

Impacting Rural Academic Achievement and Economic Development:

The Case of New Tech Network High Schools

By

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New Tech Network

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“In the area where we live, it would be fairly difficult to have filled these open positions. There just isn’t a lot of opportunity in our rural community to find the caliber of employee we’re looking for—the maturity and skill levels vary so much—but it was just streamline for them [the New Tech students] to join us....you can tell that they were well-prepared and committed to their work.”

--Internship Interview

Purpose

The purpose of this research paper is to present findings from a mixed methods study into the impact of the New Tech Network model on rural schools. The study examined ways in which implementation of the New Tech model in rural, economically disadvantaged communities impacted the local economy as well as students’ readiness for postsecondary and career experiences. Specifically, the project aimed to investigate the following questions:

- *What impact is the model having on measures of academic achievement and college readiness in rural schools?*
- *What impact is the model having on different indicators of economic development in the rural communities where these sites are situated?*
- *What knowledge, skills, or attributes were most valuable to businesses where students completed internships?*

For the purposes of this study, two rural North Carolina counties, each with a mature New Tech STEM school, were selected for research—Anson and Warren. Both counties are low-wealth communities as defined by the North Carolina Department of Commerce, who, since 1996, has ranked the state’s 100 counties’ economic well-being based on the following development factors: a) 12-month average unemployment rate, b) Media household income, c)

36-month population growth rate, d) Per capita adjusted assessed property value (NC Department of Commerce, 2011). The resulting tier designation provides for economic incentives for companies that locate in these most economically distressed “Tier 1” communities. According to Schweke and Disilvestro (2008), the Act’s “purpose was to (1) stimulate the state economy by reducing business costs and (2) balance economic development across the state by awarding larger amounts of tax credits for business activity in economically distressed counties” (p. 3); however, these incentives have proven insufficient to permanently move Anson or Warren counties out of the Tier 1 designation over the past fifteen years. The following table provides the 2012 economic snapshot from each county’s [profile](#) according to the North Carolina Department of Commerce:

Economic Indicators	Anson	Warren
2010 Census Total Population	25,275	20,972
Annual Growth	0.7%	0.5%
2010 Estimated Median Family Income	\$39,612	\$40,323
% Estimated Total Pop with Income Below Poverty Level, Last 12 Months	20.5%	27%
2011 Q3 Unemployment Rate	12.1%	13.7%
2010 Annual Unemployment Rate	14.3%	12.8%
2010 Estimated Median Value of Owner Occupied Housing	\$78,400	\$94,700

Given that the New Tech Network first established a partnership with Anson County Schools and Warren County Schools in 2007, this study’s data analysis on academic achievement and

economic impact begins with the partnership in 2007 and continues through the first graduating class in 2011.

Research Context

The challenges facing rural schools in the United States have been well-documented in prior studies. Many rural schools have been facing increasingly diverse student populations, limited state and federal funding, and increased rates of teacher mobility. However, there is a dearth of evidence-based educational research into characteristics of effective rural schools and the impact of school-community partnerships. Reform studies into rural education have focused on the need to preserve community attributes, the potential impacts of technology, and the role of education in personal development and community well-being. However, researchers such as Arnold, Newman and Dean (2005) point to a lack of rigorous studies examining the specific components of rural education that are sustaining reform. Economists also point to the preponderance of public and private investments in rural economic development that have failed and the need to link education reform to align to local and global competitiveness (e.g., Porter, M.E., Ketels, C.H.M., Miller, K., & Bryden, R.T., 2004). The current study aims to address some of these key gaps by exploring the impact of a research-based reform model on rural communities and how the model has sparked community and business partnerships in significant ways.

Methods

In order to answer the proposed questions, this research study relied upon mixed methodological approaches. Comparative analysis was conducted on measures of achievement and college readiness (i.e., North Carolina state test results, high school graduation results, and college course completion rates) to determine the impact of the model on rural schools.

Specifically, outcome measures were collected and analyzed for New Tech schools situated in rural communities and analyzed against both comparison schools in rural communities as well as other New Tech schools in urban and suburban communities. Qualitative research methods were also employed; specifically, ethnographic-informed, in-person interviews were conducted with selected business partners who hosted interns and with New Tech graduates of both counties to more thoroughly investigate related issues in two representative New Tech STEM schools in rural areas.

Discussion

New Tech Network: A National Network of Schools

New Tech Network works nationwide with schools, districts, and communities to develop innovative public schools. We help schools fundamentally rethink teaching and learning, empowering students to become the creators, leaders, and producers of tomorrow. Founded in 1996, New Tech Network (NTN) is made up of 86 high schools in sixteen states serving more than 23,000 students. Our effective school model is built on three core elements: a culture that empowers teachers and students; rigorous and engaging project-based learning; and the integrated use of technology to facilitate relevant, collaborative learning.

Education, business, and policy leaders not only appreciate New Tech's innovative approach to learning; they also see it as a way to drive economic development via students who excel at what is increasingly known as Deeper Learning, as well as in the STEM fields. Many students participate in STEM-engaged extracurricular activities, summer programs, virtual opportunities, blended experiences, and internships which provide learning experiences throughout their high school tenure.

A diverse mix of students attends New Tech Network schools in equally diverse communities. Slightly more than a third of our schools are located in urban areas, another third are rural, and slightly less than one-third reside in suburban communities. In addition, 25% of New Tech high schools, including schools in Indiana, New York, North Carolina, and Texas, have a specific STEM focus.

The New Tech High School Model

In recent years, a number of school reform models have emerged focused on preparing students for success in college and career paths. A few of these models are based on student-centered teaching practices. New Tech Network schools represent one such model but are also one with a unique niche: the integration of technology and instruction. NTN creates an engaging, student-centered learning culture that empowers and supports teachers and prepares students for postsecondary success. The use of rigorous project-based learning as the primary pedagogy ensures that students acquire critical analytical, critical thinking and problem solving skills.

NTN's proprietary collaborative online learning platform, Echo™, along with high-speed internet access and 1:1 computing in NTN schools, provides a foundation for integrating technology into an individualized instructional program. Echo™ supports a learning environment where students work on complex projects, collaborate with peers, and are assessed on authentic outcomes, such as critical and analytical thinking, collaboration, communication, and media literacy, through the use of multiple assessments and carefully constructed rubrics. Differentiated student learning is supported through a set of multiple measures, including peer and teacher review, performance assessment, portfolio assessment, traditional examinations, and the completion of mandatory college-level coursework. In the world of high school design work,

NTN is known as a “tight-tight” model: tight on the specificity of features in our model, and tight on fidelity of implementation. We believe this approach helps account for the strong student success in what we call our “high fidelity” schools.

Evidence of Effectiveness

The New Tech model has piqued the interest of school reform researchers, and three recent studies explored outcomes of its implementation (Friedlaender, Darling-Hammond, et al, 2007; Rockman, et al., 2006). Indeed, Stanford University’s Linda Darling-Hammond considers New Tech Network the kind of school model that “breaks the conventional links between race, poverty, and academic failure. Not only do their students receive an academically rigorous curriculum that prepares them for college and career, they also experience learning opportunities that are culturally rich, socially and practically relevant, and responsive to their needs and interest.”

The Rockman study tracked alumni from Napa New Tech High School regarding their postsecondary experience. Among the results reported were:

- 89% of the responding alumni attended a two-year or four-year college/university or professional or technical institute
- 40% of the alumni respondents were either majoring in STEM fields or were working in STEM professions
- Students graduate well versed in standards-based education and 21st-century skills and are ready for college and careers, as demonstrated through multiple assessment measures that are transparent to teachers, students, and families.

New Tech has been adopted by several districts as the foundation for creating robust STEM schools in their communities. Recognizing that STEM schools ought to embrace a pedagogy that

inculcates problem-solving and innovation, districts have resonated with the New Tech approach and have augmented the model with other programs to support the “e” in STEM - engineering - by adopting other programs like Project Lead The Way, or IGNITE. As an indication of this commitment to a project-based approach, in a study of Texas STEM academies (of which 4 are NT schools), Young and Klopfenstein noted that “...project-based learning, a key component specified in the T-STEM Blueprint, is not implemented consistently across T-STEM academies...”, but that “...T-STEM academies belonging to the New Tech Network pursue project-based learning with team-teaching across subject areas, week in and week out...” (Young, [“Inclusive STEM Schools: Early Promise in Texas and Unanswered Questions”](#), 2011).

Over the last three years, New Tech has gained significant adoption in many states and regions and foresees continued growth for New Tech schools over the next few years. By extending to middle schools within districts where NTN already has established high schools and online/blended learning projected in the next 5 years, NTN seeks to develop scalable ways to impact more students with a dual focus on quality and growth.

Academic Achievement and College Readiness

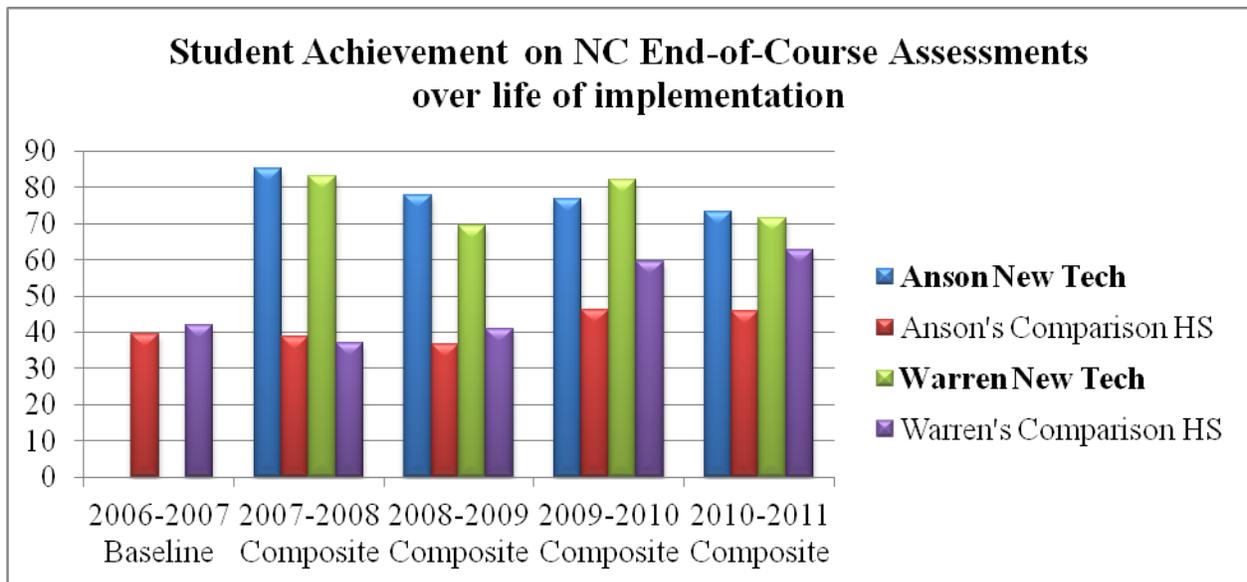
With the North Carolina Department of Public Instruction’s first release of cohort graduation rates came the first list of low-performing schools. Almost immediately, these low-performing schools were framed as “turnaround” schools as a function of their significantly lower ABCs Performance Composites and four-year cohort graduation rates. Turnaround High Schools were first identified in 2004-2005 with Judge Howard Manning’s ruling in *Leandro vs. State of North Carolina*, which reinforced North Carolina’s Constitutional requirement to provide every child the opportunity to receive a sound basic education. According to Manning,

any high school with an ABCs Performance Composite below 55% must engage in some turnaround or transformation approach.

In North Carolina, the ABCs Performance Composite is based on the percentage of test scores, including End-of-Course assessments, in the school at or above Level III, which is often considered to be “at grade level” or “proficient.” Students enrolled in any of the following high school courses must take End-of-Course tests: English I; Algebra I and II; Biology; Physical Science; Civics and Economics; and US History. Though Physical Science, Algebra II, Civics and Economics, and U.S. History were eliminated from the testing program effective July 1, 2011, this study includes all of the aforementioned assessments since achievement data reported includes all student assessments through the 2010-2011 school year.

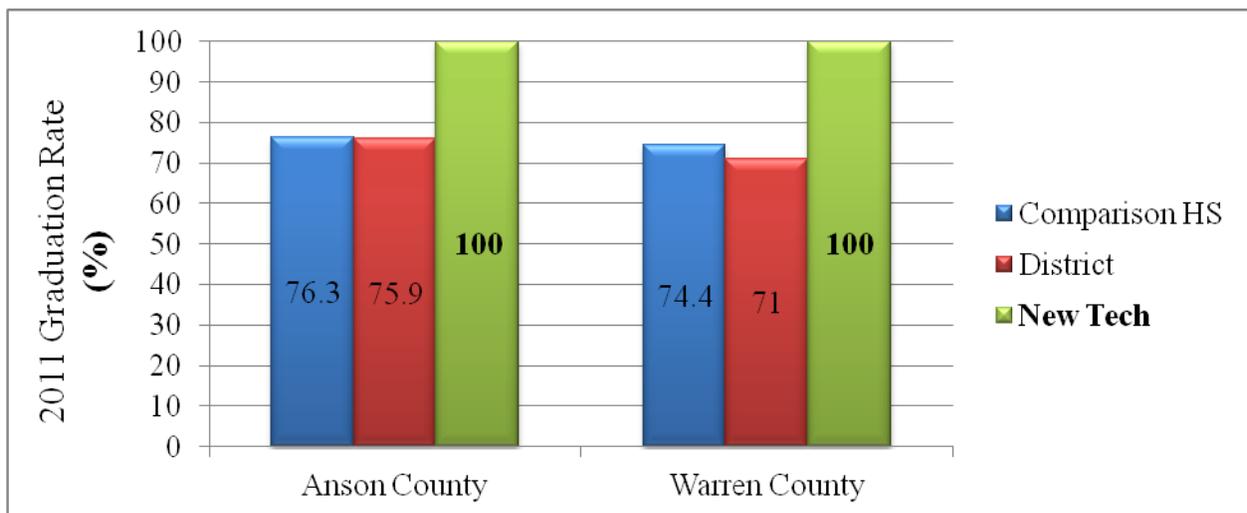
Given that both Anson New Tech and Warren New Tech High Schools were identified as turnaround schools in 2007, the 2006-2007 turnaround performance composites below serve as an anchor for understanding the impact of the New Tech approach on student academic achievement over the life of our partnership. Both New Tech High Schools have met with success in their quest to improve student achievement, improve attendance and increase graduation rates and postsecondary enrollment. What follows graphically represents key proof points realized in the selected North Carolina turnaround STEM schools which evolved from underachieving, high poverty areas in rural North Carolina—Anson New Tech High School and Warren New Tech High School—and implemented the New Tech approach with fidelity¹.

¹ NTN has a number of evaluative measures in place to assure fidelity to the model, including staff and leadership self assessment using a scoring rubric; periodic review of projects, rigor, and alignment to standards; a range of academic indicators including content mastery, college readiness indicators, postsecondary enrollment, 21st century skills assessment, and more.



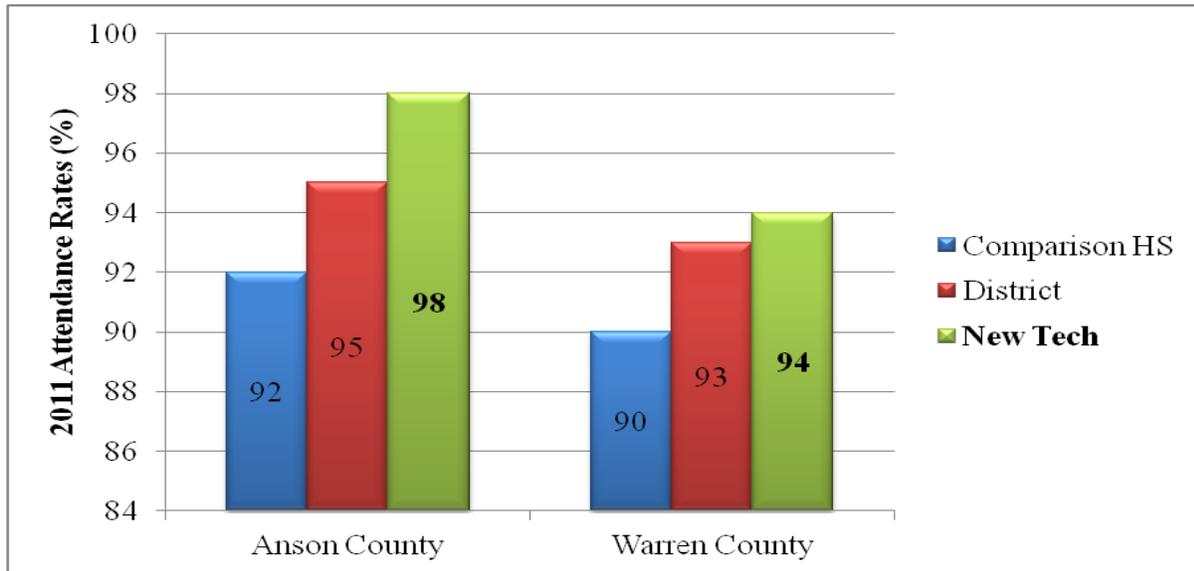
Chief among achievement indicators of success is the four-year cohort graduation rate.

The following figure compares cohort graduation rates of each New Tech High School to each comparison high school and to the district average, showcasing the unprecedented 100% cohort graduation rate in both New Tech schools.

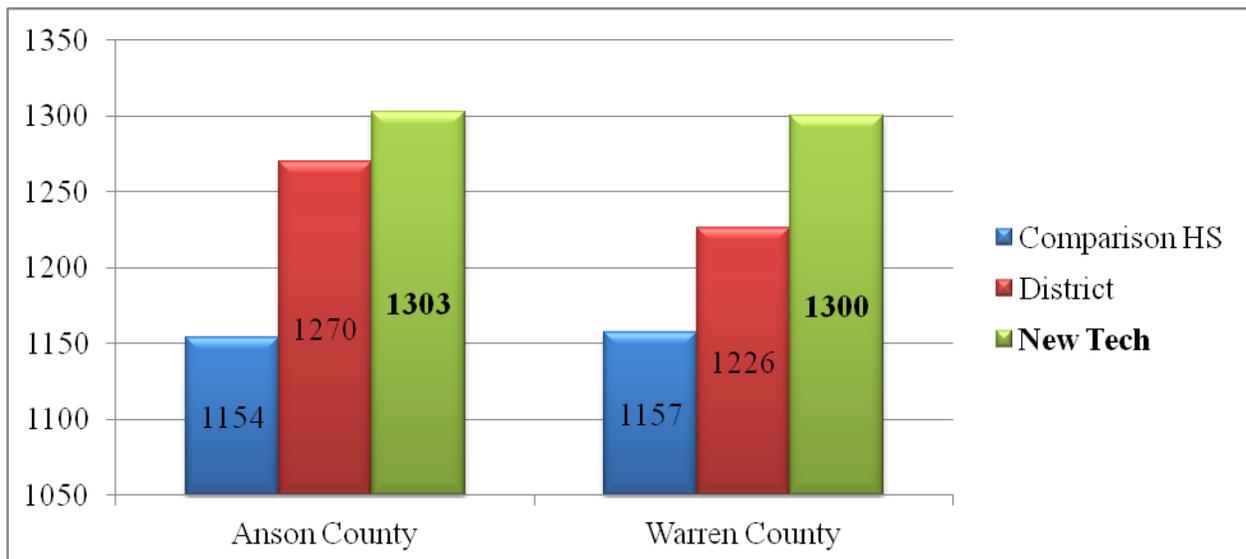


A primary contributor to the aforementioned measures of academic achievement is student attendance; students must be present to learn. In this measure, New Tech schools continue to outpace comparison schools by substantial

margins.



Increases in postsecondary enrollment, however, require more than just high graduation rates and attendance rates coupled with low dropout rates. This type of increase requires both a focus on college readiness and early college success as well as high levels of academic achievement on common college entrance metrics such as the SAT. The following figure compares the composite SAT results of each New Tech High School to each comparison high school and to the district average.



While outperforming both the comparison high school and the district on SAT achievement is worth mentioning, senior interviews reveal that it was their NTN schools articulation of high expectations, purposeful actions and meaningful relationships that contributed more broadly to their postsecondary readiness. In part, this postsecondary readiness was due to early engagement in college courses while completing high school requirements. The data below reflects the numbers and percentages of students across NTN schools who were engaged in postsecondary coursework while in high school during the 2010-2011 school year:

College course enrollment for 9th graders: 245, 9% of students

College course enrollment for 10th graders: 345, 13% of students

College course enrollment for 11th graders: 488, 26% of students

College course enrollment for 12th graders: 325, 31% of students

Every student at Anson New Tech and Warren New Tech High School matriculated to their postsecondary pathways with a transcript of college success.

Transformative Impact

While research on the impact of New Tech model attributes provides compelling results from among our 86 schools, for the purposes of this study New Tech elected to focus on the two most apropos North Carolina turnaround STEM schools who evolved from underachieving, high poverty areas in rural North Carolina—Anson New Tech High School and Warren New Tech High School. In addition to having 0 reported dropouts at each school, both report that 100% of seniors who started the year graduated in 2011. Given that both communities had dropout rates well above the state average when the New Tech Network partnership began in 2007 (6.12% in Warren and 3% in Anson), our re-imagined schools now not only produce graduates who achieve at higher levels, but also a highly skilled knowledge workforce. In addition to the non-

existent dropout rates and exceptional cohort graduation rates at each site, both celebrate high rates of postsecondary matriculation. At both Anson New Tech High School and Warren New Tech High School, 100% of graduating seniors were accepted into some form of post secondary education (two- or four-year) or military. Both credit the transformational nature of the New Tech culture and learning environment as the strategic levers in what the community recognizes as a remarkable conversion.

Model Attributes and Economic Imperatives

“Since January 2011, Samantha's classroom has been the Napa Sheriff's Department. As part of her project, she is able to interview and shadow the Coroner, and recently was able to observe an autopsy. She has had enlightening conversations with the pathologist and has been able to learn much more about the human body than would have been possible in a traditional classroom. After watching the autopsy, Samantha is even more secure she is making the right career choice.”

–from Learning by Doing blog (April 11,2011)

Partnering to positively influence the high school experience for today's students is at the core of the New Tech approach. Since its founding in the mid 90s, the New Tech Network (NTN) has capitalized on a renewed, cooperative spirit between education and the business/community sector to assure that all students get a quality education that readies them for college and career. As a result, most NTN schools require completion of an internship in addition to regular graduation standards. Through the internship experience, NTN students are uniquely positioned to pursue their passions and to challenge themselves by gaining significant skills in a key area of interest with a local business or community partner. Often, NTN seniors

are engaged in an internship program, but this one year, state level snapshot from 2009-2010 data reveals the percent of students currently engaged in an internship across all grade levels:

Indiana – 16%

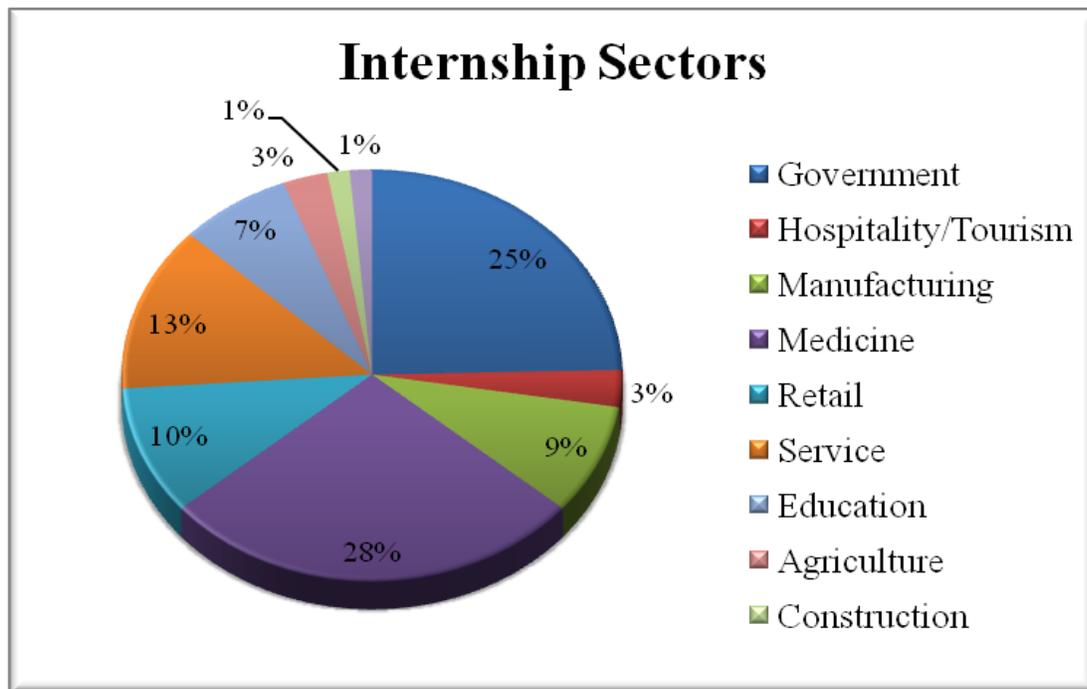
North Carolina – 51%

California – 18%

The end game is that 100% of students in NTN schools complete the internship requirement before graduating.

Survey data from the graduating seniors at each of the New Tech schools in the study confirms that 100% of graduates completed at least 50 hours of an internship in the community.

The figure that follows reflects the business and industry sectors in which students interned.



Not surprisingly, the sectors over-represented in both communities are Government and Medicine, which are the larger employers in each community. This is consistent with economic

development patterns that show a sharp decrease in private and non-farm employment in each rural community since 2007.

The benefits of the internship are multi-dimensional. Through this experience of work-based learning, New Tech students have the opportunity to take their skills beyond the high school classroom and to gain an understanding of the workplace and its culture, expectation, and necessary skills. These opportunities to learn and apply skills in the wider community give New Tech students a broader perspective on lifelong learning. Through the internship experience, students have the opportunity to “try on” a perspective career.

Likewise, interns benefitted business and industry partners in a variety of ways. While many business partners interviewed cited the luxury of an “extra pair of hands” in the down economy, others highlighted characteristics that contributed to a more effective and efficient business environment. Repeated qualities cited across multiple interviews include:

- Prepared—interns were consistently focused on their work and had necessary materials
- Self-directed—interns knew what was expected of them and took initiative to complete tasks beyond those identified, requested or required
- Mature—interns knew how to interact with clients and co-workers and how to manage their time efficiently
- Committed—interns were characterized as effective, consistent, reliable, and responsible
- Persistent—interns met difficult tasks with a positive, cooperative attitude rather than abdicating their responsibilities despite the challenge or length of the work load
- Professional—interns were punctual and consistently provided excellent quality work
- Curious—interns were interested learners who wanted to understand all aspects of the business

Moreover, New Tech interns were routinely counted among workers who “could be trusted...in all aspects of their work and of how they presented themselves to employees and clients” (Interviews). In fact, 96% of those surveyed cited trust as the quality that most inspired businesses to consider a deeper or extended relationship with the New Tech school or the student. In many instances, interns were hired as part-time workers based on their track of success; more significantly, in at least one instance, an intern’s business placement offered their intern a college scholarship to continue his post-secondary career preparation.

Analyses of economic development results demonstrate patterns of amplified economic impact on students, schools, and communities across both rural New Tech schools. Results show that the high fidelity New Tech schools sparked community and business partnerships by encouraging strategic cultural brokers, including economic development coordinators and Chambers of Commerce, to be a partner in leading learning in their school community. These relationships allowed community and business leaders to co-design, co-implement, and co-assess authentic, challenging project based experiences with and for their New Tech schools, which lead to greater relevance, broader student engagement and, by association, increased academic achievement. Moreover, these relationships evolved into access points for school interns, who were able to complete their desired internship requirements in communities with declining business numbers and almost total lack of high-skill/high-wage business opportunities beyond education, criminal justice, and government jobs.

Conclusion

On-going community and business project-based, technology rich experiences throughout a student’s tenure and the internship component near the end of a student’s New Tech career afforded students a more encouraging, upwardly socially mobile perspective of their economic

opportunities within rather than outside of their rural communities after completion of postsecondary study. While this offers no panacea for rural brain drain across the country, our research suggests that New Tech graduates from rural communities will have the skills and education necessary to step off the “economic down-escalator” (Carenevale, Smith and Stohl, 2010) and step in to the middle class upon completion of high school and postsecondary instruction.

Scholarly Significance

The William T. Grant Foundation (1988), American Youth Policy Forum (2008) and others have long signaled concern over the critical need to expand opportunities for “the forgotten half,” young people who are neither connected to education or the workforce and who lack the skills and postsecondary educational access and completion rates to be successful in the new economy. These forgotten youth “lack the skills and work ethic needed for many jobs that pay a middle-class wage” (Harvard, 2011), but research offers few pathways for altering this reality, particularly in our nation’s most challenged regions—rural communities.

This study’s focus on the impact of New Tech Network schools’ culture and conditions for success on rural academic achievement and economic development and on clear recommendations for sustaining reform in rural communities aligns to findings in current research and begins to fill the scholarly void noted by Arnold, Newman and Dean (2005). Arguably, New Tech Network schools provide the best environment for closing the equity gap faced by the forgotten half by offering “structured programs that combine work and learning, and where learning is contextual and applied” (Harvard, 2011). Since such learning conditions are evident Network-wide, these New Tech school cases provide comparative evidence of which levers promote the greatest transformation in rural communities, which aspects of the research

based model promote broader economic growth and development, and what is possible when high fidelity schools achieve interdependence among all aspects of the New Tech approach.

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