

The Emperor's Clothes

Traditional and *Avant Garde* at High Tech High

Charles Taylor Kerchner

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The Emperor's Clothes

Traditional and Avant Garde at High Tech High.

Charles Taylor Kerchner


High Tech High may be the only school in the country that has an Emperor. Rob Riordan took the tongue-and-cheek title of “emperor of rigor” partly to address the expectations of visitors looking for someone in authority and partly as a serious joke, a conversation starter about how HTH views student achievement. It’s not about test scores.

Where the emperor of fable was delusional and naked, Riordan is spunky—at age 67 he ran the Boston marathon—and a bit preppy, favoring khakis and polo shirts. But like the fabled emperor, Riordan does draw a crowd, or at least the schools do. When I visited, he was guiding visitors from five states through an examination of HTH’s fabric and what swatches might be taken home to conventional public schools.

The visiting Hawaiians thought of building projects around native culture and ecology. Another delegation considered exploring the nature of patriotism with Vietnam War vets who live close to the school. A third wanted to investigate a suspected cancer swarm centered on a creek near the school.

All the visitors struggled with how to replicate the golden threads that cloak High Tech High: the engagement of students, their apparent integration across social class, the fact that school is simultaneously fun and productive. So did I. I had come to San Diego to visit the set of schools started in 2000 with the hope of finding organizational levers to move public education, particularly in California.

I listened to a group of administrators and teachers from Ohio visiting HTH for the second time say, “We tried to take it home; hit a brick wall.” It wasn’t a question of technology in the schools; every student has a computer. “It’s the people: How to get teachers to buy in? How do we involve the entire school?” It’s the structures: how does project-based learning, the central pedagogy of HTH, exist within an eight period day? How can you do this with a school that has tenure, a union, and a meddling school board?



Answers to these questions are relevant because HTH considers changing public education to be part of its mission, and I was curious about how or whether a celebrated set of charter schools might help reinvent an institution. But that gets ahead of the story, for to understand the institutional potential of HTH, one first has to understand the emperor's organizational threads. These are worthy of examination; for Riordan spins a powerful story about schooling that is both traditional and *avant garde*.

From the start, one is led to expect something different at HTH: its schools don't look like schools. Its leaders don't sound like administrators but unabashed evangelicals preaching a new form of learning: "At HTH, we believe that change in schooling happens, not incrementally by adding programs, but by generating holistic designs that enable new ways of teaching and learning."¹ These are not the good, gray, self-effacing bureaucrats of public school administration.

The mystique of High Tech High is reinforced by a visitor's first impressions. I came to HTH not to write a definitive organizational study, which the following does not pretend to be, but to better understand what the school calls its "changing schools mission." When I emailed school founder and CEO Larry Rosenstock asking to include the school in a study of places where students learned in ways that varied from the norm, I got an immediate positive response. When I talked with Simi Rush, the director of external affairs, she set up a schedule for me right away. When I walked into the school on Tuesday morning, Laura McBain, the director of policy and research, was waiting to show me the campus. When I spoke to students, they proudly told me about their projects. When I spoke with faculty about their classes, they took time to explain their work. Attention to visitors is how the school learns about itself, and for the visitor it opens a window on learning about what the next iteration of public education will be, that which I call Learning 2.0.²

High Tech High is a happy camp, or if it isn't that fact is well disguised. When McBain and I walked around the complex in the Point Loma neighborhood that holds the original High Tech High, HTH International, HTH Media Arts, HTH Middle, HTH Middle Media Arts, and HTH Explorer Elementary, we saw students engaged in their work. We did not see fighting, loud talking, screeching, bullying, or school personnel whose sole job it was to monitor student behavior. There are, in fact, no such personnel. There are no bells to announce classes at HTH, no loudspeaker announcements, no separate bathrooms for faculty and students.

HTH operates 11 charter schools in San Diego County, is considering founding two others, and is gently exploring a virtual project-based school. It also runs a graduate school to train its own teachers and spread its practices. The brick-and-mortar

¹ <http://www.hightechhigh.org/about/> (Accessed October 22, 2011).

² www.mindworkers.com (Accessed March 12, 2012).

schools include two elementary, four middle, and five high schools. All of these serve a racially and socially integrated student body largely selected by ZIP Code lottery. All follow the same principles.

Four Design Principles

The roots of the High Tech High program and curriculum lie in earlier work of Rosenstock, Riordan, and colleagues at the New Urban High School Project in the 1990s, an initiative of the U.S. Department of Education's office of vocational and adult education.³

Rosenstock studied law and then made amends by teaching carpentry for 11 years in urban high schools in Boston and Cambridge, Massachusetts. He worked as a staff attorney for the Harvard Center for Law and Education and was a lecturer at the Harvard Graduate School of Education. He was also the principal of two schools in Cambridge before taking on the new high school project.

The aim of the New Urban High School Project was to select, study, and assist urban high schools that were using school-to-work strategies, such as internships, as a lever for school change. From that work, the founders of High Tech High distilled four principles:

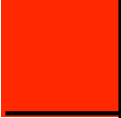
Personalization: HTH is built around small learning communities with a maximum of 125 students per grade. Each faculty member advises 10 to 15 students. Each student has a faculty advisor, who monitors student academic development and is the point of contact for the student's family. Students pursue their interests through projects they design with the faculty. They compile and present their best work in digital portfolios, many of which are available to the public on the HTH website.⁴ Students with special needs receive individual attention in a full inclusion program. The physical facilities are tailored to individual and small-group learning: networked wireless laptops, project rooms for hands on work, and exhibition space.

Visitors are immediately confronted by student work and students working. Forget bland stuff stuck on bulletin boards; think banners, artwork that illustrates mathematical principles, and big gears. A short walk-through provides evidence of students using saws to build furniture out of corrugated cardboard, others using welding torches to create a tandem bicycle where the students ride side-by-side,

³ For background see:

http://www.eric.ed.gov/ERICWebPortal/search/detailmini.jsp?_nfpb=true&_ERICExtSearch_SearchValue_0=ED423351&ERICExtSearch_SearchType_0=no&accno=ED423351 (Accessed December 20, 2011). Also available as NUHS Practitioner's Guide at www.hightechhigh.org/resource-center.

⁴ <http://www.hightechhigh.org/> (Accessed October 11, 2011).



and a determined group of middle school students using glue guns to patch a leak in their hydroponic tomato farm. It is readily apparent that students own their work.

HTH faculty say that personalization markedly diminishes discipline problems and cheating. It's easy to crib a set-piece essay on a book read by millions of high school students nationwide where hundreds of pre-written papers are available on the Internet. It's much harder to fake participation in a project.

Adult World Connection: The HTH curriculum integrates school and community learning. Juniors complete a 3-4 week full time internship in a business, nonprofit, or government agency. Seniors develop a substantial thesis-like project that enables them to learn while working on a problem of community concern. In the earlier grades, students may shadow an adult through a workday or have a "power lunch" with adults who work on issues that the students are studying. Since 2002, HTH students have completed 1,300 internships at over 200 sites. Chris White, the director of college advising for the schools, says that the internship experience is critical in convincing students to go to college, particularly those who would be the first in their families to do so.⁵

Common Intellectual Mission: There is no distinction between college prep and technical education. The program qualifies all students for college and provides hands-on experiences for everyone. Every graduate completes the full A-through-G list of requirements for the University of California. There is no tracking, and enrollment is not selective.

There are no separate honors or Advanced Placement courses. Any student can take a junior or senior core class for "honors credit," which the University of California weighs in making admissions decisions. The school chooses not to offer Advanced Placement because of the common observation that the prescribed curriculum almost always favors syllabus coverage over deep understanding.

Also, there are no classes or students labeled as *gifted*. Instead, techniques associated with teaching gifted students are used for all students. At Explorer Elementary, for example, teachers use techniques for understanding the depth and complexity of language that were developed for gifted and talented students.⁶

Rosenstock speaks to the value integrating head and hands. He saw this first hand in Massachusetts, where he found a greater percentage of the students who did internships going to and succeeding in college than was the case at the local college-prep high schools.

⁵ Riordan, Rob, "High Tech High: Three Integrations" (2011) unpublished ms.

⁶ <http://www.explorerelementary.org/readingicons.php> (Accessed December 20, 2011).

Teacher as Designer: It is not true that HTH does not have books. (Something like this was said on Oprah.) A library of texts is kept in cabinets should teachers want to reference them. But designing the curriculum is teacher work. For at least an hour a day, they work in interdisciplinary teams, with office space located next to seminar rooms and workspaces. Part of their job is to design the curriculum for 50-70 students per team. The curriculum reflects their interests and what they think will capture the engagement of students in ways that will also fulfill the California content standards.

The principle of teacher-curriculum designer differentiates HTH from most urban schools and from the idea that the road to success is to outsource a school's intellectual core to a textbook publisher or curriculum packager, so that the essential educational decision made by a school or district is whose bundle of goods to buy. At HTH, educational coherence is created at the culture-of-learning level by the projects that teachers design. The actualization of the teacher-as-designer principle creates a division of labor and teaching jobs far different than that found in most schools.

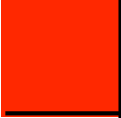
These are the clothes that Riordan as Emperor tells about, but the substance of the cloth depends on how the eleven HTH schools weave these principles.

The HTH Threads at First Touch

Perhaps the first thing to know about the HTH brand is that it is a bit of misnomer. High Tech High isn't all about technology; it is about teaching and learning in ways that John Dewey would recognize and Ted Sizer would laud. There are lots of computers, cameras, power tools, and Internet connections, but school is more about high touch than virtual reality.

The High Tech High idea was conceived in 1996 by a group of about 40 civic and technology industry leaders in San Diego as a response to the problem of finding workers in high-tech industries and as a means of addressing the low numbers of women and ethnic minorities in science, math, and engineering. Gary Jacobs, then director of education programs at Qualcomm, and Kay Davis, director of the Business Roundtable, were key participants in those discussions.

In late 1998, the group decided to form a charter school and engaged Rosenstock, who was then president of Price Charities in San Diego, as the founding principal. Jacobs and his wife Jerri-Ann offered \$3-million to start the school, which since has



been named after them. HTH would be described as a school “where a pedagogical vision met community resources. Larry’s ideas; Gary’s money.”⁷

The first school opened in 2000 on the Point Loma site of a former Navy Training Center that was the port of embarkation for thousands of troops during World War II. Now, six of the HTH schools are clustered there in the midst of residential and commercial redevelopment. Schools and neighborhood seem to fit together well. Students are supposed to stay on campus, but just across the street are several enticing eateries that would welcome the students’ business but whose owners feared teenage exuberance. Rosenstock’s solution was to extend the campus boundary to include the restaurants and to provide the restaurant owners with the dean of student’s cell phone number telling them: “If you see a student misbehaving, take a picture with your cell phone. Send it. The problem will be dealt with within the hour.” There have been few problems.

The six Point Loma schools enroll between 340 and 550 students each, thus following the HTH small school design. Each has a diverse student body and, with the exception of Explorer Elementary, has more than a third of its students from sufficiently challenging economic circumstances that they qualify for free or reduced price meals (FRPM in Table 1).⁸

Although selected by ZIP Code lottery from those who apply, HTH is clearly a chosen or preferred educational option by students and their families. In 2009, there were 4,700 applicants for 350 positions. The school has a culture where students not only want to be in school; they want to be in *this* school. School records show that 82 percent of 9th graders graduated four years later. Of those who didn’t, most transferred to other schools for a variety of reasons, including the lack of varsity sports at HTH, the difficulty of the program, transportation issues, or because they preferred a traditional high school. A handful left for disciplinary reasons. Very few did not graduate from high school at all.

The tables below also include each school’s score on the California Academic Performance Index (API) and its rank against other schools in the state on a ten-point scale (one being the lowest) and in comparison to 100 other schools that the state calculates are most like the HTH schools in their demographics and operating characteristics. However, some of the suburban schools in the state’s comparative demographics group are profoundly different than HTH. HTH is certainly not an inner city school where the majority of students are English language learners who live in poverty. But the operation of the lottery system tilts the scales for admission in favor of students from economically poor families.

⁷ Sutton, Marcia, “The Vision Behind the High Tech Journey,” *San Diego News Network*, <http://www.sdn.com>. (Accessed April 12, 2010).

⁸ All data in tables 1-3 are taken from the California Department of Education dataquest utility: www.cde.ca.gov (Accessed October 12, 2011).

Table 1
Point Loma Campus Schools 2009-2010

Students				
High Tech High	Enrollment:	API	Percent Proficient	
School API: 795	Total 549		English	Math
Statewide Rank: 8	Asian 39 (7.1%)	864	90	50
Similar Schools: 3	Filipino 35 (6.4%)	818	82	23
FRPM: 32%	Latino 190 (34.6%)	738	57	19
	Black 56 (10.2%)	720	58	15
	White 214 (39%)	843	88	36
High Tech Middle	Enrollment:	API	Percent Proficient	
School API: 806	Total 366		English	Math
Statewide Rank: 7	Asian 20 (6%)	925	92	83
Similar Schools: 3	Filipino 17 (5.1%)	872	71	82
FRPM: 35%	Latino 132 (39.3%)	746	54	48
	Black 29 (8.6%)	687	44	41
	White 126 (37.5%)	863	76	70
HTH International	Enrollment:	API	Percent Proficient	
School API: 798	Total 391		English	Math
Statewide Rank: 8	Asian 25 (6.4%)	863	79	58
Similar Schools: 6	Filipino 20 (5.1%)	878	10	33
FRPM: 36%	Latino 136 (34.8%)	740	60	16
	Black 50 (12.8%)	728	44	9
	White 147 (37.6%)	857	84	40
HTH Media Arts	Enrollment:	API	Percent Proficient	
School API: 787	Total 404		English	Math
Statewide Rank: 7	Asian 11 (2.7%)	NR*	NR	NR
Similar Schools: 2	Filipino 22 (5.4%)	871	88	53
FRPM: 38.1%	Latino 152 (37.6%)	719	49	15
	Black 44 (10.9%)	751	45	20
	White 159 (39.2%)	842	78	31
HT Middle Media Arts	Enrollment:	API	Percent Proficient	
School API: 802	Total 336		English	Math
Statewide Rank: 7	Asian 18 (5.4%)	NR	NR	NR
Similar Schools: 1	Filipino 14 (4.2%)	NR	NR	NR
FRPM: 38%	Latino 116 (34.5%)	755	59	38
	Black 29 (9.8%)	NR	50	31
	White 129 (38.4%)	830	80	64
Explorer Elem.	Enrollment:	API	Percent Proficient	
School API: 903	Total 341		English	Math
Statewide Rank: 9	Asian 24 (7%)	962	88	94
Similar Schools: 7	Filipino 12 (3.5%)	NR	NR	NR
FRPM: 5.6%	Latino 92 (27%)	840	62	73
	Black 17 (5%)	868	64	91
	White 190 (55.7%)	929	83	89

*NR=Not Reported; the California Department of Education does not report scores on small subgroups.

In the column headed API, the performance index is listed for the largest racial and ethnic subgroups, and under Percent Proficient, the percentages of students whose

scores reached the proficient range on the California Standards Test are listed. Note the considerable gap between Asian, Filipino or White students and Latino or African American students, a problem that HTH shares with most other schools. However, all students, including African Americans and Latinos, do relatively well on the gateway-to-college SAT exam, a subject that will be revisited later.

HTH has also built three schools in Chula Vista, just north of the border with Mexico. High Tech High Chula Vista serves about 450 students (see Table 2) in a sunlit environmentally friendly building, for which HTH has received both LEED certification and architectural awards. The middle and elementary schools are too new to have their test scores published by the state. HT Elementary Chula Vista is home to 402 students, 43 percent of whom qualify for free or reduced price meals, 19 percent of whom are English Language Learners, and 10 percent of whom receive special education services. HT Middle Chula Vista enrolls 334 students, half of whom qualify for free or reduced lunch, 11 percent of whom are English Language Learners, and 9 percent of whom receive special education services. In each school, approximately half the students are Latinos.

Table 2				
Chula Vista Campus				
HTH Chula Vista	Enrollment:	API	Percent Proficient	
School API: 741	Total 453		English	Math
Statewide Rank: 5	Asian 14 (3.1%)	875	85	23
Similar Schools: 1	Filipino 34 (7.5%)	843	77	42
FRPM: 36%	Latino 309 (68.2%)	719	50	14
	Black 33 (7.3%)	701	47	13
	White 52(11.5%)	803	67	21

HTH has started two schools in north San Diego County: HTH North County and HT Middle North County (Table 3).

Table 3				
North County Campuses				
HTH North County	Enrollment:	API	Percent Proficient	
School API: 793	Total 405		English	Math
Statewide Rank: 8	Asian 20 (4.9%)	860	73	60
Similar Schools: 2	Filipino 10 (2.5%)	NR	NR	NR
FRPM: 19.5%	Latino 70 (17.3%)	720	63	14
	Black 21 (5.2%)	720	67	17
	White 269 (66.4%)	803	72	26
HT Middle N. Co.	Enrollment:	API	Percent Proficient	
School API: 836	Total 323		English	Math
Statewide Rank: 8	Asian 8 (2.5%)	NR	NR	NR
Similar Schools: 2	Filipino 3 (.9%)	NR	NR	NR
FRPM: 26.6%	Latino 67 (20.7%)	747	55	42
	Black 7 (2.1%)	NR	NR	NR
	White 217 (67.2%)	863	77	65

An Integrated School

HTH appears much more authentically integrated than the vast majority of American schools. Because of admissions by ZIP Code lottery, there is a mix of races and economic circumstances. The broad net of the admissions lottery serves as an antidote to housing segregation and the flight of wealthier and whiter families to the suburbs.

The admissions lottery assigns weights to ZIP Code regions of San Diego County based on the size of the youth population in that region. It adds statistical preference for students whose family income is low enough to qualify them for free or reduced price meals. So in the lottery, students who live in densely populated, low-income areas gain preference.

But it is not the composition of the student body alone that distinguishes HTH. Many high schools with a racially mixed student body are deeply segregated inside. The tracking and honors system, and norms about social interaction, often separate the races. HTH's lack of tracking, separate honors courses, or selective electives means that students are more likely to mix. The projects students undertake make it almost inevitable that an HTH student will have working interaction with a student of a different race every semester.

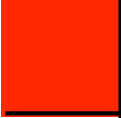
Rosenstock, along with advocates for charter schools, suggests that school choice may encourage truly integrated schools. After decades of white flight to the suburbs that left urban schools throughout the country more segregated than they were before court-ordered desegregation lawsuits, Rosenstock believes that there is an appetite among parents and students for high quality integrated education. The HTH ZIP Code lottery admissions makes it possible for a family to choose an integrated school without relocating their residence. Some 60 years after *Brown*, it is being argued that choice, rather than compulsion, is more effective in getting students of different races and economic classes to be educated together.⁹ Of the students who responded to a survey question, 52 percent said that a diverse student body was one of the things that was working well at HTH.¹⁰

Weaving Four Strands of Organizational Material

The fabric of HTH weaves the founding principles with four strands of organizational chord. The first is the charter school law, under which HTH operates, and without which it could not. More than most charter schools, HTH has taken advantage of the flexibility in the law to create an organizational form that differs from a public school district. Second, HTH has adopted a human resources strategy that is

⁹ www.excellence.net/commentary/education-gladfly-daily/flypaper/2012/3-thoughts-about-the-future-of-school-integration.html (Accessed, March 15, 2012).

¹⁰ High Tech High. *School Quality Review 2009-2010*. San Diego, CA. 2011.



starkly different from that of public schools: one part autocracy, one part autonomy, all surrounded by a common culture. Third, the principle of an integrated intellectual experience is delivered through project-based learning that combines cognitive ability and application, a pedagogy of head and hands. Fourth, HTH maintains organizational fidelity to its own goals of student achievement. It has not become a test score maximizer.

Flexibility and the Charter School Law

California's charter school act enabled and encouraged novel forms of organizing and governing schools. Compared to a district school, HTH has enormous flexibility in how it uses its resources. As Rosenstock notes, "It's governance, finance, pedagogy, personnel, facilities."¹¹

The strands of flexibility are important to Rosenstock, who saw the opposite in his district-run school experience: "I saw that teachers unions, administrators, parents, and school board were locked in a bureaucratic stasis of self interest. It is a dysfunctional stasis, yet in perfect equilibrium, and is therefore very difficult to dislodge."¹²

HTH was also the first school in the state to receive what is called a Statewide Benefit Charter from the California School Board allowing it to operate outside the bounds of a specific school district. Although it does not plan to start many additional brick and mortar schools beyond the 11 it now operates, it has authority to open as many as 48 schools. (The schools it operates in San Diego are chartered under the authority of San Diego Unified School District. Those outside are chartered under the statewide charter authority.)

It has had a stable and supportive board that, in the words of one school director, "knows how to open doors but keeps its hands off day-to-day operations." In marked contrast, the San Diego Unified School District board is known for roiling politics and frequent changes in direction.

The stable board has led to the ability to control finances. HTH has been successful in raising foundation support to assist with its new ventures, such as its graduate school. Gates, and other foundations have contributed about \$20 million, largely to disseminate its curriculum and assist others in adopting it.

However, for their basic operations, HTH schools live mostly within their charter school tax revenue, effectively about 80 percent of that which school districts receive.

¹¹ Sutton, "The Vision..."

¹² Rosenstock, Larry, "I Used to Think..." *UnBoxed*, 6, Fall 2010, p. 8 .

The Jacobs family and others have also contributed about \$6 million to construction and remodeling, and the schools obtained \$11 million in low interest public-backed bonds to build new buildings. Like many other charters and school districts, HTH raises funds among parents and the community: \$430,000 in 2009-2010.¹³

Purpose-Built Structures

HTH's buildings mirror its pedagogy and mission. Where most charter schools exist in storefronts or rented buildings, HTH looks like a campus.

Buildings at HTH speak the school's language. They are built around work spaces and exhibition spaces rather than classrooms. The interior walls are largely half-glass, making the rooms and the activities inside them visible to anyone walking by and thus allowing for relatively unobtrusive interventions. A teacher I was talking with stopped our conversation to go tell a class to quit socializing and focus on its work. It wasn't his class. The teacher whose class it was had been called away for a moment, and the kids were being kids. The whole intervention took perhaps 15 seconds, order was restored, and we continued our conversation.

The 38,500 square foot old Navy manufacturing building that houses the first HTH (now called the Gary and Jerri-Ann Jacobs High Tech High) retains its industrial look with the high ceilings and sawtooth roofline. The schools have continued matching form and function in the other buildings it has reconstructed on the Point Loma campus.

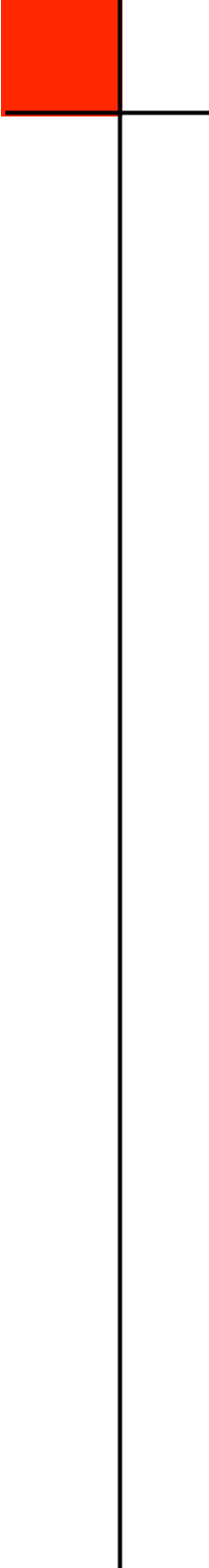
The Wow! experience upon entering a HTH school is purposeful. Ceilings soar, and banners, artwork, mobiles, even airplanes hang from them. Along with transparency, Wow! is the most visible architectural attribute. As the school says of itself:

Visitors to any High Tech High remark that it looks and feels more like a high-performance workplace than a school. With beautiful textures and colors, lofty ceilings, comfortable furniture, informal meeting areas and lots of interior and exterior windows, our facilities communicate a high level of trust and respect for the work of teachers and students. Visitors are struck by the effect on students of all ages, who can be seen interacting with adults in collegial, respectful, and engaged ways.¹⁴

HTH Learning, a non-profit that owns the buildings, has also built two new buildings in Chula Vista, and is building permanent facilities in San Marcos for HTH North County to replace temporary, modular buildings. The Chula Vista schools, under

¹³ *School Quality Review*, p. 18.

¹⁴ <http://www.hightechhigh.org/about/facilities.php> (Accessed October 28, 2011)



construction when I visited, are strikingly modern, yet flooded with natural light, hard edged, yet quiet because sound is absorbed through the perforated ceiling panels.

HTH Chula Vista was largely built from pre-fabricated components, a fact that accounted for its rapid completion. The roof is topped by photovoltaic cells that will generate about 80 percent of the school's needs when it is fully operational. At present, the school sells electricity to the power company.

The designs have won HTH a trophy case of awards. The original HTH received the "2001 Education Design Excellence Award" from the American School and University Architectural Portfolio, and others followed. The conceptual design of the first HTH schools was the work of David Stephen, who had been a colleague of Riordan and Rosenstock in Massachusetts. Christopher Gerber, who worked for a San Diego design firm, finalized the plans, subsequently joined HTH as director of facilities, and has overseen design and construction of additional schools.

Each school breaks from century-old traditions of school design to connect the form of the building to the school's educational function. Each has a commons room, a centrally located reconfigurable meeting place. Each has teaching clusters, including shared teacher's offices and seminar rooms. The seminar rooms themselves are flexible. Furniture moves. Walls move for team teaching. There is adequate technology—wi fi everywhere—and storage. Hard surfaces for easy clean up. (One of the clearest lessons of project based learning: it's messy. Glue guns, Skill saws, sawdust, paint, blood—sometimes real, mostly fake—all fit into the architecture.) Perhaps the most traditional looking spaces are those devoted to purpose-built labs, such as the one for biotechnology, media, and art studios.

And then, of course, there is gallery space, for the exhibitions that are seemingly everywhere.

Staffing and the School Day

The charter school flexibility extends to the design of the school day and staffing. There is no union contract at HTH schools, so creating a school day where teachers arrive early was a matter of managerial fiat, not collective bargaining. On most campuses, the student school day does not begin till 8:30. Teachers meet in teams every morning for an hour before the students arrive. The school sees this as a benefit rather than an imposition. Some days the whole faculty meets. Other days there are critiques of student work. Two days a week teachers meet to design projects for a shared set of students.

The schedules have fewer blocks of time than the typical school. By integrating art into the core curriculum, students use artistic expression to learn history, science and math. Longer classes allow more substantive engagement of the students, their work, and their teachers. Students learn sufficient self-discipline so that long periods of project work are not wasted time. There is a five period day, rather than the seven periods common at many high schools, and two periods are blocked or

joined together, thus creating three learning venues for a student and a teacher a day. A two-person team at HTH might share 50 students, where a teacher at a conventional high school might teach 150 in a given day and grade that many papers at night.

A high percentage of teachers work in the core subjects. There are fewer elective subjects than at a conventional school. Because the curriculum is built on depth rather than breadth, some things that are found in a comprehensive high school are missing. There is only one language, Spanish, for example. Engineering is taught, but there are no dance or music classes at most HTH schools.

The entire curriculum is aligned with the seven University of California entrance prerequisites known as the A-through-G requirements. All students take four years of English, history/social studies, math, and science. HTH schools build student choice into these core courses rather than creating alternative courses, as is common in comprehensive high schools.

HTH students also take courses outside the core, but largely they continue as a cohort. Depending on the school, all students take courses such as Spanish, art, drama, engineering, multimedia, or music.

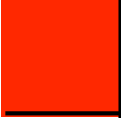
Each week includes a 2-3 periods called X-block when students can choose a course or activity designed by a faculty member, sometimes at the instigation of students. In addition, all schools offer a 2-3 week intersession program between semesters when teachers offer courses, trips, and other activities on a cross-age basis.

Also, each school has a college counselor. The intensity of college advice and assistance is almost unheard of in district schools. Says, Daley: "Their job is to be like a private school college counselor, but for public school kids." HTH tries to hire counselors who were the first in their families to go to college and who worked in college admissions themselves. "It helps that we have wonderful kids, but there is also an element of relationship building. So the kids get access to the unfair advantage that prep school kids get."

Special Education

The flexibility available to charter schools does not extend to special education, where most charter schools in the state operate their programs as organizational arms of the school districts that issued their charters. HTH has worked hard to craft a legal and organizational structure that matches a small-school, inclusive-teaching ethos and gains freedom from district control.

School districts in California are members of Special Education Local Plan Areas (SELPA), designed to pool risk and coordinate services. Large districts, such as San Diego Unified formed single-district SELPAs into which charter schools were umbrellaed. But SELPAs model of special education was at odds with the HTH



philosophy. The SELPA approached unsolved learning problems by classifying a student as in need of more intensive intervention and removing them from regular classrooms. HTH sought ways to tailor the classroom and its activities to the needs of the student, keeping them within the special education ideal of full inclusion.

Also, HTH, as a charter, felt it stood well back in the line for services of the overloaded SELPA staff.

And then there was the matter of money. Federal law mandates special education services, but the federal government pays only a small portion of the bill. California's state budget supports the major portion of a special student's education, but particularly in recent years, that support has lagged. Thus, each special education student encroaches on the school district's general education budget. In San Diego, the encroachment reached \$440 a student by 2005, and these costs were passed along to HTH. (By 2011, the encroachment was \$1,200.)

Meanwhile, HTH was becoming more popular with special education students and their parents, and the percentage of the total school population enrolled in special education increased to higher levels than either San Diego Unified or California as a whole. The combination of the encroachment and what was seen as spotty services motivated Rosenstock, who sought to remove HTH from the San Diego Unified SELPA. The story of how this occurred is torturous, but after many attempts HTH was able to affiliate with a SELPA that had a similar educational philosophy and which carried no budgetary encroachment. Based on an enrollment of 800 special education students, the budgetary support for their education grew from \$141,000 to \$410,000. HTH was able to hire a special education resource teacher for each of its small schools, and the schools are seeing their own seasoned and philosophically compatible teachers trained for special education positions.¹⁵

Teacher as Designer; Teacher as Worker

Jim Collins, the popular writer about organizations and management, made famous the phrase, "get the right people on the bus."¹⁶ Far more than most schools, HTH practices this admonition, and it gets what it considers the wrong people off the bus quickly. Organizationally, HTH functions as an autocracy. At the same time, it provides its teachers almost unheard of autonomy to design and deliver education. It's a paradox of tight organizational authority and high trust.

¹⁵ The story of HTH's efforts to shape special education funding and policy as well as its own programs can be found in: Cushman, Kathleen. *Special Delivery: The Promise, the Problems, and the Policy of Serving Students With Exceptional Needs in High Tech High Schools and Other California Charter Schools*. San Diego: High Tech High, 2006.

¹⁶ http://www.jimcollins.com/article_topics/articles/good-to-great.html (Accessed November 30, 2011), See also: Collins, Jim. *Good to Great*. First ed. Harper Collins Publishers, 2001.

Organizational paradox cannot be eliminated, but only managed. At HTH a common culture and educational belief system places checks around the tendency of autocracy to decay into tyranny, and the tendency of autonomy to decay into self-serving organizational incoherence.¹⁷

Design and Autonomy

HTH instruction is relentlessly teacher designed and developed. When I remarked about the novelty of students working together on projects, Rosenstock stopped me short, saying: “No, it’s about *adult* conversations; these precede the ability of students working together.” Not only has the school not outsourced its intellectual core to commercial curriculum packagers; it has placed it in the hands of its teachers.

Rosenstock is fond of saying that it is not true that HTH does not have textbooks. “There are lots of them in the cabinet over there. Teachers can refer to them any time they want.” But the most prominent books at HTH are ones that the students and teachers have written. Sixty are listed on the school’s web site creating both examples of the school’s own ideas about its best work and the transparency through which others can judge it.¹⁸

San Diego Bay begins about 200 yards from the HTH Point Loma campus. It serves as a social and scientific laboratory, and students have written four books about the bay and its environs. One of them, *San Diego Bay: A Story of Exploitation and Restoration*, was published by the University of California, San Diego, and supported by the National Sea Grant program.


As Jane Goodall wrote in the forward, “It describes the long-lasting effects that certain human activities have had on these animals and plants. The students have used traditional scientific methodology, the careful collection and analysis of data, enriching their research, and adding to its veracity through the use of GIS technology. In addition, they researched the history of human activities in and around the Bay and conducted their own interviews with selected individuals whose experience and knowledge could help to shed new light onto aspects of their investigations.”¹⁹

Through a series of projects developed by teachers Jay Vavra, biology; Tom Fehrenbacher, humanities; and Rod Buenviaje; mathematics, students interviewed

¹⁷ For examples of paradox and its management see: Handy, Charles. *The Age of Paradox*. Boston: Harvard Business School Press, 1994.

¹⁸ <http://www.hightechhigh.org/projects/> (Accessed October 24, 2011).

¹⁹ Students of Gary and Jerri-Ann Jacobs High Tech High. *San Diego Bay: A Story of Exploitation and Restoration*. San Diego: University of California, San Diego, Sea Grant Program, 2007, p i.



Native Americans, Chinese fishermen, and hunters. They follow the fortunes of tuna, sea lions, white sea bass, abalone, and dolphins. They applied Jared Diamond's themes from *Guns, Germs, and Steel* to the Bay.²⁰ They ended by saying, "Only when we realize that all the pieces of the bigger picture we call nature must be considered will we be capable of sustainably using the Bay, and the rest of the world's environment, to its fullest extent."²¹

Several other groups of students, and their teachers, have produced "alphabet books" or dictionaries on academic disciplines. Andrew Gloag's students published *Absolute Zero*, which illustrates physics terms. "A is for Antimatter" writes Kathy Anderson, explaining that high energy antimatter engines are still sci-fi stuff, but that PET (Positron Emission Tomography) scans of brain activity exemplifies a practical application of the science.²²

Jenny Morris and a biology class at HTH Chula Vista, wrote *Alphabet Soup: The A-Z of Cell Biology*, about which Morris comments: "This book is living proof that students will aspire to and reach the high expectations you set for them, if you provide a safe and supportive environment in which to try, fail, try again, and eventually succeed."²³

Dan Wise's economics students produced posters explaining economic terms in language a junior high school student could understand. Students had to test their examples on them. If a sixth grader couldn't understand, start over. Think: could you define a "moral hazard" or a "free rider"? In the process of creating these examples, the students learned the underlying economics, concise writing, and design. They illustrated each defined term with linoleum block prints that became part of the posters, and the posters and definitions became part of a book, *Economics Illustrated*.²⁴

In addition, the HTH Graduate School, described in a later section, produces a journal called *Unboxed*, which, somewhat counter intuitively, comes in a box along with a series of graphic cards illustrating something that a teacher, students, or the school has done.

Ben Daley, HTH chief operating officer, sees great value in publishing student work: "I have observed the pride that many students feel at having their words and their work appear in print. One of my high school senior advisees solemnly observed to

²⁰ Diamond, Jared. *Guns, Germs, and Steel: The Fates of Human Societies*. New York: W.W. Norton, 1999.

²¹ *San Diego Bay*, p. 311.

²² <http://www.blurb.com/books/1069347> (Accessed October 21, 2011).

²³ <http://www.blurb.com/books/1900542> (Accessed October 21, 2011).

²⁴ <http://www.blurb.com/bookstore/detail/1418997> (Accessed May 30, 2010).

my advisory group, 'I'm a published author now.' I believe that micro-publishing is an opportunity that allows almost any teacher to work alongside students to produce high quality products in which students not only absorb new information but also transform it to help make it their own, as well as develop important skills such as learning to work well in a group and the ability to effectively communicate one's ideas."²⁵

Regardless of how much the school is built around student engagement, there are clear bounds. Attendance is expected. There is a dress code requiring a "professional" appearance. Boys must wear a collared shirt, and girls are not allowed to wear short skirts, show their midriff, or wear tank tops with spaghetti straps.

A Functional Autocracy

HTH considers itself a teacher-run school, but the enormous latitude that faculty enjoy exists within an autocracy. Teachers are involved in a lot of decisions, but school directors have the final word on hiring and teacher discipline. There is no union contract, no civil service protection, no tenure, and no mechanism for faculty governance. Teachers get fired at HTH. One was let go in the middle of the semester while I was visiting, and students said one was released after only a month. The students I met with said, "We told them that she wasn't good, but they hired her anyway." (That said, HTH is extraordinary in the extent to which it involves students in teacher hiring decisions.)

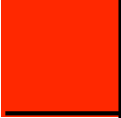
It is not just the teachers who work outside of public education's normal employment security safety net. Everyone is on a one-year contract, and everyone evaluates everyone else.

Clearly, in the calculus of the faculty, the capacity to control one's own teaching, to be creative with the curriculum, and work with engaged students outweighs employment security. In 2010 more than 1,100 teachers applied for about 35 jobs. The only major recruitment problem HTH has is finding math teachers who can balance projects and content.

The schools take choosing faculty seriously. Some 150 were brought to campus in 2010 to interview. Part of what Riordan calls the "hiring bonanza," involved applicants working in teams to design a project, auditioning the work they would be doing if they were hired.

Students say, "it takes a certain kind of teacher to work here." Because there is no packaged curriculum to march through, teachers have to create structure.

²⁵ <http://blogs.hightechhigh.org/bendaley/> (Accessed October 24, 2011).



New teachers come to school seven days before anyone else, and then they work for eight days with others in their team. They get help and also critical eyes on their work. The open classroom space makes their teaching visible. People can come in; they can walk by. New teachers are encouraged to engage in reflective writing about their work and to create personal narratives.

HTH schools do not have a row and column salary schedule, but as Daley notes, “at the same time there needs to be some sense of equity,” and the schools pay close attention to salaries in surrounding public districts. However, during the post-2008 economic downturn, HTH froze salaries for four years and has slipped behind surrounding districts in teacher pay. (Some of these districts, it should be noted, are on the brink of receivership.) Still, HTH has the ability to offer somewhat higher salaries than surrounding districts to experienced teachers and new teachers with heavy experience in business and industry.

There are salary differentials based on subject matter, but they are not huge and not openly discussed. There are also differences based on performance, but they account for no more than 5 percent of salary. “The real incentive in the system is to work with stunning colleagues and the professional freedom that is accorded to the teachers in HTH,” said Daley.

Off the bus

HTH considers the lack of tenure essential. “Our stuff is based on trust,” said Daley. “I am not going around telling people what to do in their classrooms. The more you have weak people, the more you have to supervise them. We definitely have a lot of ways that we support teachers who struggle...formal and informal mentors, partnering them up with more experienced teachers, meeting with them weekly.”

There is a bit of psychological tenure, the notion that if you were rehired over the first three years or so, your job is secure. Yet, the school has fired five-year veterans who did not have the ability to move into teaching the core subjects. The insecurity makes some teachers anxious, but not all. On a survey, 32 percent of staff said they felt anxiety about whether they would be offered a contract next year, 38 percent said they did not, and the rest offered no opinion.²⁶

Stacey Caillier, director of the HTH Graduate School teacher leadership program, says that those asked to get off the bus are teachers who can’t learn from their own experience or who can’t collaborate. One was a teacher who had come to HTH with industry credentials but a narrow, non-engaging way of teaching. “Could not see that there was anything wrong,” Caillier said. “We showed videos, visited other classrooms, and there was no hint of recognition of why things were not going well. We don’t look for perfection, but we do look for growth.”

²⁶ *School Quality Review*, p. 42.

Student performance is the greatest single factor in teacher evaluation, but student performance is found in the work they produce, not test scores. “We say ‘that the single greatest judge of the quality of a teacher is the quality of a student’s work.’ It’s kind of pithy, but we have all our teachers and our students presenting their work publicly, in a variety of different ways,” Daley said. Numbers are not assigned, but “when school directors are deciding who they should rehire and who gets a raise, that’s primary consideration: ‘Are their students producing interesting, high quality work?’” Because the schools are so focused on exhibition, school directors—along with everyone else—can see what students are producing, both during formal exhibitions and during their frequent visits to classrooms. Directors also judge the extent to which a teacher can work well with other adults, particularly during daily staff meetings before school.

On the bus

Teachers at HTH bring content with them. HTH assumes, and the hiring process reinforces, that incoming teachers know their subject matter and that the school’s job is to help the teacher build pedagogy around that knowledge. Sometimes knowledge equates to a degree. More universally, though, it signals both experience and passion about a subject.

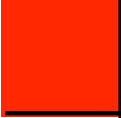
Collaboration and the ability to solve ambiguous problems become core competencies for HTH faculty. The image of a high school teacher as a sole practitioner, the last vestige of the employed iconoclast, fades in an atmosphere where group problem solving is required as part of one’s work.

The idea of teacher as designer, “it’s partly about your own work in the classroom, but we think it extends beyond that,” said Daley. Teachers hire their colleagues, “although at the end of the day school directors decide.” Teachers create the schedule and the curriculum. “I don’t know any place in a union environment where the teachers have more ownership not just of their own classroom but of the broader organization as they do here,” said Daley. “So, it’s a paradox.”

The Pedagogy of Head and Hands

Projects exemplify the head-and-hands credo and approach to learning. Project-based learning is frequently misunderstood, and HTH takes pains to clarify what it is, and isn’t.

Art teacher Jeff Robin explains, “It’s not project *oriented* learning, like studying the (California) Missions in class and then going home on Friday and making a model of a mission out of sugar cubes.” He continues saying the opposite of project based learning is project oriented learning where kids learn everything first and then do a project. Cover the basics; cover the standards. “Then about two weeks before the end of the semester you say ‘okay kids, we’re going to do a project.’” On exhibition



night, the kids dress up and show their parents the projects they made, but the projects didn't run the semester.²⁷

At HTH, projects drive learning. At Explorer Elementary, first grade students spent a semester designing a city. Students started out with what they knew—blocks—and then their work became more sophisticated. They went on field trips to study transportation and see different kinds of buildings. They donned hard hats and went to a construction site to see what buildings were made of and to talk to architects about what all those funny symbols on the drawings meant. They put together scale drawings, made mockups, even costed out their projects, and in the end they created a scale model city.²⁸

Another middle school project gained real world application quickly. Ben Krueger, a 6th grade math-science teacher at HTH Middle School, led students in using Google Sketch Up, a sophisticated open source design tool, to conceptualize the outdoor play space for a new HTH school in Chula Vista.

The students researched other play spaces, created and analyzed a survey, developed designs in three dimensions, created blueprints and scale drawings, and budgeted their designs, picking up the mathematical concepts of positive and negative numbers along the way.

Gerber, the director of facilities, took the students' designs and created the final plan. Several of the student designers were speakers at the Chula Vista school's grand opening.

At the high school level, Janel Holcomb created the "This New House" project for 10th grade math and chemistry students. In eight weeks, students studied sustainable architecture and learned the key stages of the design process. Working in two-person teams, they studied photovoltaics and the principles of passive solar design including such concepts as thermal mass and such practical applications as calculating the effects of roof overhang and window size. They applied the geometry of surface areas, polygons, volume, and they used sign, cosine, tangent, cosecant, secant, and cotangent calculations.

They also learned something about architecture itself: how to create scale drawings, the symbols used, and the process of model building. All of this covered about 20 California content standards.²⁹

²⁷ <http://videos.hightechhigh.org/> (Accessed October 17, 2011).

²⁸ See City Systems Project: <http://videos.hightechhigh.org/> (Accessed January 3, 2012).

²⁹ Project description available at: <http://www.hightechhigh.org/pbl/this-new-house/activities.html> . (Assessed October 9, 2011).

The work of creating and teaching with projects has created a distinctive pedagogy for HTH schools. In a journal article and video, Robin explains the process of planning, managing, and exhibiting.³⁰

For the teacher, the key to planning is to do the project yourself. “You go through all the steps yourself and you have an example to show the students,” he says. “It’s critical, if you can’t do it yourself, how can you expect the students to do it?”

Once a teacher understands the steps he or she can manage the process: “When you are doing project based management, you are a project manager.” When you manage things, you have to have a system, he says, and Robin uses a very low-tech check in system: a sales order book. The students get a copy showing what they have done, and the “sales ticket” goes on the classroom wall illustrating the progress that a student or team has made. Work in progress also goes on the wall. This allows ongoing critique, and it keeps people from gaming the system. It’s not necessary to “nickel and dime” students with a point system, Robin notes.

Exhibition is what makes projects real. “If you think that you are an artist, but your paintings are only in your mother’s garage, you’re really not an artist; you’re just cluttering up your mother’s garage.” Teacher and students need to know where the project will live. “If you know that the project will be displayed in an art gallery in downtown San Diego and your family and friends are going to be there, you are going to want to do a better job.”

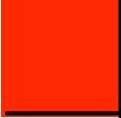
Teachers at HTH schools teach using projects because they think the results are worth the extra effort, not because it’s easy. As Robin says, “Project-based learning is difficult to do well, but it is worth it! (Keep repeating this even when you’re covered in sawdust in the middle of the night on a weekend at school.)”³¹

As Robin says, teaching through projects is not easy, particularly with heterogeneous classes, where not all the students may be able to engage a project at the same level. In one instance a 9th grade physics teacher was guiding students toward building a submarine that would withstand pressure at 150 feet when the teacher found that about a third of them didn’t understand what a radius was, a key concept to depth and pressure calculations. The teacher found a way to develop problem sets for the students who needed a math refresher while allowing the class project teams to move ahead without boredom for the rest of the students.

The flexibility and inherent need for teachers to respond to teachable moments rather than march through the curriculum, means that teachers at HTH need to be

³⁰ <http://videos.hightechhigh.org/> (Assessed October 3, 2011).

³¹ Robin, Jeff. “PME: My Advice to You.” *Unboxed* 1, no. 1 (2008): 19.



uncommonly skilled and to understand that the effort is rewarded in student learning.³²

Sometimes that learning is reflected in student comments, like this one from 9th Grader Brandi Coley, who commented about a writing project in these words:

The Hero in My Eyes project opened my eyes to a whole side of my mother's life that I may not have seen otherwise. We conducted interviews with the person we viewed as our Hero. This gave me the chance to learn what my mom went through being a single mother: how hard it was to raise a baby by herself, only at the age of seventeen, with barely enough money to support us. It taught me to appreciate my mother more than I already did. Not only did it show me another side of her, it showed me another side of writing. We were taught how and when to use literary devices, descriptive writing, interviews, and narrative for our character sketches. I used these elements to put a voice in my writing, one that made my audience feel like they were really there as it all happened. I was able to convey why she is my hero without directly saying it. I can say that the Hero in My Eyes is one of my favorite projects so far. It helped me develop my writing skills and my relationship with my mother.

Her teacher, Diana Cornejo-Sanchez, wrote that she likes to start the school year with an identity project that encourages students to think about who has had an impact on their lives. Some students had trouble identifying someone. "Working with those student I learned about the struggles that prohibited heroes from rising in their lives, and about their sources of motivation."³³

Projects and Exhibitions

High Tech High displays its pedagogy and the results of its work to an extraordinary extent: Annual school exhibitions, student and faculty digital portfolios, published books of student work, and the school's journal, *Unboxed*. Rosenstock, Riordan, Daley, and Caillier are also articulate spokespersons, and their blogs, articles and video clips are well-represented on education policy web sites.

Although the highlighted projects are without doubt the school's best, not all the posted projects are wonderful, and the student portfolios exhibit a range of skill and imagination. For some, the learning experience is to do better next time.

³² Riordan, "Three Integrations."

³³ Sanchez, Diana. "A Hero in My Eyes." *Unboxed 3* (2009): (included card). Sanchez' portfolio, including other projects, is at: <https://sites.google.com/a/hightechhigh.org/ms-diana-s-digital-portfolio/> (Assessed, March 13, 2012).

This combination of organizational exhibitionism and transparency about what students and teachers do is a hallmark of the school. Whatever the emperor's clothes are, they are on display to all. Indeed, the HTH leadership considers exhibitions a key motivator for faculty and students to design more challenging projects. Any interested party can follow the Internet trail from www.hightechhigh.org.

Student Achievement on its Own Terms

When HTH talks about student achievement it is in terms of projects, books, videos and other things students have made, and the success that students have getting into colleges. In 2011, 97 percent of the 532 graduates from the five HTH high schools were admitted to college, and 68 percent planned to attend a four-year school.³⁴

HTH approaches state test scores with a mixture of wariness and disdain. Riordan says that the schools do well enough on state tests so that they are left alone. They care more about the SAT because it has real consequences for students' college admission. The school also reports grades in the A-B-C-D format and accompanies them with a narrative description of the student's accomplishments.

For example, Leily Abbassi and Mike Vasquez at HTH Middle School experimented with parent-student-teacher dialogues that produce information-rich feedback loops that help teachers understand what students learned, didn't learn, and what motivates them. This kind of activity builds a cycle of improvement into everyday work: going to school makes one smarter about how to learn, and in the aggregate it makes the school organization smarter, too.³⁵

HTH cares a lot about college. It prepares students to take the SAT, a gateway examination for admissions, and almost all do. In 2009, 94 percent of HTH students took the test compared to 45 percent of San Diego Unified Students and 35 percent of students in California. Participation rates were high for students of all races and ethnicities; 95 percent of African-Americans and 90 percent of Latinos took the test.³⁶ This preparation shows in the results.

With a much higher percentage of students taking the test, HTH students exceed city, state, and national scores, as Table 4 shows. The differences persist across races and ethnicities. In 2009, HTH schools Latino students scored combined

³⁴Riordan, "Three Integrations." Also see: <http://www.hightechhigh.org/about/> (Accessed October 25, 2011).

³⁵ Abbassi has written about the use of formative assessment, particularly the narrative dialogue with parents and students, as a part of her work at the HTH Graduate School of Education. Her description can be found at: labassci.wordpress.com/action-research/ (Accessed April 7, 2012).

³⁶ *School Quality Review*, p. 2-3.

verbal and math scores were 937, higher than their counterparts throughout California (916) or the U.S. (911). African-American students combined verbal and math scores were 916 compared to California (880) and the U.S. (855).

	Verbal	Math	Writing	Combined
Jacobs HTH	533	536	521	1590
HTH International	534	514	529	1577
HTH Media Arts	496	506	488	1490
San Diego Unified	490	498	482	1470
California	495	513	494	1502
U.S.	501	515	493	1509

Source: *School Quality Review*, p. 4-5.

HTH pays attention to state rankings because it has to, said Ben Daley, but they would gladly not. Daley produced a chart listing the California math standards showing that if one tried to cover each one, the typical math class would have to tick off a standard every 30 seconds.

The schools have always done some test prep and are now doing more because the content on is much more specifically geared to the California standards. “Now (the tests) have become more content specific...did you memorize all the facts on the California history standards?” Daley said. “There’s a bigger gap between what we think ought to be happening in schools and what the test is measuring.”

While district schools have been working hard to improve their scores on the state’s tests, they have been relatively unimportant to HTH. “As a result our scores have pretty much stayed the same over the last decade, and others have gone up. So, we are paying more attention than we have in the past. We don’t want to get our schools closed. There is the world as it is and the world as we would want it to be,” said Daley. “You would think when we get 99 percent of our graduates into college that would trump test scores, but it doesn’t seem to.”

The lack of focus on test scores shows in the school’s results, which are reasonable but not outstanding, as Tables 1-3 illustrate. In 2009-2010, the flagship High Tech High had a school-wide Academic Performance Index of 795 giving it a statewide rank of 8, or top 20 percent. But against similar schools—the state’s sometimes quirky comparison of demographically kindred schools—High Tech High ranks in the lower third.

The other High Tech brand schools show similar test score characteristics. Explorer Elementary is the most highly ranked at 903, but it also has the most affluent student body with only 5.6 percent of students qualifying for free or reduced price meals.

In the federal Annual Yearly Progress calculations, all but two of the HTH brand schools met growth expectations in the 2010 report. At High Tech High Chula Vista,

Latino students missed the target percentage by about 4 points, and at High Tech Middle North County, Latino and economically disadvantaged students missed both English Language Arts and Math targets.

Clearly, if test score maximization were one's goal, the HTH way of learning is not the most direct route. But for those who have visited the school—some 2,000 visitors come every year including eight U.S. governors and seven education ministry heads from other countries—the engagement of students, the excitement in learning is more impressive than test scores.³⁷


In a focus group, students said that they liked the smaller classes and the visibility of students to teachers. They knew that the smaller scale meant, “we have to know stuff” and can't hide in class. They are very good information seekers. Google is their friend. And they had favorite and memorable projects: building an operating submarine, creating a scale model of San Diego Bay, or the global warming project “where I was allowed to be skeptical about the severity of current projections.”

Appreciating HTH harkens to a kind of evaluation that grows from observation rather than data sets. In a test-score driven world, knowing HTH requires something close to what Stanford professor Elliot Eisner calls connoisseurship. Connoisseurship is to test scores what Rembrandt is to paint-by-numbers. It's harder to do well, and it raises questions about style and taste in the clothing of education.

As a school that values authenticity and hands-on learning over test scores, HTH presents a challenge to part of the political rationale for charter schools. The charter movement continues to gain traction because of the low test scores of district run schools. Low scores became scandalous in the eyes of politicians and a league of education policy writers who could send regression lines through their test score data bases and confidently declare that public schools were doing less with more.

When public school teachers would respond that they had objectives other than test scores, they were inevitably hammered in the media and by politicians who styled themselves as reformers. When Los Angeles teachers protested the unfairness of using student test scores as the measure of teaching effectiveness, the *Los Angeles Times* editorialized:

³⁷ <http://www.hightechhigh.org/about/> (Accessed October 18, 2011).



But it's revealing, and disturbing, to read the comments of some teachers who don't seem to care whether their students' scores slide. They argue that they're focused on more important things than the tests measure. That's unpersuasive. The state has carefully constructed some of the best curriculum standards in the nation, which are about to become better with the adoption of new English and math standards. These represent widespread agreement among educational experts on what students should learn by certain grades. We're far past the point of allowing individual teachers to decide how much of the curriculum they want to impart, or sitting by while low-income students enter high school illiterate and without a basic grasp of multiplication.³⁸

If public charter schools gain legitimacy based on the failure of school districts to perform well, and then claim that their unique pedagogy allows them to value different standards, then, at least, they should offer a close examination of the results.

To an extent, HTH does. The school is remarkably transparent; visitors can examine what students do and reach their own conclusions about quality. In addition, HTH tracks its students through college. Of the class of 2010, 91 percent of graduates enrolled in college. The persistence rate from freshman to sophomore has been above 90 percent for the last six years. Some 40 percent of the class of 2004 and 52 percent of the class of 2005 achieved a college degree in six years; 66 percent and 69 percent respectively graduated or are still in college. Of all HTH alumni, 78 percent are still enrolled or have graduated. This is the case for 69 percent of students who are the first in their families to go to college, 67 percent of low-income students, and 73 percent of students with special educational needs.³⁹

They can be found in prestigious colleges throughout the country, but more generally they go to college closer to home. San Diego Mesa Community College, San Diego State University, and San Diego City College are the most frequent destinations of HTH graduates. These are followed by three University of California campuses: Santa Cruz, Berkeley, and San Diego.⁴⁰

A quarter of the graduates have received degrees in science, technology, engineering, or mathematics compared to 17 percent nationally.

³⁸ Editorial. "A Teachable Moment." *Los Angeles Times*, Sept. 3, 2010, A-16.

³⁹ Calculations based on: National Student Clearinghouse. Student Tracker for High Schools Aggregate Report Prepared for High Tech High Consortium. San Diego, CA. 2011.

⁴⁰ National Student Clearinghouse Report.

Examining The Mission of Changing Schools

The High Tech High organization is in the changing schools business, but not by conventional means. It does not consider itself a model, something that other schools can adopt, like a packaged curriculum. And it has rejected the idea of growing by becoming a franchise. “The more we looked at what we could actually control, the harder the franchise idea became,” Rosenstock said looking out through the glass wall of his office. “I can control what I see from here, what I can walk through on this (Point Loma) campus, but outside one has to control remotely.” Or as Riordan puts it, “HTH is not a model, but rather a laboratory; not a franchise, but rather a set of principles and a growing body of experience.”⁴¹

Big organizations engage in remote control by rule. Alfred Chandler’s classic history of corporations makes the point that impersonal controls through rules and standard operating procedures is what made modern organizations possible.⁴² Railroads, for example, realized in the 19th century that getting people hundreds of miles away to perform required tight specifications: standardization of work. The designers of 20th Century schooling learned these lessons well.

HTH seeks a different growth principle. They borrow from Michael Fullen’s concept of dynamic complexity in which vision emerges from action rather than preceding it. Thus, new schools grow from the experiences of the people, what HTH calls “a dynamic relationship between vision and practice.”

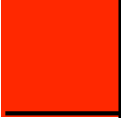
This, ultimately, leads to relying on organizational culture, “an evolving sense of shared purpose” to control an organization rather than a common rulebook or organizational structure.⁴³

A strong culture is the HTH design’s answer to the very porous political and social system in which schools find themselves. All schools face externally created graduation standards, testing, teacher training requirements, accreditation, community pressures, and fiscal realities. Without a strong culture, attempts at changing schools inevitably are compromised and trivialized. David Tyack and Larry Cuban, who have written powerfully about the unchanging “grammar of schooling,”

⁴¹ Riordan, “Three Integrations,” p. 5.

⁴² Chandler, Alfred D., Jr. *The Visible Hand: The Managerial Revolution in American Business*. Cambridge, MA: Harvard University Press, 1977.

⁴³ On the implications of cultural control systems as opposed to structural or political ones, see: Bolman, Lee G., and Terrence E. Deal. *Reframing Organizations: Artistry, Choice, and Leadership. The Jossey-Bass Management Series, the Jossey-Bass Social and Behavioral Science Series, and the Jossey-Bass Higher and Adult Education Series*. San Francisco, CA: Jossey-Bass, 1991.



once titled a section “How School Changes Reform.”⁴⁴ HTH counters this school reform failure tendency by staffing its new schools with faculty experienced in other HTH schools and constructing iconic structures to house them.

Seeds and Bricks Organizational Design

When HTH starts new schools that it will run, it does so by seeding the new organization with experienced teachers, administrators, and even students from existing schools. It counts on them being the cultural carriers.

These seeds turn into the bricks of organizational structure. “Rather than devising a rigid scheme for intended future impact that presumes to understand an unknowable future, High Tech High places a premium on retaining flexibility and agility. We know that whatever leverage we may have hinges upon High Tech High continuing to be known as an organization that operates only excellent schools. This is why we follow a slow deliberative process of building each new school ‘in brick,’ securing ownership of our buildings, and staffing new schools with experienced HTH educators.”⁴⁵

The seeding and bricklaying process allows new schools to retain a close relationship with the central organization, but as other emerging school organizations, such as KIPP, have found, “Our growth efforts to date have taught us that quality replication requires that practitioners receive a higher level of support than is commonly thought necessary. We also know that the central organization must be finely tuned to its schools so that it can change the supports it offers to meet ever-evolving needs.”⁴⁶

Culture-building, particularly among teachers, is a slow process. “The reflective high stakes discussions that happen at High Tech High do not occur among strangers, and only time allows such trusting relationships to develop. As our staff become committed to one another and develop consensus regarding both the ‘how’ and the ‘why’ for our collective undertakings, the HTH culture becomes an indispensable resource infusing the organization with the professionalism, energy and optimism needed to take on ever growing challenges.”⁴⁷

Open Source Copying

HTH also encourages copying. Thousands of visitors each year, hundreds of Internet- accessible examples, and highly articulate leaders have brought

⁴⁴ Tyack, David. “Public School Reform: Policy Talk and Institutional Practice.” *American Journal of Education* 100, no. 1 (1991): 1-19.

⁴⁵ <http://www.hightechhigh.org/about/> (Accessed October 22, 2011).

⁴⁶ <http://www.hightechhigh.org/about/> (Accessed October 22, 2011).

⁴⁷ <http://www.hightechhigh.org/about/> (Accessed October 22, 2011).

international attention to the schools. Its leaders say they are not selling anything, but they are certainly going out of their way to make the HTH fabric available.

School teams and administrators visit HTH for residencies, and they strategize about ways to take bits of its fabric home. There is anecdotal evidence that they enjoy their visits, but no systematic evidence that they are applying what they learned. One would wish that these experiences were more closely followed with consequent feedback on how residencies are run. In its own practice, HTH has moved beyond the point of being a glamorous educational fashion show, and if its residencies are to gain acceptance in traditional school districts, HTH needs to be presented as an innovation capable of adoption. For example, it should be noted that at the end of his efforts to institutionalize what he called *Essential Schools*, Sizer tried hard to create a pathway for schools and eventually states to follow. That these were ultimately unsuccessful, does not make them less interesting.

One concrete example of a school system adapting the HTH pedagogy of project-based learning to its own circumstances can be found in Whitfield County Georgia, a largely rural 13,000 student district where most students qualify for free or reduced-price meals. Some 45 staff members have visited HTH, and project based learning has been introduced in grades 6 and 9.

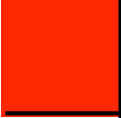
“Those design principles are something that can be replicated even if you are in a traditional school,” said Eric White, a teacher at Whitfield Career Academy in Dalton. Yet, the work of replication is called hard and messy. On the one hand, there has been great attention. When five middle schools held a joint exhibition (which they called Presentation of Learning) an estimated 3,000 people attended. On the other, there is much work ahead in connecting the schools’ projects with state standards, for example, and in convincing teachers in other grades to sign on to the project-based learning approach.⁴⁸

Part of open source copying involves others telling the HTH story in ways that simplify its steps and processes to encourage copying. *Edutopia*, for example, the web enterprise supported by the George Lucas Educational Foundation, has posted several stories about the schools and its leaders. Expanding project-based learning is one of its core strategies.⁴⁹

It provides free resources and tools, and discussion groups for teachers including those who are frustrated trying to introduce PBL to students who want the study sheet for the “test.” It offers helpful “ten helpful tips” kinds of resources that give adopters concrete things to grab onto. Tip #2: Grant the freedom to fail.

⁴⁸ Rubenstein, Grace. “Who Says You Can’t Replicate Another School’s Success,” *Edutopia* <http://www.edutopia.org/stw-replicating-pbl>. (Accessed March 10, 2012).

⁴⁹ <http://www.edutopia.org/project-based-learning>. (Accessed March 10, 2012).



The Innovations Unit has also studied project-based learning at HTH and elsewhere and attempted to distill its lessons.⁵⁰

The HTH Graduate School

The HTH Graduate School of Education opened in 2007 and has become the means by which the schools socialize new teachers, advance their own pedagogy, and spread its practices without franchising or building a chain of schools. Now, 60 percent of its students come from outside HTH.

By having its own graduate school, HTH revives a practice that was once common among urban public school districts and which has become increasingly common among charter management organizations that espouse a distinctive pedagogy. But HTH may well be the smallest aggregation of schools to run its own graduate school, and doing so is a huge commitment to its ideas. Intensive internal education is necessary to create, develop, and improve their particular style of teaching and learning. Initially, HTH didn't want its teachers being taught a pedagogy it didn't believe in, and it didn't want to saddle its teachers with the expense and hassle of a conventional teacher education program. So it started its own.

The school has five programs:

1. School Leadership and Teacher Leadership M.Ed programs for experienced teachers who want to lead a small, innovative school and for teachers who aspire to deepen practice and broaden leadership capacity at their school. Both programs are open to students beyond the network of HTH schools. They can be completed in two years part time or one year of full time study.
2. Professional Development: HTH offers residencies and institutes in topics ranging from project-based learning and creating exhibitions to school leadership. Most of these are held on the HTH campus in San Diego, and the faculty also travel to other schools.
3. Collegial Conversations: On the second Saturday of each month, the school sponsors discussions of educational pedagogy innovations, some in person and some online.
4. The Leading Schools Program is a new one-year program blending online learning and face-to-face collaboration designed to transform schools by serving as a 'change incubator' for teams of educators engaged in school reform. This program is available to both national and international educators, and has become an important way that HTH spreads its ideas.
5. Teacher Credentialing: HTH is the first charter school in the state to offer preliminary and second (so-called "clear") credentials to its own staff and to teachers from partner schools.

⁵⁰ Patton, Alex, *Work that Matters: The Teachers Guide to Project-Based Learning* (London: Paul Hamlyn Foundation), 2012.

The programs are deeply embedded in teaching practice. Stacey Caillier, the Director of the GSE teacher leadership programs, says: “We have chosen to make action research the backbone of our M.ED. programs precisely because it challenges the distinctions between theory and practice, between knower and doer, that are perpetuated by many universities and schools of education. We believe that the practice of teaching is inherently laden with theory, and that useful theory develops from practice. We also believe that teacher researchers, as insiders, are in a unique and powerful position, not only to contribute to the knowledge base of teaching, but also to use that knowledge to effect change within their classrooms and schools.”⁵¹

The Reflection Protocol

Building skill at reflection is an important part of what the graduate school does. Teacher reflection gained faddish fashion in teacher education and quickly went out of style, largely because reflection was mostly individual mulling, never very rigorous, and seldom led to change. The HTH model is trying to change that. It asks tough questions about cause and effect, and teachers (who may also be HTH Graduate School students) are required to post their analysis for public viewing and commentary.


Reflection feeds a culture of conversation among teachers. “You can’t reflect in isolation, which is often what teachers were told to do.” Loops of inquiry would happen, change would happen. “It’s most important to give people opportunities to reflect with each other so they can push each other’s thinking, and they have to be able to connect it back in some way.”⁵² Conversation is intended to lead to an organizationally smarter school. As Caillier writes, “We at HTH believe that (schools of education) would look much like our nation’s top research hospitals, where adult learning is situated within a clinical site. In such institutions, adults are practitioners and researchers, healers and contributors to the profession’s knowledge base. The distinction between practice and theory is blurred; each informs the other and each is better as a result.”⁵³

There may be an instinct toward reflection. Caillier thinks so. But at HTH the instinct is cultivated by substantial training in the process of reflecting. In a reflection session carried out with teachers from Hawaii, Canada and Israel in the Leading Schools Program, Azul Terronez, a veteran teacher at HTH Middle School, raised

⁵¹ Caillier, Stacey. “Transforming Schools One Question At a Time.” *Unboxed* 1, no. 1 (2008): 41-47, p. 43.

⁵² Caillier, Stacey, telephone interview by author, Nov. 28, 2011.

⁵³ Caillier, “Transforming...” p. 46.



the dilemma of how to teach students to push themselves to take on hard projects where they encounter and push back failure.⁵⁴

In response to the first set of questions, called clarifying questions, Terronez says that students are not so much working for grades but that they have been socialized to work on tasks that match their self-perceived capabilities. Some take on very easy tasks. He wants all students to take on hard tasks that force them to a point where they are stuck, and then he wants students to figure out what to do next.

As questioning deepened, it became apparent that Terronez had not talked with his students about failure and how to manage it before the project began. He had tried student update reports, but students seemed to gravitate toward reporting laziness on the part of their peers or simply naming things that didn't work.

As part of the protocol, Terronez was removed from the discussion as the other teachers talked. They comment that he does not have a structure for helping the students deal with failure. If not grades, then what? They suggest an increase in adult modeling, journaling, creating a protocol that guides students when they reach failure.

Terronez rejoins the conversation, and warms to the idea of a more specific protocol. "I want them to do more intellectual tinkering," he says.

The final step is a debriefing of the reflection experience itself. The session with Azul was the first done with new technology. Rosenstock, who was having trouble with his microphone, said quietly, "I look forward to getting more agile at using the technology."

The steps in the reflection session involved conventional processes: listen carefully, ask clarifying but not judgmental questions, discuss, report, and get feedback. But two aspects of the HTH culture marked it as an unusual event in public school professional development. First, an experienced teacher admitted that he had a pedagogical problem that he could not solve alone. Second, the leaders of the school—Rosenstock, Daley, Caillier, Riordan—all spent an hour mostly listening to teachers talk about their craft. They did not hog the conversation or engage in monologues. But they did send a clear signal that HTH values reflection and teaching practice.

Of the students that are not HTH employees, more come from other charters and private schools than from nearby district schools, but word of mouth is bringing what HTH calls "creative noncompliance" to district schools. "The folks who are coming from traditional schools who are interested in project-based are doing it on their own.

⁵⁴ <http://www.hightechhigh.org/online/cc> (Accessed, Nov. 20, 2011).

I think for them the idea of teacher led schools is central. They are really coming to us with the idea of trying to shift the culture of their schools,” said Caillier.⁵⁵

The graduate school charges \$25,000 for its two-year MA. There is significant foundation-supported fellowship support, and the average student pays \$11,000 out of pocket. The California Commission on Teacher Credentialing supports \$2,500 of the tuition of teacher credential students under its district-intern program.

Adults Model Behavior

The adults at the HTH Graduate School model the behaviors they want to see in students. They create personal learning plans, pursue a project-based curriculum, explore their own questions through action research and other forms of inquiry, and develop digital portfolios to demonstrate their learning. While not anti-intellectual, the graduate school programs are fundamentally about developing a practice in innovative schools.

As is the case with students at HTH, their teachers who study in the graduate school, produce portfolios and post examples of their work on the Internet. And as is the case for secondary students, the public posting of results is a powerful incentive. It also allows others to build their teaching practice and to build the HTH-desired culture of collaboration among adults.

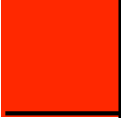
Pam Baker teaches English at HTH International and is in the teacher leadership master’s program at the graduate school. “Camouflaged Training Wheels,” a course project, grew out of her realization that English Language Learners in her classes were falling behind and disengaging. Using class discussion as a way to introduce texts and vocabulary didn’t seem to work, so Baker created an alternative.⁵⁶

Drawing on conversations with other teachers at HTH International, a summer teaching experience in a poor South African township, and a close reading of Paulo Freire and others, she created a grounded experiment of non-obvious help for second-language learners.

For her next class, she chose a difficult text on the morality of advertising, read it aloud without stopping, and then asked the class to summarize the main point. Everyone struggled, not just the English Language Learners. The classes’ realization of common struggle allowed her to make the point that understanding difficult texts was a key skill in learning and a gateway skill toward college success.

⁵⁵ Callier, telephone interview, March 2012.

⁵⁶ Baker’s description of the project can be found at https://docs.google.com/a/hightechhigh.org/document/d/1jlxRcCJguV0ABkEWIqV3fPMDhTn_O3JnSDejj76GIVg/edit?hl=en&ndplr=1&pli=1 (Accessed October 17, 2011).



She then asked the students to identify words they didn't know. She had pre-read the article, guessed correctly at most of the words that would trouble students, and prepared a sheet of synonyms and definitions. Students wrote them next to the obscure words in the article.

Then the class read the article by paragraph and wrote summaries. Virtually all the students got it, and the whole class, including the English Language Learners, had a Socratic discussion.

Baker is one of scores of teachers who write about their practice. David Stahnke, who teaches at HTH Media Arts, is experimenting with puzzles in his 12th grade class, trying to bring creativity to learning math. Namir Yedid, who teaches at an independent school in Carlsbad, is trying apply Mihalyi Csikszentmihalyi's *Flow* psychology to his teaching.⁵⁷ Chris Webber, a South African, puzzled with the problem of why one group of students engaged a seminar style of learning and another didn't. Cady Staff wrote about social business practices. Zoë Randall studied how to teach digital story telling.⁵⁸

Taken together, the seeds and bricks mode of school development, the ability of other schools to engage in open source adoption of HTH teaching and organizational methods, and the graduate school—particularly its outward facing programs such as Leading Schools—present a clear picture of how HTH might spread. History, however, as it often does, provides us a cautionary tale about how ideas spread in public education, and how they don't. And historical consideration raises the question of where public policy might intervene.

Public Policy Lessons from History

It's easy to see *avant garde* at HTH, but there is a great deal of retro style, too. The 1980s educational styles are obvious. Along with Ralph Lauren, Valley Girls and headbands, that decade witnessed the popularity of Ted Sizer's ideas of teaching essentials in depth. His 1984 book *Horace's Compromise* became an educational best seller, espousing the idea that high school learning had become superficial because teachers, like his protagonist Horace, were pushed to march their students through a prescribed curriculum rather than allowing them to learn a subject in detail.⁵⁹ His ideas are evident everywhere at HTH, even in the core curriculum. For example, the original HTH school drills deeply into biotechnology but has no

⁵⁷ Csikszentmihalyi, Mihaly. *Flow: The Psychology of Optimal Experience*. New York: Harper & Row, 1990.

⁵⁸ These examples are available at: <http://gse.hightechhigh.org/digitalPortfolios.php> (Assessed October 9, 2011).

⁵⁹ The family influence continues. Ted's widow, Nancy Sizer, serves on the HTH advisory board.

chemistry lab. Deep learning builds engagement with a discipline, and partly as a result a substantial percentage of HTH graduates go into science, technology, engineering, or math programs in college.

Because HTH publishes *Unboxed*, it is easy to find who influences the school. One of the current practice-carriers is former carpenter Ron Berger, who continues the tradition of John Dewey and of Elliot Wiggington. Berger speaks of *beautiful work*, getting students to be accurate and elegant through providing them good models, going through multiple trials or drafts, and using critique as an instructional strategy. “Beautiful work is exactly what you don’t hear discussed in conversations about education and test scores. It’s always left out.”⁶⁰

Underneath the soft sounding exterior, finding beauty in student work has a laser like focus. Teachers have to be very clear with themselves and their students what they are trying to accomplish in a lesson, and they have to be candid with their students when they are getting it and when they are not.

“A habit grows in classrooms of just complementing kids, like ‘Great Work, Ben’. But like great coaches, teachers have got to be able to say, ‘You’re doing that all wrong, you’ve got to rethink this, or that was *terrible* today and it was absolutely terrible for the following five reasons.”⁶¹

“I don’t think clarity and candor means meanness or hurting kids’ feelings. If you can be very specific about what’s working in a piece of work and equally specific about what’s weak, it’s a gift to the student who created it.”⁶²

The graduate school itself is built around action research and the necessity for teachers to reflect on their experiences, incorporating what they learned from these thought experiments into their designs for learning.


Reflection and action research were once widespread practices, championed by educators such asSizer and pushed by school reform programs in various cities, including Los Angeles.⁶³ They were largely abandoned in the face of pressure for test-score accountability and because reflection itself seemed inconsequential. But HTH offers an interesting contrast in how reflection is built into practice. It is not an optional activity. Time is built into the school day and year to examine teaching

⁶⁰ Berger, Ron. “Crafting Beautiful Work: Interview.” *Unboxed* 1, no. 1 (2008): 11-17, p. 11.

⁶¹ Berger, “Crafting...”, p. 14.

⁶² Berger, “Crafting...”, p. 15.

⁶³ For documentation of this period in Los Angeles see: Kerchner, Charles Taylor, David J. Menefee-Libey, Laura Steen Mulfinger, and Stephanie E. Clayton. *Learning From L.A.: Institutional Change in American Public Education*. Cambridge, MA: Harvard Education Press, 2008.



practice and student work. Reflection becomes part of a teacher's job. Second, reflection is understood to be something that is practiced; one gets better at it over time. The protocols for reflection are improved and modified. Teachers develop a language system that allows them to talk about their craft.

However, adapting 1980s styles shows only the surface layer of what HTH is attempting to create. Although less immediately evident than the 1980 styles, HTH is grounded both in the deep past and emerging forms of education. In an interview, Rosenstock said:

*Why is it that your average kid regardless of socioeconomic or educational background if given an MMO [massive multiplayer online game] or video game if left to their own devices play with it for 10 hours a day for 14 months even though it is fraught with failure, frustration, and setbacks and successes, but going through and persevering. Some of us think, 'isn't there something that we can take from that pedagogically, that if we were to change the nature of the transaction?' So there is a lot of opportunity there. At High Tech High from the beginning, we've said that you can't play video games unless you made them here. And they can't be violent and they have to be educational. I want kids to be producing, not consuming. I want kids making those things.*⁶⁴

Rosenstock's fascination with play and the connection of head and hands, echoes the learning fashions exhibited in some of the newest thinking about education. Douglas Thomas and John Seely Brown are among the most prominent gurus of the Internet age. Like Rosenstock, they see a pedagogy in games; in fact, their concrete version of the new culture of learning looks a great deal more like a massive, multiuser computer game than it does a conventional classroom. In *A New Culture of Learning*, they lay out the dimensions of "arc of life" learning, "which comprises the activities in our daily lives that keeps learning, growing, and exploring."⁶⁵

New learning may be child's play, but it is vexing to adults, and it brings to mind a much older volume featuring playful children connecting learning to the community: John Dewey's *School and Society*, published in 1900. Dewey, too, wanted schools to individualize learning experiences, connect schooling to learning about the means of production, and he wanted students to explore and discover.

But the cautionary tale for HTH and the new arc of learning lies in the history of public education in the 20th Century, for it is in large part a tale of how Dewey lost.

⁶⁴<http://howtovideos.hightechhigh.org/video/3/Edutopia%3A+Interview+with+Larry+Rosenstock> (Accessed October 31, 2011).

⁶⁵ Thomas, Douglas, and John Seely Brown. *A New Culture of Learning: Cultivation the Imagination for a World of Constant Change*. Author, 2011, p. 18.

Despite his damning commentary on waste in education, Dewey's pedagogical ideas fell victim to the organizational mandates of social and industrial efficiency. Where Dewey had sought individualization, industrial efficiency produced a batch processing system. Where Dewey had sought matching school to student, industrial efficiency created tracking and social separation.⁶⁶

While pedagogical progressives, such as Dewey, shared distaste for traditional schooling with those who came to be called Administrative Progressives, the two diverged dramatically about what and how to teach. The Administrative Progressives followed the intellectual path of Stanley Hall and Edward Thorndike and particularly their belief that the curriculum had to be task-specific, and that transfer of knowledge from one domain to another was a myth. Thus the discipline of a general liberal education was worthless.

Dewey and the pedagogical progressives, on the other hand, focused on new modes of learning and capturing what they believed to be the innate curiosity of children in ways that modeled the development of important social values, such as community, cooperation, justice, and democracy.

The Administrative Progressives won in large part because their ideas about social efficiency were the more popular public policy. Utilitarianism was an easier sell. Their ideas rested on the developing science of behavioral psychology and the growing body of literature about public administration. The Administrative Progressives developed schools of education to forward their ideas and a technology of administration that could be transferred around the country, "brought to scale" in contemporary parlance. They successfully founded the first nationwide version of public education in the United States, Learning 1.0 in software terminology.

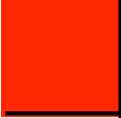
It was harder to be Dewey-like. Dewey was romantic, and labeled as such. Child-centeredness became distorted and labeled as permissive. Progressivism itself became doctrinaire.⁶⁷ Those who follow in Dewey's fashion may find lessons in how his fashion faded.

Into the Lab

HTH's fascination with Dewey's old, threadbare, unfashionable, and largely discarded clothes raises essential questions about its mission of changing schools. Just how does the HTH laboratory work to leverage public education?

⁶⁶ In, Labaree, David F. *How Dewey Lost: The Victory of David Snedden and Social Efficiency in the Reform of American Education*. Stanford, CA: Stanford University, School of Education, 2010, p. 4. For a longer essay on the relationship of new learning and John Dewey's ideas see: Charles Taylor Kerchner, *A New Culture of Learning: John Dewey Meets the Internet*, <http://charlestkerchner.com/?p=433> (Accessed April 22, 2011).

⁶⁷ Labaree, p. 6, 18, 19.



Clearly, by its own design, HTH is not going to become the Walmart of schools, replacing those less efficient home town school districts with a big box store selling off the rack education. HTH's current business plan is void of statewide or national expansion through ownership or franchising. In his blog, Daley is disdainful of the "going to scale" notion of educational change. In the series of questions thrown at HTH, ultimately came this one: "The problem with High Tech High is that it is like Apple. But what we need is Windows."⁶⁸

Daley wrote in response, "This last line was a pivotal moment in my life. It was the instant when I realized that even if we had so many High Tech Highs that 10% of the students in the world attended our schools, we still would be 'just a boutique'. It wouldn't be 'at scale'. It still wouldn't be significant."

In the public education institution of the last century, going to scale meant adoption by more and larger units, taking an idea to the point that it became ubiquitous, if not universal: things like dividing schools into grades or high schools into subjects. Much of education policy has held going to scale as the test of robustness of school reform ideas.

The value of scale was one part economics and one part ideology. For most of the 20th century, educators believed that there were substantial economies of scale in larger operating units and in standardization. The number of school districts collapsed by two-thirds as small ones were merged into larger. Economies of scale fed a belief in standardization: that there was a single best answer to educational questions; one that produced the instinct toward what David Tyack called "one best system."⁶⁹

But what if significance and scale were not connected, or what if scale were achieved through means other than organizational aggregation?

HTH does not want to corporatize, franchise, or become a nationwide charter management organization. It does not even want to become a brand-name membership organization, although it is drifting in that direction. But if considered as a laboratory, as the school wants to be, HTH has the capacity to be the Bell Labs or the PARC Xerox of education, the place where new learning technologies get their trials and merge with educational practice.

As a laboratory, HTH is short on basic science. It has artisanal history and ideology, but there are aspects of the educational sciences, including cognitive psychology, design based research, and practice-based assessment systems. HTH would also be a natural source for better understanding the real-life incentives that behavioral

⁶⁸ <http://blogs.hightechhigh.org/bendaley/> (Accessed, Nov. 4, 2011).

⁶⁹ Tyack, David B. *The One Best System: A History of American Urban Education*. Cambridge, MA: Harvard University Press, 1974.

and positive economists seek to understand. It could make stronger basic science connections if it wished, and doing so would add to its stature and to that of its graduate school.

The Development Part of R&D

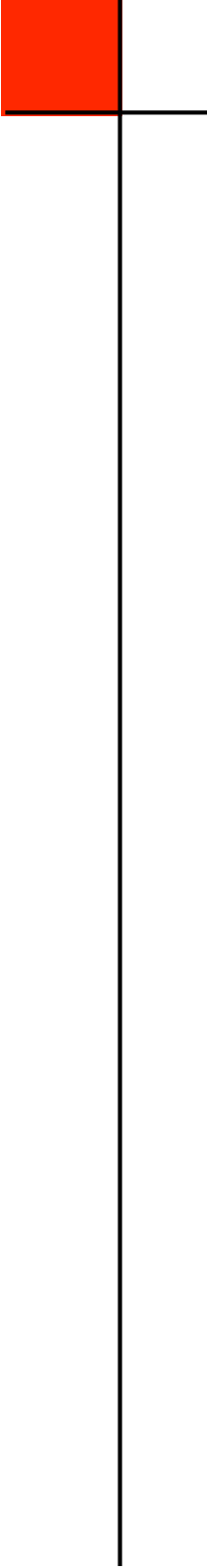
If the whole cloth of HTH is not going to be adopted by school districts, and if it is not going to franchise, then HTH needs to cut its fabric into smaller more usable pieces in order for its changing schools' mission to be realized. Three aspects of HTH seem adoptable as an innovation in learning and schooling.

First, project-based learning is gaining traction. Part of the attraction follows what might be termed the new vocationalism, finding workers for a world where the requirements for success transcend the industrial-era disciplines built into conventional public schools. HTH's version is much more like Dewey's; head and hand integration combined with school and community integration is a way to learn about the world and how it operates. In the policy discussions about project-based learning, what HTH does is a necessary corrective to narrow vocationalism.

The HTH approach to project-based learning is also more process-intensive than that of other schools. There are many structural examples and templates available, some of which were created by HTH teachers. As helpful as these are, they don't get at the core of how to teach using projects or how to determine when a project approach is more educationally useful than direct instruction. The HTH graduate school is beginning to develop a useful production technology for project based teaching—consider Jeff Robin's project management video as an example—that is capable of adoption and usable within conventional high school departments and elementary grade level teams.

Second, reflection and critique are perhaps the most powerful forms of teacher professional development ever. That so few schools or districts have made it work is testimony to its difficulty, not its worth. That HTH seems dedicated to its use suggests that there are powerful lessons that can apply outside of its own schools. Unlike other forms of professional development, reflection and critique aim squarely at artisanship and artisanal production, a status long sought by teachers and teacher educators but traditionally suppressed by conventional school administrations and most public policy interventions. Introduction of reflection and critique, with its attached protocols and implications for the structure and content of teacher work are the fabric of quiet revolution.

Third, HTH could be capable of providing its own fashion of blended learning: a mixture of virtual and schoolhouse learning. Most on-line learning is designed as an efficiency substitute (credit recovery programs, fact-drills), a specialized curriculum (Chinese in a rural school), or supplementary tutoring. Thinking about project-based learning as a combination of bricks and clicks, could take the core teaching technology from HTH and make it available to virtual project groups anywhere in the world. A rich combination of residencies for teachers and sometimes for students with high content virtual interaction could transform something such as Leading



Schools into a distinctive and adoptable form of education as significant and lasting as Montessori or the International Baccalaureate.

The adoptability of HTH styles and availability of HTH fabric are important as forms of educational policy entrepreneurship. For the last 40 years, public education reform has tried to remedy the design problems in Learning 1.0, the education system created by the Administrative Progressives. A fierce battle is shaping up between the neo-Administrative Progressives, who believe that schooling can, again, be engineered, packaged, sequenced and tested, and a loose coalition of educators who are on the verge of inventing something truly different, Learning 2.0.

HTH and a Potential Network of Innovation

The emerging world of education production can look more like a network and less like a hierarchy. Networks are distinguished from hierarchies by their ability to connect across the usual organizational boundaries. In such settings it should be possible for leagues of like-minded schools to grow and prosper on their own terms, without respect to whether they had successfully transformed a whole city or state, or whether its methods had become the norm.

Rosenstock talks of the commonality between small independent schools where teachers have agency to control much of what they do. Some of these schools are privates, others are charters and, still others exist within school districts as Pilot Schools or experimental campuses. These schools are often more like schools with similar philosophies outside their local than they resemble the school down the street. It would allow many heads and hands to design the emperor's clothes.

Some such leagues of schools have existed for decades—Montessori and the International Baccalaureate as examples—some are relatively recent—Sizer's *Essential Schools* and the *Big Picture Schools*. All have in common the ideas of membership in a group or league, certification, training, and name identification: sometimes strong, sometimes nominal.

New forms of learning will expand faster if public policy encourages the growth of networks where teachers and students create, critique, and modify the curriculum and instructional processes. In the traditional information economy, on which conventional school districts are based, information is scarce and distributing it at scale is expensive: hence, the tendency for newspapers, television production, and even book publication to concentrate into a few highly capital intensive firms. This has certainly been the case for curriculum publication and test production in public education. The conventions and processes of teaching—particularly in urban systems—are increasingly centrally designed and monitored.

This 19th and 20th information production system has been severely challenged over the last decade with the rise of what is called *peer production*, or what HTH calls *adult conversations*. Linux, Wikipedia, Curriki, and scores of others illustrate that it is possible for individuals—often cooperating for no monetary gain—can be powerful producers of valuable information. HTH teachers engage in peer production every

day. If the system capacity existed, the influence of HTH teachers and their peers outside of their own schools could multiply greatly.⁷⁰ Thus, building an infrastructure for the new network of learning would be a valuable public policy intervention. A network infrastructure changes the social and political dynamics of education by changing how learning is accomplished. It moves power to the nodes of the network rather than the apex of the hierarchy. It is through networks of teacher collaboration that the emperor's clothes can become fashionable. Public policy to create, enable, and sustain networks of talented, creative teachers and school leaders can spread the fashion.

⁷⁰ For background, see: Benkler, Yochai. *The Wealth of Networks: How Social Production Transforms Markets and Freedom*. New Haven, CN: Yale University Press, 2006.