students still struggled, their perception hinged on whether students had truly absorbed and adopted the practices needed to become ***agents in their own learning.*** For teachers whose response indicated that a large number of students ***were thriving*** or performing competently indicated that, ***in comparison to their peers in other settings*** these students were far more engaged and their performance – even when not at the highest end of achievement – was likely better than had they opted to stay in a traditional comprehensive setting. The implication in this set of responses may less indicate actual student performance and more imply a certain level of pride at the culture of learning fostered at Manor New Tech High.

Both the surveys and interviews referenced a myriad of school, teacher and student practices that contribute toward the perception of both a positive learning environment and improved student performance.

Four overarching themes emerged from the data: **Student Engagement, Student Agency, Support for Teachers' Work and Teacher Agency.**

- **Student Engagement** refers to level of connection, interaction, and learning students demonstrate in classroom projects and activities.
- **Student Agency** speaks to the level to which students take responsibility for their own learning, actively asking questions and seeking answers on their own as well as becoming critical thinkers and discerning users of the Internet.
- **Support for Teachers' Work** includes the range of school structures, professional development and relationship-building activities that strengthen the teachers' skills and help foster the faculty as its own professional learning community.
- **Teacher Agency** refers to high autonomy in the design and implementation of classroom projects, strong classroom management, improved instructional strategies, systematizes processes to access students beyond the classroom setting and ability to tailor lessons and activities to meet the range of learning styles demonstrated in the classroom.

We contend that, ultimately, each of these four themes contribute toward both a culture of high expectations for teaching and learning and an environment supporting improved student outcomes, such as high graduation rates and high numbers of students successfully transitioning into post secondary settings and into promising career opportunities.

Student Engagement

1) Teachers both in the survey and during interviews identified **Project Based Learning (PBL)** as critical to their success in engaging students and subsequently to improved student performance. Follow up interviews with a selection of teachers revealed certain components or characteristics of PBL that seemed particularly effective.

    1. Three of the six interviewees identified the "small group workshop" component as critical to student success particularly in *teaching team work* and *student responsibility*, and *adjusting teams* to meet and challenge *student performances*. Of those who had taught in comprehensive high schools, they noted that students were more readily able to adjust to working in teams through a PBL model at MNTH than at their former school. In addition, two teachers explained that small group performance enabled more *student choice* and greater opportunity for *experimentation*, which in turn, heightened student engagement.

    2. Two teachers specifically mentioned the "entry documents" and *rubrics* as essential to success in PBL. Entry documents establish the "know" and "need to know" learning points that students define at the outset of any project and are then responsible for obtaining the "need to know" information. The rubrics provide students with the performance measures by which they will be judged on a given project, creating *transparency* in learning expectations and, again, fostering a sense of mutual responsibility in the teaching/learning process.

    3. Two teachers noted that "project reflections" were important in providing the necessary *post mortem* by students on their own team effort. Students provide feedback to the teacher about the dynamics of group performance as well as about the process of researching and completing a given project. Teachers also provide a reinforcement of key learning objectives that help to reinforce what students have already attempted to apply within a given project.

    4. Two teachers commented that one of the critical aspects of PBL was students learning to ask the right questions. As a result, the focus in their classrooms included "problem-based inquiry" and the resultant *compilation and organization of research* around the set of questions identified by the student teams.

> ***[I value most] project based learning. (sic) Teachers that mentor and instruct students. Classrooms that are loud, but completely on topic! 15-year olds arguing about what types of light bulbs would be most efficient to use in their project.***
>
> *-- from surveys*

2) Weekly **all-school meetings** were also mentioned as a way to create a sense of community among the students and faculty. Announcements-- including birthdays, performance milestones, team activities and school awards—are typical to the content for these Tuesday morning assemblies. It is important to note that the small school size enables assemblies each week of all students across all grades.

3) A third practice that teachers identified as a factor in student engagement was the **practice of integrating projects and grades across subject areas.** Students were able to work on a single project that involved engineering, social studies, English Language Arts, and science, allowing students to see the same issue from different disciplinary perspectives and allowing for greater depth of understanding. Students would have a more realistic outlook on the "interconnectedness of subjects" and develop their skills in formulating questions based on an *inter-disciplinary approach to critical inquiry*. Also, teachers could evaluate student work for more than one subject area, in particular:

    1) *Around TAKS performance goals and TEKS objectives*: Teachers set the goal that they wanted to improve math TAKS scores for their students. As a result, all teachers committed that every subject would incorporate TEKS specific math concepts. The good news is that students improved in math passing for the 2008-2009 school year.
    2) *Providing multiple grades for a single comprehensive student project*. One teacher may score on mastery of science content, while the English Language Arts teacher would give a grade for writing.

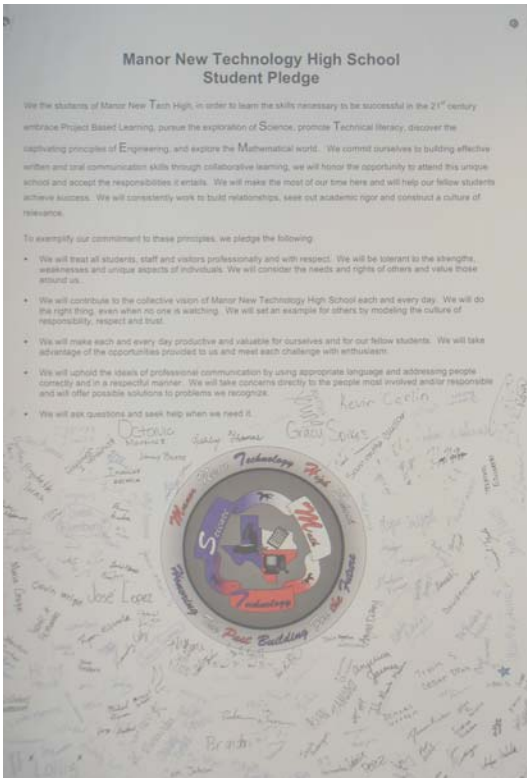
4) Two teachers discussed PBL within the context of **Project Lead the Way**, a national engineering curriculum designed to raise awareness and build skills in engineering prior to college.
    1) All students at MNTH are required to take Introduction to Engineering Design and Principles of Engineering. The intent of this requirement is to help students gain a better grasp on mathematics concepts *through applied approaches*, and to help foster team-based *problem solving skills*.
    2) PLTW requires business partnership through councils and classroom speaking engagements, thus providing a clear connection to the local high tech industry. For students in these classes, direct connection to local business offers them work-based learning opportunities that improve career awareness in high tech fields, offers examples of how professionals shaped their own paths through education, and grounds projects in cutting edge applications.

> ***[As a New Tech School] we focus on 21st century skills and integrate technology in the curriculum … posting of grades and projects.***
> *-- from surveys*

5) Of course, one of the signature characteristics of the New Tech Model is the **use of technology** in a classroom. Indeed the expectation in maintaining fidelity to the model is a *1:1 ratio of student to networked computer.* However access to technology does not imply effective use. Teachers observed that taking advantage of new media, while sometimes challenging to the veterans, was critical to maintaining student engagement and adjusting to variations in learning style. Specifically, teachers found that students responded to:
    1) *Visual learning strategies* used with technology including video, YouTube, Internet Research.
    2) *On-line learning* in terms of the use of Wikis, project management tools, access to rubrics, entry documents, and so on allowing for students to become active and critical consumers of knowledge
    3) *Extended access to teachers* and peers through text messaging, twitter, and email.

Student Agency

In the front entrance of Manor New Tech hangs a large poster ascribing the Manor New Tech High Student Pledge. Below the words are the signatures of those students in the inaugural 2007-2008 class. This poster embodies a key mission of Manor New Tech High: students take responsibility for their learning. Teacher responses in both the survey and interviews also claimed that by treating **students as agents in their own learning**, these same students begin to develop their own *higher expectations* and foster a *culture of learning*. For teachers who discussed this attribute of MNTH, they described examples of this culture of learning as based in the intention that every interaction between teacher and student and between student and student is a potential learning opportunity. Such language corresponds to classic definitions of cultures of learning that define knowledge as "situated in the every day practices and contextual experiences" of the students.[20]



To some extent this process proved quite challenging because these same students had experienced their previous education career as passive recipients of knowledge rather than as "*empowered learners*." One interviewee acknowledged that in a given 9th grade class a teacher could find no student to enter MNTH with this sense of agency. Yet, by the end of the school year as much as 30% of that same 9th grade class had accepted this responsibility.

1) **Teacher/student transparency** fosters *greater agency* because students know from the outset what their performance expectations are.

2) **Peer learning** through the small group efforts encourages students to collaborate and remediate with each other. It also provides its own kind of "*policing*" of student responsibility. There are opportunities throughout the duration of a given project to call out a student who fails to perform allotted tasks by her own team members. In some instances these students will be asked by the team to leave. Teachers then work with the student one-on-one and make the determination to reassign the student to another team or have her continue on her own.

3) Teachers observed that students who did actively become agents in their learning were more likely to acquire important **professional skills** and *integrate them into their academic behavior*, such as *time management, team work, critical thinking, and presentation skills*.

4) Students at MNTH are provided **the opportunity to participate in decisions** pertaining to school and classroom activities and projects. As a result, teachers find students more invested in these activities and often are more motivated to perform well.

Support for Teachers' Work

Not surprisingly, one of the most common themes from both the survey and the teacher interviews identified as unique at MNTH was the intensity and range of support provided for teachers to do their work. These supports generally fall into three categories: **school structures, leadership and administrative support, and extensive year-round professional development focused on skill acquisition and relationship-building.**

1) **School structures** at MNTH allow for teachers to meet regularly for common planning periods as well as formal and informal workshops in professional development. Examples of these structures include:

1. *Monday late start:* Faculty identified this time as critical to faculty communication because it offered two hours each week for faculty to identify and solve problems they encountered as they worked towards the goals of teaching PBL across all subject areas, the one-to-one student to networked computer ratio, development of rubrics and student use of rubrics, and student behavior vis-à-vis the student pledge. This time was also used for important professional development (more on that later), and enabled teachers to talk about their students' performance across subject areas.

2. *Small School Environment*: Although few teachers overtly mentioned the small school environment with respect to teacher effectiveness, many noted aspects of smaller learning communities that were beneficial to both teachers and students. Examples of aspects benefiting both teachers and students include: smaller class sizes, Tuesday All-School Assemblies, effective all-faculty meetings, and the flat hierarchy of administrators, teachers and students.

3. *Ubiquitous Technology*: Several teachers noted that, although at times they felt intimidated by the amount of technology available, it was a valuable asset in PBL, classroom management, and maintaining teacher/student transparency. Further, the integration of technology into all aspects of learning and teaching enabled teachers to tailor assignments for specific learning styles.

Teaching in [this] way is more powerful, relevant, and rewarding than in a traditional school setting. … This change has been very rejuvenating for me. I believe in what I am doing more than ever *– from surveys*

2) All teachers interviewed expressed their appreciation for the **strong leadership** at Manor New Tech High. Specifically, they identified several characteristics they believed contributed to that strength.
   1. *Support for innovation*: Three of the six interviewed teachers felt that they were encouraged to be creative in planning their classroom activities and projects. The principal encouraged wide latitude in creativity as long as the work was connected to TEKS learning objectives and appropriate for adolescent and teenage students.
   2. *Participating in school mission and goal setting*: Three of the six teachers interviewed noted that the flat hierarchy -- as indicated by their open access to the principal and dean and participation in key decisions-- contributed to their sense of commitment to MNTH and their students.
   3. *Actively seeking school-industry partnerships*: Two of the six teachers referred to industry partnerships and connections as important in the career awareness and professional development of their students. One specifically referenced the principal's active pursuit of local business partners as helpful.

3) One of the most notable differences between MNTH and more traditional comprehensive high schools is the **extensive, year-round professional development that teachers undergo**. A typical MNTH teacher participated in a range of 150 – 174 hours of professional development over a 12 month period. Figure 5 provides a table of the amount and kinds of professional development offered to teachers at MNTH. In essence, the professional development contributes toward skills in teaching and assessing their content area and use of expected planning and instructional strategies such as PBL and toward building strong relationships among the faculty.

1. **Skill Development:**

> ***The coolest part of working here is that in a comprehensive school we talk about analyzing our strategies, here we do it.***
> *– from interviews*

a. *Weekly Professional Development:* Often taking place during Monday late morning start, the Teacher Advancement Program (TAP) meetings included both *Cluster Meetings* and *Critical Friends*. Interviewed teachers who were new to PBL also found that Master Teachers were critical to their success and sense of confidence. TAP Master Teachers are full time in their professional support of classroom faculty. Three teachers also stated that weekly access to the *New Tech Coach* helped them to strategize and trouble shoot instructional issues and classroom management.

b. *Year Round Professional Development*: Teachers are expected to undergo summer professional development and are also partially compensated for it. The mandatory summer professional development is the All Schools Conference held for all New Tech High Schools. Both surveyed and interviewed teachers ranked this particular professional development of greatest value. Those who ranked it first, noted that at the All Schools conference, teachers from around the country were sharing PBL approaches in core subject areas without having to spend the first half of any work shop convincing their audience of the value of PBL. Without having to listen to the pitch, teachers could get into a lot more detail about classroom activities, planning processes, grading structures that worked in mathematics, in English Language Arts, in Social Studies and in Science.

> ***Here we are all each other's mentors. We request workshops from each other just like a student would request a workshop.***
> *– from interviews*

2. **Relationship Building**

a. *On-Demand Professional Development:* The structure of the Teacher Advancement Program requires the availability of mentor and master teachers to address problems that arise weekly and--at times--, daily.

b. *Paired-Teacher Model:* When asked whom they most valued and turned to for professional support, the majority of surveyed teachers responded with "my co-teacher." Follow-up interviews revealed that teachers constantly referred to the co-teacher as integral to their planning and implementation of classroom projects and an essential "sounding board."

Figure 5: Breakdown of Teacher Professional Development

Typical Number of PD hours per year	174	Description
36 (1 hr week) faculty in Critical Friends & cluster meetings	72	Teacher Advancement Program
24 Staff Development (district)	24	Varied
18 coaching (average NT coach 30 minutes a week)	18	New Tech Model
24 (conference attendance)	24	All Schools Conference + subject specific conference such as CAST
36 (1 hr week) new teacher training	36	

Teacher Agency

At MNTH, faculty described a strong sense of community and camaraderie that they believed arose in part from the strong support they received in their work. When asked about what they valued most in the survey about working at MNTH, 5 of 19 teachers specifically talked about the culture, while an additional 5 stated their "peers" and fellow teachers or the "collaboration" among peers. This **culture of high expectations in learning and in teaching** characterized the interactions at MNTH in faculty-faculty interactions, faculty-student interactions, and – less consistently – in student-student interactions. The concept of culture is defined by Richard Elmore as the instructional core and is more difficult to quantify, but considered a critical factor in school success. School improvement, according to Elmore, occurs through improving the instructional core or "increasing teacher's knowledge of content and how to connect that content to specific students, by increasing the pre-requisite knowledge that students bring to their interactions with teachers and by deepening their own knowledge of themselves as learners."[21]

In fact, teachers in both the surveys and interviews used language such as "empowered," "more effective," "successful in my work" as very important and contributing toward a sense of being able to get what they needed done to reach the students. Still additional factors were also mentioned.

> ***If my kids graduate and they are not college and career ready, that's on me.***
> *– from interviews*

1. ***Group Dynamic in Goal Setting:*** Teachers play an active role in setting MNTH's annual goals and in clarifying and extending its mission. In addition, teachers felt a greater sense of responsibility toward meeting those goals for their students. Elmore argues such a sense of agency leads toward a school-wide "internal accountability", that is, all faculty work at the same level of expectation for student outcomes as well as their own role or responsibility in ensuring students meet these expectations. Again, as Richard Elmore notes: "The ability of a school to make improvements has to do with the beliefs, norms, expectations, and practices that people in the organization share, not with the kind of information they receive about their performance."[22]

2. ***Strong Communication*:** Most teachers interviewed noted that MNTH varied significantly from other high schools in their experience because of the openness and frequency of communication among faculty and staff. Teachers felt their input was valued by both peers and leadership contributing to sense of mutual commitment and mission about Manor New Tech High. Further, some teachers described the transparency in communication with students that resulted in increased levels of trust students felt. One teacher noted that, while she did not think that teachers were more caring at MNTH, students perceived that they cared more about them and knew more about them than their counterparts in traditional high school settings. In the surveys, another teacher noted that while collaboration among faculty was strong, that communication still needed improvement among staff and between faculty and students.

3. ***Modeling work ethic:*** As both an asset and a challenge, teachers in both interviews and surveys pointed out the exceptional work load that they face at MNTH even with smaller class sizes. Veteran teachers new to the MNTH environment observed that they felt like brand-new teachers in their facing the requirements of PBL and the use of technology and hours spent beyond instructional time planning and revising projects for their classes.

4. ***Dedicated, creative faculty*:** Teachers repeatedly referred to a strong sense of community and, more importantly, of a *community of mentors*. At any given time, because of the frequency of faculty meetings, teachers knew who they could seek out to answer specific questions about instruction (content or strategy). Survey responses showed that over half the faculty valued most their peers and the innovative thinking they demonstrated.

Teachers overwhelmingly emphasized the positive environment they experienced and they perceived their students experienced at MNTH; however, not surprisingly, the school was not without its challenges.

> *[I value most] the students, my colleagues, the environment, the philosophy, and the freedom to teach "outside the box" -- together these make me feel complete as a teacher and successful at what I do.*
> -- *from surveys*

Teacher Challenges

Manor New Tech High's "sophomore" year saw challenges that, according to teachers, were both typical of any school and also unique to the New Tech Model. Chief among the latter was the **immense workload** felt by teachers in preparing content with the PBL instructional approach. All interviewed teachers noted the workload and two of the six specifically commented that teachers "looked for signs of burn out" among their peers as a result. There were a few instances where teachers were encouraged to take time off in order to regroup. The downside to such a heavy workload is both **burnout** and, potentially, **high turnover**. It is important to note that MNTH had no turnover in faculty, staff or administrators from the 2008-2009 to the 2009-2010 school year.

A second challenge identified by teachers that also is unique to newly-launched, innovative schools was a **perception in the district that MNTH took the best students and therefore left a brain drain at Manor High School.** Teachers did not claim that there was a direct impact on teacher effectiveness. However, they were concerned about district and parent morale and support of MNTH. Although there were demographic differences across the two campuses, too many variables such as school size, type of faculty, implementation of PBL or any of the other practices mentioned above, could result in disparities in student performance across the two campuses. Still, for dynamics within the district, this perception remains a challenge.

A third issue identified by teachers as a challenge for them and a benefit for students was **the trimester system**. The trimester system allows students to take more courses during their four years of high school. However, it requires that teachers completely cover course curricula within less time than in a traditional semester system. Teachers felt added pressure for MNTH to find a balance between PBL and direct instruction.

Perhaps the most prevalent issue and most common to secondary schools in high needs districts was the recognition that MNTH students are still teenagers from backgrounds that often lead to complicated lives. As a result, students entered MNTH **lacking key foundational knowledge** in core subjects such as math and science, and had **trouble adjusting to an ethic in which they were "agents in their own learning."** Not surprisingly when surveyed on perceptions of student performance, there was variation in teacher responses with half of the teachers responding that they felt students "performed competently" in the MNTH environment. Others noted a large proportion of students (median 28%) were either just "getting by" or "struggling."

A further complication identified in two interviews was that for some students, increased input into classroom projects and strategies led to a **sense of entitlement** – and occasionally resulted in classroom management challenges when their recommendations were not followed.

These challenges notwithstanding, the findings from site visits, surveys and interviews suggest that MNTH is implementing a model of high school redesign that is leading toward both student and teacher success. It is too soon to measure the long term results, and we would welcome the opportunity to validate these observations through additional research.

Given these parameters, the following section describes three practices drawn from these findings that show promise in application to traditional high school settings. Why does this application matter so much? Because the majority of school districts across Central Texas (and the nation) lack the resources to scrap the traditional comprehensive high school model altogether – and instead are looking for systemic adaptations that can lead to improved teacher effectiveness and higher levels of student achievement.

Selected Practices for Application in Comprehensive High School Setting

Noted high school redesign researcher and consultant, Bob Pearlman, observes in his *Best Practices Description of the Transformation of North Eugene High School* into smaller learning communities that:

Large high school conversion requires design, implementation and effective change management to bring about successful small schools in addition to district leadership and support and effective small school leadership.[23]

In reviewing literature in high school reform, researchers repeatedly find that near term positive outcomes are more likely when launching a brand new school like Manor New Tech High than through redesigning existing under-performing schools.[24] A study by the American Institutes for Research and SRI International found that positive outcomes are more likely in new schools, in part, because older schools focus first on structural changes rather than addressing teacher instruction.[25] Further, recent longitudinal research into New York City's Small Schools Initiative found limited success in the smaller school settings and detrimental consequences for the remaining comprehensive high schools.[26]

In selecting three practices from the many possible options identified in our findings, we filtered our candidates through the following set of criteria.

1. Did a majority of teachers (both surveyed and interviewed) identify this practice as connected to teacher or student success?
2. Was there evidence (either as described through survey answers or interviews or through a review of literature) that suggests the practice leads to teacher agency or improved student outcomes?
3. Are there examples where similar practices have been undertaken successfully at traditional comprehensive high schools?
4. Can the planning and implementation of these practices occur in a timely manner without exhausting available district or school resources?

Finally, these selected practices draw upon Richard Elmore's three principles to improving performance discussed in the literature review and target *what happens in the classroom for both teacher and student*. As a result, the recommendations identified below center on increasing student engagement through PBL and strengthening support for teachers' work.

We hypothesize that increasing student engagement and support for teachers' work will increase both student and teacher agency leading to improved overall student achievement. We recommend that comprehensive high schools:

1) Adopt Project Based Learning strategies in core courses beginning in 9th grade
2) Provide extensive professional development to teachers in PBL throughout the calendar year. Offer professional development to administrators in developing school structures to support PBL
3) Restructure the school schedule to allow for weekly common planning periods and focused teacher interactions

1. Adopt Project Based Learning Strategies in core courses beginning in 9th grade. In 1996, Linda Darling Hammond published a seminal report based on longitudinal research that found quality teaching was paramount to student success. In part, her study claimed that such teachers were not identified by any specific set of credentials but instead by their ability to adapt their teaching to student learning styles and to create classroom environments that were interactive and engaging.[27] It is important to note that this report predates the proliferation of PBL as an established instructional model, however the principles of student engagement and agency in learning that guide PBL are the same foundational characteristics described by Darling-Hammond.

Further, PBL need not be situated solely in STEM-related classes. Indeed, as one of our non-STEM teachers interviewed noted of her classroom, "Students must become independent learners – teachers help to guide, remove barriers, and do not hold their hands. [The approach] helps students to build their ability to "question" and to pinpoint the important questions."

Follow up Research Questions in PBL:

1. How much does MNTH faculty's close attention and emphasis on PBL affect student engagement and agency as compared to their peers at a traditional comprehensive high school?
2. Does PBL address challenges to "sufficient instructional time," a factor often cited when explaining low student performance?
3. What is the relationship between student engagement and agency and student achievement?

2. Provide extensive professional development to teachers in PBL throughout the calendar year. Offer professional development to administrators in developing school structures to support PBL.

One underlying theme that teachers at MNTH either implied or explicitly stated was the level of support they had and *needed* in creating PBL-based classes. One veteran teacher interviewed stated that when he came to MNTH, he felt like a first year teacher all over again. For many teachers Project Based Learning requires not only a shift in how they teach but also requires rebuilding WHAT they teach. For core subjects in the state of Texas, the learning objectives within specific grades may remain the same, but to create projects that apply these concepts in real-world settings takes a high level of knowledge in pedagogy, in content and an awareness of industry-uses for these concepts. Four of the six interviewed teachers noted that having full time master teachers and instructional coaches readily available on any given day to help troubleshoot or work through project planning contributed greatly to their sense of efficacy and comfort in taking on this new way of teaching.

Bob Pearlman notes in his work in high school reform that school leadership well-versed in change management and in implementing strategies that support changes to organizational culture. School principals and administrators may well require professional development to build these particular skills.

3. Restructure the school master schedule to allow for weekly common planning periods and focused teacher interactions.

The challenge to the type of extensive professional development described above for traditional comprehensive high schools is having school structures that directly support teacher work and professional development in PBL. Specifically, MNTH used Monday late start as the foundation consistently and continually throughout the year. The time allotted allowed teachers to share concepts and lesson plans with their peers for feedback, and ongoing support occurred through cluster meetings.

In a school of just over 200 students such structures are more easily implemented. Traditional comprehensive high schools may opt to offer changes to the traditional faculty meeting that allow for common planning periods and frequent review and problem solving of PBL challenges. The instructional coach model was instrumental to the sense of teacher efficacy at MNTH. But this support is only beginning to emerge at comprehensive high school campuses. Note that a faculty of 22 at MNTH had two full-time master teachers in addition to access to instructional coaches to support various components of the New Tech Model.

Follow Up Research Questions for teacher professional development and school structure modifications

1. How does the leadership in a traditional comprehensive high school provide ongoing professional development and common planning time for teachers throughout the school year?
2. What central administration supports enable these approaches?
3. What is the relationship between this ongoing professional development in PBL and teacher agency?
4. How does MNTH student performance fare relative to comparable T-STEM academies launched in the same year? What differences, if any, exist between T-STEM models that are stand alone versus "schools within schools?"

Closing Remarks

Throughout the surveys and interviews, many teachers noted that MNTH is in the spotlight as a model that can make a difference in student achievement – in particular, for those students who have traditionally struggled in education. This report offers suggestions of practices emerging as contenders in contributing to teacher and student agency – to a sense of personal responsibility and commitment both in teaching and in learning.

The 2009-2010 school year marks the first senior class at MNTH, and with it will come renewed attention to the school's commitment by both faculty and stakeholders to graduate all of its students college and career ready. This aspiration tempered by inspiration would be a testament to the school's community were they to achieve it.

At the end of the day, the seismic shifts in education underway at the state and federal levels register only if the interactions in the classrooms engage, challenge and empower students to learn. At Manor New Tech High, the challenges are substantial, the progress measurable, and – from the perspective of the teachers – the rewards ample. To paraphrase the words of the great poet, Khalil Gibran, "The Teacher is wise …who gives not of his wisdom… but leads you to the threshold of your own mind."

Appendix A: On-Line Survey Administered to MNTH Faculty, April 2009

Have you had a career before teaching?
Name up to three careers that you have worked in before becoming a teacher.
Has (have) your previous career(s) contributed toward your preparation or ability to teach?
If so, please describe how your previous career(s) has (have) contributed to your preparation or ability to teach.
How many years have you taught, including this year?
How many years have you been certified to teach? (Please count from your first certification onward and include this year.)
Please list up to six TEXAS certification(s) in teaching, supervision or counseling that you currently hold. For each certification, name the SUBJECT AREA (or enter "supervision" or "counseling") and GRADE LEVEL. Please mark any provisional or emergency certifications with an asterisk.
Do you hold any out-of-state teaching, supervision, or counseling certifications?
If you currently hold OUT-OF-STATE educator certification(s), please list each. Include the STATE, the SUBJECT AREA (or enter "supervision" or "counseling") and the GRADE LEVEL. Please do not include provisional or emergency certifications.
When did you start teaching at MNTH?
What is the main reason that you accepted a position here at MNTH?
What SUBJECT AREAS do you teach this year at MNTH?
Please name or list up to eight topics of PROFESSIONAL DEVELOPMENT that you have received in the last year. Include professional development during the summer of 2008, during late start days, and that occurred off-campus.
Which of the professional development topics named above do you consider the most essential to teaching MNTH students? If none of the professional development you named were essential, please enter "None" for your answer.
Explain how this particular professional development topic contributes to teaching MNTH students. (If you answered "None", please skip this question.)
In your opinion, what percentage of MNTH students fit the following descriptions of LEARNERS?
If you entered a percentage for "Other" in the question above, please describe:
Name or list up to eight INSTRUCTIONAL PRACTICES that you use at MNTH to engage your students. Based on your experience, please list these practices in order of effectiveness, listing the most effective practice first, the second most effective practice second, and so on.
Who is your most supportive colleague at MNTH?
In what ways has he or she been supportive?
What, in your opinion, makes this school a NEW TECH high school?
What do you value the most about working at MNTH?
Explain WHY the aspect you named above is to valuable to you.
This ends the on-line survey. If there is anything else on which you would like to describe or elaborate, please do so below.
If you would like to receive a copy of the written report based, in part, on this survey, please enter your e-mail address below:

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[16] Texas Education Agency's Academic Excellence Indicator Systems (AEIS) reports 2003-2004 and 2007-2008. http://ritter.tea.state.tx.us/perfreport/aeis/
[17] Texas Education Agency developed the "comparison group" model as a way for districts to compare their performance to districts with similar demographic characteristics. The group is comprised of 40 schools that share similar demographics on 6 characteristics: % African American students enrolled, % Hispanic students enrolled, % White students enrolled, % economically disadvantaged students enrolled, % of mobile students as determined from previous years cumulative attendance and % English Language Learners enrolled. While schools are grouped in this manner, districts are not. Data retrieved on April 21, 2009 from http://ritter.tea.state.tx.us/perfreport/ci/2008/index.html.
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