



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

Food For Thought Luncheon
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Hosted by



Hannah Gourgey www.e3alliance.org

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What is the E³ Alliance?

A regional collaborative to increase economic outcomes
by aligning our education systems
to better fulfill the potential of every citizen.

- The P-16 Council of Central Texas
- A catalyst for *systemic change* in the region



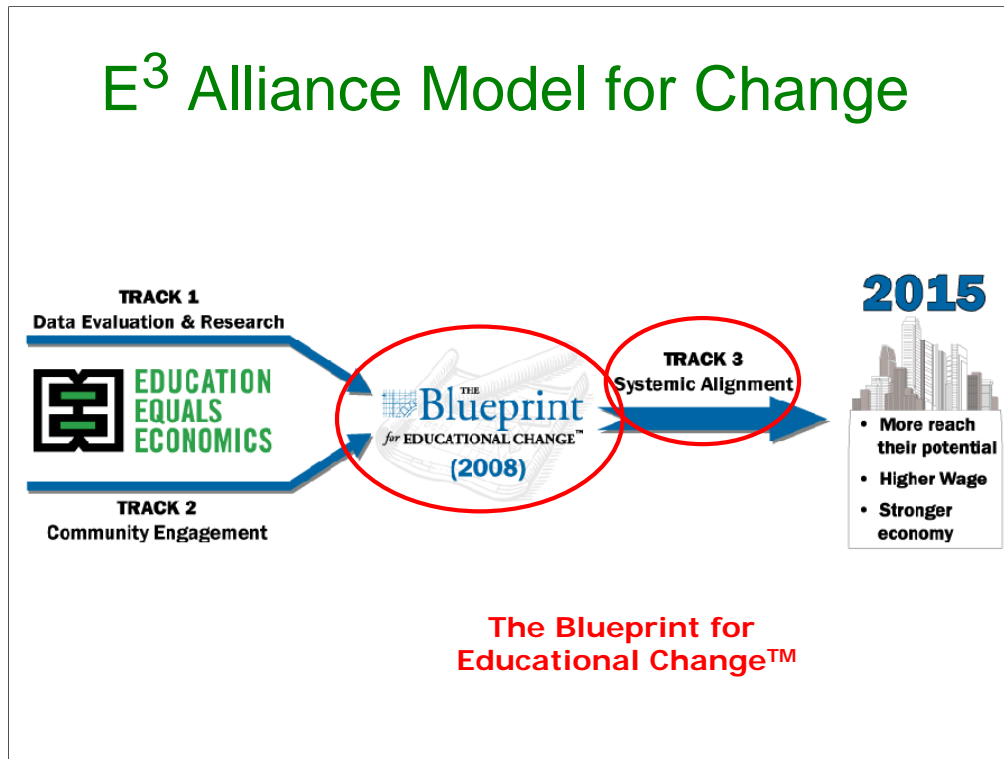
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Goal is a regional project, not a state or national level.

The E3 Alliance was Launched in end of May 2006 by founding partners AARO, ACC & UT.

Replicable model – actively working with other regions

E³ Alliance Model for Change



The E3 Alliance was Launched in end of May 2006 by founding partners AARO, ACC & UT.

E3 Alliance is A regional collaborative to create a research-based “blueprint” to align our education systems to better fulfill the potential of every citizen and in turn, increase economic outcomes and build a stronger economic future for our region.

Based on research of what’s worked and what hasn’t from around the country, the E3 Alliance adopted this model for systemic change that combines a focus on objective data evaluation and research to objectively determine the best leverage points and investments with broad and deep engagement of the community around change to create systemic alignment and drastically higher outcomes.

History of the Blueprint

- Based on 2 years of research and thousands of hours of engaging the community
- Brought together 150 business CEO's, college presidents, community and education leaders to set priority goals
- Developed an unprecedented, comprehensive strategic plan
- Includes priority goals, indicators and targets, partners, action strategies, going forward



The Blueprint is the most comprehensive plan ever developed for a Texas region
It is based on data never before available

And entails collaborations with districts, colleges, and community partners
throughout Central Texas

 **THE Blueprint**
for EDUCATIONAL CHANGE™



**Central Texas' Strategic Plan
to build the strongest education pipeline
in the country**

History of the Central Texas Engineering Education Collaborative

- Engineering/Comp Science 2nd highest demand occupation – yet many barriers to success
- Determined a regional collaborative including districts, IHES, Community and Industry Partners needed to address issues
- Regional NSF grant for expanded pipeline
- Organized network of PLTW programs, 12 High Schools in 10 Districts
- Developed articulated college credit (*first in state!*) for HS engineering students
- As a result of these and specific district efforts....



Goal 3: Students Graduate College- and-Career Ready and Prepared for a Lifetime of Learning

This is an example where the E3 Alliance has been working with regional partners, supported by [KDK Harman](#) Foundation, to build a stronger pipeline to high demand, high paying jobs. It's now part of the Blueprint!

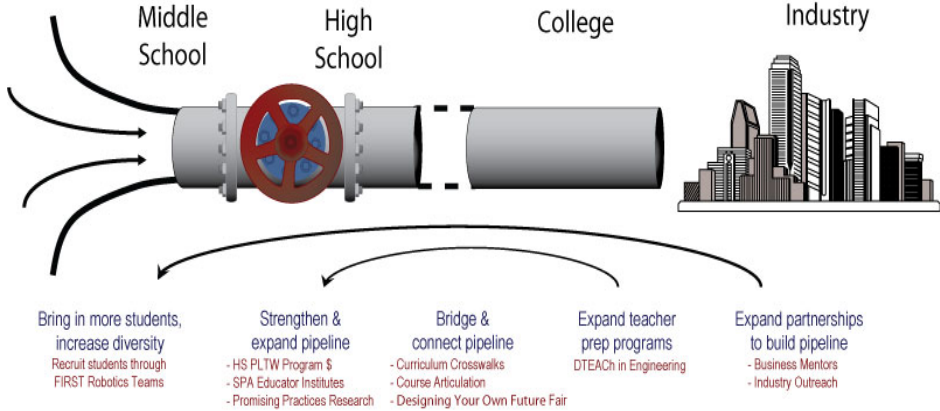
Engineering/computer science is the second highest demand profession in the region, with high paying jobs even in a down economy. And we have students throughout the region taking a nationally-accredited high quality engineering curriculum in high school. But we don't make it easy for them! Currently, even their most advanced engineering courses don't count for core credit in math or science. And even though some of the best schools in the country – Duke, Purdue, and Rochester Institute of Technology – offer them college credit, no college in the state of Texas has ever done so.

So we brought the players to the table to strengthen the pipeline. We built a network of the 12 high schools in 10 districts across the region that offer Project Lead The Way engineering programs. We worked with area colleges to offer students *the first opportunities in the history of the state* to obtain articulated college credit in high school for these courses! **Why Not?** It's really important because data from the [Ray Marshall Center](#) says that those students who have even one college credit in high school are more than twice as likely to go on to Higher Ed!

The numbers speak for themselves (1416 ->2150), 52% increase.

And last fall we were able to announce a collaborative [Natl. Science Foundation](#) grant for the region with the E3 Alliance, partner [SkillPoint Alliance](#), and ten districts with current or emerging engineering programs. It supports teacher professional development, recruiting middle school students into the STEM pipeline, and the first STEM college and career fair for students from across the region. And, so far as we know, the research team looking at lessons learned from Manor New Tech High will be the first time ever that [UT](#), [Texas State](#), and [ACC](#) have worked together on a collaborative research project! *Many firsts are being made to build a stronger pipeline for our students and our employers!*

Architecture of CTEEC



CTEEC Partners:

School Districts: Austin ISD, Georgetown ISD, Hays CISD, Lake Travis ISD, Leander ISD, Manor ISD, Pflugerville ISD, Round Rock ISD, Waco ISD, Wimberley ISD

College & University Partners: Austin Community College, Texas State University, Texas Tech University, The University of Texas at Austin

Community and Industry Partners: National Instruments, Skillpoint Alliance

PLTW Enrollment Grew 70% in 3 Years

School Year	Central Texas PLTW Enrollment
Total Enrollment 2007-2008	1416
Total Enrollment 2008-2009	2105
Total Enrollment 2009-2010	~2410



CTEEC's Inaugural Year A Big Success In....

- ✓ *116 middle school students from diverse backgrounds experienced robotics competitions with many new industry mentors for their teams*
- ✓ *124 high school students participated in a full-day engineering academy at Texas State*
- ✓ *40% of these students were young women*
- ✓ *64 middle and high school STEM teachers received Professional Development through PLTW, Skillpoint Alliance's Educator Institutes, UT's DTEACH and UTeach ESIT programs*



MNTH Report Discussion

- Research Questions
- Methodology
- Context
 - Manor ISD
 - MNTH Demographics
- Findings
 - Student Engagement
 - Student Agency
 - Support for Teachers Work
 - Teacher Agency
- Preliminary Recommendations & Suggested Further Research
- Questions & Answers



Research Project at Manor New Tech High School

- What are promising practices from Manor New Tech High School (MNTH) that have potential for implementation at traditional high schools?
- What are the advantages to these promising practices?

Co-Principal Investigators: Bahram Asiabanpour, Ph.D., Texas State and Richard Crawford, Ph.D. The University of Texas at Austin

Contributors: Carol Fenimore, Ed.D., E3 Alliance, Anthony Grasso, Karen Herbert



Methodology

- Small scope, blended methodology:
 - surveys, interviews, observations and student performance data
- Recent launch of MNTH limited longitudinal student performance research
 - Performance on state standardized tests
 - Performance relative to Texas Education Agency's Comparison Group
- All findings are preliminary and suggestive of further research



Context: Manor ISD

- 2004-2008 Manor ISD increased its overall student population by 80%
- Close to 70% of Manor students qualify for Free & Reduced Lunch
- The District's English Language Learner population grew 144%



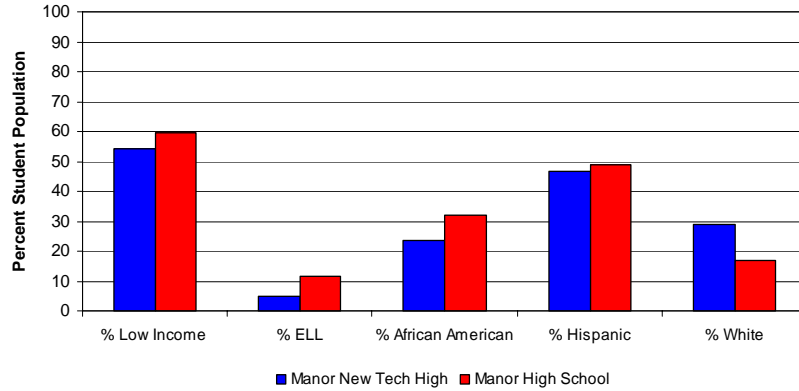
Context: Manor New Tech High School

- New Small School launched in 2007-2008
- Modeled on High Tech High and as a T-STEM academy (through THSP) with integrated technology in every classroom
- Aspired to 12 college credits by hs graduation
- MNTH implements several other programs: PLTW, TAP, FIRST Robotics, ACOT²
- Faculty of 22 with 5 additional staff including administration
- Total number of students in 2008-2009 school year = 212



Manor New Tech High School Student Population Differs from Manor High

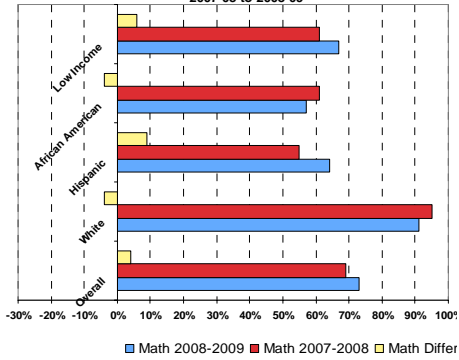
Demographic Differences Between Manor New Tech High and Manor High School 2007-2008



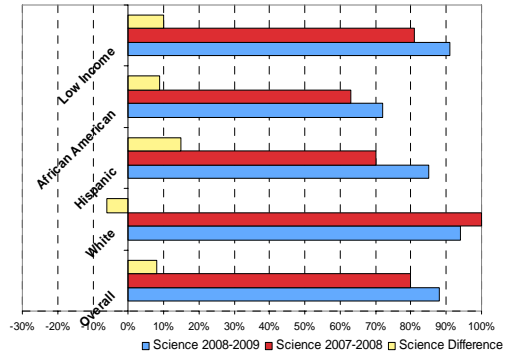
Source: E3 Alliance Analysis of TEA AEIS data, Manor New Tech High Case Study, 2009

Student Performance Shows Overall Improvement with Notable Exceptions

MNTH Student Performance on Math Comparison
2007-08 to 2008-09



MNTH Student Performance in Science 07-08 & 08-09



Source: E3 Alliance Analysis of TEA AEIS data, Manor New Tech High Case Study, 2009

Findings: Four Key Themes

- **Student Engagement:** level of connection, interaction, and learning students demonstrate in classroom projects and activities
- **Student Agency:** 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:** 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:** high autonomy in the design and implementation of classroom projects, strong classroom management, improved instructional strategies, systematizes processes



Student Engagement

Student Engagement
Project Based Learning (PBL)
Small group workshops
Project-based Inquiry
Entry documents
Project Reflections
All School Meetings
Cross-discipline projects
Project Lead the Way
Integrated Technology

*[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.*



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.

“**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.

“**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.

“**project reflections**” were important in providing the necessary *post mortem* by students on their own team effort.

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.

Weekly **all-school meetings** were also mentioned as a way to create a sense of community among the students and faculty.

A third practice that teachers identified as a factor in student engagement was the **practice of integrating projects and grades across subject areas**. *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. *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.

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. 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*.

use of technology in a classroom. *1:1 ratio of student to networked computer*. However access to technology does not imply effective use. Specifically, teachers found that students responded to:

Visual learning strategies used with technology including video, YouTube, Internet Research.

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

Extended access to teachers and peers through text messaging, twitter, and email.

Student Agency

Student Agency	Teacher Perceptions of Student Performance	Median	Range
Teacher/Student transparency	Thriving	23%	10%-70%
Peer Learning	Performing Competently	50%	0-65%
	Getting By	18%	0-30%
Professional Skills	Struggling	10%	4-70%
Participation in class decision making	Other	10%	4%-70%



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

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.

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*.


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

Support for Teachers' Work
School Structures
Monday Late Start
Small School Environment
Ubiquitous Technology
Strong Campus Leadership
Support for innovation
Participation in school mission and goal setting
School-industry partnership development
Professional Development
Skill Development (weekly PD, Year-round PD)
Relationship Building (On-demand PD, Paired Teacher Model)

The coolest part of working here is that in a comprehensive school we talk about analyzing our strategies, here we do it

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



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.**

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:

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. 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.

Small School Environment: 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.

Ubiquitous Technology: it was a valuable asset in PBL, classroom management, and maintaining teacher/student transparency. Allowed for customization of student projects to match student skills and learning styles.

strong leadership.

Support for innovation: 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.

Participating in school mission and goal setting: 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.

Actively seeking school-industry partnerships: 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.

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	



extensive, year-round professional development that teachers undergo.

Content and pedagogy

Skill Development:

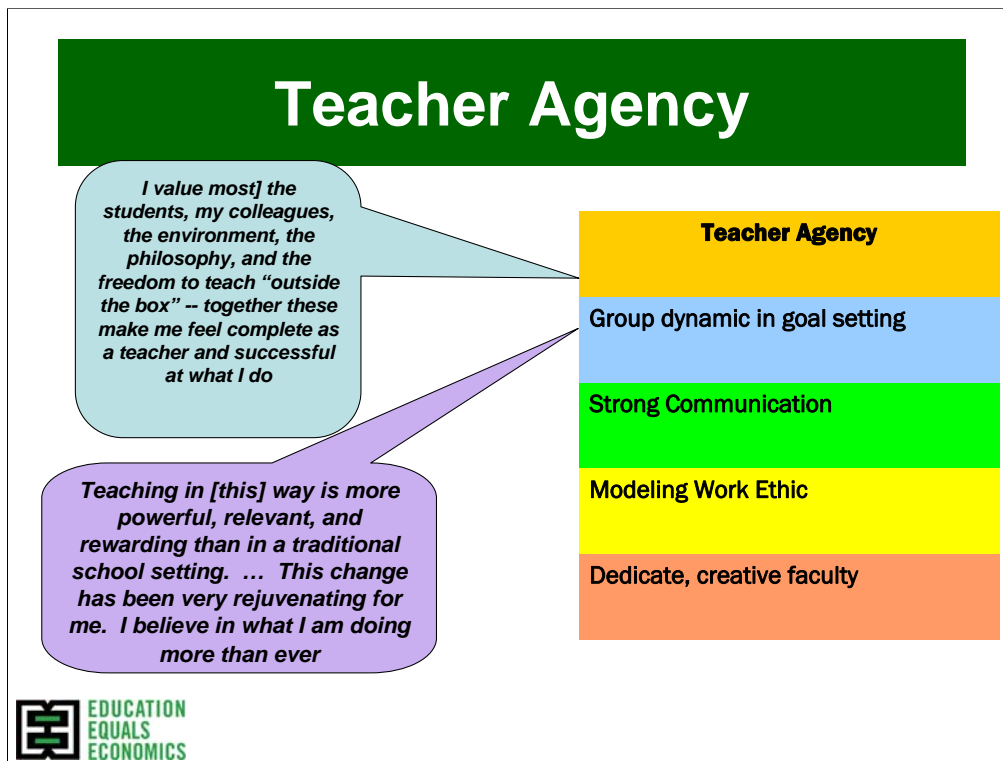
Weekly Professional Development: Often taking place during Monday late morning start, the Teacher Advancement Program (TAP) meetings included both *Cluster Meetings* and *Critical Friends*. Ongoing access to master teachers, new tech coaches essential

Year Round Professional Development: Teachers are expected to undergo summer professional development and are also partially compensated for it. All Schools Conference

Relationship Building

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

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



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

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 student.."ii

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 resulted in increased levels of trust students felt. 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.

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.

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.

Challenges at MNTH

- Immense Workload
 - Concerns about burn out & turnover
- Perception of Selectivity with Students
- Trimester System
 - Good for students, hard for teachers to cover all TEKS in 2 trimesters
- Students' Foundational Skills
 - Unfamiliar with culture of taking responsibility for learning
 - Core Math, Science, English skills lacking



Selected Practices: Criteria

- Did a majority of teachers (both surveyed and interviewed) identify this practice as connected to teacher or student success?
- 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?
- Are there examples where similar practices have been undertaken successfully at traditional comprehensive high schools?
- Can the planning and implementation of these practices occur in a timely manner without exhausting available district or school resources?



Preliminary Recommendations

- Adopt **Project-Based Learning Strategies** in Core Courses beginning in 9th Grade
- Provide extensive **PD for teachers** in PBL
- Offer **PD to administrators** in developing school structures to support PBL
- Restructure School Master Schedule to allow for **weekly common planning time & focused teacher interactions**



PBL

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.^[i] 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

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

PD teachers and administrators

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.

Adjust Master schedule to allow for weekly common planning periods

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 and instructional coaches to support for various components of the New Tech Model

Further Research Directions

- Longitudinal study of individual student performance overtime, in comparison to T-STEM academies launched the same year
- PBL relationship to student engagement (in comparison to their peers at a traditional comprehensive high school)
- Relationship between school leadership and teacher agency
- Relationship between teacher agency & student performance



Further Research Directions

- Relationship between on-going professional development and teacher agency
- Relationship between school structures and teacher agency
- Considerations when applying PBL instructional strategy in an existing school versus a newly-launched school



Questions?

- Special Thanks to the **Teachers at MNHT**, to **Steven Zipkes** and **Manor ISD leadership** for supporting our research, to the **Dana Center**, to the wonderful **E3 Staff and Grad Students: Carol Fenimore, Tony Grasso and Karen Herbert**

- And to  **ROUND ROCK**   

