



Case Study of Manor New Tech High School: Promising Practices for Comprehensive High Schools

Introduction

The following paper culminates a year of research sponsored by the National Science Foundation (NSF) 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 Texas State University and The University of Texas at Austin. MNTHS follows several high school redesign principles such as smaller 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.***

III) Manor New Tech High Overview

MNTHS launched in the 2007-2008 school year. 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. In addition to the New Tech Model, MNTH implements: *Project Lead the Way*, *Teacher Advancement Program (TAP)*, *FIRST Robotics*, *Bob Pearlman Small School Consulting* and *Apple Classrooms of Tomorrow-Today (ACOT²)*

2008-2009 10th graders of MNTH increased passing rates on English Language Arts (Reading in 9th grade) and Mathematics. 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. White students saw small declines in passing rates in Science.

VI) Findings from Survey and Interviews

The teachers at MNTH have certain unique qualities that distinguish them from typical comprehensive high school teachers. Of the 22 faculty, 9 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.

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

Four overarching themes emerged from the data that contribute toward both a culture of high expectations for teaching and learning and an environment supporting improved student outcomes:

- **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.

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Student Engagement	Student Agency	Support for Teachers' Work	Teacher Agency
Project Based Learning (PBL)	Teacher/Student transparency	School Structures	Group dynamic in goal setting
Small group workshops	Peer Learning	Monday Late Start	Strong Communication
Project-based Inquiry	Professional Skills	Small School Environment	Modeling Work Ethic
Entry documents	Participation in class decision making	Ubiquitous Technology	Dedicate, creative faculty
Project Reflections		Strong Campus Leadership	
All School Meetings		Support for innovation	
Cross-discipline projects		Participation in school mission and goal setting	
Project Lead the Way		School-industry partnership development	
Integrated Technology		Professional Development	
		Skill Development (weekly PD, Year-round PD)	
		Relationship Building (On-demand PD, Paired Teacher Model)	

Selected Practices for Application in Comprehensive High School Setting

We contend 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. Adopting Project Based Learning Strategies in core courses beginning in 9th grade.

In 1996, Linda Darling Hammond published a report that found quality teaching was paramount to student success. 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.¹ Although this report predates the proliferation of PBL as an established instructional model, the principles of student engagement and agency in learning that guide PBL are the same foundational characteristics described by Darling-Hammond.

PBL need not be situated solely in STEM-related classes. 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."

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. 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.

Essential to supporting these instructional changes is a school leadership well-versed in change management and in implementing appropriate support structures. School principals and administrators may well require professional development to build these particular skills. A faculty of 22 at MNTH had two full-time master teachers and instructional coaches to support for various components of the New Tech Model.

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

School structures must be in place to enable teachers to apply their professional development such as "Monday Late Start" to instructional coaches and master teachers.

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



Guided by an objective data map and a clear community vision, we propose to better align the system components and practices of our regional education system and allocate our investments and services more efficiently to dramatically and sustainably increase educational outcomes within a decade. By doing so, we can increase our global competitiveness and the economic vitality and overall quality of life in our region.

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¹ Darling-Hammond, Linda. (1996) What Matters Most: Teaching for America's Future – Report of the National Commission on Teaching and America's Future.

The full document of: Case Study of Manor New Tech High School: Promising Practices for Comprehensive High Schools can be found at: <http://www.theblueprintforeducationalchange.org/Media/wp-mnth-110409.pdf>