Generating and Maintaining a Distinctive Feature: Lessons for Urban New Schools

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Abstract

As the number of new schools explodes in urban centers, educators need to understand the processes and challenges faced by schools trying to develop a central focus for curriculum and instruction. Using case study methods including interviews and document analysis, the current study explores the ways in which a highly successful magnet high school for science and technology developed and maintains its Technology Laboratories as its distinctive feature. Issues such as funding, staffing, leadership, and competition are explored. Recommendations are made for schools seeking to organize themselves around a distinctive center of excellence and questions posed for further exploration.

INTRODUCTION

Around the country urban districts are opening schools at a rapid pace, either out of stark necessity, such as in New Orleans (Simon, 2007), or as means of addressing low graduation rates, low test scores and school violence, such as in Atlanta (Guitierrez, 2007), Chicago (Ayers, W. & Klonsky, M., 2006), and Los Angeles (http://www.laschools.org/news/item?item_id=2140986). New York City will open 43 high schools in September 2007, with many of these new schools organizing themselves around a central theme (http://schools.nyc.gov/Offices/NewSchools/default.htm) ranging from international relations to arts and media to science and technology. However, teachers report concerns over the realities of implementing their schools' themes (Keiler & Carter, 2007). 'New' schools that have reached maturity offer important lessons about founding and sustaining schools with a clear mission to the current iteration of urban school reform.

Formed in response to the Nation at Risk Report (1983), High Tech High[4] is a highly successful, highly selective science and technology magnet school, accepting fewer than 20% of its applicants. Its students win national and international competitions and the most selective colleges compete for its graduates. Educators and policy-makers from across the country and around the globe visit the school, modeling their own programs on it. With the trend toward alternative school formats for public education, a clear and objective understanding of the achievements and shortfalls of such schools, the ways and means by which they develop, as well as the challenges faced over a 20-year history, becomes ever more vital to education stakeholders.

Repeatedly described as the 'distinctive feature' of High Tech High, the Technology Laboratories are the focus of this research. As one faculty member explained: "I see it as the

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[4] pseudonym

reason we are set apart from other schools; this is our really unique offering that we have. I think other schools may emphasize research but we have really devoted our resources to this program." These specially designed instructional spaces appear to play a vital role in recruitment, learning, and funding for the school. They form a nexus for debate about the mission of the school and the resources required to support and sustain the school's mission. Understanding the history of these Technology Laboratories illuminates the challenges ahead for the new school movement today.

CONCEPTUAL FRAMEWORK

The conceptual framework for this study begins in the magnet and charter schools literatures of the time of the school's founding and stretches to the current new urban school literatures, in particular the work concerning urban small schools. While the literatures of charter and magnet schools most closely relate to its foundation, unlike many charter schools, High Tech High was not created to circumvent the local school system but as an addition to it, receiving the full support of the district's administration. It shares this characteristic with the new schools being created by urban districts. Much of the magnet school literature addresses the integration role of these schools more prominently than their academic missions (Goldring & Smrekar, 2000), and explores admissions processes rather than school structures (Ming, 2002). Those authors that do focus on programmatic issues tend to omit critical factors in their descriptions and analyses, providing program overviews without demonstrating the process of achieving claimed success (Crim & Odom, 1987; Monaco & Parr, 1988; Passow, 1992). Finally, much of the magnet and charter school literature consists of insider reports without objective observation and analysis, (Graham, 2002; Kass, 1996; Lindeman & Bishop, 1997; Monaco & Parr, 1988; Rakovic, 1987; Taffel, 1987), usually presented by administrators discussing the strengths but not the challenges of their programs (Crim & Odom, 1987). Vocational education literature also contributes to the understanding of specialized schools. For example, Kent (1985) addresses the critical role of industry in a variety of vocational education programs, particularly in the areas of resources and expert advice. He quotes one superintendent's pride in having "a lot of state-of-the-art equipment" (Kent, 1985, 13), attributing this to the newness of the program, but does not address the challenges of staying "cutting edge." Thus, the charter and magnet school literatures leave gaps in understanding critical for those involved in current new school efforts. This study addresses this gap, exploring questions of success and sustainability in an established context that are beginning to be examined in the current new school movement (Ayers & Klonsky, 2006; Keiler & Carter, 2007; Siegel, et. al., 2005; Wasley et al., 2000), adding the critical perspective of time.

METHOD

This study uses case study methods, analyzing school documents and faculty and administrator interviews. The school records include Course Selection Guides, documents from the founding committee and School Board including minutes of meetings and sub-committee reports, publicity pieces by the school, and curriculum documents. This record is far from complete and in many ways served as a departure point for interview questions as much as a resource unto itself.

In addition to the relevant administrators and department head, the 16 faculty members currently attached to all of the school's 13 technology labs were interviewed about the establishment, growth and development of the their particular laboratory, the technology

laboratory program in general, and the school at large. Participants ranged from school founders to teachers with only two years experience there. Interviews lasted from 40 minutes to three hours following a semi-structured format (Merriam, 1988; Kvale, 1996). All but two of the interviews were audio taped and transcribed, with the others relying on detailed notes. Where appropriate this data set was supplemented with interview data from a related study of humanities faculty members at the school (Rennix & Keiler, 2003).

Analyses of these data were through reiterative assertion development, in which the transcripts and documents were chunked (i.e., divided into coherent, single-subject pieces), the chunks placed in categories, and assertions developed as the data in a category was read. Assertions were tested against the complete data set and amended as needed to reflect the statements of the research subjects and the written record (Anderson & Burns, 1989; Cooper & McIntyre, 1996; Maykut & Morehouse, 1994; Millar *et al.*, 1994; Tobin & Gallagher, 1987; Tobin & Fraser, 1987). The assertions address issues of challenges of resource allocation, success and frustration of industry support, the need for professional development, and the relationship between the distinguishing feature and the rest of the school. The results section presents these assertions and the data that supports them.

RESULTS
The changing role of the Technology Laboratories strained resources of time, space, and personnel: the evolution of a distinguishing feature can place unanticipated demands on its resources.

The Technology Laboratories were one of the original and most enduring elements of this school's planning and development. Having grown from four to 13 in number, the labs range in specializations from Automation and Robotics to Biotechnology to Computer Assisted Design (CAD), with each headed by an expert lab director. According to one of the original directors: "in the beginning, in the first two years, the lab directors had no responsibilities; there were no students assigned. They were just completely resource people." One of their main roles was in providing space and expertise for the freshman technology course. Groups of students cycled through the various labs with the lab director serving as the resident expert. As the school grew and students entered the laboratories for senior research projects, the faculty realized that the students lacked the technological skills they required. In response, the directors developed technology electives, which they teach in addition to supervising the senior research. Thus, the school identified a student need and met it; yet they did not anticipate the impact that removing the resource role from the lab directors would have. In early course guides, course descriptions ranging from Calculus to German II mentioned use of the Technology Laboratories. Such a ubiquitous role for the labs is absent from later catalogues. The senior independent research projects and related electives dominate the current labs and their directors, isolating them from the rest of the school. The changing role of the labs and responsibilities of the directors generated benefits, but left some critical gaps.

Industry can provide vital resources in terms of equipment and training, but consistency can be problematic

From its inception, High Tech High has relied upon external funding and resources. Many Technology Laboratory directors discussed the initial infusion of resources including sponsorship for most labs. While a few of the labs continue to have generous sponsors, economic realities in the community have decreased opportunities for others. One long-term staff member explained that the founder of the school was able to access local business and industry resources for the founding of the school; however, "a lot of their interest wasn't long term. A lot of them were interested as far as getting it started, getting it going; and a lot of interest shifted in probably the first two or three years." Further, some teachers claimed that much of the equipment donations arrived broken or outmoded: "A lot of our stuff came as castoffs and for a long time we would get calls from people who wanted to unload things, take a write-off, and we were between them and the trashcan." Thus, industry has been involved to differing degrees and in varying ways; all essential but with a lack of consistency that makes planning and development severely challenging.

The availability of industry sponsors and their continuing commitment controlled the focus and development of several labs. One lab director described what happened when his lab sponsor was not able to fully fund the program they envisioned:

> We here were left with what equipment can we get and how to put a program together that sort of blends the resources that we have and the original vision for the lab. I think that sort of evaluation went on for most of the tech labs. The vision was clear; how do you carry it off?

The school and the lab directors have had to be flexible about the directions their labs have taken, utilizing the available resources and making compromises when reality did not meet expectations.

While some original sponsors have changed ownership, moved out of the region, or had limited resources diverted to other projects, some directors attributed the loss of support to a diversion of focus away from the research laboratories to other aspects of the school. They ascribed the changing priorities to new administrative leadership, leading to limited acquisition of new resources. The lab directors had differing opinions about taking up the responsibility of courting sponsors themselves. One director explained: "groveling is a part of my job." However, another director was not as optimistic:

> The tech lab directors were told 'Well, that is something you need to pick up.' Well, when you are teaching six periods a day when do you do it? And the CEO of some company doesn't want to have lunch with a high school teacher; it should be somebody in a better position to represent more people.

Another lab director explained that the Parent Teacher Student Association (PTSA) had spawned an organization to raise funds for the labs, "We are trying to recoup what was lost and rebuild with a future of expectations and anticipations. Unfortunately that happens slowly and just now we are getting the support that has been reduced over the years." Many faculty members described the equipment needed in order to fulfill their mission in the school and allow students to conduct state-of-the-art research, speaking with guarded optimism about the role the PTSA organization could play.

Well-trained lab directors with time for professional development are critical to lab success; well-supported faculty are the lynch-pin for maintaining a successful focus.

Second only to the specialized student population, those interviewed claimed that the lab directors ensured success of the research laboratory program. The characteristics and skills described as essential for this position included the ability to manage independent learning and get out of the students' way, in-depth knowledge of and enthusiasm for the discipline and its application in the real world, and being an advocate for the laboratory. School planning meetings minutes suggest that the Technology Laboratories were to be "staffed by scientist/technician from local business and industry." While most of the lab directors came to the school from positions in other high schools within the district, three came directly from industry or academia. The latter varied in success depending on their ability to relate to the high school students and acquire appropriate teaching methods.

One of the challenges discussed by all the teachers was of remaining current in their rapidly advancing disciplines, given the time constraints of the job description. One of the most important roles played by industry was initial training and curriculum development, yet one lab director described its inconsistencies and the drop off in interest after labs were established. He continued, "There has always been a sort of an intangible connection where people, particularly lab directors, reach out and say 'what is industry doing?' but there hasn't always been a consistent commitment." In describing the declining role of industry, one director explained that they now had to rely on formal training sessions rather than individualized support: "But that was the thing that was nice about (the original sponsor), it was more informal, and they would schedule it at our convenience." The division manager discussed budget cuts and staffing distribution issues as major factors in limiting professional development opportunities. When asked what advice she would give a new school, the first thing the department chair mentioned was adequate time for professional development.

As the majority of the lab directors reach retirement, the school is faced with replacing this vital resource and has not developed a method for doing so. Many faculty members expressed concern over the hiring of the next generation of directors, since it has been such a specialized field. One experienced teacher suggested a training program for new technology teachers in which retired teachers would work part-time to mentor new lab directors. This teacher acknowledged the significant burden placed on a new teacher in a Technology Laboratory: "I will also tell you the first year I taught (an elective in this lab) I never studied a college subject any harder than I studied then, never, ever. I studied this very hard." This teacher took the initiative to become a student teacher in this lab in addition to her normal teaching load. The teacher suggested that using out-of-ratio staffing would allow teachers already within the school to gain expertise before current Technology Laboratory directors retired taking their extensive resources with them. Such an arrangement might also facilitate the transition of faculty recruited from industry. One teacher hypothesized that the early use of directors as a resource rather than a full-time teacher enabled practicing scientists to be mentored by practicing teachers.

A 'distinguishing feature' can develop a collaborative or a competitive relationship with the rest of the school.

Some teachers, both within and outside the lab group, discussed the role that all aspects of students' education played in their success in senior research. Some lab directors commended the humanities teachers for students' communication and literature research skills. One lab director even suggested freeing class periods for directors to work with humanities teachers in order to "enrich what they are doing and carry our message to them." Some humanities teachers saw it as their responsibility to prepare students for their senior technology lab. These positions suggested a shared vision of the school's mission and how to achieve it.

Other teachers perceived a competitive relationship between the research labs and the other subject areas in terms of time, financial resources, and students' attention. Humanities teachers claimed that the demands of senior research placed limits on their assignments. One lab director believed it was reasonable for science and technology to be prioritized in this way:

> It is going to take a disproportionate share of your resources and if the name on the door says school for science and technology or whatever then people in other departments have to expect that that is where the primary focus is going to be. If you don't like that then go to the [] Academy for English or English and Social Studies. I'm not saying that everything else isn't important; it is. But then again if you get a bunch of good teachers then everybody is going to try to have the strongest possible program.

Some teachers perceived a refocusing of the school away from science and technology and toward innovative teaching and curricula in other disciplines. One director argued: "we see funding going for other different kinds of things around the building and it would be nice if we could really make the labs state-of-the-art." The valuable time resource for lab directors to be out-of-ratio had been reallocated throughout the school. While the teachers acknowledge the value of other programs, they still argued that the technology labs: "were supposed to be a little more central than they are."

Some faculty claimed that an increasing number of students came to the school without a desire to study science and technology, attracted by the strengths of non-science and technology programs. They told of students who announced their freshman year that they were not going to complete the mathematics and/or technology requirements, therefore not receiving the High Tech High diploma. Many of the lab directors expressed a desire for more science and technology requirements while others saw the diversity of interest and foci as a strength of the school and an advantage to technology. One director saw a benefit in influencing non-technical students; however, most directors perceived the movement away from science and technology as a loss of the original purpose of the school.

DISCUSSION AND IMPLICATIONS

Whether or not a school wants to choose this particular distinguishing feature, the journey that High Tech High has made in designing, developing, and evolving its research laboratories provides critical lessons for school communities creating a central focus.

The need for substantial and consistent external support is vital for the success of a resource-dependent focus, but would benefit any program desiring a real-world connection. While many new schools can brag of initial investment, the challenge lies in maintaining external interest when the school is no longer the new-kid-on-the-block, as well as over periods of economic flux.

For example, the Bill and Melinda Gates Foundation has funded the creation of small schools from New York to Texas, but requires that schools become self-sustaining after the initial years, which creates problems of sustainability for the districts receiving the funds (Miner, 2005). Teachers in small schools receiving Gates Foundation funding express concern over what will happen to their schools and their jobs when starter funds end (Keiler & Carter, 2007). Rather than be surprised by variations in funding, new schools must plan for economic downturns, being savvy about the realities of funding sources and establishing priorities and procedures for when, not if, shortfalls arise.

The vital role that the lab directors have played and the challenges of providing time and resources for their development would be true of any staff attempting to work on the cutting edge of secondary education. In addition to updating the skills of experienced faculty, attracting and training new staff poses serious problems for a highly demanding, cash-strapped profession. Further, although it was the original staffing plan, lab directors from industry have faced mixed success in the High Tech High classroom, resulting from both personal and contextual factors. The longevity of many lab directors at High Tech High would be the envy of many urban schools, which struggle to retain teachers for five years. However, retaining, developing, and replacing senior faculty members is a problem new schools must address as they plan for their maturity. As school attempt to be desirable places to teach and thus retain faculty, they may be creating unanticipated challenges for themselves.

The importance of a clear and comprehensive vision transfers to any educational project. A leader who effectively and passionately maintains the school's mission appears critical for success in keeping the staff and resources focused and flowing (Reese, 2003). Yet when school leaders and other original staff members leave the school, what happens to the vision? Do new administrators and faculty have the right and/or opportunity to mold the school and its objectives? If the school is deemed a success, do students have the right to exploit that success, regardless of their relationship to the original mission? Is maintaining the school's initial purpose stagnating or invigorating in the face of changing political, economic, and educational climates? High Tech High has created a powerful distinguishing feature for itself and provided a remarkable educational experience for its students. The ways in which it and other schools answer these questions and plan for the challenges ahead will determine their success in maintaining and surpassing that standard of excellence.

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