Education’s Perfect Storm: A Case Study of the Transformation of Worcester Technical High School

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Abstract

The purpose of this case study is to investigate how a low performing urban vocational technical high school transformed to become a national model for vocational technical education. Distributive Leadership and Organizational Change Theory are the two theories that informed the design and analysis of the case study. In addition, a literature review of vocational education and school change is also provided to inform the study. The research questions are as follows: (1) How did Worcester Technical High School become a high performing school?; (2) How did leadership in the school contribute to this school becoming a high performing school?; and (3) What strategies and use of resources were particularly valuable in the improvement of the school? A case study approach was used to identify and describe, as perceived by the principal, faculty, and school partners, key factors that led and contributed to the transformation of Worcester Technical High School. It is evident that the move into a new state-of-the-art learning facility in tandem with a new leader has led to a new vision and culture of the school. Through a collaborative leadership approach with staff, business, and higher education partners, students are in a personalized learning environment graduating college and career ready. The identification and analysis of these themes are presented to potentially inform other low-performing schools regarding strategies, practices, and the identification and use of resources to improve student outcomes.

Keywords: vocational technical education, school improvement, leadership, transformation, business expectations, career readiness
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Chapter I: Introduction

Problem of Practice

America’s public education system is critical to our economy and is also the foundation of our democratic rights and freedoms (National Task Force on Public Education, 2005, p. i). The educational system came of age at the beginning of the last century, amid an enormous growth in population and a changing economy. Early 20th century America saw the evolution of an agrarian society, to the advent of the industrialized economy, and a massive influx of immigrants (Cuban, 1990). One hundred years later, America faces a newly globalized economy, rapidly changing demographics, and a lingering and dangerous achievement gap for minority and poor students that continues to sap America’s strength by failing to give all children the tools they require to become the highly skilled workforce and engaged citizenry our country needs (National Task Force on Public Education, 2005, p. iii).

The growing diversity of the United States’ workforce has profound implications for the future shape of the economy, and the challenges facing our education system (Massachusetts Business Alliance for Education, 2006). According to Preparing for the Future: Employer Perspective on Work Readiness Skills (2006), drastic demographic changes are altering the United States’ working population. The racial and ethnic groups with the least education are experiencing the greatest growth in the United States (Massachusetts Business Alliance for Education, 2006, p. 4). According to the National Center for Higher Education Management Systems (2005), in the forty-year span from 1980-2020, the working age white population will decrease from 82% to 63%, while the percentage of minority workers will increase from 18% to 37%. It goes on to state the Latino working population alone will become three times larger,
growing from 6% to 17%. Raising the education level of these populations is essential for sustaining a competitive economy.

Compounding the problem, industry expectations are rapidly changing. In 1973, 72% of the nation’s workforce was composed of people with a high school education or less. During this time, almost one third of the nation’s 91 million workers were high school dropouts (Harvard Graduate School of Education, 2011). Manufacturing was the leading industry and it was possible for those with less education, but with a strong work ethic, to earn a middle-class wage (Pioneer Institute, 2008). Present industry expectations suggest that education below a high school diploma will no longer be sufficient to provide middle-class income.

Presently, employers are seeking employees that are equipped with 21st century skills. In this global economy, this workforce requires people to be problem solvers, have the ability to work in groups, think critically and incorporate technology (Brown, et al., 2005; Massachusetts Business Alliance for Education, 2008; Partnership for 21st Century Skills, 2010). Education beyond a high school level is being demanded and companies are seeking college graduates and/or candidates with specialized training (Fraser, 2008; Harvard Graduate School of Education, 2011; National Governors Association, 2011). Business executives are leading the charge expecting high school graduates to be properly equipped with 21st century skills to meet industry needs and expectations.

Although one would think a vocational technical school would be aligned with industry expectations, Worcester Technical High School was not keeping up with workforce demands. The school was one of the first vocational schools built in the United States, opening in 1910. By 1990, the facility was antiquated, the infrastructure incapable of being updated, and the equipment to train students was obsolete. In 1997, the New England Association of Schools and
Colleges’ Commission voted unanimously that the school be placed on probation for failure to meet the Commission’s Standard 10 on School Facilities. In addition to an aging facility, Worcester Technical High School was the lowest performing high school in the city and one of the lowest performing vocational/technical schools in the state. In 2000, 97% of the students scored in the Needs Improvement and Failing Categories of the ELA Massachusetts Comprehensive Assessment System (MCAS) exams, with 76% of these in the Failing Category. On the MCAS mathematics exams, 97% scored in the Needs Improvement and Failing Categories, with 85% of these students in the Failing Category (DESE, 2012). Graduates were not trained with 21st century skills to be prepared for a global economy. Students were not engaged in academically rigorous coursework and were not graduating career or college ready.

In August 2006, what was then Worcester Vocational High School was renamed as Worcester Technical High School and moved to a new $90 million, 400,000 square foot facility. Although the school name, address, leadership, mascot, and student demographics changed, the school’s mission remained essentially the same, “to educate and prepare our students, both academically and technically, to meet the challenges of a global society” (Worcester Technical High School, 2012).

Five out of the past six years, Worcester Technical High School met the Annual Yearly Progress (AYP) for “No Child Left Behind,” exceeding benchmarks in English, mathematics, and every subgroup, including special education. In 2012, the school met the Progress and Performance Index (PPI) both in the Annual PPI and the Cumulative PPI (DESE, 2012). The graduation rate for the class of 2012 is 96.4% with a 1.5% dropout rate (DESE, 2013).

In six years the school has achieved significant gains in MCAS scores. In 2012, 88% of the students scored in the Advanced and Proficient categories in English Language Arts, an
increase of 61% with a 1% failure rate. In mathematics, 78% of the students scored in the Advanced and Proficient categories, an increase of 43%, with a 3% failure rate. In science, 95% of the current 10th and 11th grade students passed with a 5% failure rate (DESE, 2012).

Since WTHS opened in 2006, the school and its students have earned several awards and have been recognized for outstanding student success. In 2006, *School Planning and Management Magazine* awarded Worcester Technical High School the Impact on Learning Award in the category of non-traditional learning space. In 2009, WTHS was selected as one of 15 public high schools featured in *How High Schools Become Exemplary* by the Achievement Gap Initiative at Harvard University. In 2011, MetLife and the National Association of Secondary School Principals (NASSP) selected WTHS as a National Breakthrough School Award recipient. This national award is presented to five high schools and five middle schools across the country. WTHS was the only high school selected in New England. The award recognizes schools achieving outstanding student gains in high poverty areas. In addition, in 2011, WTHS was selected by NASSP to be featured at the NASSP/Alliance for Excellent Education Event at the nation’s capital in Washington, D.C. Also in 2012 and 2013, Worcester Technical High School was selected as a Breaking Ranks Showcase School at the NASSP Conference. Furthermore, in September of 2012, NBC Education Nation selected Worcester Technical High School as one of 10 schools/programs featured as a Case Study for school districts across the country to replicate for student success. In addition, the school was featured on the Today Show and at the NBC Education Nation Summit on September 25, 2012 (NBC Education Nation, 2012).
Significance of the Problem

According to *Pathways to Prosperity* (2011), by 2007 employment opportunities had changed drastically. While the workforce had exploded nearly 70% to 154 million workers, those with a high school education or less had shrunk to just 41% of the workforce (Harvard Graduate School of Education, 2011, p.2). Many of the newly created jobs require at least some post-secondary education. The study further states that roughly one-third of the jobs created in the coming years will require an associate’s degree or occupational credentials. Equipping high school students with the necessary skills will be essential to meet industry needs. According to *Educating a 21st Century Workforce* (October, 2008), if employers do not see skills needed for employment, jobs in Massachusetts may go unfilled and the unskilled may remain unemployed. This lack of training creates a lost opportunity for Massachusetts’ citizens and monetary loss for state businesses. In an increasingly competitive economy, state companies cannot afford to lose business due to the lack of skilled workers.

Business executives are leading the charge expecting high school graduates to be properly equipped with 21st century skills to meet industry needs and expectations. Students are graduating from high school lacking basic skills to be successful in entry-level positions. According to the Massachusetts Business Alliance for Education (2008), communication skills, basic math and technical skills, execution skills, work ethic and conduct and deportment have been identified as skills employers see students lacking and which are vital for success. There is a disconnect between what is being taught in school and what is expected of our high school graduates for both career and college readiness.
Practical Goals

The strength of a case study method is its ability to examine, in-depth, a “case” within its “real-life” context (Yin, 2005, p. 380). Therefore, the practical goals of this research project was to identify and describe, as perceived by the principal, faculty, and school partners, key factors that led and contributed to the transformation of Worcester Technical High School. Through a case study model, interviews and focus groups were conducted with faculty members, students, and business leaders. This led to the identification of specific initiatives and potentially culture changing events that led to the school’s transformation.

This research provided significant information for the school and the educational community as a whole. Industry is changing and educational institutions have not adapted to these changes. The information obtained through this case study could potentially assist other failing schools by providing best practices for other schools to replicate.

Intellectual Goals

Business conditions change and yesterday’s assumptions and practices no longer work. There must be innovation, and innovation means change (Bridges and Bridges, 2000, p. 1). Through the case study method, research was addressed using descriptive or explanatory questions and aimed to produce a first-hand understanding of people and events (Yin, 2005). The basis of this study was to discover the factors associated with the transformation of this school. The intellectual goals of this study were:

1. What contributed to the significant improvement and transformation of Worcester Technical High School that could recommend actions, strategies, and use of resources to improve other schools?
2. Outline how the success at Worcester Technical High School might be replicable in service of other vocational/technical schools making improvements.

**Research Questions**

Three research questions guided this case study:

1. How did Worcester Technical High School become a high performing school?
2. How did leadership in the school contribute to Worcester Technical High School becoming a high performing school?
3. What strategies and use of resources were particularly valuable in the improvement of the school?
4. What were student experiences at Worcester Technical High School and the degree to which the school has supported their success in school and opportunities for college and career?

**Document Organization**

First, the introduction presented the problem of practice, the research questions and significance of the study. Following is the theoretical framework in support of the investigation, which included a discussion of the two educational theories of Distributive Leadership and Organizational Change Theory. The Burke-Litwin Change Model has been selected specifically to examine the organizational change. A literature review followed, presenting relevant literature regarding business and industry expectations of high school graduates and brief history to the present status of vocational technical education. The literature review also examined successful school transformation models and the leadership style and qualities that led to school success. The research design was then introduced taking into account the theoretical frameworks and the review of the pertinent research. And finally, the findings were presented followed by an
analysis and synthesis of the findings, including a discussion concerning the limitations of this study.

**Theoretical Framework**

Distributive Leadership theory and Organizational Change theory were used to inform the design and data analysis of this study. Each of these theories served to emphasize the magnitude of the potential positive impacts on student learning and school success.

**Distributive Leadership Theory**

New understanding about organizational development and leadership suggest that active involvement by individuals at all levels and within all domains of an organization is necessary if change is to take hold (Ogawa & Bossert, 1995; Spillane, Halverson, & Diamond, 2001). Distributed leadership is about leadership practice rather than leaders or their roles, functions, routines, and structures. From a distributive perspective, leadership practice is viewed as a product of the interactions of school leaders, followers, and their situation (Spillane, 2005, p. 144). Rather than viewing leadership practice as a product of a leader’s knowledge and skill, the distributed perspective defines it as the interactions between people and their situation (Spillane, 2005).

The idea of distributed leadership is not a new one. As far back as the 1950s, in the first edition of the *Handbook of Social Psychology*, Gibb (1954) posed the possibility of leadership displaying a distributed pattern or configuration. In the 1960s, organizational theorists and researchers Thompson (1967) and Barnard (1968) presented the concept that leadership flows throughout organizations and spans levels of organizational hierarchies. In 1984, Murgatroyd and Reynolds stressed that “leadership can occur at a variety of levels in response to a variety of situations and is not necessarily tied to possession of a formal organizational role” (Law and
Glover, 2003, p. 37). Throughout the 1980s and 1990s, the practice of developing teacher leadership was being explored and implemented (Lieberman, 1988; Wheatley, 1999). Concepts such as teachers working together in teams and teachers taking a variety of responsibilities within the school were evolving. In addition, concepts of shared decision-making and the democratization of the school were being evaluated (Greenleaf, 1996; Wiess and Cambone, 1994).

In the 1990s, distributed leadership was viewed by Copland (2003), as a set of functions or qualities shared across a much broader segment of the school community that encompasses administrators, teachers and other professionals and community members both internal and external to the school. Such an approach imposes the need for school communities to create and to sustain broadly distributed leadership systems, processes, and capacities (p. 376). In addition, Spillane, et al, support that leadership happens in a variety of ways throughout the school and is centered in the relations and interactions among people. “Depending on the particular leadership task, school leaders’ knowledge and expertise may be best explored at the group or collective level rather than at the individual leaders level” (Spillane, Halverson and Diamond, 2001, p. 25). Therefore, the distributed leadership perspective is neither a top-down nor a bottom-up approach, but recognizes that leadership roles are played by different people at different times. Individuals play off one another, creating a reciprocal interdependency between their actions (Spillane, 2005, p. 146).

Distributive leadership is not the same as dividing task responsibilities among individuals who perform defined and separate organizational roles, but rather it comprises “dynamic interactions between multiple leaders and followers” (Timperley, 2005, p. 2). Tasks and responsibilities are distributed across traditionally defined organizational roles creating an
atmosphere of ownership. “Decisions about who leads and who follows are dictated by the task or problem situation, not necessarily by where one sits in the hierarchy” (Copland, 2003, p. 378). Spillane et al. (2004) refers to this distribution as being “stretched over” people in different roles.

Spillane, Halverson, and Diamond’s (2001, 2004) model of distributed leadership, like the models of Firestone (1996) and others who take functionalist approaches, associates leadership with action and activity rather than with the behavior of individuals formally identified as the leaders. Leaders act in situations that are defined by others’ actions. Spillane et al identifies “the tasks, actors, actions and interactions of school leadership as they unfold together in the daily life of the school” as contributing factors to distributed leadership in schools (Spillane, Halverson and Diamond, 2001, p.23). From a distributed perspective, it is in these interactions that leadership practice is constructed.

This educational theory is pertinent to this research by helping to explain effective leadership qualities and practices that lend to successful transformation. The need for improved leadership in many urban schools is evident in the persistently low performance found among urban, low-income, and minority students (Education Trust, 2003a, 2003b; National Assessment of Educational Progress, 2003). The achievement gap continues to widen and there is a need for major transformation of schools to reverse this trend. Distributed leadership is one of the potential vehicles to assist in this process and is essential for successful and continuous transformation.

Burke-Litwin Causal Model of Organizational Performance and Change

Organizational change is a kind of chaos (Gleick, 1987). According to Burke and Litwin (1992), “the number of variables changing at the same time, the magnitude of environmental change, and the frequent resistance of human systems create a whole confluence of processes
that are extremely difficult to predict and almost impossible to control” (p. 523). Even with all these factors and variables, consistent patterns of organizational change exist and can be seen in actual organizations (Burke & Litwin, 1992).

The Burke-Litwin Causal Model of Organizational Performance and Change was developed by Warren W. Burke and George Litwin in 1989 and further refined in 1992. The model was designed with both theoretical and real-life experience to attempt to “provide a causal framework that encompasses both the what and the how-what organizational dimensions are key to successful change and how these dimensions should be linked causally to achieve the change goals” (Burke & Litwin, 1992, p. 525). Litwin established the original thinking underlying the model, particularly as the model pertains to organizational climate and open systems theory. Litwin’s influences on climate include inputs (leadership style) and outputs (individual and organizational performance). These frames were empirically tested in three businesses and the results indicated that “the better the work unit climate, the greater the likelihood of high organizational performance” (Burke, 2008, p. 184). In addition, the Burke-Litwin model also defines culture as “the relatively enduring set of values and norms that underlie a social system” (Burke & Litwin, 1992, p. 526). This provided members the opportunity to attribute meanings and values to a variety of external and internal events that members are experiencing.

The Burke Litwin Model (see Figure 1) shows the various drivers of change and ranks each factor in terms of importance. The model has the most important factors featured at the top. The lower layers become gradually less important. The model is designed so that all the factors are integrated to greater or lesser degrees. Therefore, a change in one will eventually affect all other factors.
**Figure 1. Burke-Litwin Model of Organizational Performance and Change**

**Components.** The Burke-Litwin model is created with the external environment box representing the input, and the individual and organizational performance box the output. The feedback loop goes in both directions. According to Burke & Litwin (1992), environmental factors are the most important driver for change. The Burke-Litwin Model (see Figure 1) is comprised of 12 components, each representing an important task or concept within the framework of an organization. The components and their definitions, as stated by Burke and Litwin (1992) are listed below.

- *External environment.* The external environment is any outside condition or situation that influences the performance of the organization (e.g., marketplaces, world financial conditions, political/governmental circumstances).

- *Mission and strategy.* Mission and strategy are what the organization’s (a) top management believes is and has declared is the organization’s mission and strategy and (b) what employees believe is the central purpose of an organization. Strategy is how the organization intends to achieve that purpose over an extended time scale.
• **Leadership.** Leadership is executives providing overall organizational direction and serving as behavioral role models for all employees.

• **Culture.** Culture is the collection of overt and covert rules, values, and principles that are enduring and guide organizational behavior. Culture is “the way we do things around here.”

• **Structure.** Structure is the arrangement of functions and people into specific areas and levels of responsibility, decision-making authority, communication, and relationships to assure effective implementation of the organization’s mission and strategy.

• **Management practices.** Management practices are what managers do in the normal course of events to use the human and material resources at their disposal to carry out the organization’s strategy.

• **Systems.** Systems are standardized policies and mechanisms that facilitate work, primarily manifested in the organization’s reward systems, management information systems (MIS), and in such control systems as performance appraisal, goal and budget development, and human resource allocation.

• **Climate.** Climate is the collective current impressions, expectations, and feelings that members of local work units have that, in turn, affect their relations with their boss, with one another, and with other units.

• **Task requirements and individual skills/abilities.** Task requirements and individual skills/abilities are the required behavior for task effectiveness, including specific skills and knowledge required of people to accomplish the work for which they have been assigned and for which they feel directly responsible.
• **Individual needs and values.** Individual needs and values are the specific psychological factors that provide desire and worth for individual actions or thoughts.

• **Motivation.** Motivation is aroused behavior tendencies to move toward goals, take needed action, and persist until satisfaction is attained.

• **Individual and organizational performance.** Individual and organizational performance is the outcome or result as well as the indicator of effort and achievement (e.g., productivity, customer satisfaction, profit, and quality) (Burke & Litwin, 1992, pp. 531-533).

**Additional Concepts.** Figure 1 attempts to portray the primary variables that need to be considered in any attempt to predict and to explain the total behavior output of an organization, the most important interactions between these variables, and how they affect change. Figure 2 (see below) contains a display of the transformational variables, which is the upper half of the model. Burke and Litwin (1992), define transformation as the “areas in which alteration is likely caused by interaction with environmental forces (both within and without) and will require entirely new behavior sets from organizational members” (p. 529). Burke and Litwin believe that transformational changes are initiated from the environment factors of the model.
**Figure 2. Transformational Components**

Figure 3 (see below) contains the transactional variables, which is the lower half of the model. Transactional is defined as “the primary way of alteration is via relatively short-term reciprocity among people and groups” (Burke & Litwin, 1992, p. 530). The important distinction between transformational and transactional change within the model is that transformational changes impact organizational culture, whereas transactional change impacts the organizational climate.
Figure 3. Transactional Components

The Burke-Litwin Model is described as an open system in which each component of the framework influences every other component. Arrows in Figures 1, 2, and 3 represent the relationships between the inputs, throughputs, outputs, and feedback. The arrows are pointing in both directions, emphasizing the influence that each individual component has upon the other components in the model. The Burke-Litwin model stresses that the arrows in the transformational section carry more weight and have more influence on the change process. “Moreover, in large scale or total organizational change, mission, strategy, leadership, and culture have more ‘weight’ than structure, management practices, and systems: that is, having organizational leaders communicate the new strategy is not sufficient for effective change” (Burke & Litwin, 1992, p. 529). The variables in the transformational section have more weight due to the fact when changing these variables; they have more of an effect on the total system. In Figure 3, the weights in the transactional model have lesser influence on the amount of change.
that can occur within a system. Changes associated with the lower arrows “may or may not affect the entire system” (Burke & Litwin, 1992, p. 529).

Along with weighted arrows, the Burke-Litwin Model incorporates different levels of organization within its model, which are individual, group and systems. Individual levels are represented through motivation, individual needs and values, and job-person match. Group levels are represented though climate, systems, management practices, and structure components. System level variables include the external environment, mission and strategy, leadership, and organizational culture. These levels are incorporated into the model to provide simplification into manageable groups as well as providing feedback loops.

**Summary**

The Burke-Litwin change model strives to bring change in the performance of a team or an organization by establishing links between performance and the internal and external factors which affect performance (Burke & Litwin, 1992). The change model is based on assessing the organizational as well as environmental factors which can be altered so as to ensure a successful change. The Distributive Leadership Theory views leadership practice as a product of the interactions of school leaders, followers, and their situation (Spillane, 2005). The distributed perspective defines it as the interactions between people and their situation. These two lenses were used to help explain how Worcester Technical High School became a high performing school. The organization of Worcester Technical High School was assessed as well as the environmental factors which led to this transformation. The leadership style of the principal was also examined as it relates to the interactions among administrators, teachers, students, and school business partners.
Chapter II: Literature Review

A review of the current literature surrounding business and industry expectations of school graduates, school and community partnerships, successful school transformation models, and the role of leadership in this transformation will be investigated. The review of the literature is structured around four main categories that cover the following areas:

1. Business and Industry Expectations
2. Vocational Technical Education
3. Transformational/Improvement models of low performing schools
4. Role of Leadership and Resources

This literature review is organized in this manner in an attempt to explain how schools become exemplary. Through an examination of the research available on the topic of successful schools graduating students both college and career ready, this researcher attempts to shed light on the expectations of business and industry and the role of vocational technical education to fill these needs. In addition, the literature review provides updated research on successful transformation models for low performing schools and the role leadership and resources played in this transformation.

Business and Industry Expectations: What are the stated needs by industry of graduates today?

Employers are seeking employees that are equipped with STEM (science, technology, engineering and mathematics) knowledge and skills (National Governors Association, 2011). Employees should have a strong mathematics and science background and be able to work in groups, problem solve, incorporate technology, and think critically. In addition, education beyond a high school level is being demanded and companies are seeking college graduates
and/or candidates with specialized STEM training. According to *Educating a 21st Century Workforce*, “many of our students graduate from high school unprepared for college and career, too few pursue the scientific and technical disciplines our knowledge-based economy demands, and an unacceptably high proportion leave high school before graduating, especially in underserved communities” (Massachusetts Business Alliance for Education, 2008, p. 2). Properly preparing the next generation of workers for STEM careers will be vital to our nation’s economic prosperity.

American students are falling behind in the essential subjects of math and science, putting the nation’s position in the global economy at serious risk. U.S. students recently finished 25th in math and 17th in science in the ranking of 31 countries by the Organization for Economic Cooperation and Development (PISA, 2011). According to the National Mathematics and Science Initiative (NMSI, 2012) website, sixty percent of the new jobs that will open in the 21st century will require skills possessed by only 20 percent of the current workforce. The National Mathematics and Science Initiative report further stated that the U.S. may be short as many as three million high-skills workers by 2018. Two-thirds of those jobs will require at least some post-secondary education, yet American universities only award a third of the bachelor’s degrees in science and engineering as compared with Asian universities (Georgetown, 2011). Worldwide, the United States ranks 17th in the number of science degrees it awards (NMSI, 2012).

According to the National Governors Association’s report *Building a Science, Technology, Engineering and Math (STEM) Education Agenda* (2011), over the past 10 years, STEM jobs grew three times faster than non-STEM jobs. STEM jobs are expected to grow by 17 percent during the 2008-2018 period versus 9.8 percent growth for non-STEM jobs. In
addition, “the average annual wage for all STEM occupations was $77,880 in May 2009, significantly above the U.S. average of $43,460 for non-STEM occupations” (National Governors Association, 2011, p. 4). Business and industry needs STEM educated and trained employees, yet the U.S. educational system is not creating a pipeline of future STEM employees to meet this demand and to keep the United States competitive in this global economy.

President Barack Obama stated, “Today, more than ever before, science holds the key to our survival as a planet and our security and prosperity as a nation” (Obama, 2008). Mr. Obama urges Americans once again to put science at the top of their agenda and work to restore America’s place as the world leader in science and technology. Fulfilling these needs is critical to the economic prosperity of every state and the nation (Obama, 2008). A labor force without a “rich supply of STEM-skilled individuals will face stagnant or even declining wealth” by failing to compete in the global economy (National Governor Association, 2011, p. 9). Discovery, innovation, and rapid adaptation are necessary elements for success in the present economy.

Students in the U.S. schools are not being properly prepared in mathematics and science and the need is pressing:

- Only 29 percent of American fourth grade students, 32 percent of eighth grade students, and 18 percent of 12th grade students performed at or above the proficient level in science.
- About a third of high school mathematics students and two-thirds of those enrolled in physical science have teachers who either did not major in the subject in college or are not certified to teach it.
- Among low-income students, 70 percent of the middle school mathematics teachers majored in some other subject in college.
• Those undergraduates who leave science and engineering majors for other majors are often among the most highly qualified college entrants, and they are disproportionately women and students of color.

• The U.S. ranks 16th of 17 nations in the proportion of 24-year-olds who earn degrees in natural science or engineering as opposed to other majors. (NMSI, 2012)

The Partnership for 21st Century Skills (2002) has brought together business and educational leaders to outline the skills and content knowledge that students should master in order to be successful. The report, *Learning for the 21st Century* (2002), recommends schools to focus on six key elements of 21st century learning:

• Core Subjects – understanding the core academic content at a much higher level.

• Learning Skills – students need to know how to use their knowledge and skills by thinking critically, applying knowledge to new situations, analyzing information, comprehending new ideas, communicating, collaborating, solving problems, and making decisions.

• 21st Century Tools – incorporating information and communication technologies into education starting in the elementary grades.

• 21st Century Context – experiences that are relevant to student lives, connected to real world applications and based on authentic projects.

• 21st Century Content – global awareness; financial, economic, and business literacy; and civic literacy.

• New Assessments that Measure 21st Century Skills – high quality standardized testing for accountability purposes and classroom assessments for improved teaching and learning in the classroom (Partnership for Learning, 2002).
Many of the themes in *Learning for the 21st Century* are similar to the 1991 *Secretary's Commission on Achieving Necessary Skills* report. Both reports generated by the business sector outlined a variety of skills including higher order thinking, personal abilities, and technology literacy (Saltpeter, 2003). These skills are essential for a knowledge-based economy. While previous work has focused on technology, John Wilson, Vice Chair for the 21st Century Skills Partnership, stated the 21st century skills goes beyond what is needed in schools to prepare students for “a world that is transformed by technology, making it necessary to constantly learn and adapt” (Saltpeter, 2003, p. 1).

In Massachusetts, Lt. Tim Governor Murray stated in *A Foundation for the Future: Massachusetts’ Plan for Excellence and STEM Education* (2010), that “developing a pipeline of STEM graduates is not only important for Massachusetts, it is critical to the success of our nation as a whole” (p. 1). The report indicated that with baby-boomer retirements expected to deplete the science and technology workforce by 50% over the next decade, Massachusetts is at risk of losing its leadership in technology and innovation. Eighty percent of jobs created in the next decade will require math and science skills (Governor’s STEM Advisory Council, 2010, p. 3). Creating this new plan is a generational responsibility for the future of our children in the Commonwealth of Massachusetts.

In 2006, the Massachusetts Business Alliance for Education released a report entitled *Preparing for the Future: Employer Perspective on Work Readiness Skills*. The goal of this report was “to inform educators and policy-makers about the work readiness skills that employers expected of Massachusetts’ high school graduates, and to describe the skills and characteristics these corporations require for entry level positions with potential for growth and advancement” (p. 1).
The Massachusetts Business Alliance for Education report identified skills that employers seek, which are vital for success:

- Communication skills - oral, written, and presentation skills
- Basic math and technical (computer skills)
- Execution skills – problem solving, following instructions, and carrying out multiple tasks – knowing how to work and get things done.
- Work ethic – motivation and drive, realistic expectations about what is needed to advance, and respect for self and colleagues.
- Conduct and deportment – appreciate workplace etiquette and behavior (Massachusetts Business Alliance for Education, 2006).

Communication skills and command of the English language were repeatedly identified in the Massachusetts Business Alliance for Education report as important skills and critical deficiencies among high school graduate job applicants and employees. The Partnership for 21st Century Skills (2002) report stated that 45% of 400 executives surveyed rated recently hired high school graduates as “deficient” in applied skills – the ability to use knowledge to perform workplace tasks. Respondents cited written communication as the most serious shortcoming, particularly “writing memos, letters, and complex technical reports clearly and effectively” (Massachusetts Business Alliance for Education, 2006, p. 6).

Pathways to Prosperity (2011), a recent two-year study by the Harvard Graduate School of Education, reported that roughly one-third of the jobs created in the coming years will require an associate’s degree or occupational credentials. Equipping students with the necessary skills will be essential to meet industry needs. According to Educating a 21st Century Workforce (October, 2008), if employers do not see skills needed for employment, jobs in our state may go
unfilled and the unskilled may remain unemployed. This lack of training creates a lost opportunity for our state citizens and monetary loss for state businesses. In an increasingly competitive economy, companies in the state cannot afford to lose business due to the lack of skilled workers.

**Vocational Technical Education: What are vocational/technical schools? Historical perspective and present status.**

The constitution of the United States makes no provision for federal support or control of education. However, “the federal government has long considered career and technical education (CTE) to be in the national interest and provided federal legislation in support of CTE” (Gordon, 2008, p. 88). Beginning with the Morrill Act in 1862, which established land-grant colleges aimed at preparing people for the “agricultural and mechanical arts,” the federal government has had a deep commitment to vocational education (Wrench, Wrench, and Galloway, 1988).

Fear of foreign economic competition and the belief that vocational schools could strengthen the domestic economy led the federal government and business leaders to fund vocational schools (Cuban, 2001). By 1917, demands for industrial and vocational education were so prevalent that congress enacted a federal program to aid vocational education. The Smith-Hughes Act of 1917, secured federal money to finance industrial courses in American schools (Cuban, 2001). According to Ellwood P. Cubberley, “people began to think of going to school as a way of getting a job, not going to school to become a wiser person” (Mondale, 2001, p. 98-99).

In the 1950’s, Representative Carl D. Perkins of Kentucky developed a strong advocacy for vocational education. He served as the leader in writing, introducing, and supporting
legislation that became the Vocational Acts of 1963 and 1984 (Gordon, 2008). The latter was named the Carl D. Perkins Vocational Education Act (Baker, 1991). At this time, the vocational education system had been firmly established. While still supporting the separate system approach by funding the construction of area vocational schools, the act broadened the definition of vocational education to include occupational programs in comprehensive high schools, such as business and commerce. The act also included the improvement of vocational education programs and the provision of programs and services for disadvantaged and disabled students (Journal of Industrial Teacher Education, 2007).

The Carl D. Perkins Vocational Education Act of 1984 (Pub. L. 98-524), known as the Perkins Act, continued the commitment of Congress to the idea that effective vocational education programs are essential to the nation’s future as a free and democratic society (Gordon, 2008). The act had two interrelated goals, one economic and one social. The economic goal was to improve the skills of the labor force and prepare adults for job opportunities. The social goal was to provide equal opportunities for adults in vocational education. The act changed the emphasis of federal funding in vocational education from primarily expansion to program improvement and at-risk populations (Gordon, 2008).

In the 1970’s, information, technology, and knowledge had propelled a new economy, which began to replace the manufacturing-driven economy. The focus of vocational technical education adapted to these changes. The changes were accompanied by a gradual transition in terminology from ‘vocational technical’ to ‘career and technical’ education. The federal government’s understanding of the changing economic landscape was evident in the Carl D. Perkins Vocational and Technical Education Act which was reauthorized in October of 1998 as Perkins III. The purpose of this legislation was to provide individuals with the academic and
technical skills needed to succeed in a knowledge and skills based economy. Unlike the language of the Smith-Hughes Act, which indicated clearly that “such education shall be of less than college grade,” the language of Perkins III stipulated support for career and technical education that prepared its students both for post-secondary education and the careers of their choice (Gordon, 2008, p. 88).

The intent of the re-authorization of Perkins III offers a glimpse into the new vision for Career and Technical Education in the 21st century. The Act envisions that students will achieve challenging academic and vocational standards, be prepared for post-secondary education and further learning, and attain the skills needed to pursue high-skills, high wage careers, and not just entry-level jobs (Journal of Industrial Teacher Education, 2007). Current Perkins law allows for more state and local flexibility and raises expectations for CTE students by holding them to the same high academic standards as all other students.

According to the official position of the United States Department of Education (Office of Vocational and Adult Education, 2012), federal involvement today administers, coordinates, and recommends policy for improving quality and excellence of programs which prepare students for post-secondary education and careers through strong high school programs and career and technical education. Specific strategies ensure that students achieve challenging vocational and technical skill standards, improve and expand the use of technology, involve parents and employers, and provide quality professional development.

**Present Status**

A report by the National Task Force on Public Education (2005), addressed the topic of globalization and competitiveness that is challenging the effectiveness of public education in our nation. According to the report, “The United States now finds itself in an increasingly
competitive global economy. The European Union and Japan today are formidable advanced industrial competitors. Developing countries like China and India offer the world economy workers of increased education and sophistication at far lower costs than the United States can match” (Brown, et al., 2005, p. iii). The Task Force report further states that “we can no longer dismiss these trends as simply the result of large populations working for low wages or isolated nations opening heretofore inaccessible markets. The jobs being outsourced...are no longer limited to low-skill, low-wage professions, but now also include sizeable numbers of jobs requiring significant skills and education, such as those in the engineering, information technology, and healthcare fields” (Brown, et al., 2005, p. 9-13). Furthermore, the report affirms that high schools must prepare every student for the challenges of post-secondary education by ensuring that all students complete a rigorous, four-year course of study in high school.

According to state and federal definitions, vocational-technical schools educate and prepare students for both employment and continued academic and occupational training. In Massachusetts, vocational-technical schools have integrated academic and vocational education and must follow both the Massachusetts Vocational Technical Education Frameworks and the Massachusetts Curriculum Frameworks. Each vocational program must include competency-based applied learning, targeting 21st century skills. All vocational-technical students are measured and assessed on adequate knowledge, work attitudes, general employability skills, and the occupation specific skills necessary for economic independence. This information is tracked and monitored through Vocational Technical Competency Tracking Education (Department of Elementary and Secondary Education, 2012).

The National Assessment of Vocational Education (NAVA) was charged by Congress with evaluating the status of vocational education and the impact of Perkins III. In the NAVA
Final Report to Congress (2004), it was noted that “in an era in which strong skills and life-long learning are rewarded, the nature and impact of student experiences in vocational education could have important implications for the nation’s workforce and America’s place in the global economy” (p. 1). The NAVA report states that over the last decade of academic reforms, CTE students have increased their academic course taking and achievement, making them better prepared for both college and careers than were their peers in the past. It further illustrates, “students who take both academic curriculum and vocational programs may have a better outcome than those who pursue one or the other” (p. 2). Also, the National Assessment of Educational Progress (NAEP) 12th grade test scores of CTE students increased by 8 scale points in reading and 11 scale points in math from 1990 to 2000, while scores of non CTE students increased by only 4 points in reading and experienced no increase in math during that same time (National Assessment of Vocation Education, 2004, p. 6).

According to Learning for the 21st Century (2002), learning skills, 21st century tools, content, and context are incorporated into student educational experiences. In vocational technical programs, students experience academic subjects through inquiry and specific pathways. Students “learn by doing” with practical applications such as hands-on activities, project-based learning, and internships (Partnerships in 21st Century Skills, 2010, p. 17). Technology is a tool used for productivity, communication, and creativity. Vocational school students use the same kind of equipment and technology that is common in their career field, giving students experience and competencies for transition to career and college (Partnerships in 21st Century Skills, 2010).

Students enrolled in Massachusetts’ vocational technical schools experience career pathways through job shadowing, internships, and relationships with employers. These
experiences help students determine what they like to do and what their passions are. Tangible connections to career areas bring purpose to students’ learning and assist them with future career plans (Partnerships in 21st Century Skills, 2010).

Reported in the Pioneer Institute’s White Paper entitled Vocational-Technical Education in Massachusetts (2008), there are over 27,000 students in regional vocational schools and virtually all vocational schools in the Commonwealth have waiting lists for admissions. Massachusetts’ vocational technical schools have also seen significant improvements in graduation rates, dropout rates, and career and college placement. The Class of 2008 had a 96% passing rate in both mathematics and English portions of MCAS, outperforming the state average by 2%. The graduation rate of regional vocational technical schools is 90.5%, which is almost 10% higher than the state average of 80.9% (Massachusetts Department of Elementary & Secondary Education, 2009). According to the Massachusetts Association of Vocational Administrators, over 70% of vocational graduates continue their education at two and four year colleges or technical schools. With these statistics, it is evident that Massachusetts’ vocational technical schools have established a high level of core academic standards.

In 2006, the Massachusetts Business Alliance for Education (MBAE) released a report entitled, Preparing for the Future: Employer Perspectives on Work Readiness Skills. This publication was created to inform educators and policy makers about the work readiness skills that employers expected of Massachusetts high school graduates. The report describes skills and characteristics that these corporations require for entry-level positions with potential for growth and advancement. According to the report, “there was general agreement that vocational school graduates are more job ready than general education or college preparatory high school graduates. In fact, a number of participants felt that vocational high school graduates were often
more job ready than college graduates” (p. 12). Also, employers felt that vocational graduates were more team oriented, disciplined, and prepared to enter the workforce. Graduates of vocational schools were described as having superior soft skills and preparation in comparison to other graduates (Massachusetts Business Alliance for Education Report, 2006).

Massachusetts has a state-wide network of regional vocational technical high schools that have been dubbed the “Cadillac of Career and Technical Education” (Harvard Graduate School of Education, 2011, p. 27). Students in vocational technical schools spend half their time in career education and academic instruction is integrated with technical education. With the support of research, vocational schools came to realize that the academic skills needed for entry-level career success are equal to those needed for college entrance (Sawter, 2011). The manuals used by professional plumbers, automotive mechanics, and electricians are written at up to grade 14 reading level (Fraser, 2008). Ignoring this reality was determined to be the reason why 95% of Connecticut vocational students failed a recent administration of an electrician’s license test (Sentence, 2008).

In Vocational-Technical Education in Massachusetts (2008), the report described that among surveyed employers there was a general agreement that vocational school graduates were more job-ready than general education or college preparatory high school graduates. It went on to state that vocational high school graduates were often more job-ready than college graduates. In addition, “employers also felt that vocational graduates were more team oriented, disciplined, and properly prepared to enter the workforce” (Fraser, 2008, p. 3).
Transformation and Improvement Models of Low Performing Schools Today: What is the Current Literature on the Transformation and Improvement of Low Performing Schools?

According to Levin (2006), schools are the focus of great expectation, but are habitually charged with producing disappointing results and being unable to meet expectations. Education has been trying to reform itself since the beginning of the 20th century. Education historian Larry Cuban suggests that calls for change resemble a recycling of the same reforms, again, and again, and again (Cuban, 1990). Specific reforms have included changes in curriculum, textbooks, teacher training, teacher certification, leadership preparation, school governance, education technology, and educational funding.

In the United States, one student drops out of school every twelve seconds (Big Picture Learning, 2011). One in every 10 high schools across our nation is labeled as a dropout factory (Associated Press, October, 2007). The graduation rates in these schools are less than 60 percent. According to researchers at Johns Hopkins University, nearly 2,000 dropout factories turn out 51 percent of the nation’s dropouts (Alliance for Excellent Education, 2011). Many of these schools are in the poorest communities. Compounding this problem, poverty is on the rise and just 8 percent of students growing up in low-income communities graduate from college by the age of 24 (Postsecondary.org, 2011). With these staggering statistics, the U.S. schools cannot afford to maintain the status quo. Public education needs to redesign its antiquated system and transform education to meet the needs of all students.

Given the realities of globalization and the demands of a knowledge-based economy, a school system that had worked well 35 years ago are no longer adequate (Hess, 2006). “Decades of earnest efforts to reform public schools through conventional means have shown remarkably little ability to substantively alter routines or results” (Hess, 2006, p. 4). Critiques of the
comprehensive high school over the past three decades include: Boyer (1983), Goodlad (1984), Sergiovanni (1996), and Sizer (1984). These scholars have all called for reform in high schools and identified the comprehensive high school’s large size and lack of personalization as key elements leading to apathy and alienation among both teachers and students (Copland & Boatright, 2006).

Improvement in student learning can dramatically boost economic growth (Hanushek et al., 2008). Overhauling today’s high schools is a potent starting point. According to *Accelerating the Agenda: Actions to Improve America’s High Schools* (2008), states need to:

1. **Restore value to the high school diploma by elevating academic standards and high school graduation requirements to a college- and career-ready level.** This would include offering students other high-quality pathways, such as career technical education and dual enrollment, that prepare students for college and entry-level technical occupations.

2. **Redesign high schools by expanding the supply of high-quality schools through new models such as early college high schools and alternative delivery mechanisms such as charter schools and virtual schools.**

3. **Improve schools by providing excellent teachers and principals by connecting teacher preparation, hiring, and evaluation to student outcomes.**

4. **Set goals, measure progress, and hold high schools and colleges accountable by developing high school accountability systems tied to college- and career-ready measures; and aligning postsecondary expectations, incentives, and performance to high school expectations.**
5. Improve education governance by bridging k-12 and postsecondary expectation gaps through the formation of effective P-16 council (National Governors Association Center for Best Practices, et al., 2008, p. 6).

Furthermore, leadership plays a major role in the transformation of schools. Researchers, Knapp, Copland, & Talbert (2003) identified five dimensions of leadership activity when transforming a high school. These dimensions closely link to other aspects of leadership identified by groups currently working on high schools transformation (e.g., NGA, 2005; Murphy, et al., 2001):

1. **Focus on learning.** Leaders’ ability to promote a clear and consistent focus on learning for all high school students and professionals as a central part of their work.

2. **Use of data and evidence.** Leaders’ continuous use of data and evidence in service of instructional improvement and as a basic element of decision making related to instructional improvement in the high school.

3. **Aligning resources with learning improvement goals.** Leaders’ targeted reallocation of resources and creation of incentives that serve the specific instructional improvement goals that each high school sets out for itself, across differing school district contexts.

4. **Construction of roles that enable leaders to focus on learning improvement.** The definition of leadership roles and authority relationships that enable leaders (construed broadly) to impact teaching and learning in high schools.

5. **Engagement with the community.** Leaders’ emphasis on engaging community constituents, parents, and support providers in ways that promote the learning agenda. (Copland & Boatwright, 2006, p. 11).
Researchers Copland and Boatright (2006), maintain that the distribution of leadership is key regardless of a school’s size. They further state, “to transform high schools into places that seek to serve each student calls for an understanding of leadership that moves away from reliance on administrative hierarchies and toward a network of shared and distributed practice (Copland & Boatright, 2006, p. 12). Copland and Boatright (2006) have identified three main concepts regarding distributed leadership for transforming high schools.

First, distributive leadership is a collective activity, focused on collective goals, which comprises a quality or energy that is greater than the sum of individual actions (Copland & Boatright, 2006, p. 12). Pounder et al., (1995) and Ogawa & Bossert, (1995), support this concept by adding that leadership is an organizational quality, formulated from many people’s personal talents and flowing through networks of roles. Spillane, Halverson, and Diamond (2001) add that leadership is a distributed activity “stretched over” people in different roles rather than divided among individuals. They believe distributed leadership is a dynamic interaction between multiple leaders and followers and their situational and social contexts. Distributed leadership has a strong emphasis on the development of the educations focus of teaching and learning with attention to both the subject specific aspects of instructional improvement and interdisciplinary learning experiences.

Second, distributed leadership spans the task, responsibility, and power boundaries between traditionally defined organizational roles (Copland & Boatright, 2006, p. 13). According to Bennett and colleagues (2003), in transformational schools, distributed leaders are more open and school administration and staff make decisions about who leads and who follows based on the task or problem, not necessarily by job title.
Third, researchers have suggested that distributed leadership rests on a base of expertise rather than hierarchical authority roles (Copland & Boatright, 2006, p. 14). Bennett and colleagues (2003) found that distributed leadership involves recognizing expertise rather than formal position as the basis of leadership authority in groups. Furthermore, “the expert knowledge and skills necessary to exercise leadership for the improvement of teaching and learning reside within the professional community with which teaching staff identify (Copland & Boatright, 2006, p. 14).

There is much research regarding various theories of action aimed at transforming high schools. Improving high school teaching and student learning is at the center of this action. According to Copland and Boatright (2006), there are three themes build around this action and they are as follows:

1. Altering structural design and coherence,

2. Changing instructional norms and practices, and

3. Creating more educational choices and opportunities. (Copland & Boatright, 2006, p. 20).

A large number of secondary school leaders are choosing to alter structural design and improve coherence through the implementation of block periods, schools-within-schools, ninth-grade academies, and advisories with the purpose of regrouping students and teachers into a more personalized and more academically rigorous environment. These actions are supported through research that strong student-teacher relations (Meier, 1995, 1998; Cotton, 1996, 2001) and reorganization of instructional time (Darling-Hammond, 1997; Raywid, 1996) will produce better teaching and learning.
Enhancing student learning requires intentional, explicit instructional leadership that focuses on the improvement of teaching throughout the school. Therefore, changing instructional norms is another form of action for transforming high schools. It is estimated that a variation in teacher quality accounts for 8.5 percent of the total variation in student achievement (Goldhaber, 2002). By shifting the focus to instructional quality, greater emphasis on content-driven professional development and the implementation of on the ground instructional coaches could be useful tools to improve teaching and learning (Fink & Resnick, 2001).

Economic debates about choice and open market theories emerge when schools have to compete for clientele to stay in business (Tiebout, 1956; Friedman & Friedman, 1982; Hoxby, 1996, 2000). The third theory of action, creating more educational choices and opportunities, seeks to address the bureaucratic rigidity and unresponsiveness of underperforming schools. Theorists believe the presence of instructionally effective schools will weed out ineffective ones much faster than system-level efforts to change the quality of public education (Hill et al., 2000; Hill, 2005).

The high school dropout rate is on the rise. It is estimated that the high school dropouts cost the nation more than $320 billion in lost wages, taxes and productivity (Alliance for Excellent Education, 2007). In addition, the Bureau of Labor Statistics projects that more than half of all new jobs through 2014 will require at least some college experience (U.S. Bureau of Labor Statistics, 2005). Yet, 22 percent of high school students are likely to succeed in first-year, credit bearing college courses (ACT, 2008). Outdated high schools built for a past era are not producing graduates prepared for today’s knowledge-driven economy. Transforming low performing schools will be essential for our countries continued success.
Role of Leadership and Resources: What is the Specific Role of Leadership and Other Resources in this Transformation?

The entrepreneurial spirit is taking hold in education. Politicians, business leaders, community members and parents are demanding better schools. A strong leader is essential to facilitate this change. Leaders need to be charismatic, dedicated and forward thinkers. According to Joe Williams, executive director of Democrats for Education Reform, educational leaders need to be like “James Dean—a rebel with a cause” (Cullinane and Hess, 2010, p. 107).

It is important to understand that entrepreneurs have a vision for a better way of doing things, thinking beyond the confines of current rules, resources, and bureaucratic routines (Hess, 2006). Leaders also need to have passion and a sense of urgency that literally compels them to take the risks necessary to realize that vision (Hess, 2006, p. 22).

Educational entrepreneurs need to be innovators of change. These leaders cannot be encumbered by the restrictions of the current system. Innovators need to “create new organizations that can both provide students with better educational options and spark disruptive change within existing institutions” (Hess, 2008, p.10). Green Dot’s Six Tenets of High Performing Schools is a good example of innovation led by strong educational leaders. The six tenets are as follows: (1) Small, safe, personalized schools; (2) High expectations for all; (3) Local control with extensive professional development and accountability; (4) Parent participation; (5) Maximize funding to the class; (6) Keep schools open late (Green Dot, 2011). These tenants have been the guiding principles for Green Dot’s innovative success.

According to Hess (2006), in a system governed by the principles of dynamic equilibrium, entrepreneurs may be both important vehicles for getting there and permanent participants in this new environment. By imagining how education can be improved, thinking
beyond our present structure and limitations, entrepreneurs can create new systems to implement this vision and inspire others to follow. Educational entrepreneurs need to be passionate leaders, with a vision and sense of urgency. As one student drops out of school every 12 seconds, there is no time to waste (Big Picture Learning, 2012).

Fullan outlined six essential elements for successful leadership in his book, *The Six Secrets of Change*. Each of the six secrets are interrelated and in some cases overlapping, in which the same action can enhance several secrets simultaneously. The six components consist of “Love your employees; Connect peers with purpose; Capacity building prevails; Learning is the work; Transparency rules; and System Learning” (Fullan, 2008, p. 11).

Secret One, “Love your employees” is not just about caring for employees. He suggests, “It is helping all employees find meaning, increased skill development, and personal satisfaction in making contributions that simultaneously fulfill their own goals and the goals of the organization” (Fullan, 2008, p. 25). Through this “love” employees will want to learn continuously and find meaning in their work, their relationships to coworkers, and to the company as a whole. Fullan believes that teachers can thrive in this supportive environment and actively engage students in a positive school culture.

The key to achieving a simultaneously tight-loose organization lies more in purposeful peer interaction than in top-down direction from the hierarchy. Fullan adds, “the nuance is that connecting peers with purpose does not require less leadership at the top, but rather more—more of a different kind” (Fullan, 2008, p. 41). Secret Two, “Connecting peers with a purpose, Secret Three, “Building capacity”, and Secret Four, “Learning is the work” supports the concepts that leaders need to embed strategies that foster continuous and purposeful peer interaction. Fullan outlines three important conditions to facilitate positive, purposeful peer interaction: (1) when
the larger values of the organization and those of individuals and groups mesh; (2) when information and knowledge about effective practices are widely and openly shared; and (3) when monitoring mechanisms are in place to detect and address ineffective actions while also identifying and consolidating effective practices (Fullan, 2008, p. 45) For Secret Five, “Transparency” and Secret Six, “Systems Learning” Fullan states, “When data are precise, presented in a nonjudgmental way, considered by peers, and used for improvement as well as for external accountability, they serve to balance pressure and support” (Fullan, 2008, p. 98).

How Leadership Influences Student Learning (2004) has contributed to this growing body of knowledge of effective educational leadership by examining the links between student achievement and educational leadership practices. Two important claims were made in this report. First, according to the authors Leithwood, Seashore Louis, Anderson, and Wahlstrom (2004), first, “leadership is second only to classroom instruction among all school-related factors that contribute to what students learn at school” (p. 7). Second “leadership effects are usually largest where and when they are needed most (p.7). Without a strong leader, failing schools are unlikely to be turned around. The authors highlights that “many other factors may contribute to such turnarounds, but leadership is the catalyst” (p.7).

According to Leithwood, Seashore Louis, Anderson, and Wahlstrom (2004), the basics of successful leadership follows three sets of practices that make up the basic core of successful leadership: setting direction, developing people, and redesigning the organization. The authors suggest that school improvement plans can provide a clear sense of direction. The report states, “having such goals helps people make sense of their work and enables them to find a sense of identity for themselves within their work context” (Leithwood, Seashore Louis, Anderson, & Wahlstrom, 2004, p. 10).
In addition to setting direction, the educational leader needs to define the school’s mission, manage the instructional program, and promote a positive learning climate (Leithwood, Seashore Louis, Anderson, & Wahlstrom, 2004). Leaders need to be tuned in to employees as people. “Recent evidence suggests that emotional intelligence displayed, for example, through a leader’s personal attention to an employee’s enthusiasm and optimism, reduces frustration, transmits a sense of mission and indirectly increases performance (McColl-Kennedy & Anderson, 2002)” (Leithwood, Seashore Louis, Anderson, & Wahlstrom, 2004, p. 24).

Lastly, successful educational leaders resist teaching to the test and other organizational pitfalls. Instead, educational leaders are purposeful about turning their schools into effective organizations. For schools to be led successfully, educational leaders need to redesign the organization by strengthening the school culture, modifying organizational structures and building a collaborative process. This is done by clearly and consistently articulating high expectations for all students. “Redesigning the organization from the inside out requires that leaders identify and capitalize on the competence of others and both model and require collaboration” (The Center for Comprehensive School Reform and Improvement, 2005, p. 3). As author Carl Glickman (2003) observed: “In successful schools, principals aren’t threatened by the wisdom of others; instead, they cherish it by distributing leadership (p. 56).

Additional educational leadership research included the work of Leithwood, Harris and Hopkins (2008). The researchers provided an overview of the literature concerning successful school leadership. The authors drew upon international literature as well as the early stages of the authors’ project and created seven strong claims about successful school leadership. The research findings are organized around what is referred to as ‘strong claims’ about successful school leadership (Leithwood, Harris, & Hopkins, 2008, p. 27). The claims are as follows:
1. School leadership is second only to classroom teaching as an influence on pupil learning.

2. Almost all successful leaders draw on the same repertoire of basic leadership practices.

3. The ways in which leaders apply these basic leadership practices – not the practices themselves – demonstrate responsiveness to, rather than dictation by, the contexts in which they work.

4. School leaders improve teaching and learning indirectly and most powerfully through their influence on staff motivation, commitment and working conditions.

5. School leadership has a greater influence on schools and students when it is widely distributed.

6. Some patterns of distribution are more effective than others.

7. A small handful of personal traits explains a high proportion of the variation in leadership effectiveness (Leithwood, Harris, Hopkins, 2008, pp. 27-28).

The seven strong claims aim at successful school leadership to improve schools and student success. The recent synthesis of evidence collected in both school and non-school contexts provide considerable evidence regarding leadership qualities and practices in different contexts that accomplish this goal.

A recent publication, *A New Agenda for Research in Educational Leadership*, claims that research on school leadership has generated few robust claims. The main reason cited for this gap in knowledge was a lack of programmatic research; a paucity of accumulated evidence from both small- and large-scale studies, the use of a variety of research designs, and failure to provide
evidence in sufficient amounts and of sufficient quality to serve as powerful guides to policy and practice (Firestone & Riehl, 2005).

Through this literature review, it was revealed that vocational technical schools across the country could no longer ignore the importance of a rigorous academic curriculum and have aligned the curriculum with business and industry expectations. Generally, vocational technical students are graduating more job ready than general educated or college preparatory high school graduates. In addition, it was found that schools are not keeping up with high demand STEM industry. Students are not graduating with proper skills for successful employment nor are they graduating pursuing college degrees in high demand industries to keep up with the global economy. The literature review further revealed that there is urgency for school transformation and leadership is an integral component of school transformation.

Chapter III: Methodology

The Burke-Litwin change model strives to bring in change in the performance of a team or an organization by establishing links between performance and the internal and external factors which affect performance (Burke and Litwin, 1992). The change model is based on assessing the organizational as well as environmental factors which can be altered so as to ensure a successful change. The Distributive Leadership Theory views leadership practice as a product of the interactions of school leaders, followers, and their situation (Spillane, 2005). The distributed perspective defines it as the interactions between people and their situation. These two lenses helped to explain how Worcester Technical High School became a high performing school. The organization of Worcester Technical High School has been assessed as well as the environmental factors which led to this transformation. The leadership style of the principal has
also been examined as it related to the interactions between administrators, teachers, students, and school business partners.

**Research Questions**

Three research questions will guide this qualitative study:

1. How did Worcester Technical High School become a high performing school?
2. How did leadership at Worcester Technical High School contribute to the school becoming a high performing school?
3. What strategies and use of resources were particularly valuable in the improvement of the school?
4. What were student experiences at Worcester Technical High School and the degree to which the school has supported their success in school and opportunities for college and career?

**Rationale for the Qualitative Case Study Design**

Much of the research around business and industry expectations of high school graduates (Friedman, 2005; Partnership for 21st Century Skills, 2012; Curriculum 21, 2010; Lynch, 2000; Harvard Graduate School of Education, 2011; President Obama’s National STEM Initiative, 2009; Lt. Governor Murray’s Massachusetts’ STEM Advisory Council’s STEM Plan, 2010; Massachusetts Business Alliance for Education, 2006, 2008, 2009) has focused on what is lacking and what is needed from our high school graduates. Compounding the problem, there is a plethora of underperforming schools throughout the country, including vocational education schools, and most have remained underperforming for years. This research has provided key elements, identification of specific initiatives, and potentially culture changing events that have led to the transformation of Worcester Technical High School. Worcester Technical High
School was once a significantly underperforming school and became a significantly high performing school in six years. The researcher has outlined how the success at Worcester Technical High School might be replicable in service to other vocational technical schools.

A qualitative approach is the strategy of inquiry used for this case study. Creswell (2009) defines qualitative research “as a means for exploring and understanding the meaning individuals or groups ascribe to a social or human problem” (p.4). There are nine characteristics of qualitative research that have been implemented in this study. The nine characteristics include: gathering information in a natural setting; the researcher collects data through examining documents and interviewing participants; multiple sources of data are used; patterns, categories, and themes are created from the bottom up by organizing the data into increasingly more abstract units of information; a focus is on learning the meaning that the participants hold about the problem; emergent design; theoretical lens will be used; interpretive inquiry will be made by the researcher; and a holistic account will be used as the reporting mechanism (Creswell, 2009).

Good case studies benefit from having multiple sources of evidence (Yin, 2012, p. 10). By using the qualitative method, the researcher was able to investigate the research questions to understand the transformation of Worcester Technical High School through the perspectives of various stakeholders who participated in the transformation of the school: administrators, teachers, students, and school partners. Their stories, incorporating their perceptions of the school factors leading to the transformation, potential leadership qualities, and resources that were of particular value have led to meaningful insight into the key elements that led Worcester Technical High School in its transformation. This analysis provided the researcher flexibility and interpretation supported by numerous data sources (Creswell, 2009).
Site and Participants

The research setting is in a single site, Worcester Technical High School. Worcester Technical High School is the largest high school and only vocational technical school in Worcester, MA. It services approximately 1,400 students. In 2006, Worcester Technical High School opened a new $90 million facility with a new principal, committed community partners, and resources with expectations to properly prepare students to be successful in career and college. Furthermore, the site was chosen due to impressive student gains. The school has achieved significant gains in the Massachusetts Comprehensive Assessment Systems (MCAS) scores. In five years, in English Language Arts, 77% of the students scored in the Advanced and Proficient categories, an increase of 50% with a 3% failure rate. In mathematics, 74% of the students scored in the Advanced and Proficient categories, an increase of 39%, with a 4% failure rate. In science, 96% of the current 10th and 11th grade students passed with a 4% failure rate (DESE, 2012). The results of the study could potentially help other underperforming schools by identifying key factors for success that can be replicated.

The strength of a case study method is in its ability to examine, in-depth, a “case” within its “real life” context (Yin, 2005, p. 380) Research and interviews took place at Worcester Technical High School with the permission of the superintendent of Worcester Public Schools and the principal of Worcester Technical High School. Interviews and focus groups were conducted with students, teachers, administration, school partners, and the chair of the general advisory board. The purpose of this study involved understanding the meaning of the participants through their experiences as students, teachers, administrators, and school partners in relationship to the transformation of Worcester Technical High School. Participation in the interview process and focus groups sessions was voluntary.
The researcher will need to master the intricacies of the study’s substantive issue while also having patience and dedication to collecting data carefully and fairly (Yin, 2005, p. 383). Interviews and focus groups were conducted in person. Dolbeare and Schuman (Schuman, 1982) designed a three-interview process that was conducted with the chair of the general advisory as well as the retired vocational/technical director. The first interview established the context of the participants’ experience. The second allowed participants to reconstruct the details of their experience within the context in which it occurred. And the third encouraged the participants to reflect on the meaning their experiences held for them (Seidman, 2006, p. 17). These two individuals have a wealth of in-depth knowledge about the school and their insight was helpful in obtaining information regarding the research questions. Their participation was voluntary. In addition, four assistant principals were interviewed individually. Three of the four assistant principals have worked at the high school for over a decade and each is responsible for overseeing one of the four small learning communities in the school. Their insight regarding the role of leadership, resource identification, and policies and practices were helpful in obtaining information for this case study. Their participation was voluntary.

The researcher conducted focus group sessions with the instructional leadership team, school business partners, and students. Focus groups allowed the researcher “to bring together a group of individuals representative of the population whose ideas are of interest” (Rubin & Rubin, 2012, p. 30). The instructional leadership team consisted of twelve educators and included: four assistant principals, one vocational technical director, five department heads (English, math, science, social studies, special education), the MCAS Specialist and the Focused Instructional Coach. The instructional leadership team is responsible for analyzing student and school data, developing and implementing the Worcester Technical High School Accountability
Plan, and developing professional development to support school initiatives. Their insights regarding school initiatives and experience working in the school was invaluable. Their participation was voluntary.

The school business partners’ focus group consisted of four community-business leaders and were chosen from the general advisory board as well as existing school business partnerships. Each partner was selected based on his or her involvement with the school. These groups were able to discuss various topics and build upon each other’s comments. Group members can “respond to each other’s points, agreeing, disagreeing, or modifying in any way they choose.” (Rubin & Rubin, 2012, p. 30). The final focus group consisted of five senior students from Worcester Technical High School. Students were selected by the guidance department head based on student involvement and availability. A focus group structure had been selected to make students feel more comfortable in the interview process. Their participation was voluntary and their names will remain confidential.

Purposeful sampling was used as the sampling strategy for this case study. Maxwell (2005) states, “purposeful sampling…is a strategy in which particular settings, persons, or activities are selected deliberately in order to provide information that can’t be gotten as well from other choices” (p. 88). Individuals for interviews and focus groups sessions were selected to target different perspectives regarding the transformation of Worcester Technical High School.

Data Collection

Case study research demands the seeking of rival explanations throughout the research process (Yin, 2012, p. 14). Data collection should involve a deliberate and vigorous search for “discrepant evidence,” as if you were trying to establish the potency of the plausible rival rather
than seeking to discredit it (Patton, 2002, p. 276; Rosenbaum, 2002, pp. 8-10). Finding no such evidence despite a diligent search increases confidence about this case study’s later descriptions, explanations, and interpretations. Interviews and focus groups were conducted to collect data on the perspectives of Worcester Technical High School’s administration, faculty, school partners, and students over the last seven years. Interviews and focus groups were conducted face to face. Through in-depth qualitative interviewing, "researchers explore in detail the experiences, motives, and opinions of others and learn to see the world from perspectives other than their own" (Rubin and Rubin, 2012, p.3). All interviews were recorded. The chair of the school’s General Advisory Board is 77 years old and has been an advisory board member for over 50 years. The researcher took ancillary notes and jotted down key points of interest or potential thoughts for further consideration. By preserving the words of the participants, researchers have their original data...the researchers can return to the source and check for accuracy (Seidman, 2006, p. 114).

Focus groups were conducted with three groups: the instructional leadership team, school business partners, and students. Krueger (1998) defines the focus group as “a carefully planned discussion designed to obtain perceptions on a defined area of interest in a permissive, nonthreatening environment .... The discussion is relaxed, comfortable, and often enjoyable for participants as they share their ideas and perceptions. Group members influence each other by responding to ideas and comments in the discussion” (p. 18). Mertens (2005) adds, “This reliance on interaction between participants is designed to elicit more of the participant’s points of view than would be evidenced in more researcher-dominated interviewing” (p. 245).

Information gained by soliciting various perspectives on the school’s transformation from the
teachers, administrators, school business partners, and students led to the collection of data that assisted in answering the research questions.

Interviews were conducted with several current and past contributors to Worcester High School’s improvement efforts. The chair of the general advisory board, which has over 350 members, was interviewed. The retired Worcester Technical High School’s Director of Career and Technical Education was interviewed. The director has over twenty years of work experience at the school and assisted in the design of the new facility, program development, and the coordination of the seamless transition from the old facility to the new. In addition, the director had worked directly for five previous principals and was able to address leadership questions. Individual interviews were conducted with four assistant principals. Three out of the four assistant principals have worked at the school for over ten years. They have also worked for four previous principals, have experience with various school initiatives, and shared their perspective on the reasons for the transformation.

In addition to conducting interviews and focus groups, the researcher reviewed school documents and data. Documents reviewed were the school improvement plans for the past six years, the STEM Early Career and College Innovation Plan, partner agreements and entrustments, and commendations. This information was used to address the research questions, as well as support and document the student and school success. This information was used to illustrate the significance of the school’s transformation.

Interviews were semi-structured for this study. The interviews took place at a scheduled time. In addition, extended conversation between researcher and interviewee were built into the appointment. The interviewer has a specific topic that was addressed with a prepared number of questions in advance.
All interviews ranged from 45-60 minutes in length (Seidman, 2006). All interviews were recorded, with permission. An interview protocol was created to log information learned during the interview. This allowed the interviewer to take notes during the interview about the responses of the interviewee (Creswell, 1998). The interview protocol outlined “the thoughts on items such as headings, information about starting the interview, concluding ideas, information on ending the interview, and thanking the respondent” (Creswell, 1998, p. 126). This particular interview protocol form has a summary of the research project, a human rights statement, a set of interview questions, and a thank you reminder.

Original records such as contact information sheets, informed consent forms, and audiotapes is kept in a secure file cabinet to guard against the names of participants being accidentally revealed. Two additional copies of materials are stored; one on a flash drive and the other saved on a computer’s hard drive which is saved to a server. All material are secured and labeled by number. Individual's confidentiality is protected through a numbering system.

**Data Analysis**

Interviews were recorded, transcribed, coded, and analyzed for common themes to identify multiple stakeholders’ perspectives on how the school improved and the role that leadership, strategies, and use of resources played in its improvement.

The process of data analysis involved “preparing the data for analysis, conducting different analyses, moving deeper and deeper into understanding the data, representing the data, and making an interpretation of the larger meaning of the data” (Creswell, 2009, p. 183). After gaining a general sense of the data from various sources, data was transcribed and coded. A transcribing company transcribed all interviews. A contract was established to ensure a participant confidentially was protected. Two hard copies were printed of each of the transcripts.
The researcher used the system outlined by Seidman (2006). Each transcript was coded with an initial of the participant, a Roman numeral for the number of the interview in the three-interview sequence, and Arabic numbers for the page number of the transcript on which the passage occurs.

According to Grbich (2007), when codes are applied and reapplied to qualitative data, you are codifying - a process that permits data to be “segregated, grouped, regrouped and relinked in order to consolidate meaning and explanation” (p. 21). Saldana (2009) outlined coding methods that are broken down into two main sections: First Cycle and Second Cycle methods. In Vivo and Process Coding will be used for the first cycle coding methods. In Vivo captures “behaviors or processes which will explain to the analyst how the basic problem of the actors is resolved or processed” (Strauss, 1987, p.33). Process Coding was administered to search for “ongoing action/interaction/emotion taken in response to situations, or problems, often with the purpose of reaching a goal or handling a problem” (Corbin & Strauss, 2008, pp. 96-7). The second cycle coding method that was administered was Pattern Coding. Pattern Coding is a way of “grouping those summaries into a smaller number of sets, themes, or constructs” (Miles & Huberman, 1994. P. 69). The researcher used this process to help develop theories based on the codes and themes that emerged from the data.

Validity and Credibility

According to Seidman (2006), “It is the researcher’s task to present the experience of the people he or she interviews in compelling enough detail and in sufficient depth that those who read the study can connect to that experience, learn how it is constituted, and deepen their understanding of the issues it reflects” (p. 51). In doing so, there are several issues this researcher had to address to ensure information was valid and credible.
First, there could have been a possible conflict between the researcher’s role as the principal and the role as a researcher in a case study conducted at the school in which she works. The researcher was careful not to let any bias for the school interfere with the validity of the research process. To address this issue, the researcher clarified the bias the researcher brought to this research study. According to Creswell (2009), “self-reflection creates an open and honest narrative that will resonate well with readers” (p. 192). In the research study, the researcher provided comments regarding how the interpretation of the findings was shaped by one’s background and involvement with the school.

The researcher also considered the relationship she has with the participants in the study. Faculty members who were interviewed were assured that the information they provided was held up to strict confidentiality and privacy codes. In addition, information that was gathered through the interviews was not used against the person or people participating in the conversation. As the principal, the researcher is responsible for teacher evaluations and needed to make sure there was not a conflict with the participants. Participants were assured that participation was voluntary and information gathered was confidential.

The researcher needed to make sure that there was not an over-generalization of the data and findings through the interview, focus groups, and evaluation of documents. In addition, the researcher did not deemphasize problems that were at the school. It was essential to present a factual case study of the successful practices that occurred to create a transformed school. According to Lincoln & Guba (1985), “Rather than decrying the fact that the instrument used to gather data affects this process, we say the human interviewer can be a marvelously smart, adaptable, flexible instrument who can respond to situations with skill, tact, and understanding (p. 107).
To address these issues, the researcher employed two validation strategies: **triangulating** and **member checking** to check for accuracy. In collecting case study data, the main idea was to “triangulate” or establish converging lines of evidence to make the findings as robust as possible (Yin, 2005). Triangulation refers to “triangulating different data sources of information by examining evidence from the sources and using it to build a coherent justification from themes” (Creswell, 2009, p. 191). The validity of the study was established by the convergence of several sources of data or perspectives from participants to confirm themes. Yin (2005), cautions that triangulation is not always as easy as it seems. “Sometimes, as when you interview different teachers and the principal, all appear to be giving corroborating evidence about how their school operates…but in fact, they all may be echoing the same institutional ‘mantra,’ developed over time for speaking with outsiders” (Yin, 2005, pp. 386-387). The second strategy, member checking, provided participants an opportunity to give the researcher feedback on their findings. According to Creswell (2009), participants receive the final report or specific descriptions or themes and are given the opportunity to confirm accuracy. The researcher conducted a follow-up interview with participants in the study and provided an opportunity for them to comment on the findings.

**Protection of Human Subjects**

Regulation 45 CFR 46, requires colleges, universities, hospitals, research institutes, and other organizations that conduct human research and receive federal funding to establish local Institutional Review Boards (IRBs) (Seidman, 2006, p. 59). The researcher developed an IRB for the Human Subjects Review Board at Northeastern University seeking permission for this research project. The researcher completed an IRB application that included a brief description of the aim of the research, the nature of the participants, the research methodology, the
researcher’s qualifications to do research, the risks and benefits involved in the research, and how the researcher will obtain informed consent from the potential participants (Seidman, 2006).

Each interviewee completed a consent form. The consent form included:

- Their right to voluntarily withdraw from the study at any time.
- The central purpose of the study and the procedures to be used in data collection.
- Comments about protecting the confidentiality of the respondents.
- A statement about known risks associated with participation in the study.
- The expected benefits to accrue to the participants in the study.
- A place for them to sign and date the form (Creswell, 1998, p.115-116).

All participants’ information is held in the strictest of confidence. No other individual has seen any identifying information regarding any participant who volunteered to be part of this study. A coding system was used to protect the identities of individuals participating in the focus groups and interviews. The researcher was the only person who knew the coding system. As suggested by Creswell (2009), all participants will be offered access to a preliminary copy of any publication that comes out of the research.

**Conclusion**

The purpose of this case study was to explore effective practices, leadership qualities, and educational factors that have led to the transformation of Worcester Technical High School. The study describes the conditions that had led to improved student achievement and outcomes. Worcester Technical High School was the lowest performing high school in the city of Worcester and one of the lowest performing vocational schools in Massachusetts. In six short years, the school is the highest achieving comprehensive high school in Worcester and a national model for successful vocational technical education.
Through the lens of distributed leadership and the Burke-Litwin Model of Organizational Change, research questions were intended to elucidate patterns and themes that established identifiable steps and principles related to the school and student success. Focusing on how leadership guided the transformation of this vocational/technical school provided insight into potential leadership qualities that are conducive to affecting other schools working on effective school change. Collecting data to answer these questions has allowed for a deeper understanding of change and the magnitude these concepts played in the success of the school.

Chapter IV: Research Findings

The purpose of this chapter is to present the results of this study from across the numerous stakeholders interviewed and as contributed to through the focus groups. The commentary from the various stakeholders – administrators, business partners, teachers, and students – will contribute to our understanding of the transformation of Worcester Technical High School, from a school at the verge of being closed in 1997 to a school that has become a national model for vocational technical education. To provide this story (case study), individual interviews and numerous focus groups were conducted. In addition, school documents were reviewed.

In this chapter, the first section provides the purpose of the case study. The next three sections present the history of Worcester Technical High School, including the improvement in student achievement on state exams and graduation rates, as well as the multiple awards the school given the school for its progress and outcomes. The last three sections present the emerging themes as identified through a deliberate review and analysis of the multiple interviews and focus groups in relationship to each of the four research questions, as well as a review of school documents. The final section presents a summary of key research findings.
Purpose of the Case Study

The main goal of this research study was to identify and to describe the key factors that led and contributed to the transformation of Worcester Technical High School. Although there were student gains on state exams from 2002-2006, the school remained the lowest performing high school in the city of Worcester and scored significantly below the state average. From 2006-2012, Worcester Technical High School closed the achievement gap and is presently scoring at the state level. WTHS has become one of the premier vocational technical schools in New England. For this case study, interviews and focus groups were conducted with administrators, faculty members, students, and business leaders who have first hand experience with the school and have play a significant role in this transformation. In addition, a document analysis of relevant school improvement plans, leadership team meeting minutes, significant initiative and program development effort artifacts, and proposals was conducted to further inform the presentation of the case study. This has led to the identification of specific initiatives and potentially culture changing events that led to the school’s transformation. This case study has sought to identify the actions, strategies, and resources that may have significantly contributed to the improvement of the school, as identified by multiple stakeholders over time. Furthermore, this study may provide some recommendations as to how other low performing schools could similarly improve.

History of Worcester Technical High School

In this section, information will be provided relevant to the history of Worcester Technical High School as it relates to its purpose and design. Worcester Technical High School is over 100 years old and has had to adapt to the changing times. This section outlines three specific eras important to the school’s history: 1910-1990, initial founding and history of the
school, including purpose and design; 1990-2002, in search of a new site; 2002-2006, a new building and purpose is born; 2006-present, a transformation. The purpose of providing this background is to describe the rich tradition the vocational school has had in the city of Worcester. It also provides details of the difficulties the school faced in keeping the education and training current with business and industry expectations.

1910-1990, initial founding and early history. According to the *Worcester Technical High School 100 Year Anniversary* Magazine (2011), Worcester Boys Trade (the original name of Worcester Technical High School) was one of the first vocational schools built in this country. Local industrialists whose companies were the very foundation of the local economy saw the need for trained workers. Milton Higgins, George F. Fuller, George Alden, and others were closely connected with Worcester industry and had the foresight to understand that manufacturing processes in machinery were growing ever more complex, and on the job training simply was not enough to meet their needs for skilled workers in their shops and factories. Worcester Boys Trade School opened in 1908 to provide the training and talent to fuel the Worcester area economy, an economy that was largely based on metals manufacturing, textiles, and abrasives. The original building opened with 50 students. The cost for construction was $117,000 and was fully funded by private dollars.

A decade after the Worcester Trade School was opened, another prominent business owner built the Fanning Trade School, an all girls trade school. Eventually the two schools merged and the school was renamed as Worcester Vocational High School. Although there were several name changes, the mission and purpose of the school stayed the same, to train graduates to enter the world of work.
1990-2002, search of a new site. For decades, the city knew Worcester Vocational High School needed a new building. It was a very difficult task to find a different site and secure funds to build the new facility. Up until 1997, Worcester Vocational High School had operated as an independent department reporting directly to city administration. In 1995, city manager, Thomas Hoover, announced that the first site choice for a new school building would be in the Beacon-Brightly section of Worcester. But there were two problems: The state’s formula for covering new school costs would not pay the $14 million it would cost to acquire the land; and even though some neighborhood activists liked the idea, many others were irritated at being the last ones to know about it. According to *The long, hard, litigious, heartbreaking triumphant struggle to build a new Voke School*, “after two neighborhood meetings drew hundreds of attendees and the budget realities began to set in, the plan was withdrawn” (Worcester Magazine, 2003, p. 3).

City Manager Hoover then appointed a blue-ribbon commission to study dozens of alternate sites. The project became more urgent after the New England Association of Schools and Colleges (NEASC) placed Worcester Vocational High School’s accreditation on “warning status” and threatened to pull the entire accreditation if the facilities remained out-of-date. In April of 1997, the city manager made two major announcements. His blue-ribbon commission recommended building the school on Belmont Hill and Thomas Hoover announced his intent to merge the vocational school department into the regular public school system. Merging the two would make the new voke building project eligible for a 90% reimbursement rate from the state instead of the 77% the school would have received if it remained on its own. The community was not in agreement with this decision. As Worcester Magazine (2003) wrote:
The labor unions and school activists went nuts, concerned the Voke School would lose its independence. At an AFL/CIO-sponsored debate that fall, every candidate for city council or school committee said they would oppose the merger. A public hearing on the issue lasted five hours as 44 speakers rose to oppose the plan. Yet reality eventually set in. Concerned about both funding and accreditation, the City Council voted in March 1998 to merge the two systems (p. 4).

Again according to Worcester Magazine (2003), a week later, Hoover formally unveiled his proposal to build the school on Belmont Hill, where the city owned 37 acres of land. The original site-search committee had recommended using just Belmont Hill land; but because the state guidelines required a new school to be sited on at least 35 acres, and some of the city-owned property was wetlands, Hoover’s plan included 5.8 acres of Green Hill Park. Area residents and park supporters were outraged. This led to three years of bitter arguments, insults traded in newspapers, and lawsuits and appeals winding through the state Department of Environmental Protection’s court and administrative system. According to Larry Freed, the leader of the lawsuits representing The Green Hill Coalition, “We sat down and met with the city manager and other officials and said look, either move the school or do what you can to stay away from the park” (Worcester Magazine, 2003, p.4). School Superintendent James Garvey, who had become a major player as a result of the merger, said, “I’m not moving the school, not one brick, not one inch” (Worcester Magazine, 2003, p. 4).

The lawsuits were eventually settled. According to the settlement agreement, the city got its school site and the park was granted a permanent conservation restriction, assuring that the land be only used for park purposes in perpetuity. On June 10, 2002 the Groundbreaking Ceremony was held. According to school documents, construction of the new facility cost $60
million, of which $6 million had been budgeted by the City of Worcester. State and Federal School Building Assistance funds were provided, at a nine to one match, to meet the rest of the construction costs. Equipment costs were another $30 million. Private interests stepped up to meet the equipment costs with a $3 million capital fundraising campaign. The money raised by this private campaign also qualified for the matching funds to meet the $30 million needed for up to date tools, training aids, equipment, and systems for all students. All fundraising costs were privately underwritten, so every dollar raised went directly towards needed equipment and technology. This private fundraising effort continued a long Worcester tradition that began in 1908, when Worcester Trade School, was built with funds contributed by local industrialists.

2002-2006, a new building and purpose is born. According to the *Worcester Technical High School 100 Year Anniversary* magazine (2011), Worcester Technical High School was designed as a 400,000 square foot facility housing four Small Learning Communities. This was a shift from the previous mission of the school to train students for the world of work. Times had changed and business and industry were expecting students to have strong writing and literacy skills. Worcester Technical High School was not providing proper academic preparation. This was evident in the school’s first year of MCAS scores. According to the DESE website, in 2002, 4% of the Worcester Technical High School students scored proficient or above in the mathematics MCAS and 13% scored proficient or above in the ELA MCAS.

The Small Learning Community model was selected with the belief that it would provide a personalized learning community that supported all students, both academically and technically. The Smaller Learning Community Program Grant document, highlighted that the smaller learning community model would foster integrated academics, characterized by project-
based learning that incorporated real world applications that engaged students in their learning to properly prepare them for college and career. Funding from the Carnegie Foundation Planning Grant ($650,000 over 5 years) and a federally funded Smaller Learning Community Program Grant ($500,000 over 5 years) allowed the large high school of twenty-four technical programs to divide into four Small Learning Communities.

The goals, as written in the Smaller Learning Communities Program Grant, were to implement four Small Learning Communities that would:

- Increase student achievement and close the gap among subgroups
- Create new schools and cultures for more personalized learning environments.
- Give students a greater sense of purpose and relevance to the worlds of work, community, and higher education.
- Partner with local institutions of higher education to craft a richer and more rigorous curriculum that incorporates the wealth of the community’s resources.
- Provide high quality and sustained professional development for teachers in using new instructional methods designed to increase student engagement and persistence. (Smaller Learning Communities Program Grant, 2003, p. i).

The new school design would be based on housing four small learning communities: the Construction Academy, Alden Design and Engineering Academy, Allied Health Academy, and the Business Information Academy. The 24 previously independent vocational/technical areas would now be grouped together based on similar areas of concentrations to enhance student learning. The chart below lists each of the technical areas by small learning community academies.
Table 1
Identification of Four Small Learning Communities and the Programs in Each

<table>
<thead>
<tr>
<th>CONSTRUCTION</th>
<th>MANUFACTURING</th>
<th>HEALTH</th>
<th>BUSINESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carpentry</td>
<td>Automotive Tech</td>
<td>Early Childhood</td>
<td>Finance / Marketing</td>
</tr>
<tr>
<td>Electrical</td>
<td>Auto Collision Tech</td>
<td>Health Assistant</td>
<td>Office Technology</td>
</tr>
<tr>
<td>HVAC</td>
<td>Pre-engineering CAD Tech</td>
<td>Medical/Lab Assistant</td>
<td>Cosmetology / Personal Services</td>
</tr>
<tr>
<td>Heating/Ventilating/Air</td>
<td>Electronics/Telecommunications</td>
<td>Medical/Lab Assistant</td>
<td>Cosmetology / Personal Services</td>
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<tr>
<td>Conditioning/Refrigeration</td>
<td>Pre-engineering CAD Tech</td>
<td>Medical/Lab Assistant</td>
<td>Cosmetology / Personal Services</td>
</tr>
<tr>
<td>Sheet Metal</td>
<td>CISCO Academy Computer Tech</td>
<td>Vet Assistant</td>
<td>Culinary Arts</td>
</tr>
<tr>
<td>Interior Decorating &amp; Design</td>
<td>Machine Tech/Welding / Metal Tech</td>
<td>Environmental</td>
<td>Hotel / Tourism</td>
</tr>
<tr>
<td>Plumbing &amp; Pipefitting</td>
<td>Electromechanical Tech</td>
<td></td>
<td>Graphic Arts</td>
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</tbody>
</table>

In 2006, staff moved into the new school and adjusted and grew into their new environment and Small Learning Community model. Staff were able to adapt and feel comfortable in their new surroundings. Interpersonal relationships were established to work in the new SLC model. Technical instructors and academic teachers, for the first time, taught side by side instead of being on opposite wings of a building from one another. In a school document, one teacher stated, “I now meet with vocational instructors on a weekly basis. I never knew them before, yet we worked at the same school for two decades.”

2006-present, the transformation of the school. In July of 2006, Worcester Technical High School opened as an award winning facility. There was nothing but change. The school’s name changed from Worcester Vocational High School to Worcester Technical High School. The physical address changed from 2 Grove Street to 1 Skyline Drive. The school changed its mascot from a bulldog to an eagle. In addition, Sheila Harrity became the new principal, the first woman principal in the schools’ 97 year history. Ms. Harrity was unlike any previous principal. She had not worked at the school nor had she ever work in any vocational/technical schools. At the time, she was the principal of Wachusett Regional High School when she was asked to be the new principal of Worcester Technical High School. Prior to working for the Wachusett Regional
School District, Ms. Harrity had previously worked for Worcester Public Schools for thirteen years in various capacities including the School to Career Coordinator and the Coordinator of Work for Worcester’s Youth overseeing the placement of 2,100 students in summer employment.

The community had high expectations for the school. Political leaders and city officials had secured state and local money for the new facility, business and industry invested equipment, materials and 3 million dollars, and parents and the community were demanding quality education. The excuses of an antiquated facility were stripped away and administration and the teachers at Worcester Technical High School were going to be held accountable. The new principal needed to seize this transformational moment and lead this change. The new principal needed to implement the small learning community model, improve the student outcomes, and change the culture that the school needed to not only survive, but also thrive in the 21st-century. The new purpose of the school was to educate and prepare all students to graduate both college and career ready. These changes have created remarkable outcomes.

Student Achievement

In this section, the current school profile will be presented along with its history of student achievement up through 2012, with a particular emphasis on achievement data prior to 2006 and after 2006, when the school opened in the new building under the guidance of the new principal and a new vision for the school. Student achievement will be presented in terms of student proficiency on Massachusetts’ standardized tests (the MCAS), graduation and dropout rates, and college placement. And improvement in these areas will be considered by comparing this data to those of the other four comprehensive high schools in Worcester, the District
Analysis and Review Data (DARTs) schools identified by the state as comparable in size and student demographics*, as well as against all other high schools in the state.

* The Massachusetts Department of Elementary and Secondary Education provides a listing of comparable schools for comparison for each school throughout the state. This DART grouping is established by comparing demographics, assessment, student support, financial, and achievement gap data and can be found at profiles.doe.mass.edu/analysis.

**Student Profile.** Worcester Public Schools consists of 34 elementary schools, 4 middle schools, and 7 high schools for a total of 45 schools in the district. Worcester Technical High School is the largest of the seven public high schools in the City of Worcester housing 1,355 students (Worcester Public Schools, 2012). According to the DESE website, in the 2011-2012 school year, the demographics of Worcester Technical High School consisted of: 52% female, 48% male, 62% free or reduced lunch, 20% special needs students. The ethnic breakdown of the student population consisted of: 49% White, 35% Hispanic, 10% African-American, 5% Asian, 2% Multi race, and less than 1% Native American and Native Hawaiian (DESE, 2012).

Table 2

**Worcester Technical High School Student Profile**

| Worcester Technical High School Student Demographics |
|-----------------|-----------------|-----------------|
| Male            | 48%             | White           | 49%             |
| Female          | 52%             | Hispanic        | 35%             |
| Low Income      | 62%             | African-American| 10%             |
| Special Needs   | 20%             | Asian           | 5%              |
|                 |                 | Multi-Race      | 2%              |
|                 |                 | Native American / Native Hawaiian | <1%      |
Student proficiency on the Massachusetts standardized tests (MCAS). In Massachusetts, not unlike most states, student academic achievement is measured through statewide tests in reading (ELA) and math, and in Massachusetts only recently in science for the class of 2010 and beyond. In 2002, only 13% of the Worcester Technical High School students scored proficient or above in English Language Arts on the Massachusetts Comprehensive Assessment System (MCAS) exam. By 2012, that changed to 88% of Worcester Technical High School students scoring proficient or advanced. This is a 75% increase in a ten-year span (DESE, 2012). In comparison to the other four comprehensive high schools in Worcester Public Schools, the students at Burncoat High School, Doherty Memorial High School, North High School, South High Community High School, showed an average combined growth of 32% during the same time period (DESE, 2012). In addition, comparing Worcester Technical High School to their District Analysis and Review Tools (DARTs) comparable schools in MA, with the other DART schools showed a growth of 28% over the similar time period (DESE, 2012). The schools identified as comparable through the DESE DART are presented in Figures 4 and 5. Also in the same time period, the average percent proficient or above in 2002 for English Language Arts MCAS for all students in the state was 59%. By 2012, 88% of the MA students were scoring at the proficient or above categories. This is a 29% increase in a ten-year span (DESE, 2012). (See Figures 4 and 5 for ELA and math MCAS test score comparisons.)
As one can see in Figures 4 and 5 above, the gains at Worcester Technical High School over the last ten years did not only take place after the move to the new facility in 2006. There
were gains prior to that. According to colleagues that had worked at the school during that time, the student growth was attributed to three factors. In 1998, Worcester Vocational Technical High School merged with the Worcester Public Schools. Due to this merger, an academic focus was brought to the school along with resources for professional development and textbooks. In addition to the resources, in 2000 the school administration began developing a school improvement plan. It was suggested that developing a yearly plan provided a school-wide focus. The third factor that led to student growth was the development of a personal literacy and numerously plan for each student. Each quarter, all students were evaluated on their individual literacy and numerously growth and supports were put in place for struggling students.

The school could have maintained achievement gains similar to the other Worcester Public Schools and DART schools, but in fact, one would argue that the school would have continued to be underperforming. From 2006-2012, Worcester Technical High School moved beyond underperforming and outperformed Worcester Public Schools and the DART schools. As one can see in Tables 3 and 4 below, percent proficiency increased from 13% to 27% in ELA and 4% to 35% in math from 2002-2006. And from 2006-2012, percent proficiency increased from 27% to 88% in ELA and 35% to 78% in math. As can be seen in both figures, this is a significant increase over both time periods in comparison to the other Worcester comprehensive high schools, the identified DART comparison schools, as well as all high schools throughout the state. In comparison to the other WPS high schools, Worcester Tech went from 13% to 27% in ELA and 4% to 35% in math from 2002-2006 while the other WPS comprehensive schools went from 45% to 51% in ELA and 28% to 44% in math during that same period. And from 2006-2012, Worcester Tech went from 27% to 88% in ELA and 35% to 78% in math while the other WPS comprehensive schools went from 51% to 77% in ELA and 44% to 64% in math during
that same period. Similarly, in comparison to the DART schools, Worcester Tech went from 13% to 27% in ELA and 4% to 35% in math from 2002-2006 while the DART schools went from 48% to 56% in ELA and 30% to 50% in math during that same period. And from 2006-2012, Worcester Tech went from 27% to 88% in ELA and 35% to 78% in math while the DART schools went from 56% to 76% in ELA and 50% to 64% in math during that same period. And, finally, in comparison to all high schools in the state, Worcester Tech went from 13% to 27% in ELA and 4% to 35% in math from 2002-2006 while all high schools in the state went from 59% to 70% in ELA and 44% to 67% in math during that same period. And from 2006-2012, Worcester Tech went from 27% to 88% in ELA and 35% to 78% in math while all the high schools in the states went from 70% to 88% in ELA and 67% to 78% in math during that same period (DESE, 2012).

Table 3

**ELA MCAS % gains from 2002-2012**

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>WTHS</td>
<td>13%</td>
<td>27%</td>
<td>14%</td>
<td>88%</td>
<td>61%</td>
</tr>
<tr>
<td>WPS</td>
<td>45%</td>
<td>51%</td>
<td>6%</td>
<td>77%</td>
<td>26%</td>
</tr>
<tr>
<td>DART</td>
<td>48%</td>
<td>56%</td>
<td>8%</td>
<td>76%</td>
<td>20%</td>
</tr>
<tr>
<td>All MA H.S.</td>
<td>59%</td>
<td>70%</td>
<td>11%</td>
<td>88%</td>
<td>18%</td>
</tr>
</tbody>
</table>

Table 4

**Math MCAS % gains from 2002-2012**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>WTHS</td>
<td>4%</td>
<td>35%</td>
<td>31%</td>
<td>78%</td>
<td>43%</td>
</tr>
<tr>
<td>WPS</td>
<td>28%</td>
<td>44%</td>
<td>16%</td>
<td>64%</td>
<td>20%</td>
</tr>
<tr>
<td>DART</td>
<td>30%</td>
<td>50%</td>
<td>20%</td>
<td>64%</td>
<td>14%</td>
</tr>
<tr>
<td>All MA H.S.</td>
<td>44%</td>
<td>67%</td>
<td>23%</td>
<td>78%</td>
<td>11%</td>
</tr>
</tbody>
</table>
Another way of looking at student growth is to compare the number of students scoring advanced with the number of students failing. From 2006-2012, the advanced rate increased by 21% in ELA and 29% in math; while the failure rate decreased by 13% in ELA and 20% in math. (Please see Figure 6 below for MCAS student growth.)

![ELA and Math MCAS Improvements](DESE, 2012)

**Figure 6. ELA and Math MCAS Improvements**

**Student achievement for all.** The school’s success can also be documented through an examination of the performance of subgroups. In the case of Worcester Tech, in 2012, the overall proficiency rate for the school was 88% in ELA and 78% in mathematics. The performance of subgroups is as follows: the low income proficiency rate was 85% in ELA and
75% in math, the African American proficiency rate was 86% in ELA and 63% in math, and the Hispanic rate was 87% in ELA and 68% in math. (DESE, 2012). (Please see Figures 7 and 8 below for ELA and math MCAS subgroup test scores.)

![ELA MCAS Scores for Subgroups](Image)

*Figure 7. ELA MCAS Scores for Subgroups* (DESE, 2013)

![Math MCAS Scores for Subgroups](Image)

*Figure 8. Math MCAS Scores for Subgroups* (DESE, 2012)
From 2006-2012, there was a 61% gain in the passing rate in ELA and a 43% gain in math for the overall student population. The Hispanic students also had a 61% gain in ELA and 35% increase in math. The low income students showed a 58% gain in ELA and 43% increase in math. Additionally, the black students had a 48% in ELA and a 23% increase in math. (Please see Table 5 below for the 2006-2012 ELA and math MCAS subgroup % gains.)

Table 5

ElA and Math MCAs % Gains for Subgroups from 2006-2012

| ELA and Math MCAS % Gains for Subgroups from 2006-2012 |
|----------------|----------------|----------------|----------------|
|                | Low Income     | Black          | Hispanic       | Overall        |
| ELA            | 58%            | 48%            | 61%            | 61%            |
| Math           | 43%            | 23%            | 35%            | 43%            |

Science. In addition to the achievement gains in ELA and math, Massachusetts began testing high school students in science for the class of 2010 and beyond. According to the DESE website, for the 2011 MCAS Science exam, 94% of 9th and 10th grade students passed with a 6% failure rate. In the past four years, the Biology MCAS passing rate has increased by 22% and the failure rate has decreased by 11%. In 2011, 6% of WTHS’s students were at the Warning/Failure level versus 7% from the state and 15% from the district. Over the past three years, WTHS has outperformed the district and state on the Biology MCAS in all major sub group populations. WTHS’s special populations including Special Education, ELL, Low-income, Hispanic, and African American Black, have higher pass rates than their peers throughout the district and state (DESE, 2012).
Graduation and dropout rates. Worcester Technical High School has outperformed the four comprehensive high schools in the district, the DART schools, and the state in graduation and dropout rates. As one can see in Figures 9 and 10, the graduation rate at Worcester Technical High School increased from 79.3% to 96.4% and the dropout rate decreased from 6.5% to 1.5% from 2006-2012. As can be seen in both figures, this is a significant increase the graduation rate and an extremely low dropout rate in comparison to the other Worcester comprehensive high schools, the identified DART comparison schools, as well as all high schools throughout the state. In comparison to the other WPS high schools, Worcester Tech’s graduation rate increased from 79.3% to 96.4% and the dropout rate decreased from 6.5% to 1.5%, while the other WPS comprehensive schools graduation rate decreased from 67.2% to 66% and the dropout rate decreased from 17% to 14% during that same period. Similarly, in comparison to the DART schools, Worcester Tech’s graduation rate increased from 79.3% to 96.4% and the dropout rate decreased from 6.5% to 1.5%, while the DART schools graduation rate increased from 69% to 76% and the dropout rate decreased from 19% to 11% during that same period. And, finally, in comparison to all high schools in the state, Worcester Tech’s graduation rate increased from 79.3% to 96.4% and the dropout rate decreased from 6.5% to 1.5%, while all high schools in the state graduation rate increased from 79.9% to 85% and the dropout rate decreased from 11.7 to 6.9% during that same period. (Please see figures 9 and 10 below for comparison graduation and dropout rates.)
AP offerings and participation. This proven track record of growth has fostered an atmosphere of high expectations for all students. With these expectations in place, the school
continued to move forward, adding more rigorous courses to Worcester Technical High School’s curriculum and course offerings, including pre-Advanced Placement and Advanced Placement courses. Presently, course levels at Worcester Technical High School range from resource and inclusion to college, honors, and advanced placement levels. In 2008, Worcester Technical High School offered its first Advanced Placement (AP) course. AP Biology was added to the curriculum to increase rigor and enhance students’ opportunities for acceptance into pre-med and four year STEM programs in college. This AP course supported students in specific technical areas within the Allied Health/Human Services small learning community. According to grant documents, in 2010, the school applied for and received the Massachusetts Math and Science Initiative (MMSI) Grant to support the advanced placement initiative. Worcester Technical High School was one of two vocational schools supported by the National Math and Science Initiative (NMSI). The school has expanded advanced placement offerings to include: AP English Language, AP English Literature and Composition, AP Statistics, AP Environmental Science, AP Computer Science, and AP Physics. In the first year of the MMSI Grant (2011), there was a 93% increase in students taking advanced placement courses with a 63% increase in qualifying scores (College Board, 2012). Also, in the past two years, there has been a 72% increase in students taking AP math, science, and English exams, which resulted in a 105% growth in qualifying scores in AP math, science, and English. Furthermore, according to MMSI documents, in the past three years, there has been a 141% increase in students enrolled in AP math, science, and English (MMSI, 2012).

**Two and four-year college attendance.** This increased rigor has led to an increase in college placement. For the WTHS graduating class of 2011, 77% of the students went on to two and four-year colleges, 18% went to work directly connected to their technical studies. There
has been a steady trend of more graduates attending two and four year colleges and universities. Additionally, there has been a steady trend of more students attending four-year colleges and fewer students attending 2-year colleges. In 2002, 57.0% of Worcester Technical High School graduates went on to 2-year colleges. In 2011, 37.8% of students went on to two-year colleges. This is a 49.2% decrease (NBC Education Nation, 2012). (Please see Figure 11 below for 2-Year Placement for the past 9 years.)

![2-Year College Placement at Worcester Technical High School](image)

**Figure 11. WTHS 2-Year College Placement Rate** (NBC Education Nation, 2012)

Conversely, 4-year college placement rates increased by 29% in the same time frame. In 2002, 9.9% of Worcester Technical High School students attended a 4-year college. By 2011, 38.9% of the students were attending 4-year colleges. The most significant increase occurred in the 2009-2011 year. The 4-year college placement rose from 8.7% to 38.9%. This is a 30.2% increase in three years (NBC Education Nation, 2012). (Please see Figures 12 and 13 below for 4-year college placement rates as well as 2 and 4-college place rate comparisons.)
Since WTHS opened in 2006, the school and its students have earned several awards and have been recognized for outstanding student success. In 2006, *School Planning and Management Magazine* awarded Worcester Technical High School the Impact on Learning Award.
Award in the category of non-traditional learning space. In 2009, WTHS was selected as one of 15 public high schools featured in *How High Schools Become Exemplary* by the Achievement Gap Initiative at Harvard University. In 2011, MetLife and the National Association of Secondary School Principals (NASSP) selected WTHS as a National Breakthrough School Award recipient. This national award is presented to five high schools and five middle schools across the country. WTHS was the only high school selected in New England. The award recognizes schools achieving outstanding student gains in high poverty areas. In addition, in 2011, WTHS was selected by NASSP to be featured at the NASSP/Alliance for Excellent Education Event at the nation’s capital in Washington, D.C. Also in 2012 and 2013, Worcester Technical High School was selected as a Breaking Ranks Showcase School at the NASSP Conference. Furthermore, in September of 2012, NBC Education Nation selected Worcester Technical High School as one of 10 schools/programs featured as a Case Study for school districts across the country to replicate for student success. In addition, the school was featured on the Today Show and at the NBC Education Nation Summit on September 25, 2012 (NBC Education Nation, 2012).

**Interviews and Focus Groups**

As a case study, the researcher conducted several interviews and focus groups with a variety of leaders, staff, students and other stakeholders to investigate and understand the transformation of Worcester Technical High School through a variety of perspectives. For this purpose administrators (6), teachers (7), students (16), and school partners (5), which included the Chair of the General Advisory Board, were individually interviewed or participated in targeted focus groups. Their stories, incorporating their perceptions of the school factors leading to the transformation, potential leadership qualities, and resources that were of particular value
have led to meaningful insight into the key elements that led Worcester Technical High School in its transformation.

Interviews were conducted with several current and past contributors to Worcester Technical High School’s improvement efforts. The chair of the general advisory board, which has over 350 members, was interviewed. The chair of the general advisory has been on the general advisory board for over fifty years. The retired Worcester Technical High School’s Director of Career and Technical Education was also interviewed. The director has over twenty years of work experience at the school and assisted in the design of the new facility, program development, and the coordination of the seamless transition from the old facility to the new. The director also worked for five previous principals and was able to address leadership questions. Individual interviews were also conducted with four assistant principals and the present Director of Career and Technical Education. The four assistant principals had all worked at the school for over twenty years each. They have also worked for five previous principals, have experience with various school initiatives, and shared their perspective on the reasons for the transformation.

Table 6

*Persons interviewed*

<table>
<thead>
<tr>
<th>Name</th>
<th>Current/Former Position</th>
<th>Years in Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kyle Brenner</td>
<td>Director of Career &amp; Technical Education</td>
<td>2</td>
</tr>
<tr>
<td>Ted Coghlin</td>
<td>Chair of General Advisory Board</td>
<td>50+</td>
</tr>
<tr>
<td>William Cousins</td>
<td>Assistant Principal</td>
<td>20</td>
</tr>
<tr>
<td>Peter Crafts</td>
<td>Former Director of Technical Education</td>
<td>21</td>
</tr>
<tr>
<td>Dalene McClintock</td>
<td>Former Assistant Principal</td>
<td>32</td>
</tr>
<tr>
<td>Mary O’Malley</td>
<td>Assistant Principal</td>
<td>25</td>
</tr>
<tr>
<td>Mary Lou Zamarro</td>
<td>Assistant Principal</td>
<td>22</td>
</tr>
</tbody>
</table>
The researcher also conducted focus group sessions with the instructional leadership team, school business partners, and students. Focus groups allow the researcher to bring together a group of individuals representative of the population whose ideas are of interest (Rubin & Rubin, 2012). The instructional leadership team consisted of eleven educators and included: four assistant principals, seven teachers, which included five department heads (English, math, science, social studies, special education), the MCAS Specialist and the Focused Instructional Coach. The instructional leadership team is responsible for analyzing student and school data, developing and implementing the Worcester Technical High School Accountability Plan, and developing professional development to support school initiatives. Their insights regarding school initiatives and experience working in the school has been invaluable.

Table 7

Focus group participants

<table>
<thead>
<tr>
<th>Focus Group Participants</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>School Business Partners</strong></td>
<td><strong>Position</strong></td>
</tr>
<tr>
<td>Dale Allen</td>
<td>Vice President, Quinsigamond Community College</td>
</tr>
<tr>
<td>Karen Duffy</td>
<td>CEO, Worcester Credit Union</td>
</tr>
<tr>
<td>Deborah Kochevar</td>
<td>Dean, Cummings School of Veterinary Medicine at Tufts University</td>
</tr>
<tr>
<td>Michael O’Brien</td>
<td>City Manager, City of Worcester</td>
</tr>
<tr>
<td><strong>ILT</strong></td>
<td><strong>Position</strong></td>
</tr>
<tr>
<td>Kyle Brenner</td>
<td>Director of Career and Technical Education</td>
</tr>
<tr>
<td>Azad Chaparian</td>
<td>Science Department Head</td>
</tr>
<tr>
<td>Betty Copeland</td>
<td>Mathematics Department Head</td>
</tr>
<tr>
<td>William Cousins</td>
<td>Assistant Principal</td>
</tr>
</tbody>
</table>
The school business partners’ focus group consisted of four community-business leaders that were chosen from the general advisory board as well as existing school business partnerships. The focus group consisted of the City Manager of the City of Worcester, Mr. Michael O’Brien; Dr. Deborah Kochevar, Dean of Tufts University; Mrs. Karen Duffy, CEO of Worcester Credit Union; and Dr. Dale Allen, Vice President of Quinsigamond Community College. Each partner was selected based on his or her involvement with the school. The group discussed various topics and built upon each other’s comments. The final focus groups consisted of four student focus groups, totaling 16 students from Worcester Technical High School. Students were selected by the guidance department head based on student involvement and availability. A focus group structure has been selected to make students feel more comfortable in the interview process.
Purposeful sampling was used as the sampling strategy for this case study. Maxwell (2005) states, “purposeful sampling…is a strategy in which particular settings, persons, or activities are selected deliberately in order to provide information that can’t be gotten as well from other choices” (p. 88). Individuals for interviews and focus group sessions were selected to target different perspectives regarding the transformation of Worcester Technical High School.

**Coding**

Interviews were recorded, transcribed, coded, and analyzed for common themes to identify multiple stakeholders’ perspectives on how the school improved and the role that leadership, strategies, and use of resources played in its improvement.

The process of data analysis involves preparing the data for analysis, conducting different analyses, moving deeper and deeper into understanding the data, representing the data, and making an interpretation of the larger meaning of the data (Creswell, 2009, p. 183). After gaining a general sense of the data from various sources, data was transcribed and coded.

According to Grbich (2007), when codes are applied and reapplied to qualitative data, you are codifying -- a process that permits data to be “segregated, grouped, regrouped and relinked in order to consolidate meaning and explanation” (p. 21). Saldana (2009) outlined coding methods that are broken down into two main sections: First Cycle and Second Cycle methods. In Vivo and Process Coding was used for the first cycle coding methods. In Vivo captures “behaviors or processes which will explain to the analyst how the basic problem of the actors is resolved or processed” (Strauss, 1987, p. 33). Process Coding was administered to search for “ongoing action/interaction/emotion taken in response to situations, or problems, often with the purpose of reaching a goal or handling a problem” (Corbin & Strauss, 2008, pp. 96-7). The second cycle coding method that was administered was Pattern Coding. Pattern Coding is a
way of “grouping those summaries into a smaller number of sets, themes, or constructs” (Miles & Huberman, 1994. P. 69).

**Document review and supporting evidence.** In addition to conducting interviews and focus groups, the researcher reviewed a variety of targeted school documents and school data. Documents reviewed include school improvement plans for the past seven years, the WTHS STEM Early Career and College Innovation Plan, partnership agreements and entrustments, newspaper articles, grants, and commendations. The school data included: student achievement data, graduation rates, and dropout rates, as previously reported.

In the presentation of themes, identified through the interviews and focus group sessions, supporting evidence has been provided for each theme. This information was used to address the research questions, provide evidence, as well as support and document the student and school success. This information illustrated the significance of the school’s transformation.

**Research Question #1: How did WTHS become a high performing school?**

Responses in relationship to Research Question #1 were predominately discussed by the instructional leadership team, current school administration, and students. Table 8 presents the themes identified from a review of transcripts across the focus groups and individual interviews.

Table 8

*Themes in relationship to the question: How did WTHS become a high performing school?*

<table>
<thead>
<tr>
<th>Theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>A move into a new state-of-the-art learning facility in tandem with a new leader led to a new vision and culture of the school</td>
</tr>
<tr>
<td>Personalized learning that is student centered</td>
</tr>
<tr>
<td>Authentic learning</td>
</tr>
<tr>
<td>Data-driven focus</td>
</tr>
<tr>
<td>High standards for all</td>
</tr>
</tbody>
</table>
A move into a new state-of-the-art learning facility in tandem with a new leader led to a new vision and culture of the school. All administrators commented on the lack of academic focus and the inability of its graduates to go on to college at the old school. And all participants discussed the new state-of-the-art facility, personalized learning opportunities through the small learning community model, and a focus on results driven new leader.

All members of the Instructional Leadership Team commented on the previous lack of textbooks and equipment. Comments such as: “math classes did not have textbooks”, “social studies very rarely had a full set of textbooks”, and “there was very few books for English classes” were used to describe the lack of resources. In addition, all administrators and ILT members spoke of low expectations and used terms such as “this school was a dumping-ground”, “the voke school was always the red headed step-child to Worcester Public Schools”, and one administrator made reference that the vocational students were treated like “second-class citizens.”

The vision for the school and culture of the school has changed significantly. All administrators commented on the school and student success. One administrator stated:

I saw our school go from the Flintstones to the Jetsons. I’ve seen growth in kids, inner-city kids, half of them are minority kids that might not have the best environment at home to be able to, over 70% of them go to college and really have a chance at life to make a good life for themselves and their families.

Another administrator commented, “Students at Worcester Tech are now graduating with a high school diploma, a certificate in their technical program, and in most cases, industry recognized certifications. Another participant added, “They also have the opportunity to earn college credits while they are learning very important skills in their technical education.”
All members of the ILT described the new vision and the change in school culture. One participant said:

We moved forward with your vision of adding more rigor, more relevance, relationships continuing to grow and to always just get a little bit uncomfortable when we’re reaching for the next goal.

Another participant offered, “I think the renaissance started when it was like, we can teach classes that offer academic rigor; we can double honors classes; we can introduce AP to the school which I thought would never happen.” Lastly, one teacher concluded, “I think we (the teachers) were challenged to move the students forward. I think that as the students became more successful, we became more driven.”


Vocational education has a reputation for being an old-timely institution where educational misfits are siphoned off from the system and sent to learn how to do something useful with their hands. But Worcester Tech is redefining what career and technical education can be – what any high school education can be, in fact. With a focus on academics and partnerships with business and higher education, the school has transformed itself from being yet another failing urban school into a place that produces high school graduates well prepared for post-secondary education and the labor market (Chivvis, 2012, p. 3).

As stated in Principal Leadership (2011):

A change in facility and leadership moved the traditional trade school physically, technically, and intellectually into the 21st century. The school’s mission, philosophy,
faculty, and students remained essentially the same, but the new building’s design incorporated four student-centered small learning communities with state-of-the-art technology, communications, and equipment. The new principal had a big picture vision for the school, its students, its programs, and its culture. The possibilities were endless, and the faculty, staff members, and students became rejuvenated and highly motivated (p. 87).

**Personalized learning that is student centered.** Twelve out of sixteen students in the focus group sessions discussed personalized learning. Students expressed personalized learning in various ways, using terms such as “independence,” “choices,” and “having options.” One student spoke of having the opportunity to select a trade from 24 different shop options when she stated:

> When you’re in eighth grade, you get the form to sign up for Worcester Tech and you have 24 shops and you have to pick. In your mind it’s so exciting because you get to decide what you’re planning to be for the rest of your life; not what you have to be or what your parents pressure you to be. Because when you come to Worcester Tech it’s like a step of independence. It’s I’m choosing this trade because this is who I want to be when I’m an adult.

Another student added, “I think giving me that independence has definitely made me grow as a person and I’m only 15 and I think that I could probably go and be successful in the real world.” Seven students spoke of having the opportunity to “follow their passion for learning” in a specific area. Another student spoke of the ability to tailor their educational needs by stating, “I can choose to have a co-op, get certified and if I do well enough get college credit for some of my classes.”
Three out of six administrators commented on personalized education at Worcester Technical High School. One participant stated:

Being able to see students and to get to spend a lot of time with them, you actually watch their transformation. You see them in a shop six hours a day from grade 9. You know if they didn’t get enough sleep, if they didn’t have something to eat, if they broke up with their girlfriend.

Three administrators referred to the personalized learning environment as “you’re a family” and one added “teachers know when a kid’s having a good day, the kid’s having a bad day.... teachers would immediately bring the kid into the guidance counselor and say, “I think something’s going on” That’s how we were able to save a lot of these kids.”

Evidence of personalized learning. One of the biggest indicators of high school success is ninth grader’s attendance, classroom grades, and providing a personalized learning environment for all students (Allensworth, 2005; Rumberger, 2011). At WTHS, the ninth grade attendance rate is over 97%, the ninth grade retention rate is less than 2%, and students are actively engaged in their personalized education (Worcester Public Schools, 2012). According to Worcester Technical High School Perkins Grant, over 95% of incoming ninth graders participate in the summer “Jump Start” program. This three day program not only introduces the Grade 9 students to the large campus, but to all academic and technical opportunities, student services, and student life. Students meet their administrators, guidance counselors, and many of the teachers. They receive class schedules, lockers, IDs, bus passes, and health and lunch forms. Students complete an individual career assessment and begin their personalized Career and College Plan. Last year, a “Tech Scholars” piece was added to the program introducing Grade 9 students to honors and advanced placement courses. In addition, pictures were taken with each
freshman wearing a commencement cap and gown. Pictures were given to students to hang in their lockers as a constant reminder of the student’s and school’s goal of graduating from high school. The Jump Start program is an introduction to the school culture of high expectations for all students. It lays a solid foundation for each students’ personalized high school educational experience at Worcester Technical High School.

**Authentic Learning.** All sixteen students commented on authentic learning opportunities. Each student described experiences that were connected to “the real world.” One student stated:

> The ticketing system is actually the most valuable asset or resource that I could ever say I’ve gotten from Worcester Tech…simply because it’s hands on experience fixing IT problems for teachers and students. We keep the school’s IT working. I also actually work in depth with numerous companies that come to our school, like Microsoft and Intel and other businesses around the city and start to work with us. I mean it’s actually like working in real life.

Another participant commented, “We run two stores (at the school).” While other students commented, “You get the feel of customer service and how to work our cash drawers” as well as “I work alongside of a veterinary doctor working on live animals.” Another student stated, “I cook for our customers at our school restaurant.”

Seven students spoke of internships experiences connected to their technical programs. One student explained the connection between theory and practice when she stated:

> One of the most important things was the hands on experience because I feel I could read books at regular high school and learn about that but hands on experience is also really important. I’ve gotten that in my lab because I want to go onto medical school and
become a doctor. I’m in biotechnology right now so we work a lot in the lab. My teacher has also gotten me a lot of really good internships, so I’ve had a lot of connections with people who have their own labs at medical schools and I’ve worked in some of the labs, so I had a lot of good experience.

Other students spoke of the value of their internship experience by describing it as “a great way to meet people in my trade” and “my internship gave me an opportunity to apply what I learned in class.” Another stated that, “this experience was great for my resume.”

**Evidence of authentic learning.** The curriculum and instruction at WTHS is driven by both the MA Curriculum Frameworks and the MA Vocational Technical Frameworks for 24 technical programs. Academic strands are embedded within the technical curriculum frameworks. These overlapping frameworks provide a structure for integrated academic and technical instruction, marked by project based learning and authentic assessment that is tied to real world application. According to school documents, authentic learning exists in all technical programs. Some examples include: student’s service a 125 seat restaurant called Skyline Bistro, a L’Oreal Redken salon and day spa, a 16 bay automotive service center, a full service bank-Worcester Credit Union, a state approved preschool, and most recently the addition of **Tufts at Tech** animal clinic.

**Tufts at Tech** is an animal clinic created by a school partnership with Tufts University to provide affordable animal care for low-income families in the Worcester area. According to **Worcester Tech: Not your Grandfather’s Vocational School** (2012), in 2009, Tufts University was trying to give their students more hands-on practice in primary care. They also saw a need to treat underserved pets, but they could not figure out where to locate a new clinic. Meanwhile, students in Worcester Tech’s vet assisting program were learning on stuffed animals. Tufts
University and Worcester Technical High School formed a partnership to establish a veterinary clinic at the high school. Tufts University funds a veterinary doctor to run the clinic with the help of a rotating crew of Tufts veterinary students, while Worcester Tech students man the front office and assist the veterinarians, restraining animals and prepping instruments. The clinic charges 75 percent less than what a regular vet would charge and serves pet owners who are on food assistance or living in public housing (NBC Education Nation, 2012).

Authentic learning was embedded in all facets of this partnership. According to school documents, Worcester Technical High School’s carpentry, plumbing, and electrical students built the veterinary clinic. The graphic students created the name and designed the logo and brochures and the painting and design students created the signage. In addition, the veterinary assistants work in a veterinary clinic with real animals. Vet assisting student Carlos stated, “that means taking chemistry and then seeing it in action in the pet clinic…that relevance has made science a hundred times better.” He further stated, “Now I could see the background, you know, the things I didn’t see before. Like drawing blood, I never did that before, hearing their heartbeats, their pulse, surgeries, and cool stuff” (NBC Education Nation, 2012, p. 4).

In addition, WTHS students from across all technical programs have been involved in numerous authentic learning experiences connected to community projects throughout the Greater Worcester region. According to numerous articles in the Worcester Telegram, in 2011, Worcester City Manager Michael O’Brien approached WTHS with an idea to decorate the city for the winter holidays. Students designed and fabricated over 200 four-foot snowflake wreaths out of anodized aluminum and then strung them with LED lights and packed them in custom made wooden crates to be hung throughout the city streets. The construction continues as more areas in the city requested the beautiful display of student workmanship.
**Data-Driven Focus.** All of the administrators described a data driven focus. Participants shared that data was used to develop the Worcester Technical High School Accountability Plan, create a school focus, and formulate school initiatives. One administrator commented:

> We’re very focused in looking at the data and if it’s our fault and we didn’t have that particular piece in the curriculum, then we need to face the fact that we didn’t do a great job on this and we need to correct it.

All administrators commented on the use of data to create the school’s accountability plan. One administrated explained, “the data was examined to develop the WTHS Accountability Plan.” All but two participants commented “they had not used data previously.” Although in the past, the development of an accountability plan was required, according to one administrator, “the principal hired a consultant to write the plan and then it was put on the shelf.” Another participant stated:

> There wasn’t a huge amount of input on behalf of any of the principals in the school improvement plan and originally when we had to start writing school improvement plans, I think one person wrote it and it sat on a shelf; we didn’t use it, not even the principal.

Other participants discussed using data to “face the realities and facts” through data, not “offering excuses, but using data to offer solutions.” In addition, another administrator stated, “the school has been very strategic in using data to impact instruction in every classroom.” A data driven focus eliminated excuses that students could not learn because “they were poor, that they were hungry or whatever excuse was being offered.”

All members of the instructional leadership team commented on the use of data to improve student outcomes. One teacher stated, “We attacked data together and learned together
ways to use data. Each year it just only increased and helped to bring about some momentous changes.” Another teacher added, “A lot of times we review the data, the hard data which I really enjoy because everybody looks at the data and are able to share what they have done in their own areas to strengthen or change what they are doing in order to get better results.” Others commented that data was “readily accessible” and “drove curriculum and instruction.”

All members of the instructional leadership team described the use of data in developing the school’s accountability plan. One teacher commented on how the accountability plan was previously written when she stated:

A consultant came into the school and worked with one of assistant principals to write the plan. I always found that interesting because she was not a part of our everyday school, and I was never ... I never quite understood how she was an expert in writing a plan for school she didn’t work at.

Presently, the school’s accountability is written as a team using all available data. One teacher commented, “Who doesn’t write it? There’s a definite buy in from every department, the administration, the principal, the vocational director, students have a say.” Another teacher spoke of the data driven accountability plan as “an actual living document that we are using so that we can progress to the next level.” Other participant comments included: “You have to see where you’ve been to know where you’re going”, as well as “I think the fact that data analysis is taken very seriously, it’s used to promote improvement and there’s a buy in from everyone; the faculty, the administration, and so forth.”

**Evidence of a data driven focus.** “We can all agree, when we are in public education, that you can rub your belly, tap your head, stand on one foot and jump, and that sometimes feels like education, Ms. Harrity said. However, she promised her staff that the school would “stop
the insanity and do one or two things well, instead of going in a hundred directions, because we all know that does not work.” (The Achievement Gap Initiative at Harvard University, 2009, p. 78). Based on this philosophy, Ms. Harrity set about developing a data driven, focused instructional high school.

In 2006, 87 percent of entering 9th graders had either failed or scored “needs improvement” on the 8th grade MCAS exam in mathematics, while 50 percent had failed or scored “needs improvement” in English Language Arts MCAS (DESE, 2012). (Please see Table 9 below for student scores for incoming 9th graders in mathematics and ELA in MCAS.)

Table 9

<table>
<thead>
<tr>
<th>GRADE 8 MCAS SCORES</th>
<th>MATH</th>
<th>ENGLISH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student Scores in 2006</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Failure</td>
<td>54%</td>
<td>10%</td>
</tr>
<tr>
<td>Needs Improvement</td>
<td>33%</td>
<td>40%</td>
</tr>
<tr>
<td>Total Percentage of Students That Failed or Need Improvement</td>
<td>87%</td>
<td>50%</td>
</tr>
</tbody>
</table>

(DESE, 2012)

According to the WTHS 2006 School Improvement Plan (now called the WTHS Accountability Plan), to address these challenges, the school’s first school-wide initiative was to focus on Open Response – or writing to a prompt- in every class throughout the school. Students were assigned open response questions in their academic and vocational/technical courses and were graded using a four point MCAS rubric scoring system. On professional development release time days, WTHS had extensive teacher training in developing open response questions,
grading based on the state scoring rubrics, and looking at anchor papers to analyze various scoring levels and their content. Past MCAS open response questions were distributed to the teachers, who have incorporated them into their present lesson plans. This allowed the students to learn using the actual questions. In addition, an “open response bank” was created to preserve all the open responses from previous MCAS exams in each subject as well as newly created open responses. Ms. Harrity responded, “We saw no reason to reinvent the wheel. Teachers and staff at high schools often forget to share information and materials – they need to rediscover the kindergarten model of working in the sandbox together” (The Achievement Gap Initiative at Harvard University, 2009, p. 79). The sharing aspect broke down classroom and department walls and created an atmosphere of collegiality with a collective focus.

According to MCAS data, in 2006, when the initiative was developed, the students were earning 39% of total points in open response on the MCAS exam. In two years, Worcester Technical High School students out performed the state in this area and earned 68% of total points, which is a 29% increase in ELA. In 2006, 10% of WTHS students scored an average of 3 and 1% scored an average of 4 on the 10th grade ELA MCAS exam. A score of 4 is the highest score you can receive for an open response question. 88% of the students scored a 0, 1, or 2. In two years, 43% of the students scored an average of 3 and 8% scored an average of 4. This is a 40% increase in average scores of 3 and 4 on the 10th Grade ELA MCAS exam with a 38% decrease in average scores of 0, 1, or 2. In the same time frame, the WTHS 10th grade students in the Mathematic MCAS exam increased their average score of 3 and 4 by 15% (Please see Figure 14 and 15 below for ELA and mathematics MCAS Open Response scoring results.)
**Figure 14.** ELA MCAS Open Response Scoring Results (DESE, 2012)

**Figure 15.** Math MCAS Open Response Scoring Results (DESE, 2012)
Additionally, in the same time frame from 2006-2008, based on average scores on the MCAS, see chart below, the graph shows the percentage of Worcester Technical High School’s 10<sup>th</sup> graders in 2008 who were in each quintile of the 8<sup>th</sup> grade math distribution in Massachusetts two years earlier, in 2006. It shows that over 60 percent scored in the bottom two quintiles as 8<sup>th</sup> graders.

![8th Grade Math Distribution](image)

**Figure 16.** Baseline Data for 8th and 10th Grade Gains (Achievement Gap, Harvard Univ., 2009)

According to calculations by the Achievement Gap Initiative at Harvard University, using unpublished data from the Massachusetts Department of Education, “Worcester Technical students’ gains from 8<sup>th</sup> grade to 10<sup>th</sup> grade were compared with other high schools in the state, Worcester Tech ranks at the 80<sup>th</sup> percentile -- performing better than 80 percent of other schools in the state.” (The Achievement Gap Initiative at Harvard University, 2009, p. 77). This entire effort is documented in the book titled *How High Schools Become Exemplary* (2009), prepared by the Achievement Gap Initiative at Harvard University

**High standards for all.** Four out of the six administrators commented on the accountability plan that focused on high standards for all. One administrator commented, “Every
year there was a step by step focus. There were short term goals and long term goals and
everything was mapped out.” Another administrator added, “The accountability plan included
specific goals for all subgroup populations with specific targets tied to measurable outcomes.”
Success for the students and the school meant, as one administrator commented, “Success for all
our students, not just some.”

Five members of the ILT pointed out that data was used to track the concept of “high
standards for all.” One participant stated:

All baseline types of data were used. From attendance to discipline... any type of things
that indicated how students are acting and feeling and learning, whether it’s what their
grade average is, and what level courses they’re in....this gives us the data to be able to
continuously move them up.

One teacher illustrated the point that all students were supported when she stated, “Every
academic department head was scheduled to teach an inclusion class because administration
wanted the best teachers with the students that needed the most help.” Another participant made
a similar comment when he stated, “putting the right teachers in the right place.” A third teacher
said, “I think the teachers working closely together for a common goal to have all students
successful has really been remarkable.”

**Evidence of high standards for all.** All faculty members of the school participate in a
data driven instructional focus to ensure all students are successful. This was documented in the
Worcester Technical High School Accountability Plan. Goals and benchmarks were clearly
established for sub-group populations. Progress was monitored through common assessments,
grades, and the evaluation of student work. In addition, all students have a career and college
plan. This plan is created with the student and their family in their freshman year and it is
updated twice a year through 12th grade. Based on future plans, students select courses and monitor progress on state assessments, PSAT scores, SAT scores as well as industry recognized certifications. All students are also monitored on Chapter 74 competencies directly related to the vocational technical program.

Worcester Technical High School has met the Adequate Yearly Progress for No Child Left Behind for five of the past six years (DESE, 2012). The school exceeded its benchmarks in English, mathematics, and every sub-group. In 2012, the school met the Progress and Performance Index (PPI) both in the Annual PPI and the Cumulative PPI (DESE, 2012). The PPI is a 100-point index assigned to districts, schools, and student groups based on their achievement as measured by the Composite Performance Index (CPI) in English Language Arts (ELA), mathematics, and science; growth/improvement as measured by their median Student Growth Percentiles (SGP) in ELA and mathematics; and, for high schools, includes their graduation and dropout rates. Worcester Technical High School has met its targets and is presently at an Annual PPI of 107 (exceeding highest standard) and a Cumulative PPI of 100 (highest ranking) (DESE, 2012).

Table 10

Adequate Yearly Progress History

<table>
<thead>
<tr>
<th>Adequate Yearly Progress History</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>NCLB Accountability Status</th>
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</thead>
<tbody>
<tr>
<td>ELA Aggregate</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No Status</td>
</tr>
<tr>
<td>All Subgroups</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Math Aggregate</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No Status</td>
</tr>
<tr>
<td>All Subgroups</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>
Table 11

*Accountability Information*

<table>
<thead>
<tr>
<th>Accountability Information</th>
<th>Accountability and Assistance Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Level 1</td>
</tr>
<tr>
<td></td>
<td>Meeting gap narrowing goals</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>This school’s progress toward narrowing proficiency gaps (Cumulative Progress and Performance Index: 1-100)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Student Group</strong></td>
</tr>
<tr>
<td>All Students</td>
</tr>
<tr>
<td>High Needs</td>
</tr>
<tr>
<td>Low Income</td>
</tr>
<tr>
<td>Students w/disabilities</td>
</tr>
<tr>
<td>Hispanic/Latino</td>
</tr>
<tr>
<td>White</td>
</tr>
</tbody>
</table>

(DESE, 2012)

**Research Question #2: How did leadership play a part in this transformation?**

Responses in relationship to Research Question #2 were predominately discussed by the school administration and the instructional leadership team. Table 12 highlights the themes across these focus groups and individual interviews.

Table 12

*Themes in relationship to the question: How did leadership play a part in this transformation?*

A new vision for the school that created a culture change

Collaborative leadership

Accountability

**A new vision for the school that created a culture change.** All six administrators spoke of Worcester Technical High School’s new vision, which created a culture change.

According to all members of the administration team, the previous vision of the school had not
changed for 96 years. Worcester Technical High School was a vocational school “training students for a trade” and students were instructed to go directly into the workforce. The school was focused on the trades and “the academic end was not important.” One administrator shared:

It was one of the oldest schools in the country for vocational education so it had some very strong roots in the way people taught. Many of the faculty members were previous students and so that kind of culture continued on and on through many, many, many generations.

All administrators commented on the lack of vision from previous principals. “It was same old-same old every year.” One administrator said, “They didn’t really want to shake up the boat too much.” Another participant added, “There really wasn’t an emphasis at the time on the principal being an academic or educational leader.” “Status quo” was an expression that was used by five out of six administrators. In addition, all administrators commented on “leadership turn-over.” Terms such as “three and out” were used to describe previous principals taking the administrator’s job and the salary for the last three years before they retire. One administrator stated, “When you count the assistant principals along with the principals, it was probably 12 to 15 that I went through in six-years.” Other participants’ comments included: “I went through several principals, minimally five, and several superintendents” and “I think you’re my 6th principal. You’re the only one who’s ever really been a leader, everybody else wanted to tread water and it seemed like they wanted to get their three years and then get out.”

The new vision for the school was to graduate all students “both college and career ready.” Academics and technical areas became partners to support student learning. The new vision led to a significant culture change. The previous culture, as one administrated stated:
I think that in many ways the academic people were subservient to the trade people and that the school, in their minds, existed for the trades and the academics were, like, an add-on to whatever the vocational areas were teaching.

Another administrator added, “Vocational was all they cared about...It was important that the kids get their trade area and education wasn’t important.” This culture changed. Administrators reported, “all of a sudden, things started changing.... vocational instructors were working with academic teachers.” Administration led the charge to “offer more rigorous coursework”, “introduce Advanced Placement courses”, establish “college articulation agreements”, and “create a culture of college and career readiness.” Four out of six administrators spoke of “creating opportunities” and “providing options for students and their families for their child to go directly into the world of work and/or college.”

All but one of the instructional leadership team discussed the new vision of the school that lead to the culture change. One teacher commented on the system that was put in place to support the career and college readiness vision. He stated:

College and career plans were created with each student in the entire school. These plans were updated twice a year with each student so that families could make informed decisions regarding their child’s future.

One teacher commented that originally “people were very reluctant to get involved in it (college and career readiness) because there was the philosophy that we were a vocational school and that we shouldn’t be pushing the academics but we prevailed.” Another teacher added, “Students now come here (Worcester Technical High School) knowing that they can not only learn a trade, but be prepared to go to college.” Out was the mindset that “Let’s push them through and after they’re out the door, who cares?” The new vision and culture of the school is
Let’s provide the best educational opportunity for our students so that they will be successful in both college and future careers.”

Evidence of the new vision that created a culture change. The National Association for Secondary School Principals (NASSP) documented the cultural shift in an article in Principal Leadership (2011), titled Laying the Foundation for Future Success. The article described how the instructional leadership team at Worcester Technical High School provided strong leadership. Many of the team members were at the school to see the remarkable turnaround with the opening of the new facility and the hiring of a new principal in 2006. When the members of the instructional leadership team were asked about the most significant accomplishments at the school over the last five years, the team said:

A change in facility and leadership moved the traditional trade school physically, technically, and intellectually into the 21st century. The school’s mission, philosophy, faculty, and students remained essentially the same, but the new building’s design incorporated four student-centered small learning communities with state-of-the-art technology, communications, and equipment. The days of leaking pipes and roofs; no power, heat, or phones; and crossing a six-lane highway between classes were gone, and the focus could return to education. The new principal brought a big picture vision for the school, its students, its programs, and its culture. The possibilities were endless, and the faculty, staff members, and students became rejuvenated and highly motivated.

(Principal Leadership, 2011, p. 87)

Collaborative Leadership. All administrators discussed a collaborative leadership approach. One administrator stated, “It wasn’t a top down (leadership approach) in the school. It was a mass of people working together.” Another administrator commented, “decisions were
made together and were always based on what is best for the students.” One participant compared this leadership style to previous administration when she stated:

I think one of the major differences is the shared leadership. I think it’s not just shared leadership. It’s shared responsibility and with responsibility comes ownership, when everyone’s together and all have the ownership of it, which, in the past, wasn’t true. Not being derogatory towards former principals but, as I said, the school had a military style and the principals were the generals and everyone followed orders whether you liked them, agreed with them, good idea or bad idea. And I think one of the major reasons we are successful here is that everyone gets to share their ideas and look at them and have a vision to move forward. Everyone feels supported in this environment, that it’s not a gotcha environment.

Four out of six administrators reported that the previous principals lead the school “like the military.” All administrators discussed the new collaborative leadership style as “positive”, “inclusive”, and provides the opportunity for all to “have a voice in the decision making.” Additional administrator comments included that collaborative leadership created “a sense of buy-in from everybody, it gives you that ownership.” Another participant added, “It’s not being jammed down your throat...This is what you are going to do, come hell or high water.”

All of the members of the instructional leadership team commented on collaborative leadership. One teacher commented on the collaborative nature the ILT provided when she stated:

Everybody that comes to the table has the school’s achievement always at the center and I truly have never in 16 years have been able to collaborate with other individuals in the school like these ILTs have provided.
A teacher commented that the group “allows us to be on the same page in collaborating.” Another teacher stated that they think, “it’s the collaboration and the mutual trust” that provides an opportunity to share ideas and be “a valued member of the team.” Additional comments from teachers included that they were “a voice for their department” and that they valued the opportunity to “assist their members of their department with implementing the school’s initiative.” Furthermore, one teacher added, “I need to listen to other teachers concerns and bring forth recommendations to be considered.... so that we can cohesively all work together and that everybody is on the same page.”

One teacher summed up the benefits of a collaborative leadership approach when she stated:

It is real important that all of the teachers in school know that what you’re saying is heard or listened to. Not that you can act on everything but at least I think when we go back to our departments at least they can have a sounding board or you can come back here and discuss it and know that if anything can be done you’re going to try to do it.

Evidence of collaborative leadership. According to school documents, the principal assembled a group of school leaders that included academic and technical department heads, the MCAS specialist, assistant principals, and the career/technical director to form an Instructional Leadership Team (ILT). Initially the charge was to create a vision, instructional focus, and establish goals that ensured student and school success. The group evaluated the school using multiple data sources and was encouraged to share ideas and offer solutions. The result was the Worcester Technical High School Accountability Plan that established MCAS performance goals, timelines, schedules, benchmarks, and responsibilities. The school accountability plan is a living document that is routinely modified by the ILT. Progress is monitored through lesson
plans, samples of student work, classroom observations and evaluations, common assessment outcomes, and MCAS and MAP results. In addition, the ILT has identified best practices and recommends professional development to support the instructional focus.

This team oriented approach was a significant shift from the traditional vocational “top down” leadership style. It embraced collaborations, valued opinions, and appreciated the expertise of the staff. It empowered teachers and supported them as they mastered their craft and became increasingly accountable for their students’ achievements. The involvement of all the stakeholders; faculty, staff, parents, advisors, and students has required continual communication and appropriate, thoughtful decision making. This has resulted in commitment to the welfare of the students and the future of vocational/technical education. In addition, through the principal’s leadership and recommendations of the ILT, a clear curriculum map was constructed, AP classes were introduced, technical programs have been expanded, and articulation agreements and dual enrollment opportunities were increased with two and four year colleges. This led to students being prepared for state testing in the short term and career and college ready in the long-term. Students at Worcester Technical High School are graduating career and college ready.

**Accountability.** Five of the six administrators discussed the importance of accountability. One administrator discussed accountability and attributed as “a major component in the transformation of the school.” She further stated:

I think it was accountability for, what are you doing, and I think that holding everyone on every level accountable for their students, their curriculum, for their teaching style. I think that your leadership and not being tolerant of bad teachers. I think that transformed the teachers: I’m here because I’m good and if I’m working hard, the people beside me are working hard.
Additional comments from another administrator included, “People that don’t want to work probably don’t want to come here anymore because the expectation and accountability is here.”

In addition to this, four out of six administrators noted the evaluation process as a tool for accountability and one administrator commented:

Teachers understand that they have to be on their game every single day. They understand that that’s your expectation as the principal and as administrators and that the evaluations and observations aren’t just going to be rubber-stamped; that they’re going to have substance. They’re going to say what you’re doing well and what areas that you need to improve.

Ten out of the fourteen members of the instructional leadership team referred to “holding people accountable.” One teacher commented that the principal “became very involved with the observations and evaluations.” Another participant added, “I think teachers understood, the faculty understood, that you (the principal) were invested in their performance and it was their performance that was going to drive success.” One department head added, “when they (teacher) turned in their lesson plan they didn’t just tell what they were going to be teaching for a period, but show me an example of the work.” Another teacher stated that “holding people accountable” ensured that “all the departments are pulling in the same direction toward the common goal” of student and school success.

**Evidence of accountability.** Student results illustrate the level of accountability teachers and administrators have to ensure student progress and success. According to the DESE website (2012), Worcester Technical High School’s graduation rate for the class of 2010-2011 is 95.8% with a 1.1% dropout rate. The school has also seen significant gains in the MCAS scores. In six years the school’s state exam scores have risen significantly. In ELA, 88% of the students
scored in the advanced or proficient categories, an increase of 61%. In mathematics 78% of the students scored in the advanced or proficient categories, an increase of 43%. In addition, according to school documents, all goals set in the WTHS Accountability Plan for five out of the past six years, have been achieved.

**Research Question #3: What strategies and resources were used?**

Responses in relationship to Research Question #3 were predominately discussed by the school business partners, school administration, the instructional leadership team and students. Table 13 highlights the themes across these focus groups and individual interviews.

Table 13

*Themes in relationship to the question: What strategies and resources were used?*

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<thead>
<tr>
<th>Themes in relationship to the question: What strategies and resources were used?</th>
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<tr>
<td>Develop school-business-higher education partnerships</td>
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<tr>
<td>Entrustments and an entrepreneurial spirit</td>
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<tr>
<td>Removing obstacles/eliminating barriers---Can do attitude!</td>
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<tr>
<td>Technology</td>
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**The development of school-business-higher education partnerships.** All five-school partners reported the importance of developing school-business-higher education partnerships. One partner described, similarly to other partners, how the relationship could benefit the school, students, their business, and the community. Karen Duffy, the CEO of Worcester Credit Union, stated:

For Worcester Credit Union, we opened up a full service branch (in Worcester Tech) and it's been phenomenal for us from a community perspective, public relations as well as a
growth opportunity at the credit union for my staff. We have trained about 80 students now to be bank tellers.

As reported by the focus group participants, members of these partnerships have developed “articulation agreements to allow students to earn college credit while still being in high school” as well as created a veterinary clinic “to provide real hands on experiences for students to work alongside a veterinary doctor and assist with live animals.” These experiences provided students an opportunity to develop “their future college and career plans.” All partners reported positive outcomes and one business partner stated, “It’s just been a phenomenal success for us.” In addition, Michael O’Brien, the City Manager of the City of Worcester spoke about the impact and benefits these partnerships have provided for student readiness by adding:

When they (students) come out of the tech school that they're far more advanced than I was when I graduated high school only because they've had a chance to understand all the facets of the world outside of high school. The realities of what career they might want to take on in their life, what fascinates them, what interests them, and how it relates to what could ultimately be a paying job.

Ten of the sixteen students spoke of the benefits of the school-business-higher education partnerships. Students spoke of “hands on experience working in the animal clinic”, experience “working as a bank teller”, and the ability to “work on cars every day,” Another participant spoke of, “earning college credits while taking high school courses.”

Evidence of school-business-higher education partnerships. All Massachusetts vocational/technical schools must follow Massachusetts General Law Chapter 74, Section 2, and the Vocational Technical Education Regulations (VTER) 603 CMR 4.00, which requires a vocational/technical school to establish a general advisory committee as well as a program
advisory committee for each of their vocational/technical education programs under its control. As a Chapter 74 approved vocational-technical high school, WTHS has over 350 industry advisors that contribute to the direction and success of the school and its students. These 350 individuals create both the General Advisory Board and the Program Advisory Committees. The General Advisory Board, chaired by Mr. Edwin “Ted” Coghlin, is composed of the chairpersons of the program advisory committees. The General Advisory Board meets a minimum of twice per year with the responsibility of advising the Worcester School Committee as to the planning, operation, and evaluation of vocational technical instruction provided by the programs under its control. The Program Advisory Committees are established for each approved technical program and meet more frequently to review the curriculum, equipment, internships/co-ops, and career trends of the respective programs. The program advisory committees consist of representatives of local business and industry related to the program, organized labor, postsecondary institutions, parents/guardians, students, and representatives from registered apprenticeship programs, if applicable. The program advisory committees are integral partners in the provision of a truly college-career ready curriculum. They are the front lines for the industries that they represent. They provide direction to the programs as to the trends in their fields in regards to training, equipment, certifications, licensure, education, and careers.

In addition, according to school parental literature and Tech Prep documents, Worcester Technical High School has over 30 articulation agreements with technical schools and two and four year colleges. Two examples of articulation agreements include: students from Telecommunications have the opportunity to earn 21 dual enrollment college credits and Allied Health students earn EMT certification which includes 7 college credits, during their high school education free of charge.
**Entrustments and an entrepreneurial spirit.** Four of the five partners discussed that as technology is continuously changing, Worcester Technical High School has created a unique system to stay current with equipment and technology. Edwin “Ted” Coghlin described how private support is being solicited through entrustment leases. He stated:

We formed an entrustment arrangement where people would work collegially together, that is a supplier of product or a manufacturer of equipment. We had a number of people sign up for a five-year entrustment arrangement wherein we would work with them in the school and they would work with us. The result is that we had state-of-the-art equipment at some very, very attractive pricing. We had the support of that company or companies to come back and refresh the equipment as new or changing product occurred.

Two of the five administrators discussed entrustments and the entrepreneurial spirit. Peter Crafts, the retired Director of Career and Technical education described the entrustment idea by stating:

That businesses were willing to support education but we wanted to do it in a slightly different way. We wanted the business to support us with their goods and material, major Fortune 100 companies that built equipment, whether it be furniture for the classrooms and for the shops or more specific equipment, high-tech equipment that would go into a classroom or a shop to benefit the students. In working with the manufacturers of this said equipment after being identified, we asked them, “Can we buy the equipment at...” what we called manufacturing cost or the cost it came off the assembly-line price.

It was stated, “as students enter the workforce, graduates will be skilled in using the sponsor’s latest tools” and companies are partnering with the school “to train our high school students on the latest technology” to be more likely to use those tools and products on the job.
It was also stated that Worcester Technical High School created entrustment agreements with national and international companies “such as DELL, Cisco and Oce.” This entrustment concept created an entrepreneurial spirit within the school. One administrator spoke about “innovative ways” to create opportunities and stated, “As simple as it was, a trade agreement was a big deal.”

**Evidence of entrustments and the entrepreneurial spirit.** Worcester Technical High School has created a unique system to stay current with equipment and technology. Private support is being solicited through gifts, equipment contributions and entrustment leases. According to entrustment documents at the school, the school has established a 501(C) 3, called Skyline Technical Fund, to accept gifts of cash or securities to be used for technology and equipment. Donation of equipment, technology, tools and supplies is also an option. Creating an entrustment is a third way to support the school. This unique concept will ensure that the school stays current with technology and equipment. The sponsor agrees to replace, donate, or lease equipment and technology either free or at a greatly reduced price to the school in exchange for access to Worcester Technical High School as a corporate training site.

Entrustments are mutually beneficial. The school gets new equipment at reduced or no cost, while the sponsor benefits by having students trained on their newest equipment. As students enter the workforce, graduates will be skilled in using the sponsor’s latest tools and companies are partnering with the school to train our high school students on the latest technology to be more likely to use those tools and products on the job. The entrustment leases have garnered attention and support from national and international organizations and companies.

According to entrustment literature at the school, WTHS has established entrustments with industry leaders to ensure that each technical program is meeting the challenge of training students in the latest technology for 21st century skills. In the Information Technology Academy,
Cisco Systems, Dell, and Microsoft have provided state-of-the-art servers, personal computing, and applications, including the latest cloud technology and WTHS website. Océ and ADOBE are providing Graphic Communication students the latest in design and printing technology. In the Alden Design and Engineering Academy, Saint-Gobain is ensuring that the students in Automotive Collision are using the newest technology in abrasives, and Harr Toyota Dealership is providing the Automotive Technology program with the most recent developments in the automotive industry. Students in Electro-mechanical and Machine Technology are using current HAAS CNC machines.

**Removing obstacles/eliminating barriers—Can do attitude!** All six administrators spoke of the “can do attitude” or “not taking no for an answer.” The most recent administrator on the administrator’s team commented:

Knowing now what the administration goes through almost on a daily basis, it makes those successes all that more impressive because this school is doing it in spite of the battles, the fights, the muck that they have to go through. It’s almost like it doesn’t take Worcester Technical High School, the school, the administration, they don’t take no. “No, you can’t do it.” Well, let’s figure out how we’ll get it done and we’ll get it done. It’s good for the students. It doesn’t matter.

Other administrators commented on removing barriers by commenting on “bold leadership”, “not taking no for an answer”, and “leadership of the principal who had no fear.” One administrator stated about the can do attitude, “you’ve (the principal) have taken bold steps in an environment in a city where bold steps are not usually welcomed.”

All school/business partners spoke of the “can do attitude” and the ability of the school to remove obstacles. One participant commented that she had been in higher education for 27 years
and people at the college had got into a rut of saying “Well, we can’t do stuff,” and in this case there was just no one saying that at all, just saying, “OK, we could deal with that...whatever the obstacle was.” Some members of the college tried to prevent the school business partnership stating “Oh, no you’re going to put high school students in the clinic. They’re going to get bitten by dogs.” Issues were addressed and the partnership and clinic has become a “national model.”

In the case of the full service bank, the school/business partner commented that she had received feedback from bank members “I don’t like kids knowing my financial business.” She said the bank managers alleviated customers concerns and that “students are doing a great job.”

**Evidence of removing obstacles/eliminating barriers—Can do attitude.** A “can do” attitude was used when decisions needed to be made regarding staffing, money allocation, and professional development to support the schools’ focus. Some initiatives cost additional money, while other initiatives needed to be aligned with the school’s focus. According to the school’s master scheduler, in the 2006-2007 school year, the principal made the decision to double the number of honors courses offered at Worcester Technical High School for incoming freshman. In the summer of 2006, when the principal was hired, Ms. Harrity was evaluating the master schedule and discovered, neither the school nor the students were going to improve if the students were not engaged in academically rigorous coursework. Incoming freshmen families were asked to “stretch” academically and were scheduled for honors courses. This did not cost the school any additional money. Instead of teachers teaching a certain number of college courses, they would be teaching honors courses.

In 2008, the administrative team was aware that the 11th and 12th grade students needed academically challenging courses and introduced Advanced Placement Biology to the course schedule. This benefited the Allied Health students greatly. The principal knew the school did
not have the money to train teachers for Advanced Placement courses and buy equipment, supplies, and textbooks. The principal gathered the Instructional Leadership Team and together they wrote a Massachusetts Mathematics and Science Imitative Grant. According to grant documents, in 2009, the school successfully secured funding, $244,277.92, to develop additional Advanced Placement courses. In 2009, the school introduced AP Language and AP Literature; in 2010, the school added AP Statistics; in 2011, the school began offering AP Computer Programming (JAVA) and AP Environmental Science; in 2012 the school added AP Physics. According to school records, presently, over 150 students are enrolled in Advanced Placement courses. In 2008 there were none. In addition, the MMSI grant paid for all professional development and training as well as for half of the equipment, materials, and textbooks for 4 new courses.

Although professional development is offered during the school year, the Instructional Leadership Team understood that some teachers would need additional support, but the school did not have funds for a literacy coach. Instead, the school relies on the “model teacher” approach to train faculty to teach literacy. For example, the principal asked the ELA Department head to teach a lesson on developing a topic for a long composition to more than 200 students seated in the school’s auditorium. At the same time, elsewhere in the building, another “model teacher” showed students how to tackle an open-response question. English Language Arts teachers that would have been teaching, but now have their students in a “model” session, chose one model teacher to observe in action to assist in their teaching strategy to support the school focus. This model did not cost the school any money and substitutes were not hired to cover classes.
Technology. School/business partners, administration and members of the instructional leadership team predominately discuss the topic of technology. Three out of five school partners discussed the importance of the use of technology in the school. The City Manager discussed the ability of Worcester Technical High School to stay updated with new technology and equipment and stated:

The world is changing so rapidly around us, faster than anybody has ever imagined from our generation and the tech school to me is the one organization within the schools that has understood how rapidly that world is changing and has adapted fast against the can’t do mentality.

Three of the six administrators spoke of the need and use of technology in the school. One administrator shared that “every room has a SMART board and five computers and every teacher has a laptop.” Another administrator commented, “It gives you access to data. It gives you access to different modes of instruction.” It was further stated that, “technology gives students access outside the school hours to both curriculum and to their instructors.” Another participant shared, “Every student has an email account. Every student has space on the server for saving their information.” One administrator highlighted the benefits of technology connected to the curriculum stating, “If something changes in the curriculum, it’s right there on the internet. We don’t have to wait for a new textbook to be published next year.”

All of the teachers on the instructional leadership team discussed the use of technology in their classroom instruction. One instructor spoke of how she no longer recognizes her previous way of teaching. She stated:

I don’t even know that teacher anymore that used to be in there, because all of the technology and all of the resources that are here have just changed totally the way I teach.
It is amazing, for example if I'm talking about something I can just immediately YouTube and we can see the video clip on the news.

Other teachers commented on the “ability to access information”, the “immediate feedback for student assessment and understanding” and the “opportunity to provide differential instruction.” One teacher spoke of 21st century skills and appreciated that all students had their own school email account. She stated, “this provided another vehicle to communicate and share information with students. Students learn how to communicate professionally with their teachers.” Another teacher discussed how she felt the school portal supports a “sharing environment.” She stated:

When I first started teaching here, it was an isolated island. Nobody shared their material at all. Now, we share a lot...We have a share directory on our school portal. We throw our lessons up there and people can grab what they need and can contact me if they have any questions.

Evidence of technology. According to school documents, the school has purchased 2,000 Dell computers, 150 Dell laptops, 160 Smart boards, 20 ELMO document readers and the entire facility has wireless capacity. In addition, the school has four computer labs and three portable laptop carts equipped with 25 laptops on each cart. Furthermore, in 2012, the school purchased 50 IPADS for students to access for senior STEM capstone projects.

Research Question #4: What were student experiences at Worcester Technical High School and the degree to which the school has supported their success in school and opportunities for college and career?

Responses in relationship to Research Question #4 were predominately discussed by students. Table 14 highlights the themes across the four student focus groups.
Table 14

Themes in relationship to the question: What were student experiences at Worcester Technical High School and the degree to which the school has supported their success in school and opportunities for college and career?

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<thead>
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<th>Career and College Readiness</th>
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<td>Supportive Environment</td>
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**College and Career Readiness.** All student participants spoke of college and career readiness. Students used words such as Advanced Placement courses, dual enrollment, articulations, and industry recognized certification and skills to describe college and career readiness. All students spoke of feeling prepared. One student highlighted this point when he said:

Here, you really get the opportunity to figure out what you want to do in life, whereas if you went to any other high school and then you went to college, that’s when you really started looking. At Worcester Tech, you can start looking in your freshman year, figuring out what you want to do and by the time you go to college; you have an advantage over everyone else.

Seven out of sixteen students spoke of being introduced to rigorous coursework and Advanced Placement opportunities. One student stated, “I am getting a taste of what college work would be like.” Another student added:

Adding AP courses for our academic areas is a huge step for preparing for college. You just get the workload, you get all the material that you would be getting as a freshman in
Regardless, if you do get by, if you pass the exam, that’s great, you get the credits. But just actual exposure to that work in the curriculum is great.

Four students spoke of taking dual enrollment courses at various colleges and universities. Students mentioned they were taking courses at Worcester State University, Mount Wachusett Community College, Bunker Hill Community College and Northeastern University. One student spoke of his opportunity to earn 18-college credits at Northeastern University when he said:

I had the educational opportunity to take courses at Northeastern University. There’s seven of us that go... We take the school van and go up to Boston. We go into the college classrooms, sit and learn. We just completed the second course; I got a “B.” In the first one, I got an “A.”

Eight students spoke of industry-recognized certifications that would provide them with real world credentials to help them get a job. One student mentioned:

I have earned my A+ and CC&A certification. This would be a cert (certification) that somebody coming out of a four year bachelors in college would look to have to put on their resume... so that when they sat in front of a potential employer, it would give them some sort of credit or some leeway to obtain that position.

Another student shared she was “going to take the national veterinary tech exam.” Another participant explained she had “1,000 hours in and I can go and get my cosmetology license when I turn 18.” Four students shared that they were “OSHA 10 certified.” One participant shared, “I already have my certified nursing assistant license and I’m going for my EMT certification now.”
Several students spoke of opportunities the school provided to showcase their skills and compete locally, regionally, and at the state and national level. One student spoke of her experience when she stated:

The students in our shop belong to DECA (Distributive Education Clubs of America). We compete with other students that are taking business and finance... That really gives you the opportunity to go out into the business world. Last year, I went to nationals in Salt Lake City. It was really cool to be able to see that and be able to get the feel of the business world.

Evidence of college and career readiness. According to school documents, the school provides opportunities for students to exhibit mastery of skills and compete with peers at the local, state, regional, and national level. According to Trade Winds (June, 2012), two Worcester Technical High School students won a gold medal in mechatronics at the nationals. The National SkillsUSA is a showcase of career and technical skills, where nearly 6,000 outstanding career and technical education students - all state contest winners - competed hands-on in 94 different trade, technical, and leadership fields. The contests were run with the help of industry, trade associations, labor organizations, and test competencies set by industry.

In addition, WTHS offers students the opportunity to earn industry-recognized certifications. For instance, in 2011, Worcester Technical High School received official Chapter 74 approval from the MA DESE Office of Career and Technical Education to open a Veterinary Program. The program received National Association of Veterinary Technicians of America (NAVTA) accreditation and opened an onsite state-of-the-art veterinary clinic in conjunction with the Cummings School of Veterinary Medicine at Tufts University. In addition, seniors in
the veterinary program have the opportunity to earn the national veterinary tech certification.

Presently, the school offers over thirty industry-recognized exams.

Students are also engaged in career preparation projects. According to school documents, in the construction academy, WTHS construction students worked with Matthew 25 (a local non-profit) to complete a foundation up construction project consisting of a fully LEED certified multi-family dwelling for low-income families. This ‘green’ dwelling utilizes the latest technology to operate at a high rate of energy efficiency thus lowering the daily utility costs. Examples include students from electrical and plumbing installing solar hot water units and high efficiency boilers; carpentry students installing super insulated panels to reduce thermal loss; and painting, design, and decorating students using low VOC water based eco-friendly paints. This partnership provides the construction students with real hands on experience to prepare the students for the world of work.

Supportive Environment. Fifteen out of the sixteen students interviewed spoke of the school’s supportive environment. Students used terms such as caring adults, high expectations, motivation, and family atmosphere. One student stated:

When I first came here, I wasn’t sure what I wanted and I wasn’t sure of a lot of things...I was kind of lost.... Just being in this environment with people who want to succeed and want to do well and a lot of teachers and guidance counselors and adults supporting you and pushing you to do well. I think it definitely shaped the person that I am today.

Half of the participants spoke of their relationship with their academic and technical teachers. One student stated “It is crazy how much I have changed because of the people that are here that look out for me and care for me and just want me to get the best education that I
possibly can.” Another student added, “I have been able to stretch my own personal limits and boundaries.”

Many of the students spoke of the high expectations teachers had for students. One student said, “All your teachers everyone expects you to do well and they want you to do well. Another participant added, “They make sure that they are there to help whenever you need their help, but they also make sure you know that it’s important for you to make it happen for yourself.”

All students spoke of the motivational speaker who speaks to the entire student body and staff every March. Students spoke of the impact these speakers have had on their lives. One student stated, “You can do anything if you put your mind to it.” Another participant added, “If he (Chris Gardner) can do it, than I can do it.” A third student commented:

I think the motivational speakers are awesome. They prove to everyone that no matter your background anything is possible if you really have the drive to do something, you’re going to get there.

Evidence of a supportive environment. Documented in Trade Winds (2009, 2010, 2011, 2012), although WTHS students work hard throughout the year, there are times when teens develop self-doubt and in some cases self-sabotage. In an effort to motivate the students, two weeks prior to the MCAS exams, the entire student body and staff traveled to The Hanover Theatre for the Performing Arts. For the past four years the principal has selected national, motivational speakers to speak to the student body and staff about reaching your potential and setting lifelong goals. Speakers have included: Liz Murray, subject of the made for TV movie, Homeless to Harvard; Dr. Benjamin Carson, subject of the made-for-TV movie, Gifted Hands: the Ben Carson Story; and Erin Gruwell, author of The Freedom Writer’s Diary. Last year, the
school was fortunate to have Chris Gardner speak to the faculty and students. Mr. Gardner is the author of the 2006 autobiography, *The Pursuit of Happyness*. He is also the inspiration for the movie *The Pursuit of Happyness* starring Will Smith. These speakers shared their extraordinary life stories of overcoming obstacles and achieving great success. Students have shared, through reflective writing, that this experience has been life changing and they feel very special, supported, and inspired to reach their full potential. Teachers’ report that they feel valued and appreciated.

**Summary of the Findings**

The findings from this study come together from the interviews and focus groups conducted with administration, faculty members, students, and business leaders, as well as a presentation and review of several related documents, e.g., student achievement data, school improvement plans, and newspaper articles.

The transformation of Worcester Technical High School is documented by the school and students’ success. The school’s graduation rate exceeds the state average and the dropout rate is the lowest in the state for urban settings. The increase in test scores demonstrated on the Massachusetts MCAS exams has been noteworthy and the introduction of Advanced Placement courses was culture changing. The school has a 77% college placement rate with a significant increase in students being accepted to four-year colleges and universities. Students at Worcester Technical High School are graduating career and/or college ready.

In sum, a new vision for the school created a positive culture change. A new focus on graduating all students career and college ready was developed. An emphasis on personalization and opportunities for students to be engaged in authentic learning provided students with the support and relevancy needed in a positive learning environment. Leadership was instrumental in
the school’s transformation. A collaborative leadership approach was used. Faculty was armed with a data-driven focus and all faculty members were accountable for student results.

In addition, school-business and higher education partnerships were noted throughout the school. These entrepreneurial partnerships provided creative learning opportunities for the students as well as real world experience. Entrustments were established to keep equipment and technology current at the school. An atmosphere of a “can do” attitude was evident throughout the school administration, staff, students, and school-business/higher education partnerships.

Chapter V: Discussion of Research Findings

Revisiting the Problem of Practice

America’s public education system is critical to our economy and is also the foundation of our democratic rights and freedoms (National Task Force on Public Education, 2005). The U.S. educational system came of age at the beginning of the last century, amid an enormous growth in population and a changing economy. Fueled by a massive influx of immigrants, the early 20th century America saw the evolution of an agrarian society and the advent of the industrialized economy (Cuban, 1990). One hundred years later, America faces a newly globalized economy, rapidly changing demographics, and a lingering and dangerous achievement gap for minority and poor students that continues to sap America’s strength by failing to give all children the tools they require to become the highly skilled workforce and engaged citizenry our country needs (National Task Force on Public Education, 2005).

The growing diversity of the United States’ workforce has profound implications for the future shape of the economy and the challenges facing our education system (Massachusetts Business Alliance for Education, 2006). According to Preparing for the Future: Employer Perspective on Work Readiness Skills (2006), drastic demographic changes are altering the
United States’ working population. The racial and ethnic groups with the least education are experiencing the greatest growth in the United States (Massachusetts Business Alliance for Education, 2006, p. 4). According to the National Center for Higher Education Management Systems (2005), in the forty-year span from 1980-2020, the working age white population will decrease from 82% to 63%, while the percentage of minority workers will increase from 18% to 37%. The National Center goes on to state the Latino working population alone will become three times larger, growing from 6% to 17%. Raising the education level of these populations is essential for sustaining a competitive economy.

Compounding the problem, industry expectations are rapidly changing. In 1973, 72% of the nation’s workforce was composed of people with a high school education or less. During this time, almost one third of the nation’s 91 million workers were high school dropouts (Harvard Graduate School of Education, 2011). Manufacturing was the leading industry and it was possible for those with less education, but with a strong work ethic, to earn a middle-class wage (Pioneer Institute, 2008). Present industry expectations suggest that education below a high school diploma will no longer be sufficient to provide a middle-class income.

Presently, employers are seeking employees who are equipped with 21st century skills. In the global economy, this workforce requires people to be problem solvers, have the ability to work in groups, think critically and incorporate technology (Brown, et al., 2005; Massachusetts Business Alliance for Education, 2008; Partnership for 21st Century Skills, 2010). Education beyond a high school level is being demanded and companies are seeking college graduates and/or candidates with specialized training (Fraser, 2008; Harvard Graduate School of Education, 2011; National Governors Association, 2011). Business executives are leading the
charge expecting high school graduates to be properly equipped with 21st century skills to meet industry needs and expectations.

Despite its mission as a vocational technical school to prepare students for the workforce, from 1990 through 2006, Worcester Technical High School was not keeping up with workforce demands. The school was one of the first vocational schools built in the United States, opening in 1910. By 1990, the facility was antiquated, the infrastructure incapable of being updated, and the equipment to train students was obsolete. In 1997, the New England Association of Schools and Colleges’ Commission voted unanimously that the school be placed on probation for failure to meet the Commission’s Standard 10 on School Facilities. In addition to an aging facility, Worcester Technical High School was the lowest performing high school in the city and one of the lowest performing vocational/technical schools in the state. In 2002, 97% of the students scored in the Needs Improvement and Failing Categories of the ELA MCAS exam, with 76% of these in the Failing Category. On the math MCAS, 97% of the students scored in the Needs Improvement and Failing Categories, with 85% of these students in the Failing Category (DESE, 2012). Graduates were not trained with 21st century skills to be prepared for a global economy. Students were not engaged in academically rigorous coursework and were not graduating career or college ready.

In August 2006, what was then Worcester Vocational High School was renamed as Worcester Technical High School and moved to a new $90 million, 400,000 square foot facility. Although the school name, address, leadership, mascot, and student demographics changed, the school’s mission remained essentially the same, “to educate and prepare our students, both academically and technically, to meet the challenges of a global society” (Worcester Technical High School, 2012).
Worcester Technical High School is now in its seventh year of operation in a new school building and a renewed sense of purpose, and now home to 1,400 students in 24 technical programs. It is the largest high school in the city of Worcester. The demographics of the school consist of 53% women, 47% men, and 63% qualify for free and reduced lunch and 19% are identified as special needs students. Worcester Technical High School has met Adequate Yearly Progress (AYP) for the “No Child Left Behind Act” in all categories five out of the past six years. In 2010, Worcester Technical High School met its target in the aggregate but did not make its targeted goal in certain subgroup populations. The students have met the targets for every designated subgroup. Last year, the school exceeded the Progress and Performance Index (PPI) and the Annual PPI and Cumulative PPI across all high schools in the state.

Worcester Technical High School is committed to providing the best academic and vocational technical education. In 2006, the school received national recognition by School Planning and Management magazine, rating our facility as “The #1 Public Education Facility in the Nation.” In 2011, Worcester Technical High School was selected as a MetLife / National Association of Secondary School Principals Breakthrough School. This prestigious award is given to five high schools from across the country for outstanding student growth in high poverty areas. Worcester Technical High School was the only school selected from New England and the only vocational technical school selected in the country. In addition, Worcester Technical High School was selected as an NBC Education Nation Case Study. NBC selected ten schools/programs from across the country to be featured as best practices that should be replicated for student success. On September 24, 2012, Worcester Technical High School was featured on the Today Show, a segment that was viewed by approximately 8 million viewers.
In the six years upon entering the new building and gaining a new Principal and renewed sense of purpose, Worcester Technical High School’s state exam scores rose significantly. In English Language Arts, 88% of the students scored in the advanced/proficient categories, an increase of 61% from 2006 to 2012, with a mere 1% failure rate. In mathematics, 78% of the students scored in the advanced/proficient categories, an increase of 43%, with a 3% failure rate. In science, 95% of the current 10th and 11th grade students passed with a 5% failure rate. Presently, the school has a 96.4% four-year graduation rate with a 1.5% dropout rate.

Students are prepared for success with a rigorous curriculum that combines academics with hands-on experience, both in school and in the workplace, through internships and cooperative education jobs. Students graduate with all academic requirements and with industry-recognized certifications. Worcester Technical High School graduates are graduating college and career ready. The profile of the 2012 graduates is as follows: 77% went on to higher education, 18% went directly into the world of work, and 3% joined the military.

This chapter will be broken down into the following sections: discussion of the major findings, discussion of the findings in relation to the theoretical framework, discussion of the findings in relation to the literature review, limitations, conclusion, significance of the study, and future studies.

Discussion of Major Findings

Through interviews, focus group sessions, and evaluation of school documents, and other resources, various themes emerged from across interviews and focus groups. Seven major themes were identified by administrators, faculty, students, and school partners. Table 15 presents each of these themes:
Table 15

Major Themes Identified by administrators, faculty, students and school partners:

- A move into a new state-of-the-art learning facility in tandem with a new leader led to a new vision and culture of the school
- Collaborative leadership led to teacher ownership in student success
- Personalized learning for all students
- Development of school-business-higher education partnerships
- The staff worked to establish high standards for all
- College and career readiness to develop productive adults
- Infusion of technology to support curriculum and instruction

A move into a new state-of-the-art learning facility in tandem with a new leader led to a new vision and culture at the school. All administrators and members of the instructional leadership team reported that leadership played a major role in creating a new vision for the school. According to the participants, the new vision was to graduate all students both college and career ready. Participants agreed the increase in rigorous coursework, including the development of Advanced Placement courses, establishment of college articulation agreements as well as the alignment of industry recognized certifications and skills, provided students the opportunity to graduate both college and career ready. This new vision led to a significant culture change. Previously, the school’s vision for its students was to train students for the world of work. Presently, academic teachers and technical instructors became partners to support student learning and to provide students with college and career opportunities for future success.

Collaborative leadership led to teacher ownership in student success. All administrators and members of the instructional leadership team commented on the collaborative
leadership approach at Worcester Technical High School. One administrator stated, “decisions were made together and were always based on what is best for the students.” Members of the instructional leadership team commented on the importance of collaboration and the development of mutual trust. Furthermore, participants reported that teachers felt valued because they were listened to. These factors created a supportive atmosphere and a collaborative working environment. Due to the fact that all faculty and administration were valued and their input was solicited, staff accepted being accountable for student results. Teachers were invested in their student performance and that investment drove the student and school success.

**Personalized learning for all students.** Many of the student participants and administrators interviewed discussed the importance of personalized learning that is student centered. Students shared that they felt supported and were provided an opportunity to make individual choices regarding their education. They highlighted the ability to choose from 24 technical programs and described the “opportunity to follow their passion for learning” in a specific area. Through this personalized learning approach, students felt better prepared than students attending a comprehensive high school because they had the ability to explore a potential career and/or college major. In addition, all students discussed the benefits of authentic learning. They described the opportunity to connect their education to real world experiences. All students highlighted their experience describing internships, co-operative learning opportunities, and community projects.

**Development of school-business-higher education partnerships.** All school-business partners reported the importance of developing school-business-higher education partnerships. School documents highlighted over 350 school-business-higher education partners. One partner described these partnerships as essential “to allow the school to keep their finger on the pulse of
what business and industry is expecting of their graduates.” Business and higher education partnerships offered a variety of opportunities for the Worcester Tech students. One partner described having a full service bank at the school, that trains high school students to be bank tellers and another partner spoke of the Tufts at Tech animal clinic that provides opportunities for students to work alongside of a veterinary doctor aiding real animals. In addition, higher educational institutions had a strong presence in the school, which included college faculty teaching college courses during the school day as well as over 30 articulation agreements with technical schools and two and four year colleges.

All school-business-higher education partners commented on an entrepreneurial spirit and a “can do” attitude. Each participant recognized administration as people that think outside of the box and make decisions based on what is best for the students at the school. One participant commented, “this school knows how to remove barriers.”

The staff worked to establish high standards for all students. All faculty members of the school participate in a data driven instructional focus to ensure all students are successful. This was documented in the Worcester Technical High School Accountability Plans. Goals and benchmarks were clearly established for sub-group populations. Progress was monitored through common assessments, grades, and the evaluation of student work. In addition, all students have a career and college plan. This plan is created with the student and their family in their freshman year and it is updated twice a year through 12th grade. Based on future plans, students select courses and monitor progress on state assessments, PSAT scores, SAT scores as well as industry recognized certifications. All students are also monitored on Chapter 74 competencies directly related to the vocational technical program.
The administration and faculty have high expectations for all students. This is evident in the state exam scores, graduation rates, and dropout rates for all of Worcester Technical High Schools’ students. In 2012, the overall proficiency or above rate for the school in ELA MCAS was 88%, the low income rate was 85%, the African American rate was 86%, and the Hispanic rate was 87% (DESE, 2012). In addition, the graduation rate for the class of 2012 was 96.4% and the dropout rate was 1.5%. The subgroup population graduation and drop-out rates are as follows: ELL 85.2% graduation rate / 3.7% drop-out rate, Students with disabilities 93% graduation rate / 4.2% drop-out rate, Low Income 95.3% graduation rate / 2% drop-out rate, African-American/Black 96.8% graduation rate / 3.2% drop-out rate, Hispanic/Latino 95.5% graduation rate / 0.9% drop-out rate (DESE, 2013). In addition, throughout the interviews and focus group sessions, there was conversation and comments made regarding high standards for all students. One particular teacher stated, “All of our students belong to the Tech family. We want all of our students to do well.”

**College and career readiness to develop productive adults.** Worcester Technical High School has created a culture of college and career readiness for all students. This is evident in the implementation of the advanced placement initiative to develop college readiness. According to grant documents, in 2010, the school applied for and received the Massachusetts Math and Science Initiative (MMSI) Grant to support the advanced placement initiative. The school has developed advanced placement offerings to include: AP Biology, AP English Language, AP English Literature and Composition, AP Statistics, AP Environmental Science, AP Computer Science, and AP Physics. In the past two years, there has been a 72% increase in students taking AP math, science, and English exams, which resulted in a 105% growth in qualifying scores in AP math, science, and English. Enrollment continues to grow in the
advanced placement courses. In the past three years, there has been a 141% increase in students enrolled in AP math, science, and English (MMSI, 2012).

This increased rigor has led to an increase in college placement. For the WTHS graduating class of 2012, 77% of the students went on to two and four-year colleges, 18% went to work directly connected to their technical studies. There has been a steady trend of more graduates attending college and universities. Additionally, there has been a steady trend of more students attending four-year colleges, with a significant increase in four-year college placement. The most significant increase occurred in the 2009-2011 years. The 4-year college placement rose from 8.7% to 38.9%. This is a 30.2% increase in three years (NBC Education Nation, 2012).

**Infusion of technology to support curriculum and instruction.** According to school documents, the school purchased 2,000 Dell computers, 150 Dell laptops, 160 Smart boards, and the entire facility has wireless capacity. In addition, the school has four computer labs, three portable laptop carts equipped with 25 laptops on each cart, and over 200 Senteo clickers. Furthermore, by 2012, the school had purchased 50 IPADS and 20 ELMO document readers for students to access for senior STEM projects and portfolios.

Technology is used to immediately assess student understanding. In the mathematics classrooms, students use Senteo clickers to solve math problems. This provides immediate feedback to teachers regarding the percentage of students in the class that understand the classroom material and which individual students need additional support. Technology is also used to accommodate various learning styles. For visual learners, classrooms are equipped with Smart Boards and document cameras (ELMO) to present primary source documents, student
exemplars, and graphic organizers. Teachers can use video stream and present material using this equipment. For auditory learning, DVD/CD players and computers are used.

Students have access to technology in every academic classroom and technical program. The school is equipped with over $3 million of equipment and technology. Students are actively engaged in the use of this equipment and technology directly connected to their technical program to develop specific industry recognized skills and competencies. All participants in interviews and focus group sessions discuss the topic of technology. One teacher commented, “I don’t even know that teacher anymore that used to be in there (referring to her classroom), because all of the technology and all of the resources that are here have just changed totally the way I teach.”

**Discussion of the Findings in Relation to the Theoretical Framework**

This study was informed through the perspective of the distributive leadership and organizational change theory. Each of these theories served as a lens to investigate the implications of the transformation of Worcester Technical High School.

**Distributive Leadership.** The idea of distributive leadership as outlined in Chapter 2 provides a new understanding about organizational development and leadership that involves individuals at all levels within all domains of an organization. The active commitment by all individuals at all levels is what is necessary for change to take hold (Ogawa & Bossier, 1995; Spillane, Halverson, & Diamond, 2001). Distributive leadership is about leadership practice rather than leaders or their roles, functions, routines, and structures. Instead, leadership practice is viewed as a product of the interactions of school leaders, followers, and their situation (Spillane, 2005, p. 144). During the course of interviews, focus groups, and evaluation of school documents, it was evident that Worcester Technical High School is run with a distributive
leadership model in mind. While participants did not use the word distributive leadership, their description of collaborative leadership clearly fits the model described by Spillane (2005). Collaborative effort was evident with the creation of the instructional leadership team and by the structure of the four small learning communities that distributed leadership to involve individuals at all levels within all domains of the school.

Noted in the focus group session and individual interviews, the principal assembled a group of school leaders that included academic and technical department heads, the MCAS specialist, assistant principals, and the director of career and technical education to form an Instructional Leadership Team (ILT). Initially the charge was to create a vision, instructional focus, and goals that ensured student and school success. The group evaluated the school using multiple data sources and was encouraged to share ideas and offer suggestions for improvements. Each department head met with their department members and brought recommendations for student and school improvement back to the ILT meetings. The result was the Worcester Technical High School Accountability Plan that established MCAS performance goals, graduation and dropout rate goals, timelines, schedules, benchmarks, and responsibilities. Members of the ILT refer to the school accountability plan as “a living document” that is routinely modified by the team. Additionally, participants commented that progress was monitored through reviewing lesson plans, evaluating samples of student work, classroom observations and evaluations, common assessment outcomes, and MCAS and MAP results. It was also shared that members of the ILT had identified best practices and recommended professional development to support the instructional focus.

According to all administrators, this team-oriented approach was a significant shift from the traditional vocational “top down” leadership style. It embraced collaborations, valued
opinions, and appreciated the expertise of the staff. It empowered teachers and supported them as they mastered their craft and became increasingly accountable for their students’ outcomes. The involvement of all the stakeholders — faculty, staff, parents, advisors, and students — has required continual communication and appropriate, thoughtful decision making. This has resulted in commitment to the welfare of the students and the future of vocational/technical education. In addition, through the principals’ leadership and recommendations of the ILT, a clear curriculum map was constructed, AP classes introduced, technical programs have been expanded, and articulation agreements and dual enrollment opportunities have increased with two and four year colleges. This led to students being prepared for state testing in the short term and career and college ready in the long-term. Students at Worcester Technical High School are graduating career and college ready.

Another example of distributive leadership is found in the Small Learning Communities model. The SLC implementation plan emphasized teacher involvement, the development of teacher leadership and a more collaborative professional culture. Each SLC had a governance structure that emphasized collaborative decision-making. A teacher-led action and design team had the responsibility for determining its needs for successful implementation of the conversion. During the implementation of these activities, all of the stakeholders had involvement through committee work and consultations. The basic design work originated with each of the SLC Action Design Teams. This ensured that teachers, administrators, business members, and other pertinent staff in each SLC took ownership of the process and advancing curricula and implementation of activities.

Organizational Performance and Change. In 1992, Burke and Litwin proposed a Casual Model of Organizational Performance and Change. In this study, as outlined in Chapter
II, the Burke-Litwin model of Organizational Performance and Change describes change as “the number of variables changing at the same time, the magnitude of environmental change, and the frequent resistance of human systems create a whole confluence of processes that are extremely difficult to predict and almost impossible to control” (Burke and Litwin, 1992, p. 523). Even with all these factors and variables, consistent patterns of organizational change exist and can be seen in actual organizations (Burke & Litwin, 1992).

The Burke-Litwin model is created with the external environment representing the input, and the individual and organizational performance representing the output. The feedback loop goes in both directions. According to Burke & Litwin (1992), environmental factors are the most important driver for change. The Burke-Litwin Model is comprised of 12 components, each representing an important task or concept within the framework of an organization. The components and their definitions, as stated by Burke and Litwin (1992) are listed below with examples of organizational change that occurred at Worcester Technical High School.

- **External environment.** The external environment is any outside condition or situation that influences the performance of the organization (e.g., marketplaces, world financial conditions, political/governmental circumstances). At Worcester Technical High School, the external environmental factor was the threat by the NEASC to close the school and business and industry demanding more of the graduates of Worcester Technical High School. This led to the funding and creation of a new $90 million facility.

- **Mission and strategy.** Mission and strategy are what the organization’s (a) top management believes is and has declared is the organization’s mission and strategy and (b) what employees believe is the central purpose of an organization. Strategy is how the organization intends to achieve that purpose over an extended time scale. Worcester
Technical High School students had poor state exam scores and the school was graduating students that were neither college nor career ready. A clearly defined mission, with strategic steps for implementation, was outlined. This led to an increase in the school’s graduation rate, increasing from 79.3% to a 96.4% in six years. Also the dropout rate fell from 6.5% to 1.5% in the same time frame.

- *Leadership.* Leadership is executives providing overall organizational direction and serving as behavioral role models for all employees. The new principal at Worcester Technical High School brought a career and college readiness focus. The principal’s organizational direction was to increase the rigor for students, by doubling the number of honors courses offered and implementing the advanced placement initiative. At the same time supporting student learning by providing the relevancy through the technical programs.

- *Culture.* Culture is the collection of overt and covert rules, values, and principles that are enduring and guide organizational behavior. Culture is “the way we do things around here.” WTHS was dubbed “The school that works.” This school motto created a “can do” culture of high expectations for all students with a data driven focus. This is mirrored in the graduation percentages for all subgroups for the 2012 graduation rate. The overall school graduation rate was 96.4%. The subgroup rates are as follows: ELL 85.2%, Students with disabilities 93.0%, low income 95.3%, African American/Black 96.8% and Hispanic/Latino 95.5%.

- *Structure.* Structure is the arrangement of functions and people into specific areas and levels of responsibility, decision-making authority, communication, and relationships to assure effective implementation of the organization’s mission and strategy. At Worcester
Technical High School, the school was redesigned into four small learning communities. This provided distributive leadership with autonomy. Decision-making opportunities were given to all staff and students.

- **Management practices.** Management practices are what managers do in the normal course of events to use the human and material resources at their disposal to carry out the organization’s strategy. The principal created an Instructional Leadership Team that empowered the faculty and created “buy in” to the organization’s strategy. In addition, department heads no longer were considered “mangers” of their departments with roles such as ordering supplies and managing the book room. Instead, department heads became instructional leaders promoting good teaching and learning practices.

- **Systems.** Systems are standardized policies and mechanisms that facilitate work, primarily manifested in the organization’s reward systems, management information systems (MIS), and in such control systems as performance appraisal, goal and budget development, and human resource allocation. Through the WTHS Accountability Plan, goals and benchmarks were established for the past six years. WTHS has met all goals outlined in this plan five out of the past six years.

- **Climate.** Climate is the collective current impressions, expectations, and feelings that members of local work units have that, in turn, affect their relations with their boss, with one another, and with other units. It was documented in the focus group session with the ILT and the individual interviews with assistant principals that teachers and administrators work together as a “team” and the climate of the school is a supportive environment, not a “got you” atmosphere.
• **Task requirements and individual skills/abilities.** Task requirements and individual skills/abilities are the required behavior for task effectiveness, including specific skills and knowledge required of people to accomplish the work for which they have been assigned and for which they feel directly responsible. At Worcester Tech, professional development was aligned with school initiatives to provide support for faculty and staff. Fellow teachers led professional development and the model teacher approach was used to support proper training.

• **Individual needs and values.** Individual needs and values are the specific psychological factors that provide desire and worth for individual actions or thoughts. It was documented through focus group sessions that teachers felt “valued” and that “their suggestions and input were heard.”

• **Motivation.** Motivation is aroused behavior tendencies to move toward goals, take needed action, and persist until satisfaction is attained. In the focus group sessions with students, students spoke about feeling supported by their teachers and principal. They spoke specifically about the Motivation Day held each year for the students at the school. Each year, two weeks before students sit for the MCAS exams, a national motivational speaker is flown in to speak with the students and staff. Students felt this provided extra motivation to reach their goals and do their best.

• **Individual and organizational performance.** Individual and organizational performance is the outcome or result as well as the indicator of effort and achievement (e.g., productivity, customer satisfaction, profit, and quality) (Burke & Litwin, 1992, pp. 531-533). Individual and organizational performance is monitored consistently. In 6 short years, Worcester Technical High School’s state exam scores rose significantly. In
English Language Arts, 88% of the students scored in the advanced/proficient categories, an increase of 61%, with a 1% failure rate. In mathematics, 78% of the students scored in the advanced/proficient categories, an increase of 43%, with a 3% failure rate. In science, 95% of the current 10th and 11th grade students passed with a 5% failure rate. Presently, the school has a 96.4% four-year graduation rate with a 1.5% dropout rate.

**Discussion of Findings in Relation to the Literature Review**

The findings from this study have a strong connection with the literature presented in Chapter II. The literature review focused on four main themes to inform this study:

1. Business and Industry Expectations
2. Vocation Technical Education
3. Transformation/Improvement models for low performing schools
4. Role of Leadership and Resources

Connections between the findings of this study to each of these four areas are reviewed below.

**Business and Industry expectations.** What are the stated needs for students today? The findings of this study were consistent with the literature review on business and industry expectations. According to *Educating a 21st Century Workforce*, “many of our students graduate from high school unprepared for college and career, too few pursue the scientific and technical disciplines our knowledge-based economy demands, and an unacceptably high proportion leave high school before graduating, especially in underserved communities” (Massachusetts Business Alliance for Education, 2008, p. 2). Properly preparing the next generation of workers for STEM careers will be vital to our nation’s economic prosperity.

Worcester Technical High School has made great strides to align its technical programs and academic standards with business and industry expectations. As documented in Chapter 4,
student scores on the MCAS exam have risen significantly, graduation rates exceed the state average, and college placement rates have more than doubled in the past four years with acceptances to four-year colleges and universities. The advanced placement initiative has played a significant role in this trend. In the past two years, there has been a 72% increase in students taking AP math, science, and English exams, which resulted in a 105% growth in qualifying scores in AP math, science, and English.

The literature review documented that employers are seeking employees who are equipped with STEM (science, technology, engineering and mathematics) knowledge and skills (National Governors Association, 2011). It was recommended that employees should have a strong mathematics and science background and be able to work in groups, problem solve, incorporate technology, and think critically. In addition, education beyond a high school level is being demanded and companies are seeking college graduates and/or candidates with specialized STEM training. To meet this demand, in the past seven years, WTHS has expanded its technical offerings to support a pipeline of trained workers in STEM fields in Central Massachusetts.

Since the school opened its new facility in 2006, Environmental Technology, Biotechnology, and Veterinary Tech were added to the technical programs. In addition, the Allied Health Program is the largest technical program at the school with over 100 students and for the past two years, all graduates went on to further their studies at four year pre-med colleges or universities.

In addition, administration and faculty understand the importance of aligning education and training with industry needs. As a result, administration and faculty created a new vision for the school last year. By a vote that exceeded two-thirds, the faculty successfully supported the implement of a STEM Early Career and College Innovation Plan. This plan aligns all 24 technical programs with a strong science, technology, engineering, and mathematics focus. In
addition, all academic areas support this plan with a strong literacy base and an increased focus on STEM fields and opportunities.

**Vocational Technical Education.** What are vocational technical schools? The second literature review was conducted reviewing the historical perspective and present status of vocational technical education. Results from this study support current literature on the purpose and present success of Massachusetts’ vocational technical schools. According to state and federal definitions, vocational-technical schools educate and prepare students for both employment and continued academic and occupational training. This is evident at Worcester Technical High School based on the placement rates for their graduates. For the class of 2012, 77% of the graduates went on to further their education at two or four year colleges or universities, 18% went into the world of work connected to their technical program and 3% joined the military.

In Massachusetts, vocational-technical schools have integrated academic and vocational education and must follow both the Massachusetts Vocational Technical Education Frameworks and the Massachusetts Curriculum Frameworks. At Worcester Technical High School, each technical program includes competency-based applied learning opportunities targeting 21st century skills. As presented in Chapter 4, students are provided the opportunity to work in authentic learning environments to support and enhance learning. All the students at the school are measured and assessed on adequate knowledge, work attitudes, general employability skills, and the occupation specific skills necessary for economic independence. In addition, many of the technical programs are aligned with industry recognized and/or national certifications. Students are provided the opportunity to take these exams to enhance their resumes and increase employment options.
According to the official position of the United States Department of Education (Office of Vocational and Adult Education, 2012), federal involvement today administers, coordinates, and recommends policy for improving quality and excellence of programs, which prepare students for post-secondary education and careers through strong high school programs and career and technical education. Specific strategies ensure that students achieve challenging vocational and technical skill standards, improve and expand the use of technology, involve parents and employers, and provide quality professional development. In Chapter 4, all these topics were discussed in detail outlining the importance of these elements to the school and student success. Specific attention was given to the school-business-higher education partnerships. Worcester Technical High School has 350 business partners that assist the school and its programs by staying current with business and industry needs and expectations. In addition, the businesses provide internships, cooperative educational experiences, field trip opportunities, teacher externships, equipment donations, and their time. The higher education partners provide over 30 college articulations and college courses during the academic school day free of charge.

**Transformational/Improvement Models for Low Performing Schools.** What is the literature on the transformation/improvement models for low performing schools? In the literature review, much was written about under performing schools. One in every 10 high schools across the nation is labeled as a dropout factory (Associated Press, October 2007). The graduation rates in these schools are less than 60 percent. Although students at Worcester Technical High School have a 96.4% graduation rate, other students in Worcester are not so fortunate. Out of the four comprehensive high schools in the city, one high school is labeled a
dropout factory with a 57.3% graduation rate for the class of 2012. Two other high schools are
dangerously close as well with a 65.4% and 68.4% graduation rate.

According to *Accelerating the Agenda: Actions to Improve America’s High Schools* (2008), states need to:

1. Restore value to the high school diploma by elevating academic standards and high
   school graduation requirements to a college- and career-ready level. This would include
   offering students other high-quality pathways, such as career technical education and dual
   enrollment, which prepare students for college and entry-level technical occupations.
2. Redesign high schools by expanding the supply of high-quality schools through new
   models such as early college high schools and alternative delivery mechanisms such as
   charter schools and virtual schools.
3. Improve schools by providing excellent teachers and principals by connecting teacher
   preparation, hiring, and evaluation to student outcomes.
4. Set goals, measure progress, and hold high schools and colleges accountable by
   developing high school accountability systems tied to college- and career-ready
   measures; and aligning postsecondary expectations, incentives, and performance to high
   school expectations.
5. Improve education governance by bridging k-12 and postsecondary expectation gaps
   through the formation of effective P-16 council (National Governors Association Center

Worcester Technical High School has followed the direction of the Massachusetts
Department of Elementary and Secondary Education (DESE) by implemented many of these
National Governors Association Center for Best Practices action steps. In this case study, four
out of the five steps have been identified in the transformation of Worcester Technical High School. A new vision for the school was created that changed the school culture. The new vision was to prepare all students to graduate both college and career ready. Students were given the opportunity to choose from 24 high quality pathways. These technical programs were aligned with business standards and higher education majors. In addition, academic standards were highlighted throughout the case study, with the decision to double the number of honors courses, implementation of the advanced placement initiative, and the development of college articulations and dual enrollment opportunities. These decisions directly impacted student learning and future student success. The rigorous academic courses provided a solid academic foundation for its students. It also created an opportunity for students to build a strong academic transcript to get accepted to four-year schools. Furthermore, students’ knowledge and skills developed in the technical program combined with a strong academic foundation tied to college articulations and dual enrollment opportunities provided proper preparation for successful transition to college or a career.

In the report, it was also recommended that high schools look to redesign their existing structure. In the transformation of Worcester Technical High School, it was documented the school administration and staff redesigned its school into four Small Learning Communities. The SLC model was implemented to increase student achievement and close the achievement gap among minority populations. It was also designed to create a new school culture supporting a more personalized learning environment. In this environment, students would develop a greater sense of purpose and relevance to the worlds of work, community, and higher education. It also provided an opportunity to partner with higher education to craft a richer and more rigorous curriculum.
Administration and staff continued to evaluate student progress and seek to improve the quality of education and opportunities at Worcester Technical High School. This has been documented with the successful development and implementation of the STEM Early Career and College Innovation School. This Innovation proposal was aligned with the Massachusetts DESE to support schools by providing more opportunities for schools to have autonomies in curriculum, instruction, assessment, professional development, hiring practices and budgeting. With this new science, technology, engineering, and mathematics focus, students will be graduating prepared to pursue STEM careers and STEM college majors.

Additional research on the topic of school improvement indicates that leadership plays a major role in the transformation of schools. Researchers, Knapp, Copland, & Talbert (2003) identified five dimensions of leadership activity when transforming a high school. These dimensions include: a focus on learning, use of data and evidence, aligning resources with learning improved goals, construction of roles that enable leaders to focus on learning improvements, and engagement with the community.

This case study supports these findings in the transformation of Worcester Technical High School. Documented through interviews and focus group sessions, WTHS leaders promote a clear and consistent focus on learning for all high school students. A high expectation for all students is evident in the school culture. The instructional leaders continually use data to drive instructional improvement in the high school. This evidence is clearly documented in the school’s accountability plan and supported by continuous professional development for the school’s staff. The principal has aligned resources with learning improvement goals and school initiatives. The administrative team targeted reallocation of resources and development of grants to support the specific instructional improvement goals. Engagement with the community is
evident throughout the school. The school has a 350 member advisory board that is composed of business, higher education, community, parents, and students that are actively directing the school and constantly updating programs.

**Role of Leadership and Resources.** What is the specific role of leadership in this transformation? In the last literature review, researchers Copland and Boatwright (2006), maintain that the distribution of leadership is key regardless of a school’s size. They further state, “to transform high schools into places that seek to serve each student calls for an understanding of leadership that moves away from reliance on administrative hierarchies and toward a network of shared and distributed practice (Copland & Boatwright, 2006, p. 12). It was well documented in this case study, the principal at Worcester Technical High School subscribes to a distributive leadership model. In the interviews and focus group sessions, administrators and teachers commented on the collaborative nature of the decision making process at the school. Teachers reported feeling valued and welcomed the opportunity to share suggestions to improve the quality of education for the students.

According to Leithwood, Seashore Louis, Anderson, and Wahlstrom (2004), the basics of successful leadership follows three sets of practices that make up the basic core of successful leadership: setting direction, developing people, and redesigning the organization. The Instructional Leadership Team created the school improvement plan to provide a clear sense of direction. The Accountability Plan clearly states goals, establishes timelines, and outlines responsibilities. This clear process helps people make sense of their work and enables them to find a sense of identity for themselves within their work context.

In addition to setting direction, the educational leader needs to define the school’s mission, manage the instructional program, and promote a positive learning climate (Leithwood,
Seashore Louis, Anderson, & Wahlstrom, 2004). At WTHS, the principal is tuned into employees as people. People are assigned responsibilities based on their strengths and talents. This promotes empowerment and buy-in. According to McColl-Kennedy & Anderson (2002), a leader’s personal attention to an employee’s enthusiasm and optimism can reduce frustration and transmit a sense of mission and indirectly increase performance.

Lastly in the literature review, successful educational leaders resist teaching to the test and other organizational pitfalls. Instead, educational leaders are purposeful about turning their schools into effective organizations. The educational leader redesigned the organization by strengthening the school culture, modifying organizational structures, and building a collaborative process. At WTHS, this was done by clearly and consistently articulating high expectations for all students. A culture of career and college readiness was established supported by the strengths of the faculty and strong relationships faculty members have with their students. As author Carl Glickman (2003) observed: “In successful schools, principals aren’t threatened by the wisdom of others; instead, they cherish it by distributing leadership” (p. 56).

Conclusion

The three research questions that direct this study focus on: how did Worcester Technical High School become a high performing school, how did leadership in the school contribute to this school becoming a high performing school, what strategies and use of resources were particularly valuable in the improvement of the school. The individual interviews, focus group session responses, and review of school documents provided answered to how Worcester Technical High School became a high performing school.

Summarizing the case study finding, it is evident that Worcester Technical High School’s success is directly related to the four R’s as it drives good teaching and learning in the 21st
The four R’s stand for Rigor, Relevance, Relationships, and Responsibility. Curriculum and instruction needed to be aligned with the state economy driven by business and industry and the four R’s were the keys to promoting student engagement and creative work.

The first “R”, rigor, sets the standard that all students should be engaged in the most challenging curriculum to stimulate student learning. Rigorous coursework requires challenging instruction and support for each student to meet high expectations. Essential components of a rigorous high school curriculum include “higher expectations for all students, with support for low-performing students through intervention programs and extended learning opportunities, and a requirement that each student complete a college or work ready curriculum in order to graduate from high school” (National Conference of State Legislatures, 2012, p.1). Worcester Technical High School doubled the number of honors courses, implemented an intensive Advanced Placement program, developed articulation agreements with two and four year colleges, embedded industry recognized certifications and standards in the technical programs, and set high expectations for all students to graduate both college and career ready.

The second “R”, relevance, provides a variety of learning opportunities that connect subject areas with both personal experiences and connections to the world of work. “Learning works best when it is personalized” (National Conference of State Legislatures, 2012, p. 2). Personalized learning experiences provide students with an opportunity to connect what is happening in the classroom (theory) with real world application (practice). At Worcester Technical High School, students are engaged in relevant and authentic learning opportunities that include interdisciplinary projects, internships, cooperative learning opportunities, and community partnerships. These opportunities provide students with a vision of their future and
an understanding of how their schoolwork is connected to what is being taught in class and applied after graduation

The third “R”, relationships, is an essential element for effective teaching and learning. Research shows that students perform better when they are in schools where they have a personal relationship with a caring adult. Relationships provide a personal connection between the teacher and student that helps ensure that students have “an advocate who understands their interests, struggles, and ambitions” (National Council of State Legislatures, 2012, p. 2). Recent work by the International Center has examined some of the most successful high schools in the country, some of which have significant challenges such as poverty and mobility, yet still have high rates of student success. In these schools, relationships among students and staff are deliberately nurtured and a key reason for student success. “Students believe that staff genuinely cares about them and encourages them to achieve at high levels” (McNulty R., Quigley J., n.d., p.3). Worcester Technical High Schools’ schedule and educational mission promotes a supportive and nurturing environment. Every other week students are in their technical programs working with a group of students and an instructor. The students spend every other week, the entire week, all day, in this small group setting. Students and staff create a bond and develop a caring and supportive learning environment for success.

Relationships also extend to business, industry, and higher education. Worcester Technical High School solicits input and seeks partnerships to assist the school in providing students with the most current training and education aligned with business, industry, and higher education expectations. Administration and staff have clearly exhibited an entrepreneurial spirit and a can do attitude to create nationally recognized partnership models.
The final “R”, responsibility, connects student learning with an individual’s responsibility to their community and our global society. At Worcester Technical High School it is important to teach students to be intelligent and knowledgeable, but we also need to assist students on how to use their intelligence and their knowledge. “Schools need to teach for wisdom, not just for factual recall and superficial levels of analysis” (Sternberg, R., 2012, p. 1). Staff at Worcester Tech believe proper teaching and learning should require opportunities for students to examine their responsibility and potential opportunities by making connections with their new knowledge and assisting in making their community and world a better place. Worcester Technical High School students have been engaged in countless community projects to improve the quality of life for citizens of the Worcester community.

The success of Worcester Technical High School is built on the concept of the 4 R’s: Rigor, Relevance, Relationships, and Responsibility. By implementing the 4 R’s, the principal was able to create a new vision for the school that led to a significant culture change. Staff and students embrace career and college readiness for all. Through a distributive leadership style, the staff developed a data-driven focus that held all faculty accountable for student and school success. By implementing the four R’s into the classroom and technical areas, a strong supportive environment was created and students thrived in this nurturing atmosphere.

Limitations

The greatest limitation in this case study was that the case study was limited to one school. In addition, Worcester Technical High School had a variety of circumstances that aligned to create “the perfect storm.” It had a brand new facility, with a brand new principal, and was funded with two major grants to redesign the failing school. Additional research would need
to be conducted to determine to what extent any of these factors translated into the school’s transformation.

Given the small sample size and demographics of the participants in this study, claims cannot be made regarding the scalability of the results. Additionally, the participants were all members of Worcester Technical High School. Participants interviewed were students, teachers, administration, and school partners, therefore the results may not be representative of all vocational/technical schools in other parts of the state, let alone the country or globally. Also, the study is only comprised of teachers and administrators from an urban district. There is only one urban district represented, and no other vocational/technical school from other districts or varying demographics participated in this study therefore limiting the results. Another limitation to the study is that the researcher is the principal of the school that is being examined. She also facilitated the interviews and focus groups. Being the principal of the school, members of the group that participated in the study could have tempered their answers accordingly therefore the results cannot necessarily be generalized.

**Significance and Possible Implications of the Study**

This study was conducted using the theories of distributive leadership and organizational performance and change. It was through the lenses of these theories that many beneficial themes developed, documenting essential components of the transformation of Worcester Technical High School. The results were consistent with what the theories suggested and were supported with current research in the four literature reviews.

America is faced with a newly globalized economy, rapidly changing demographics, and a lingering and dangerous achievement gap for minority and poor students. This trend has sapped America’s strength by failing to give all children the tools they require to become the
highly skilled workforce and engaged citizenry our country needs. With one in every ten schools across the nation labeled as a dropout factory, our nation’s educational system needs to restructure its present model. The present system is not meeting the needs of its students nor is it meeting the needs of business and industry in our country. Creating successful school models and implementing essential elements of transformational schools, will potentially engage student learners, improve the quality of educational services, and address the growing achievement gap in this country.

Worcester Technical High School has a very well defined structure in place that provides a successful model of education for its students. This study could potentially provide other schools the ability to create schools of choice. What would it mean for every urban setting to have a school like Worcester Technical High School where students are academically prepared and engaged in meaningful learning experiences connected to their community?

If communities did not have the funds to build an infrastructure like Worcester Tech, what would it look like if each comprehensive high school had a few programs in its school and provided students the opportunity to choose which program they would like to attend based on their potential college major or career goal? Some of these elements can be incorporated into a comprehensive high school setting to create a pathway for successfully graduating students both college and career ready.

All students in a comprehensive high school could develop an individualized college and career plan. This plan could be developed with the student and their family in the ninth grade and could be updated through the student’s high school experience. Courses and levels could be selected based on a student’s future goals.
All students should also participate in a career and college exploration curriculum. The MA DESE has developed a free, *Your Plan for College*, website, for students to explore potential college and career options matched to students’ interest. In addition, students can explore thousands of colleges, explore majors, and evaluate private, public, large, small, urban and rural technical programs, community colleges, and four-year colleges and universities.

In comprehensive high schools, administration should evaluate electives being offered at the school. The elective system could be redesigned to support college and career readiness by providing sequential courses for a more in-depth exploration of potential college majors and/or careers. By sequencing the electives, students can master industry recognized skills, potentially earn industry recognized certifications, and develop a pathway to introduce career speakers, and create job shadowing and internship opportunities for their students. In addition, the school could align their curriculum with local two and four year colleges and universities for articulation agreements. This would provide the students the opportunity to earn college credit while earning their high school diploma.

Worcester Technical High School has a strong business-industry-higher education partnership that can be replicated in comprehensive high schools as well. Program advisory committees could be created for each of their career and technical programs. The committees could consist of representatives of local business and industry related to the program, organized labor, post-secondary institutions, parents/guardians, students, and representatives from registered apprenticeship programs. The program advisory committee could assist and support school personnel in order to improve planning, operation, and evaluation of its program area. This committee could also provide timely information as to workforce and job development
demands for job market trends, technical developments, training alternatives, and other factors affecting the quality of the program.

At Worcester Technical High School, students learn skills with 21st century tools, content, and context by incorporating these concepts into student educational experiences. One of the best practices that could be implemented in comprehensive high schools is to provide students with opportunities to experience academic subjects through inquiry and specific pathways. Students “learn by doing” with practical applications such as hands-on activities, project-based learning connected to the community, and internships. Technology is a tool used for productivity, communication, and creativity. Students in comprehensive high schools should have opportunities like Worcester Tech students, to use the same kind of equipment and technology that is common in their career field, giving students experience and competencies for transition to career and college.

To help support technical programs, comprehensive high schools could replicate the very successful entrustment model in their comprehensive high school. Over 100 international, national, and local corporations participate in entrustment partnerships with Worcester Technical High School. Starting off on a smaller scale, this model can be replicated in comprehensive schools as well. Businesses can provide expertise, knowledge, and critical resources to schools. In return, schools could open doors during non-school hours to provide workforce training programs, some of which can be open to high school students. These types of programs utilize otherwise unused building capacity while generating revenue for core high school programs and contributing to regional workforce development activities.

The findings from this study will hopefully encourage further research on how vocational technical education can prepare high school students with essential career and college readiness
skills. In addition, developing vocational technical schools in urban districts could potentially increase the district, state, and national graduation rates, lower the drop-out rates and properly prepare minority students for college and future careers. This could directly impact and potentially slow down or reverse the growing achievement gap in this country.

This study could also potentially be used as a resource to school districts on how to improve the quality of educational services provided to students in their community. This study outlines improvement strategies and identifies resources and leadership qualities that might be replicable in service to other vocational technical schools. It is the researchers hope that other school districts read about Worcester Technical High School’s transformation and are inspired to make the needed changes to improve the quality of education for its students.

**Future Studies**

The following list represents recommendations for further study that would begin to address the universality of the findings and the scalability of the role of vocational/technical schools in addressing the achievement gap with minority students in urban settings. Future studies could include:

- to multiple case studies to look at context, resources, and relationships
- using a survey for administrators, teachers, students, and school-business-higher education partners to gather more quantitative data
- investigate using additional transformational urban vocational/technical schools
- conducting classroom observations of students learning in their natural setting in both academic classrooms and technical areas.
- explore further the role of teacher relationships with students at Worcester Technical High School
• examine the extent to which the means and methods that are emblematic of vocational technical schools that could be replicated to comprehensive high schools

**Personal Reflection**

I was born and raised in Worcester. I am the youngest of seven children. We lived near Newton Square with grandparents and many uncles, aunts, and cousins in the neighborhood. I still live in the neighborhood today with my own family sharing the neighborhood with my Mom, siblings, nieces, and nephews. I am a product of Worcester Public Schools. I believe in public education and I am proud to be an educator.

I began my career in the Worcester Public Schools as both a teacher and a district administrator. Earlier in my educational career, I taught second grade at Millbury Street Elementary School, was a severe special needs teacher at Mill Swan Elementary School, and a math, physical education, and career teacher at the high school dropout program, the Comprehensive Skills Center. I also previously worked as the WPS School to Career District Coordinator, Coordinator of Work for Worcester’s Youth placing 2,100 students in summer jobs, and the District Coordinator of Advancement Via Individual Determination (AVID) for Worcester Public Schools. Prior to becoming the principal of Worcester Technical High School, I left Worcester Public Schools for four years and was an assistant principal and principal at Wachusett Regional High School.

When I became the principal of Worcester Technical High School, I felt a lot of pressure to improve the school. As documented in this case study, the school had a long history in our community, but had developed a “dumping ground” reputation. There were a lot of eyes focused on the school with high expectations that their $90 million investment would produce a college and career ready student.
I was up for the challenge. Throughout my career, I accepted positions working with students who faced adversity and economic barriers. From working for five years with students with severe special needs to working with high school students, many of whom were pregnant or gang affiliated, and in danger of dropping out, I always rooted for and worked with the underdog. Working at Worcester Technical High School was like a dream come true. I had the opportunity to work with inner city youth and be part of changing students’ and their family’s lives. Education and training are power and students were getting empowered at Worcester Tech to break the cycle of poverty.

At first, I was not well received by the faculty. I was not a “vokie,” but that quickly changed when the faculty realized I respected vocational technical education and only wanted to build upon this technical model. I have never worked with a group of teachers who cared more for their students and were so passionate about their programs than at Worcester Tech. Through a distributive leadership model, teachers became empowered to work with school-business-high education partners to provide students with internships and co-operative education opportunities. They also developed articulation agreements with higher education partners and incorporated training for students to earn industry recognized certifications. These opportunities afforded the students to graduate both college and career ready.

Every year, administration and staff have built upon this strong foundation and have created a nationally recognized vocational technical school. In 2011, the National Association of Secondary School Principals recognized our student growth and awarded our school as a NASSP/MetLife Breakthrough School. In 2012 and 2013, NASSP featured our school as one of 16 Showcase Schools at their national conferences. This selection was due to student success and unique school-business-higher education partnerships. Also this year, NBC featured
Worcester Technical High School on the Today Show and at the NBC Education Nation Summit to give other states examples of successful national school models.

The success at Worcester Technical High School is due to a collaborative environment between city and state officials, school-business-higher education partnerships, and the dedication of our students and staff. It is my hope that this case study will inspire other communities to transform their schools.
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Appendix A

Permission Letter Superintendent of Schools

August 22, 2012

Dear Dr. Boone:

As you know, I am currently enrolled in a doctoral program at Northeastern University and am in the process of completing the dissertation stage of the program. My research is focused on the transformation of Worcester Technical High School. Worcester Technical High School students have shown significant gains on state assessments and increased graduation rates. The school has also received numerous national awards within the past six years.

Through the qualitative method approach, I will investigate the transformation of Worcester Technical High School through the perspectives of various stakeholders that participated in the transformation of the school: administrators, teachers, students, and school partners. Their stories, incorporating their perceptions of the school factors leading to the transformation, potential leadership qualities, and resources that were of particular value will lead to meaningful insight into the key elements of this transformation. The research process will involve designing questions and procedures, collecting data at Worcester Technical High School, and developing general themes inducted by the analysis of data. Through a case study model, interviews and focus groups will be conducted with administration, faculty members, students, and business leaders. This will lead to the identification of specific initiatives and potentially culture changing events that led to the school’s transformation.

I believe this case study will serve to benefit Worcester Public Schools as well as under performing schools in the Commonwealth. The goal is to outline how the success at Worcester Technical High School might be replicable in service to other under performing schools.

If you have any questions regarding this study, please contact me directly at (774) 696-1369 or via e-mail at harritys@worc.k12.ma.us or the chairperson of my committee, Dr. Christopher Unger at Northeastern University, (617) 909-1360. Thank you in advance for your time. I look forward to hearing from you regarding this request for permission.

Sincerely,

Sheila M. Harrity
Principal
Worcester Technical High School
Doctoral Candidate, College of Professional Studies
Northeastern University, Boston, MA
Appendix B

Initial Participant Recruitment Letter – e-mail

August 22, 2012

Dear Colleagues and Students:

My name is Sheila Harrity and I am a doctoral candidate in the College of Professional Studies at Northeastern University and the principal of Worcester Technical High School. As part of my dissertation research, I am conducting a study about the factors that have led to the transformation of Worcester Technical High School.

In order to gather data about this research, I am inviting you to participate in my study. You have been asked to participate in this project because you have a wealth of in-depth knowledge about the school and your insight will be helpful in obtaining information regarding the school’s transformation. Your input regarding the role of leadership, resource identification, school initiatives, and policy and practices will be helpful in obtaining information for this case study.

Once I complete my proposal of this study and receive approval from Northeastern University, I will formally request your participation. At this time, I am simply looking for an initial interest response from site participants involved with Worcester Technical High School. Please be aware that agreeing or not agreeing to participate in this study will have no reflection on your work within the school or as a teacher at the school, whatsoever. Also, any participation in the study will be completely confidential; names and other personal information will not be used.

Please respond via e-mail to harritys@worc.k12.ma.us if you are interested or have any questions. Thank you in advance for your time.

~Sheila Harrity
Appendix C

Initial Student Participant Recruitment Letter

August 22, 2012

Dear Student:

I would like to invite you to take part in my Northeastern University Doctoral study entitled: Education’s Perfect Storm: A Case Study of the Transformation of Worcester Technical High School. As part of my dissertation research, I am conducting a study about the factors that have led to the transformation of Worcester Technical High School. I would like to conduct student focus groups. I think you could offer valuable information for this research. For your participation in this activity, I will need to have your consent, as well as your parent/guardian’s approval. Your participation is completely voluntary and you can decide not to participate without any repercussions.

In order to gather data about this research, I am inviting you to participate in my study. You have been asked to participate in this project because you have a wealth of in-depth knowledge about the school and your insight will be helpful in obtaining information regarding the school’s transformation. Your input regarding your educational experience at Worcester Technical High School will be helpful in obtaining information for this case study.

Once I complete my proposal of this study and receive approval from Northeastern University, I will formally request your participation and your parent/guardian approval. At this time, I am simply looking for an initial interest response from site participants involved with Worcester Technical High School. Please be aware that agreeing or not agreeing to participate in this study will have no reflection on your rights, benefits, or services that you would otherwise have as a student. Also, any participation in the study will be completely confidential; names and other personal information will not be used.

If you have any questions about the study, you or your parent can contact me by phone at 508-799-1940 or via e-mail to harritys@worc.k12.ma.us. Thank you in advance for your time.

~Sheila M. Harrity, Principal
Worcester Technical High School
Appendix D

Initial Student Participant Recruitment Letter for Parent/Guardian

August 22, 2012

Dear Parent/Guardian:

I would like to invite your son/daughter to take part in my Northeastern University Doctoral study entitled: *Education’s Perfect Storm: A Case Study of the Transformation of Worcester Technical High School*. As part of my dissertation research, I am conducting a study about the factors that have led to the transformation of Worcester Technical High School. I would like to conduct student focus groups. I think your son/daughter could offer valuable information for this research. For your son/daughter’s participation in this activity, I will need to have your consent. Your son/daughter’s participation is completely voluntary and your son/daughter can decide not to participate without any repercussions.

In order to gather data about this research, I am inviting your son/daughter to participate in my study. Your son/daughter have been asked to participate in this project because he/she has a wealth of in-depth knowledge about the school and his/her insight will be helpful in obtaining information regarding the school’s transformation. Your son/daughter’s input regarding your educational experience at Worcester Technical High School will be helpful in obtaining information for this case study.

Once I complete my proposal of this study and receive approval from Northeastern University, I will formally request your son/daughter’s consent to participate and your approval. At this time, I am simply looking for an initial interest response from site participants involved with Worcester Technical High School. Please be aware that agreeing or not agreeing to participate in this study will have no effect on rights, benefits, or services that your son/daughter would otherwise have as a student. Also, any participation in the study will be completely confidential; names and other personal information will not be used.

If you have any questions about the study, you can contact me by phone at 508-799-1940 or via e-mail to harritys@worc.k12.ma.us. Thank you in advance for your time.

~Sheila M. Harrity, Principal
Worcester Technical High School
Appendix E

Signed Informed Consent Document

Northeastern University, College of Professional Studies
Investigator Name: Sheila M. Harrity
Title of Project: Education’s Perfect Storm: The Transformation of Worcester Technical High School
Informed Consent to Participate in a Research Study

Why am I being asked to take part in this research study?

You have been asked to participate since you expressed an initial interest in participating from a request letter sent in September 2012.

Why is this research study being done?

The purpose of this study is to identify and describe, as perceived by the principal, faculty, and school partners, key factors that led and contributed to the transformation of Worcester Technical High School. Through a case study model, interviews and focus groups will be conducted with faculty members, students, and business leaders. This will lead to the identification of specific initiatives and potentially culture changing events that led to the school’s transformation.

What will I be asked to do?

The researcher will be looking for you to participate in the following ways:

1. Participate in an interview session that will be audio taped
   or
2. Participate in a focus group session that will be audio taped

Your participation is voluntary, and you can opt out at any time.

Where will this take place and how much time will it take?

Individual interviews will take approximately 45 minutes each. The focus group session will last approximately one to two hours. Interviews and focus groups will take place in a conference room or classroom at Worcester Technical High School at a convenient time for participants.

Will there be any risk or discomfort to me?

There are no significant risks involved in being a participant in this study.
Will I benefit by being in this research?

Benefits will include the opportunity for site participants to reflect on factors that have led to the transformation of Worcester Technical High School. With your insight and feedback, your participation could potentially assist other under performing schools.

Who will see the information about me?

Your part in the study will be completely confidential. Pseudonyms will be used for all study participants. Only the researcher will be aware of the participants' identities. No reports or publications will use information that can identify you in any way.

As a focus group participant, your part will be confidential. The other participants in your focus group will hear your ideas, but confidentiality will be discussed with all participants. The data collected for this study will be kept by the researcher, including audio tapes, and will not be shared with others. Only first names will be used during focus group sessions and in transcriptions. False names will be used in reports related to focus groups. All audio tapes will be destroyed following transcription.

In rare instances, authorized people may request to see research information about you and other people in this study. This is done only to be sure that the research is done properly. The researcher would only permit people who are authorized by organizations such as Northeastern University to see this information. No identifying information will ever be shared with people at Worcester Public Schools.

If I do not want to take part in the study, what choices do I have?

You are not required to take part in this study. If you do not want to participate, you do not have to sign this form.

What will happen if I suffer any harm from this research?

There are no significant risks involved in being a participant in this study.

Can I stop my participation in this study?

Participation in this study is voluntary, and your participation or non-participation will not in any way affect other relationships (e.g., employer, school, etc.). You may discontinue your participation in this research program at any time without penalty or costs of any nature, character, or kind.
Who can I contact if I have questions or problems?

Sheila M. Harrity  
Worcester Technical H.S.  
One Skyline Drive  
Worcester, MA 01605  
Home # (508) 754-2451  
Work # (774) 696-1369  
E-mail: harritys@worc.k12.ma.us

Christopher Unger, Ed. D.  
College of Professional Studies  
360 Huntington Avenue (BV 20)  
Northeastern University, Boston  
Cell # 857-272-8941  
E-mail: c.unger@neu.edu

Who can I contact about my rights as a participant?

If you have any questions about your rights as a participant, you may contact Nan C. Regina, Director, Human Subject Research Protection, 960 Renaissance Park, Northeastern University, Boston, MA 02115. Tel. 617-373-7570, e-mail: irb@neu.edu. You may call anonymously if you wish.

Will I be paid for my participation?

There is no compensation for participation in this study.

Will it cost me anything to participate?

There is no cost to participate in this study.  
I have read, understood, and had the opportunity to ask questions regarding this consent form.  I fully understand the nature and character of my involvement in this research program as a participant and the potential risks.  Should I be selected, I agree to participate in this study on a voluntary basis.

____________________________________  __________  
Research Participant (Printed Name)  
Research Participant (Signature)  Date
Appendix F

Signed Informed Consent Document for Student and Parent/Guardian

Northeastern University, College of Professional Studies
Investigator Name: Sheila M. Harrity
Title of Project: Education’s Perfect Storm: The Transformation of Worcester Technical High School

Informed Consent to Participate in a Research Study

I am inviting your child to take part in a research study. This form will tell you about the study, and Ms Sheila Harrity will explain it to your child. You may ask Ms Harrity any questions that you have. Your child does not have to participate if you do not wish him/her to do so. If you decide to allow your child to participate, please sign this statement and Ms Harrity will give you a copy to keep.

Why am I being asked to take part in this research study?

You have been asked to participate since you expressed an initial interest in participating from a request letter sent in September 2012.

Why is this research study being done?

The purpose of this study is to identify and describe, as perceived by the student, key factors that led and contributed to the transformation of Worcester Technical High School. Through a case study model, focus groups will be conducted with students. This will lead to the identification of specific initiatives and potentially culture changing events that led to the school’s transformation.

What will I be asked to do?

The researcher will be looking for you to participate in the following way:

- Participate in a focus group session that will be audio taped

Your participation is voluntary, and you can opt out at any time.

Where will this take place and how much time will it take?

The focus group session will last approximately one to two hours. Interviews and focus groups will take place in a conference room or classroom at Worcester Technical High School at a convenient time for participants.

Will there be any risk or discomfort to me?

There are no significant risks involved in being a participant in this study.
Will I benefit by being in this research?

Benefits will include the opportunity for site participants to reflect on factors that have led to the transformation of Worcester Technical High School. With your insight and feedback, your participation could potentially assist other under performing schools.

Who will see the information about me?

Your part in the study will be completely confidential. Pseudonyms will be used for all study participants. Only the researcher will be aware of the participants' identities. No reports or publications will use information that can identify you in any way.

As a focus group participant, your part will be confidential. The other participants in your focus group will hear your ideas, but confidentiality will be discussed with all participants. The data collected for this study will be kept by the researcher, including audio tapes, and will not be shared with others. Only first names will be used during focus group sessions and in transcriptions. False names will be used in reports related to focus groups. All audio tapes will be destroyed following transcription.

In rare instances, authorized people may request to see research information about you and other people in this study. This is done only to be sure that the research is done properly. The researcher would only permit people who are authorized by organizations such as Northeastern University to see this information. No identifying information will ever be shared with people at Worcester Public Schools.

If I do not want to take part in the study, what choices do I have?

You are not required to take part in this study. If you do not want to participate, you do not have to sign this form.

What will happen if I suffer any harm from this research?

There are no significant risks involved in being a participant in this study.

Can I stop my participation in this study?

Participation in this study is voluntary, and your participation or non-participation will not in any way affect other relationships (e.g., employer, school, etc.). You may discontinue your participation in this research program at any time without penalty or costs of any nature, character, or kind.
Who can I contact if I have questions or problems?

Sheila M. Harrity
Worcester Technical H.S.
One Skyline Drive
Worcester, MA 01605
Home # (508) 754-2451
Work # (774) 696-1369
E-mail: harritys@worc.k12.ma.us

Christopher Unger, Ed. D.
College of Professional Studies
360 Huntington Avenue (BV 20)
Northeastern University, Boston
Cell # 857-272-8941
E-mail: c.unger@neu.edu

Who can I contact about my rights as a participant?

If you have any questions about your rights as a participant, you may contact Nan C. Regina,
Director, Human Subject Research Protection, 960 Renaissance Park, Northeastern University,
Boston, MA 02115. Tel. 617-373-7570, e-mail: irb@neu.edu. You may call anonymously if you
wish.

Will I be paid for my participation?

There is no compensation for participation in this study.

Will it cost me anything to participate?

There is no cost to participate in this study.
I have read, understood, and had the opportunity to ask questions regarding this consent form. I
fully understand the nature and character of my involvement in this research program as a
participant and the potential risks. Should I be selected, I agree to participate in this study on a
voluntary basis.

____________________________________
Research Participant (Printed Name)

____________________________________     __________
Research Participant (Signature)          Date

For Parent/Guardian of Student

I agree to have my child take part in the research project.

____________________________________     ______________________
Parent/Guardian (Printed Name)                     Date

____________________________________
Parent/Guardian (Signature)
Appendix G

Interview Protocol

Interviewee (Title and Name): Edwin B. Coghlin, Jr., Chairman of General Advisory Board
Interviewer: Sheila M. Harrity
Date: ________________________
Location of Interview: ____________________________
Previously attained background information (assume this has already been collected)

INTRODUCTION

Part I: Introductory Question Objectives (5-7 minutes): Build rapport, describe the study, answer any questions, review and sign IRB protocol and form for tape recording.
Introductory Protocol

You have been selected to speak with me today because you have been identified as someone who has a great deal to share about the experience of the transformation of Worcester Technical High School. This research project focuses on student and school success with a particular interest in understanding how they experience key factors that have led and contributed to this success. Through this study, we hope to gain more insight into how the school became a high performing school. Hopefully this will allow us to identify actions, strategies, and use of resources that can be recommended for replication at other underperforming schools.

Because your responses are important and I want to make sure to capture everything you say, I would like to audio tape our conversation today. I will also be taking written notes during the interview. I can assure you that all responses will be confidential and only a pseudonym will be used when quoting from the transcripts. The tapes will be transcribed by a transcriptionist, but the pseudonym will be used to label the tapes. I will be the only one privy to transcripts and information and the tapes will be destroyed after they are transcribed.

To meet our human subjects’ requirements at the university, you must sign the form I have with me (provide the form). Essentially, this document states that: (1) all information will be held confidential, (2) your participation is voluntary and you may stop at any time if you feel uncomfortable, and (3) we do not intend to inflict any harm (allow time to review form). Do you have any questions about the interview process or this form? I would also like to audio tape this interview and have a consent form related to this as well (provide form).

We have planned this interview to last approximately one hour. During this time, I have several questions that I would like to cover. If time begins to run short, it may be necessary to interrupt you in order to push ahead and complete this line of questioning. Do you have any questions at this time?

Introduction to Interview I
A. Interviewee Background – My name is Sheila Harrity and I am a doctoral student at Northeastern University. I am presently working on my dissertation. I am also the principal of Worcester Technical High School. I have been the principal for six years. I have worked in the education profession for over 20 years.

**Interview 1: Focused Life History**

Objectives: “To put the participant’s experience in context by asking him or her to tell as much as possible about him or herself in light of the topic up to the present time” (Seidman, 2006, p. 17).

1. Tell me about your past life up to before you became associated with Worcester Technical High School. Please go as far back as possible
2. Reconstruct your early life experiences in your family, school, and at work.
3. How did you come to volunteer and join the advisory board at Worcester Technical High School?
4. Describe a key experience that you believe influenced you in this decision.
5. Are there additional key experiences/situations that impacted your involvement at the school?
6. Please describe your earliest experiences with Worcester Technical High School, going as far back as you can remember and continuing up until the present time.

**Interview 2: The details of the experience**

Objectives: “To concentrate on the concrete details of the participants’ present lived experience in the topic area of the study” (Seidman, 2006, p. 18).

1. Tell me exactly what you do as the Chair of the General Advisory.
2. Tell me about the relationship you have with the principal, assistant principals, director of vocational education, and teachers.
3. In comparison to previous administration, has this relationship changed in any way?
4. In your opinion, how did Worcester Technical High School become a high performing school?
5. What strategies and use of resources were particularly valuable in the improvement of the school?
6. What does it mean to you, after investing 50+ years of your time to this school, to see it as a national model?
7. What advice would you give to a principal or superintendent of a low performing school?
Appendix H

Interview Protocol

Interviewee (Title and Name): Peter C. Crafts, Retired Director of Vocational Technical Education

Interviewer: Sheila M. Harrity

Date: ________________________

Location of Interview: ____________________________

Previously attained background information (assume this has already been collected)

INTRODUCTION

Part I: Introductory Question Objectives (5-7 minutes): Build rapport, describe the study, answer any questions, review and sign IRB protocol and form for tape recording.

Introductory Protocol

You have been selected to speak with me today because you have been identified as someone who has a great deal to share about the experience of the transformation of Worcester Technical High School. This research project focuses on student and school success with a particular interest in understanding how they experience key factors that have led and contributed to this success. Through this study, we hope to gain more insight into how the school became a high performing school. Hopefully this will allow us to identify actions, strategies, and use of resources that can be recommended for replication at other underperforming schools.

Because your responses are important and I want to make sure to capture everything you say, I would like to audio tape our conversation today. I will also be taking written notes during the interview. I can assure you that all responses will be confidential and only a pseudonym will be used when quoting from the transcripts. The tapes will be transcribed by a transcriptionist, but the pseudonym will be used to label the tapes. I will be the only one privy to transcripts and information and the tapes will be destroyed after they are transcribed.

To meet our human subjects’ requirements at the university, you must sign the form I have with me (provide the form). Essentially, this document states that: (1) all information will be held confidential, (2) your participation is voluntary and you may stop at any time if you feel uncomfortable, and (3) we do not intend to inflict any harm (allow time to review form). Do you
have any questions about the interview process or this form? I would also like to audio tape this interview and have a consent form related to this as well (provide form).

We have planned this interview to last approximately one hour. During this time, I have several questions that I would like to cover. If time begins to run short, it may be necessary to interrupt you in order to push ahead and complete this line of questioning. Do you have any questions at this time?

Introduction to Interview I

A. Interviewee Background – my name is Sheila Harrity and I am a doctoral student at Northeastern University. I am presently working on my dissertation. I am also the principal of Worcester Technical High School. I have been the principal for six years. I have worked in the education profession for over 20 years.

Interview 1: Focused Life History

Objectives: “To put the participant’s experience in context by asking him or her to tell as much as possible about him or herself in light of the topic up to the present time” (Seidman, 2006, p. 17).

1. Tell me about your past life up to before you became associated with Worcester Technical High School. Please go as far back as possible
2. Reconstruct your early life experiences in your family, school, and at work.
3. How did you come to work at Worcester Technical High School?
4. Describe a key experience that you believe influenced you in this decision.
5. Are there additional key experiences/situations that impacted your involvement at the school?
6. Please describe your earliest experiences with Worcester Technical High School, going as far back as you can remember and continuing up until the present time.

Interview 2: The details of the experience

Objectives: “To concentrate on the concrete details of the participants’ present lived experience in the topic area of the study” (Seidman, 2006, p. 18).

1. Tell me exactly what you did as the vocational technical director.
2. Tell me about the relationship you had with the principal, assistant principals, director of vocational education, and teachers.
3. In comparison to previous administration, was this relationship different in any way?
4. In your opinion, how did Worcester Technical High School become a high performing school?
5. What strategies and use of resources were particularly valuable in the improvement of the school?
6. What does it mean to you, after investing 20+ years working at this school, to see it as a national model?
7. What advice would you give to a principal or superintendent of a low performing school?
Appendix I

Interview Protocol

Interviewee (Title and Name): Assistant Principal

Interviewer: Sheila M. Harrity

Date: ________________________

Location of Interview: ____________________________

Previously attained background information (assume this has already been collected)

INTRODUCTION

Part I: Introductory Question Objectives (5-7 minutes): Build rapport, describe the study, answer any questions, review and sign IRB protocol and form for tape recording.

Introductory Protocol

You have been selected to speak with me today because you have been identified as someone who has a great deal to share about the experience of the transformation of Worcester Technical High School. This research project focuses on student and school success with a particular interest in understanding how they experience key factors that had led and contributed to this success. Through this study, we hope to gain more insight into how the school became a high performing school. Hopefully this will allow us to identify actions, strategies, and use of resources that can be recommended for replication at other underperforming schools.

Because your responses are important and I want to make sure to capture everything you say, I would like to audio tape our conversation today. I will also be taking written notes during the interview. I can assure you that all responses will be confidential and only a pseudonym will be used when quoting from the transcripts. The tapes will be transcribed by a transcriptionist, but the pseudonym will be used to label the tapes. I will be the only one privy to transcripts and information and the tapes will be destroyed after they are transcribed.

To meet our human subjects’ requirements at the university, you must sign the form I have with me (provide the form). Essentially, this document states that: (1) all information will be held confidential, (2) your participation is voluntary and you may stop at any time if you feel uncomfortable, and (3) we do not intend to inflict any harm (allow time to review form). Do you have any questions about the interview process or this form? I would also like to audio tape this interview and have a consent form related to this as well (provide form).

We have planned this interview to last approximately one hour. During this time, I have several questions that I would like to cover. If time begins to run short, it may be necessary to interrupt
you in order to push ahead and complete this line of questioning. Do you have any questions at this time?

Introduction to Interview I

A. Interviewee Background – my name is Sheila Harrity and I am a doctoral student at Northeastern University. I am presently working on my dissertation. I am also the principal of Worcester Technical High School. I have been the principal for six years. I have worked in the education profession for over 20 years.

Interview Questions:

1. How long have you worked at Worcester Technical High School?
2. What positions have you held at the school?
3. Describe your role in the transformation of Worcester Technical High School.
4. For the past six years, please describe what it is like to work at Worcester Technical High School.
5. How has that experience differed from previous years?
6. In your opinion, how did Worcester Technical High School become a high performing school?
7. What strategies and use of resources were particularly valuable in the improvement of the school?
8. Tell me about the relationship you have with the principal, director of vocational education, and teachers.
9. In comparison to previous administration, was this relationship different in any way?
10. What does it mean to you, after investing years working at this school, to see it as a national model?
11. What advice would you give to a principal or superintendent of a low performing school?
Appendix J

Interview Protocol

Interviewee (Title and Name): Instructional Leadership Team

Interviewer: Sheila M. Harrity

Date: ______________________

Location of Interview: ____________________________ ________________

Previously attained background information (assume this has already been collected)

INTRODUCTION

Part I: Introductory Question Objectives (5-7 minutes): Build rapport, describe the study, answer any questions, review and sign IRB protocol and form for tape recording.

Introductory Protocol

_You have been selected to speak with me today because you have been identified as someone who has a great deal to share about the experience of the transformation of Worcester Technical High School. This research project focuses on student and school success with a particular interest in understanding how they experience key factors that had led and contributed to this success. Through this study, we hope to gain more insight into how the school became a high performing school. Hopefully this will allow us to identify actions, strategies, and use of resources that can be recommended for replication at other underperforming schools._

_Because your responses are important and I want to make sure to capture everything you say, I would like to audio tape our conversation today. I will also be taking written notes during the interview. I can assure you that all responses will be confidential and only a pseudonym will be used when quoting from the transcripts. The tapes will be transcribed by a transcriptionist, but the pseudonym will be used to label the tapes. I will be the only one privy to transcripts and information and the tapes will be destroyed after they are transcribed._

_To meet our human subjects’ requirements at the university, you must sign the form I have with me (provide the form). Essentially, this document states that: (1) all information will be held confidential, (2) your participation is voluntary and you may stop at any time if you feel uncomfortable, and (3) we do not intend to inflict any harm (allow time to review form). Do you have any questions about the interview process or this form? I would also like to audiotape this interview and have a consent form related to this as well (provide form)._*

_We have planned this interview to last approximately one hour. During this time, I have several questions that I would like to cover. If time begins to run short, it may be necessary to interrupt_
you in order to push ahead and complete this line of questioning. Do you have any questions at this time?

Introduction to Interview I

A. Interviewee Background – my name is Sheila Harrity and I am a doctoral student at Northeastern University. I am presently working on my dissertation. I am also the principal of Worcester Technical High School. I have been the principal for six years. I have worked in the education profession for over 20 years.

Interview Questions:

1. How long have you worked at Worcester Technical High School?
2. What positions have you held at the school?
3. What is the role of the Instructional Leadership Team?
4. What are your specific tasks that you are responsible for?
5. How are they carried out?
6. What initiatives were implemented in the past six years?
7. Had the school ever worked on these types of initiatives? If so, please give an example.
9. For the past six years, please describe what it is like to work at Worcester Technical High School.
10. How has that experience differed from previous years?
11. In your opinion, how did Worcester Technical High School become a high performing school?
12. What strategies and use of resources were particularly valuable in the improvement of the school?
13. Tell me about the relationship you have with the principal, director of vocational education, and teachers.
14. In comparison to previous administration, was this relationship different in any way?
15. What does it mean to you, after investing years working at this school, to see it as a national model?
16. What advice would you give to a principal or superintendent of a low performing school?
Interview Protocol

Interviewee (Title and Name): School Business Partners

Interviewer: Sheila M. Harrity

Date: ______________________

Location of Interview: ____________________________

Previously attained background information (assume this has already been collected)

INTRODUCTION

Part I: Introductory Question Objectives (5-7 minutes): Build rapport, describe the study, answer any questions, review and sign IRB protocol and form for tape recording.

Introductory Protocol

You have been selected to speak with me today because you have been identified as someone who has a great deal to share about the experience of the transformation of Worcester Technical High School. This research project focuses on student and school success with a particular interest in understanding how they experience key factors that led and contributed to this success. Through this study, we hope to gain more insight into how the school became a high performing school. Hopefully this will allow us to identify actions, strategies, and use of resources that can be recommended for replication at other underperforming schools.

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We have planned this interview to last approximately one hour. During this time, I have several questions that I would like to cover. If time begins to run short, it may be necessary to interrupt
you in order to push ahead and complete this line of questioning. Do you have any questions at this time?

Introduction to Interview I

A. Interviewee Background – my name is Sheila Harrity and I am a doctoral student at Northeastern University. I am presently working on my dissertation. I am also the principal of Worcester Technical High School. I have been the principal for six years. I have worked in the education profession for over 20 years.

Interview

1. What company do you work for and what is your present position?
2. What is your involvement with Worcester Technical High School?
3. How long have you worked with the school?
4. Could you describe your experience working with the school?
5. Has the partnership been worthwhile to your business? Why?
6. How has your experience been working with the school?
7. Has the quality of students improved, stayed the same or decreased over the past six years? Please elaborate.
8. Do you feel the graduates are properly prepared with 21st century skills to be successful in your business? If yes or no, please explain why.
9. In your opinion, how did Worcester Technical High School become a high performing school?
10. What does it mean to you, after investing years working with this school, to see it as a national model?
11. What advice would you give to a principal or superintendent of a low performing school?
Appendix L

Interview Protocol

Interviewee (Title and Name): Students

Interviewer: Sheila M. Harrity

Date: ______________________

Location of Interview: ____________________________ ________________

Previously attained background information (assume this has already been collected)

INTRODUCTION

Part I: Introductory Question Objectives (5-7 minutes): Build rapport, describe the study, answer any questions, review and sign IRB protocol and form for tape recording.

Introductory Protocol

You have been selected to speak with me today because you have been identified as someone who has a great deal to share about the experience of the transformation of Worcester Technical High School. This research project focuses on student and school success with a particular interest in understanding how they experience key factors that had led and contributed to this success. Through this study, we hope to gain more insight into how the school became a high performing school. Hopefully this will allow us to identify actions, strategies, and use of resources that can be recommended for replication at other underperforming schools.

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To meet our human subjects’ requirements at the university, you must sign the form I have with me (provide the form). Essentially, this document states that: (1) all information will be held confidential, (2) your participation is voluntary and you may stop at any time if you feel uncomfortable, and (3) we do not intend to inflict any harm (allow time to review form). Do you have any questions about the interview process or this form? I would also like to audiotape this interview and have a consent form related to this as well (provide form).

We have planned this interview to last approximately one hour. During this time, I have several questions that I would like to cover. If time begins to run short, it may be necessary to interrupt
you in order to push ahead and complete this line of questioning. Do you have any questions at this time?

Introduction to Interview I

A. Interviewee Background – my name is Sheila Harrity and I am a doctoral student at Northeastern University. I am presently working on my dissertation. I am also the principal of Worcester Technical High School. I have been the principal for six years. I have worked in the education profession for over 20 years.

Interview Questions:

1. What grade and technical area you in?
2. How and why did you decide to attend Worcester Technical High School?
3. What specific educational opportunities has Worcester Technical High School provided you?
4. What specific college and career opportunities has Worcester Technical High School provided you?
5. Reflect on your growth since you became a student at Worcester Technical High School.
6. Do you think you would have had the same educational opportunities at a comprehensive high school? Please elaborate.
7. What are your future plans?
8. Do you feel properly prepared for college? If so, what has made you feel prepared? If not, why do you feel you are not prepared?
9. Do you feel properly prepared for a career? Why?
10. In your opinion, how did Worcester Technical High School become a national model for vocational technical education?
11. What advice would you give to a principal or superintendent of a low performing school?