

New Technology High School
Postsecondary Student Success Study

Submitted by:

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New Technology High School Alumni Study

EXECUTIVE SUMMARY

Purpose

ROCKMAN *ET AL* conducted a six-month study of New Technology High School (NTHS) alumni for the New Technology Foundation (NTF). The study was designed to gather feedback from NTHS graduates regarding their postsecondary education and/or career, 21st Century skills, knowledge and use of technology, and on what they valued most about their NTHS experience. Results of the study will provide insights for other schools in the NTHS Network and for those interested in adopting its principles.

Methodology

Evaluators met with NTF representatives to design a survey specifically for NTHS graduates. Both quantitative and qualitative feedback was collected from the 244 responding alumni. Questions focused on alumni's postsecondary education, job/career status, overall preparation from attending NTHS, technology skills and use preparation, and on the impact of the NTHS program on their postsecondary education and career.

Participants

Requests were sent to 658 graduates of New Technology High School. A total of 244 alumni responded to the request to complete an online or paper survey, yielding a response rate of 37%. The initial response rate was lower, but a sample of non-respondents was surveyed again and increased our confidence in the reported data provided by more than one-third of the school's alumni.

Findings

NTHS believes that an effective education should include the key elements of a 21st Century education. These elements enhance the core academic subjects while motivating and engaging students through real-world examples and applications. Students learn problem solving and communication skills, interpersonal and information skills, and use 21st Century tools within the content and context of their high school program.

Feedback from responding alumni strongly suggests that the NTHS program is based on the 21st Century principles. Alumni reported the use of appropriate technologies by their teachers for communication, and as tools for learning. A majority of graduates rated the use of technology as very valuable to their personal academic and career successes. Additionally, graduates believed that the overall environment of the school led to successful decision-making about postsecondary education and an ultimate profession. Of

particular value was the project-based curriculum, which integrated real-world skills and experiences within the core subject areas. Respondents mentioned acquiring collaboration skills, problem solving skills, and communication skills, all of which resulted in graduates developing critical thinking skills.

Alumni were asked to think about the various NTHS program components and to rate how valuable each component was in helping respondents achieve each of three personal stages – 1) successfully graduating high school, 2) being successful in college or other postsecondary schooling, and 3) in preparing for a career. On average, responding alumni rated each component of the program as valuable to very valuable for high school, postsecondary schools, and career success. Alumni were quite positive about the impact of the high school program, specifically 90% or more of the respondents rated nearly all the components in the valuable to very valuable ranges. The very high ratings underscore the importance of the following characteristics embedded in the program and curriculum:

- Using technology as a tool for learning, communicating, and work.
- Experiencing an environment that required high levels of personal responsibility, respect for others and time management.
- Using real world projects to make classroom learning relevant and interesting.
- Regularly presenting information in front of groups.
- Having a one to one computer ratio in the classrooms.
- Taking college courses while still in high school.
- Working with teams on large projects (collaboration).
- Attending a small school where you are well known by peers and teachers.

Responding alumni also indicated that integrating technology within the NTHS program significantly impacted their ability to succeed in college or in other postsecondary schooling, and was valuable in preparing them for finding success in the workplace. Respondents also believed that the overall NTHS environment was a significant asset in their postsecondary education and in their career.

Alumni also credited the requirement of taking college level courses in high school as a key component of the program. They felt prepared to handle college knowing in advance what would be expected of them. Some alumni mentioned that the courses helped them decide on a major, others mentioned that “taking college classes in high school gets you further ahead and also prepares you to be more motivated throughout your whole life.”

The project-based curriculum, which included learning to make presentations to groups of other students, teachers, and community members, was considered the second most valuable component of the program. Respondents appreciated that project-based learning

allowed them to develop and use their personal learning styles, and that this methodology made learning meaningful “because it gives you the incentive to work hard on a project in order to complete it to the best of your ability as you know there is real-world relevance to the end product.”

Alumni also pointed out the impact of the curriculum and its components once they began working. One respondent commented, “The concept of personnel management, time management, research and development and presentation skills are infinitely valuable in my progress as a professional.” Others noted that they learned to work within groups, with people of different skills, “regardless of if you like them or got along.”

An important component of a 21st Century education and goal of NTHS is to support the local business community and economy by “preparing students to successfully compete in an information-based, technologically advanced society.” Respondents listed postsecondary majors within the Social Sciences, Humanities, Science/Engineering, Business, Technology, and the Arts disciplines. The range of studies suggests that the high school program/curriculum is meeting that goal. Additionally, another national goal is to increase the number of college graduates who pursue careers in science, technology, engineering and mathematics (STEM). NTHS alumni feedback revealed that 43% of the male respondents and 37% of the female respondents were either preparing for, had prepared for, or were working in STEM related careers.

Graduates of New Technology High School consider themselves capable of working in a 21st Century setting, of having the self-management skills to make decisions and engage in challenging curricula and jobs. Alumni believe that the level of technology competency they attained from New Technology High School prepared them to move comfortably through a high technology, competitive environment with confidence.

Data discussed in the report that follows suggest that New Technology High School is meeting the academic and skill needs of its 21st Century students. Overall feedback indicated that:

- 89% of the responding alumni attended a 2-year or 4-year college/university or professional or technical institute.
- 92% of respondents have applied some or a great deal of what they learned at NTHS to their postsecondary education or career.
- 96% of the respondents would choose to attend NTHS again.
- 40% of the alumni respondents were either majoring in STEM fields or were working in STEM professions.

INTRODUCTION

At the urging of the local business community concerned about economic development in the region, New Technology High School (NTHS) opened in Napa in 1996 as an alternative public, small, high school. Until the 2004-2005 school year, NTHS was a two-year school serving only juniors and seniors. In the fall 2004 freshmen were added, and beginning in fall 2005 NTHS serves as a four-year high school.

The New Technology Foundation (NTF) was established in 1999 to assure the flagship status of NTHS and to foster and support a network of high schools nationwide modeled on the Napa school. While the Foundation and the high school had anecdotal data that suggest that NTHS's program impacts graduates of the program in a positive way, the NTF leadership decided that a more formal study was needed to validate the effectiveness of the program. NTF contracted with ROCKMAN *ET AL* to perform the Postsecondary Student Success Study. The goal of the study was to gather feedback from the Napa NTHS alumni about their experience while attending NTHS. Specifically, NTF was interested in the impact that the technology, social, and academic skills they acquired through the program had on their postsecondary education and/or career.

Data generated through the study is expected to help refine the NTHS model and provide insights of the value of the program to other schools in the NTHS Network.

ROCKMAN *ET AL* conducted the evaluation by gathering feedback on key aspects of the NTHS program from Napa NTHS alumni. This report presents the evaluation findings from data collected from January through June 2005.

METHODOLOGY

ROCKMAN *ET AL* evaluators met with NTF representatives to design a survey (see Appendix) for NTHS graduates. Evaluators then finalized the survey and placed it on the ROCKMAN server. Questions on the survey focused on gathering alumni demographic information, their secondary, postsecondary and career goals, the value of the primary characteristics of the program, and their technology preparation.

NTHS alumni were either contacted by email and asked to access an online survey, sent a paper version of the online survey if no email address was available, or telephoned and completed the survey as an interview. New Technology Foundation staff was responsible for providing both email and postal addresses. Evaluators attempted to reach a total of 658 graduates from 1998 – 2004, however many email bounced back, mailed surveys were returned and phone numbers were disconnected. The initial response rate was 22%; consequently, evaluators resampled the group of non-respondents and successfully

contacted an additional 15%. The data from the second sample paralleled the data collected from the first sample, allowing for confidence in the data reported in the Findings Section below.

As an incentive to submitting the survey, each respondent was entered into a drawing for one of five Amazon.com gift certificates valued at \$50.00.

RESPONDENT DEMOGRAPHICS

A total of 244 alumni responded by completing a survey, a 37% response rate. Sixty percent of respondents were male and forty percent were female.

The distribution of respondents by year of graduation was relatively even (see Table 1). Each class had approximately 100 students enrolled. Ninety percent of the respondents attended NTHS for two years, ten percent attended only one year.

Table 1: Percentage of Respondents by Year of Graduation (N = 244)

Year graduated	Number of respondents	Percent of total respondents
1998	29	12%
1999	37	15%
2000	34	14%
2001	36	15%
2002	40	16%
2003	34	14%
2004	32	13%

FINDINGS

Evaluators designed the online survey to elicit a relatively complete picture of the NTHS graduates. Questions focused on alumni current activities, postsecondary education, job/career status, overall preparation from attending NTHS, technology skills and use preparation, and on the impact of the NTHS program.

High School Plans

Alumni were asked to think back to their postsecondary plans prior to attending NTHS and then, if they did not follow their plans, to report what had occurred instead. Although the survey directions did not ask respondents to check all choices that applied, many did indicate that they planned to continue their education and anticipated following it with a career. As incoming 11th graders most respondents (85%) planned to attend college, but

were unsure of whether they were going to a 4-year or 2-year institution and chose both. Others had planned to begin a career, to attend a technical or professional school, or to join the military following graduation from NTHS.

The Napa Valley Unified School district reports that 67% of seniors have postsecondary enrollment plans, compared to 95% at NTHS (Source: Senior exit surveys given by NVUSD 2000-2005). California and the U.S. graduate 67% and 71% of high school students respectively, of which 32% in California and 34% nationally are college-ready.¹ Compared to other high schools in the District, and to statewide and national percentages, NTHS is meeting its vision of graduating college-ready alumni.

When asked if they had followed their plans once graduating from NTHS, 83% of the responding alumni reported that they had—either continuing their education, beginning a career (7%), or joining the military (3%). Overall, a greater percentage of the responding NTHS alumni (89%) did attend a 2-year or 4-year college/university or professional or technical institute, thus continuing their education.

Given that NTHS students are required to take college level courses as a part of the normal curriculum it is not surprising that such a high percentage of graduates attended college. Respondents commented that they felt prepared for postsecondary education based on their experience while in high school.

Of the 41 respondents who reported that they did not follow their pre-NTHS plans, 18 went to college who hadn't planned to, while another 13 alumni reported that attending NTHS impacted their change of decision to attend college.

Postsecondary Education

NTHS can be proud of the high percentage of graduates who attended or completed a postsecondary institution. Specifically, 89% of the responding alumni attended a community college and/or a 4-year college or university, or professional or technical institute after graduating from NTHS.

Respondents were asked to indicate their highest level of education attained and to list the institution's name. Of the 79 graduates (32%) who responded to this question, 33 completed an Associate degree, 34 received a Bachelor's degree, 12 received a degree from a vocational training program and one person held a Master's degree. Alumni reported graduating from California State Universities (18), Napa Valley College (18), State Community Colleges (7), University of California (6) and private/independent

¹ Greene, Jay P. and Winters, Marcus A., February 2005. *Public High School Graduation and College-Readiness Rates: 1991 – 2002*. Manhattan Institute for Policy Research, Education Working Paper No. 8.

colleges and universities (6). Professional/training degrees (14) included Heald and the Expression Center for New Media, a Digital Arts College.

The remaining respondents (60%) reported that they were still attending a college, university or training program at the time they completed the survey and had not yet graduated. Within this group, over one half were attending a 4-year college or university, about 30% were attending a 2-year college, three percent were in a graduate program and three percent were attending a training program.

One goal of NTHS is to support the local business community and economy by “preparing students to successfully compete in an information-based, technologically advanced society.” Alumni were, therefore, asked to state their postsecondary area of study. Respondents listed a wide range of majors, listed below in Table 2, suggesting that the high school program/curriculum is meeting that goal.

Table 2: Areas of Study* Listed by Alumni (n=149)

Humanities	Social Sciences	Science/Engineering	Business	Technology	Arts
Literature (2)	Education (7)	Veterinary (3)	Administration	Computer engineering (6)	Film (7)
History (4)	Political science (4)	Nutrition	Business/marketing (18)	Digital media (2)	Art (4)
English (4)	Criminal justice (7)	Chemistry	Economics (2)	Automotive technology	Graphic design (7)
Journalism (2)	Social Welfare (2)	Biochemistry (3)	Finance	Techno-cultural studies	Interior design
Philosophy (2)	Psychology (9)	Molecular biology (2)	Sports management	TV/broadcasting	Photography (2)
Liberal arts (3)	Speech/Communication (5)	Nursing (7)	Real estate	Software engineering	Music
	Anthropology	Engineering		Computer information systems	Dance (2)
	Global studies	Electrical engineering		Audio engineering	Advertising (2)
	Law enforcement	Civil engineering			Culinary Arts
	Community development	Aerospace engineering (2)			Fashion
	International relations	Biology (2)			Special effects makeup
		Mathematics (2)			Sound arts
		Radiology technician			
		Health			
		Pharmacy			
		Geology (2)			
		Geophysics (2)			
		Marine sciences			
		Mechanical engineering (2)			
		Neuroscience (2)			
		Physics			
		Chiropractic			
		Physical Therapy			
Total: 17	Total: 39	Total: 41	Total: 24	Total: 14	Total: 30

*Each major equals one mention unless noted in parentheses.

Several respondents listed multiple majors; therefore, the total number of subject areas listed is greater than the number of respondents.

Career

One hundred ninety-eight respondents (81%) reported that they were currently working either full or part-time, or had worked following graduating from NTHS. Forty-four percent of those respondents were working full time, a third worked part-time and nine percent were not currently employed.

Alumni were also asked the level of education required for their job and their annual salary. Thirty-nine percent of respondents reported that a 2-year or 4-year college/university degree was required to work in their field, forty-three percent reported that their job did not require any education beyond high school, and twenty-four percent reported that a training program was required.

The majority of respondents (57%) earned an annual salary less than \$30,000, twenty-five percent earned from \$30,000 to \$50,000, twelve percent earned between \$51,000 and \$75,000 and six percent earned over \$76,000.

Analysis also indicated that 60% of the respondents attending a postsecondary institution at the time that they completed the survey also reported that they were working. This result explains the large number of lower salaried occupations that were reported, as these individuals had not yet completed their degree or training.

Responding alumni who answered that they were working or had worked, were asked to state their occupation. Table 3, on the next page, shows the variety of careers and occupations held by graduates (not all graduates stated their profession).

Table 3: Careers* Listed by Respondents (n = 163)

Other	Service Industry	Managerial	Professional	Science/Technology
Military (7), Parent (2)	Bank teller (2), camp counselor, cashier (2), chef, Childcare (2), customer service (3), equipment coordinator, hair stylist, house keeper, makeup artist, master barista, mechanic, office helper, personal assistant, school aide (2), projectionist, puppeteer, radio, receptionist (2), retail (10), server (12), shipping (4), store clerk (3), technician, tutor, youth director	Administrator (2), administrative assistant/secretary (6), assistant manager (4), bank teller (2), entertainment director, loan officer (2), marketing support, office manager, sales manager, supervisor (3) information director, warehouse manager (2), program coordinator (2)	Accountant (2), Business associate (2), business owner (5), dancer, Graphic designer (4), painting conservation (2), realtor (3), self- employed, social work, stock investment, substitute teacher	Analytic Science Engineer, audio-visual technician (2), CD-Rom development, computer consultant (2), Computer operator, computer repair/networking, computer technologist, data entry (2), electrical engineer, electrician (3), finance specialist, geospatial analyst, graphics, medical technician (3), Internet based corporate sales manager, IT administrator (3), lab technician, network administrator, programmer (4), research assistant (2), software engineer (2), sound engineer, structural engineer, technology coordinator, telecommunications administrator, Web designer (6)
Total: 9	Total: 58	Total: 28	Total: 23	Total: 45

*Each career equals one mention unless noted in parentheses.

STEM

The Business Roundtable², composed of many of the nation's most prominent business organizations, has issued a challenge to the education community to increase the number of college graduates in the fields of science, technology, engineering and math (STEM).

Current research indicates that an imbalance between the supply and demand of STEM focused skilled workers exists in the United States.³ According to Dr. Shirley Jackson of the Rensselaer Polytechnic Institute,

The crisis stems from the gap between the nation's growing need for scientists, engineers, and other technically skilled workers, and its production of them. Our colleges and universities are not graduating enough scientific and technical talent to step into research laboratories, software and other design centers, refineries, defense installations, science policy offices, manufacturing shop floors and high-tech startups. This 'gap' represents a shortfall in our national scientific and technical capabilities.

For NTHS, over a fourth of the careers and occupations listed by the respondents were in the science, technology, engineering or mathematics (STEM) fields, and over a third of respondents enrolled in postsecondary institutions listed their primary area of study within a STEM field. There is still little national data tracking high school student interest and preparation for STEM careers. Nationally, however, only 5.7% of the college-age cohort achieves bachelor's degrees in STEM-related fields.⁴

Using the National Science Board's Science and Engineering Indicators 2000, Jackson also noted that only 15% of white females and 7% of non-white persons work in science or engineering fields. Additional figures from the National Council for Research on Women indicated that in 2001 women constituted 45 percent of the workforce in the U.S., but held just 12 percent of the science and engineering jobs in business and industry.⁵

² TAPPING AMERICA'S POTENTIAL: The Education for Innovation Initiative. July 2005. Business Roundtable, 1717 Rhode Island Avenue, NW, Suite 800, Washington, DC (<http://www.businessroundtable.org>)

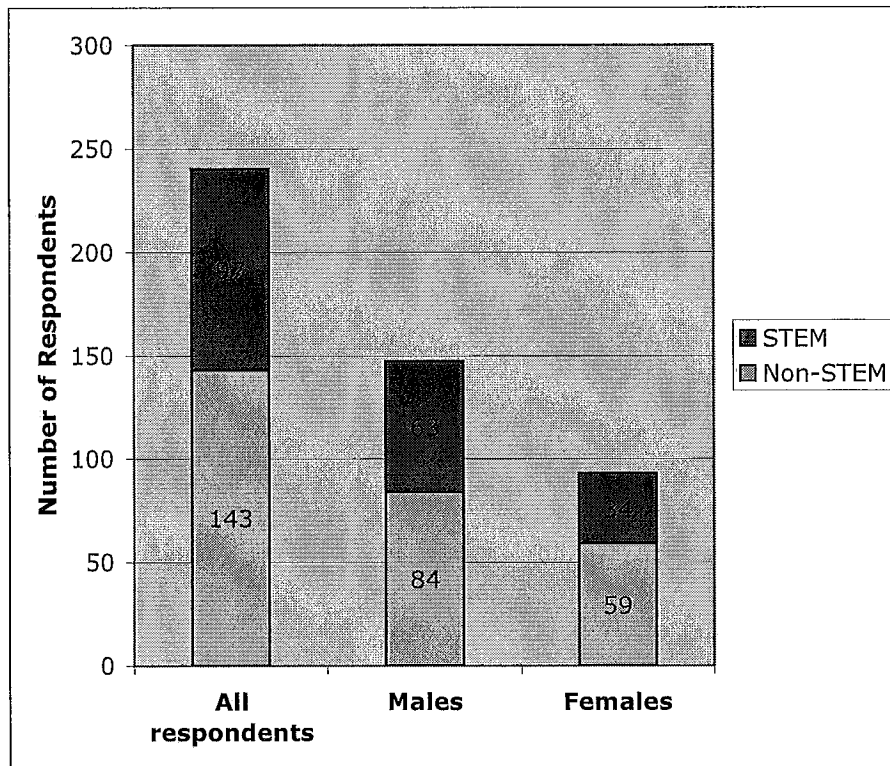
³ Jackson, Shirley. 2004. *The Quiet Crisis: Falling Short in Producing American Scientific and Technical Talent*. Building Engineering & Science Talent, San Diego, CA (www.bestworkforce.org)

⁴ National Science Board, 2004. Science and Engineering Indicators 2004 (NSB 04-1). Arlington, VA; National Science Foundation, Chapter 2.

⁵ National Council for Research on Women, *Balancing The Equation: Where are Women & Girls in Science, Engineering & Technology, 2001*. (<http://www.ncrw.org/research/scifacts.htm>).

Chart 1, below, shows the total number of respondents, the number of male respondents, and the number of female respondents who are either studying a STEM field or are working in a STEM occupation.

Chart 1: STEM Majors or Careers (n = 240)



Overall, 40% of the alumni respondents, including 43% of the male respondents and 37% of the female respondents, reported that they were either majoring in a STEM field, had graduated with a degree in a STEM field, or were working in a STEM related field.

Data from the responding alumni suggest that NTHS provides the education necessary for postsecondary education, and ultimately, for careers in the fields of science, technology, engineering or math.

Impact of the NTHS Program Components

Alumni were asked to think about the various NTHS program components and to rate how valuable each component was in helping respondents achieve each of three stages – 1) successfully graduating high school, 2) being successful in college or other postsecondary schooling, and 3) in preparing for a career. Table 4 (below) displays the average, the standard deviation, and the number of Not Applicable responses for each component and stage.

Table 4: Alumni Ratings for Value of NTHS Program Components (N=244)

	High School	Postsecondary	Career
	M (SD) NA	M (SD) NA	M (SD) NA
Using technology as a tool for learning, communicating, and work.	3.78 (.529) 2/NA	3.72 (.557) 16/NA	3.84 (.427) 32/NA
Having a one to one computer ratio in your classrooms.	3.73 (.631) 2/NA	3.48 (.802) 27/NA	3.61 (.747) 43/NA
Taking college courses while still in high school.	3.70 (.645) 3/NA	3.78 (.564) 30/NA	3.51 (.796) 51/NA
Using real world projects to make classroom learning relevant and interesting.	3.70 (.622) 3/NA	3.58 (.670) 20/NA	3.69 (.623) 43/NA
Experiencing an environment that required high levels of personal responsibility, respect for others & time management.	3.69 (.618) 3/NA	3.72 (.619) 17/NA	3.80 (.553) 32/NA
Attending a small school where you are well known by peers and teachers.	3.65 (.656) 2/NA	3.05 (.840) 24/NA	3.35 (.836) 50/NA
Regularly presenting information in front of groups.	3.59 (.716) 2/NA	3.54 (.741) 16/NA	3.64 (.716) 33/NA
Working with teams on large projects (collaboration).	3.48 (.760) 2/NA	3.29 (.826) 16/NA	3.61 (.657) 37/NA
Successfully completing an internship.	3.17 (.972) 16/NA	3.21 (.888) 35/NA	3.31 (.951) 50/NA
Reflecting on and describing your abilities in a digital portfolio.	3.03 (1.002) 10/NA	2.71 (1.040) 30/NA	2.93 (1.079) 51/NA

Scale of: 1 = Not at all valuable, 2 = Somewhat valuable, 3 = Valuable, 4 = Very valuable

NA = Not applicable (i.e. respondents had not reached that level, or they did not believe the measure applied)

SD = Standard deviation

Respondents used a 4-point scale, with 1 = Not at all valuable to 4 = Very valuable, to rate the program components. Respondents could also choose Not Applicable (NA) if appropriate. Alumni were quite positive about the impact of NTHS's program. On average, responding alumni attributed each component of the program as valuable to very valuable for their success in high school, in their postsecondary education, and in career success.

An overall mean was calculated for each measure across the three stages by first calculating the mean for each respondent and then averaging those means. Based on these calculations, the measures *Using technology as a tool for learning, communicating and working*, and *Experiencing an environment that required high levels of personal responsibility, respect for others and time management*, were statistically more valuable to alumni than other components.

Table 5: Percent of Respondents Choosing Very Valuable (N=244)

	High School	Postsecondary	Career
	% choosing rating 4	% choosing rating 4	% choosing rating 4
Using technology as a tool for learning, communicating, and work.	83%	77%	87%
Having a one to one computer ratio in your classrooms.	81%	64%	73%
Using real world projects to make classroom learning relevant and interesting.	78%	67%	76%
Taking college courses while still in high school.	78%	84%	67%
Experiencing an environment that required high levels of personal responsibility, respect for others & time mgt.	76%	80%	86%
Attending a small school where you are well known by peers and teachers.	73%	35%	55%
Regularly presenting information in front of groups.	69%	66%	75%
Working with teams on large projects (collaboration).	62%	49%	69%
Successfully completing an internship.	49%	47%	57%
Reflecting on and describing your abilities in a digital portfolio.	42%	29%	41%

Scale of: 1 = Not at all valuable, 2 = Somewhat valuable, 3 = Valuable, 4 = Very valuable

Additional analysis displayed in Table 5 (above) shows the percentage of respondents who chose the highest rating, *Very Valuable*, for each of the components. Percentages ranged from 29% to 87%, the majority of components had over 60% of the respondents choosing rating 4, the highest rating. These results should be gratifying to NTHS administration and staff. Responding alumni indicated that integrating technology within

the NTHS program positively impacted their ability to succeed in college or in other postsecondary schooling, and was valuable in preparing them for finding success in the workplace. Respondents also believed that the overall NTHS environment was a valuable asset in their postsecondary education and in their career.

Alumni were also asked to add a brief explanation of their ratings. There were an average of 21 comments per NTHS characteristic listed. The vast majority of them were positive and suggested that students understood and valued the program components. Representative comments for each component follow in the table below.

Table 6: Representative Comments From Alumni About Program Components

NTHS Components	Comments
Attending a small school where you are well known by peers and teachers.	• <i>My high school experience had felt hellish until I went to NTHS. I was then able to focus less on false image and more on myself, schoolwork, and art.</i> • <i>Made it easier to learn and not be afraid to make mistakes. Attending a high school this small made it difficult to fall through the cracks and not graduate.</i> • <i>You almost work harder and try to do a better job, because you have a relationship with the teacher, and it's like you don't want to let them down. I loved all the support and ideas I got from my teachers at NTHS.</i>
Working with teams on large projects (collaboration).	• <i>This stays with you through college and into your career. I'm always working on projects and I always remember my NTHS project planning and presenting.</i> • <i>Not only did I have to understand the stuff but I had to be able to teach it to others when they didn't as well. It made sure I really understood everything.</i> • <i>All through out college, and in many professions, group collaboration is a key factor. It was wonderful that this was a part of our education.</i> • <i>I loved working with teams. It gives you a feel about what others are thinking. And not always being able to rely on just yourself was a good lesson to learn. Picking the right people to work with and get the job done was a lesson learned hard. It is hard to tell your friends that you don't want to work with them because they don't really do the work.</i>
Regularly presenting information in front of groups.	• <i>In college, we were made to present in front of class. NTHS gave me a huge head-start on that. This made presenting a whole lot easier and impressed teachers. Impressing teachers = good grades!</i> • <i>School presentations helped me a lot. I do as much informal and unplanned presentation, as an artist, as I do formal presentation.</i> • <i>Helped me to gain presentation skills that are needed everyday in the business world.</i> • <i>I give briefings regularly at work. With out this I would not be able to do my job.</i>
Reflecting on and describing your abilities in a digital portfolio.	• <i>Though the guidelines of the portfolio were a bit tedious, it helped me to organize my skills and resume in an easy to access medium, which I am finding to be very useful here in college as I am looking for jobs.</i> • <i>I was able to see all my completed work online. I still look at it today.</i> • <i>Well NTHS did provide me with a greater knowledge for html, but it really didn't focus on the main point of a portfolio... your trying to sell yourself to an unknown party.</i> • <i>I think that they were to restrictive and in a way a waste of time. Fun to make, but a bit of a waste, because they don't post them on the web any more.</i> • <i>Not very useful, I never used it.</i>

Successfully completing an internship.	• <i>Great learning experience and looks good on my resume.</i> • <i>Working with professionals and peers builds my network and leads to the next job.</i> • <i>While my internship seemed like a big deal to me at the time, I realize now that it was only preparing me for future work, and wasn't as tough as I initially thought it was. I have learned a lot from it, including the skills necessary to work in a professional environment.</i> • <i>Internship program lacked structure.</i> • <i>Didn't do one that related to my career of choice.</i>
Using technology as a tool for learning, communicating, and work.	• <i>Technology is what brought me to NTHS and it is what kept me in high school. It has been quite valuable in my career so far.</i> • <i>I loved this part and allowed me a lot of freedom compared to just using books.</i> • <i>Everything involves technology now a days. Technology has been woven into our culture and every day lives. It is necessary to learn how to use technology.</i> • <i>Technology is just going to get more complex and more necessary as you go further with careers.</i>
Taking college courses while still in high school.	• <i>Taking college courses helped me to get some general education courses out of the way. I worked hard and took a few extra classes every summer and during a winter break. I graduated from a 4 year college in 3 years. Taking those courses helped me achieve that goal.</i> • <i>This made sure I knew what I was getting into later and I think prepared me a little earlier. It also allowed me to know I could take more units than they suggested.</i> • <i>It let students see how the college system worked, and be better prepared for finishing high school and attending a college full time.</i>
Experiencing an environment that required high levels of personal responsibility, respect for others and time management.	• <i>I am very grateful that NTHS taught me these necessary skills of responsibility and self-discipline. Time management, a skill I learned at NTHS, has proved to be very useful in college and will prove to be even more useful when I get a job.</i> • <i>I have always been a pretty responsible person, but at NTHS you are given so much freedom and power to make choices that it does teach you many things that you need to learn before going into the real world, which other, more traditional school do not do.</i> • <i>The lessons I learned as a result of my actions were invaluable, and perhaps could not have been conducted in a safer environment.</i>
Having a one to one computer ratio in your classrooms.	• <i>I choose to bring my laptop to class in college because I feel comfortable taking notes that way. Also, taking the courses on computer networking, repair, and how to use the office programs was GREAT.</i> • <i>The ability to work independently of others on your own schedule was facilitated by a one computer to one student ratio. It has improved my work ethic and technology literacy.</i> • <i>I think they were a great tool, but sometimes a major distraction from work. I think students would benefit greatly from a better understanding of when technology was a tool and when it was a burden on the education process.</i>
Using real world projects to make classroom learning relevant and interesting.	• <i>This made things interesting to me. Made me actually happy to show up to class because I had to think about things that actually affected me.</i> • <i>The skill sets learned are thoroughly more valuable than those I would have learned in a traditional learning environment.</i> • <i>By applying coursework to real life, I was able to gain a reference point and gain a new perspective on where my education fits into the real world. This also made the material realistic and interesting.</i>

Alumni were then asked to choose the two components, listed in Table 6 above, that proved to be most valuable. By far, the measure technology skills and use was chosen most often, over half of the respondents chose this program component as one of two that had the most value to them. The second most often chosen components focused on the curriculum, specifically project-based learning, presenting to groups, and taking college level courses. Closely following the curriculum as most valuable was the overall environment comprised of the small school atmosphere and collaborating with peers.

Alumni were asked to explain why the program components they chose were valuable following their graduation from NTHS. Respondents focused their answers on the advantages they received in college and in their careers from the skills learned at NTHS and from the overall environment of a small school.

Responding alumni understood the value of technology in their lives and the necessity of it in the workplace. One respondent wrote, "In this rapidly expanding world that we live in with technology as the forerunner, a knowledge of technology is essential." Most believed that the technology preparation they received set them apart from their peers in college and in their careers.

Alumni underscored technology's importance in the workplace, several mentioning that their use of technology inspired them to work in the technology field.

My first time I used a computer was at NTHS. Getting to interact with computers and technology sparked my interest and in the long run became my career.

Technology skills have helped me with my career as a digital photographer,

Having a strong foundation in technology allowed me to find a higher paying job after high school that helped support me while I attended college.

I now have a full time job working with computers that I would not have been qualified for without the opportunities for learning at Tech.

Respondents acknowledged how much they used technology in college and shared the positive impact technology had on their academic success:

I use the computer skills every day. PowerPoint presentations in some of my classes have helped me pull a better grade. I've gotten straight A's thru my first 3 years of college.

My major is graphic design and by going into that field already knowing Photoshop and Pagemaker made things really easy for me.

Having the skills in technology combined with the college courses I had taken before entering a four-year gave me an edge in pretty much every internship I applied to while in college.

Technical skills helped me to complete projects and do research faster and more efficiently.

Alumni also credited the requirement of taking college level courses in high school as a key component of the program. They felt that they were prepared to handle college knowing in advance what would be expected of them. Some alumni mentioned that the courses they took while attending NTHS helped them decide on a major, others mentioned that “taking college classes in high school gets you further ahead and also prepares you to be more motivated through out your whole life,” and that “college courses ended up being very useful in bumping up my enrollment status to sophomore and getting priority registration which is very important in a time of budget cuts and class cutbacks.” Many respondents were also motivated to take extra courses while in college because of credit they had already received while attending NTHS.

The project-based curriculum, which included learning to make presentations to groups of other students, teachers, and community members, was considered a valuable aspect by many of the alumni. This component was chosen as the second most valuable component of the program. Respondents appreciated that project-based learning allowed them to develop and use their personal learning styles, and that the method made learning meaningful “because it gives you the incentive to work hard on a project in order to complete it to the best of your ability as you know there is real-world relevance to the end product.” Alumni noted that information they learned was easier to retain due to the “critical thinking used in the process.”

Alumni also pointed out the impact of the curriculum and its components once they began working. One respondent commented, “The concept of personnel management, time management, research and development and presentation skills are infinitely valuable in my progress as a professional.” Others agreed, noting that they learned to work within groups, with people of different skills, and “regardless of if you like them or got along.” These important life-skill concepts resulted in alumni feeling capable and confident in their jobs.

A component of the project-based curriculum that alumni mentioned as valuable was the requirement of making presentations to an audience. Most respondents who chose this measure remarked on the feeling of confidence that resulted from the presentations. Alumni reported using their presentation skills in college to participate more fully in discussions, to present research, and to communicate effectively with professors. Most who chose this aspect of the program also felt that the skill enabled them to be successful in their careers. Alumni in marketing, sales, entertainment, and the military reported that they were able to present proposals to clients, teach or lecture in front of large groups, and explain project outcomes or propose new ideas. Several respondents also noted that

the confidence gained through public speaking resulted in leadership positions in their companies.

The overall environment, including attending a small high school and developing relationships with and collaborating with peers, had a strong impact on the alumni's development during their high school years. Based on the choice to attend NTHS for their junior and senior years, these students were looking to make a change in their educational environment. Responding alumni appreciated the 1-to-1 attention they received at a smaller school from teachers. One student wrote, "Having a small school really helped me. I was the type of kid that needed to be pushed and in a large school that wasn't being done. There's no way you can get the attention you need in a large school to help you learn your strengths and weaknesses." Others shared how important it was to get to know their peers without the pressures of "clicks and stereotypes" influencing friendships. The atmosphere at the school allowed them to "open up and interact with people my own age and really get to know people that we probably never would have."

Several comments captured the thoughts of alumni about the school's impact:

NTHS was instrumental in changing my life and views on education. I have made very good, well thought out choices for myself and I attribute my accomplishments to my time spent at NTHS.

By being able to learn how to collaborate with my peers on a constant basis I was prepared when coming to college when group projects were assigned as I had already learned of the skills required to succeed in such assignments.

It is also a feeling that is hard to describe, when you walk in the doors, you feel the energy there, the caring of the teachers and students, where everyone wants to be there and is working on making it the best it can be.

Alumni who were working felt that the preparation they received through collaboration with peers helped to develop their communication skills and taught them the value of teamwork. Representative comments by respondents included:

Communication and interaction with your peers in any setting is very important. In both college and in my career I have had to work with others to achieve a common goal.

Collaborating with peers is very important. Peers will be able to learn from each other and see different ways on how to approach and solve a problem.

Small school and team projects built my confidence to go out in the world and make a difference.

My job requires an extensive technological knowledge as well as a lot of professional interaction with co-workers.

Technology Preparation

Although students at NTHS use computers everyday, and technology is integrated completely into the curriculum, evaluators decided to use the survey as a way to gather specific feedback about technology skill preparation. Alumni were asked to use a 4-point scale to rate the various skills. On average, alumni felt most prepared to use presentation software, suggesting that they were prepared to use appropriate technology for their project presentations. (See Table 7 below.)

Table 7: Technology Skill and Use Preparation (N = 244)

	Mean (SD)	Prepared to Very prepared
Use presentation software (PowerPoint, Hyperstudio, Photoshop)	3.67 (.582)	94%
Find, insert and manipulate graphics	3.53 (.694)	90%
Create a complex document (e.g. newsletter) on the computer.	3.46 (.699)	91%
Do basic computer trouble shooting (freezes, lost documents, etc)	3.40 (.803)	86%
Use data processing programs (Excel, databases)	3.40 (.800)	85%
Use peripheral equipment (digital camera, scanner, video camera)	3.40 (.787)	86%
Create an e-portfolio	3.09 (.950)	74%
Create a Web site	3.09 (.949)	72%
Use computational tools (graphing calculator, probeware)	2.83 (1.059)	63%
Create an edited video/iMovie	2.42 (1.114)	43%

Scale of 1 = Not at all prepared, 2 = Somewhat prepared, 3 = Prepared, 4 = Very prepared

Responding alumni rated technology as the component of the NTHS program that was most valuable to them in college and in their careers. Therefore, it is not surprising to see that the vast majority of alumni felt prepared to very prepared to do or use all but one of the technology skill variables. Given that 21st Century careers require knowledge and use of 21st Century tools, data suggest that these graduates were prepared to enter technology rich career environments.

Overall New Technology High School Experience

Alumni were then asked a series of open-ended questions. The first asked if alumni experienced any special challenges when in college or in the work place as a result of attending NTHS. Seventy-eight percent responded that they had not experienced any special challenges while attending the school.

Those who said they had experienced challenges were asked to explain what they were. Several alumni mentioned the problem of being in a non-traditional school and then having to readjust to a traditional college environment involving primarily independent work. Most did not feel prepared to study for traditional college exams and scantron tests, or to learn from textbooks. However, they followed by stating that they adapted easily, although reluctantly, preferring the alternative assessments used at NTHS.

Some also mentioned that the more competitive colleges or universities were not familiar with the school's philosophy and that applicants were at a disadvantage because their transcripts did not include any honors or AP classes. One alumna wrote that "Schools see it as less rigorous academically, so it was harder to get into competitive schools." Considering that students are required to take four college level courses while attending NTHS, it is surprising that this would be an issue for graduates.

Graduates who were interested in majoring in science or math commented that the lack of classes offered at NTHS in these fields was problematic once they began college. They felt unprepared compared to graduates from traditional programs. One graduate explained her situation.

Attending NTHS did create a special challenge for me when I entered college because I chose to major in Biology. The professors in my science classes expected that we all took AP or Honor classes in high school, such as Physics, Biology, Calculus and Chemistry, but in my case I had not. Not having learned the material in high school, I found myself presented with many challenges.

Alumni were also asked what skills or programs they would have liked to learn while attending NTHS. The majority of responses focused on technology skills and software. Suggestions were:

Databases, digital media programs, networking, Quark, Illustrator, Photoshop, video editing, Flash, Web design, multi-media, programming language (such as PHP, c++), CAD, general computer troubleshooting, and Microsoft Office.

Alumni also wanted to have learned more math, science, graphic design, and to have the opportunity to study the arts.

Alumni were then asked to rate the extent to which they believed that NTHS impacted their future. Using a 4-point rating scale of 1 = Not at all, 2 = A little, 3 = Some and 4 = A great deal, overall feedback indicated that:

- 89% of respondents have applied some or a great deal of what they learned at NTHS to their postsecondary education or career.
- 47% of respondents believed that attending NTHS impacted their decision to apply to college or university.
- 45% of respondents believed that NTHS had some or a great deal of influence in their decisions about their primary area of study or employment.

Furthermore, 97% of the alumni respondents would choose to attend NTHS again given the chance.

Alumni were asked to add comments about their overall experience attending NTHS. Many graduates wrote that they had felt lost in the large local high schools they had attended for their first two years. They felt that the intimate environment created a “strong sense of community” where they knew their teachers, peers and the school staff well. Alumni felt supported and were encouraged to be successful, responsible critical thinkers. One alumna wrote, “NTHS was there to guide you in the right direction and give you enough information to form your own opinion.” Most respondents reiterated the benefits they gained by learning to use technology, through collaborating with peers to complete projects, and by learning to be comfortable presenting to groups. Representative comments follow:

I think the school does and did an excellent job preparing high school students to be able to confidently move forward in life.

The skills and challenges that I was given through New Tech are ones that I don't think I could've gotten anywhere else. The teaching staff was amazing and the environment was in all ways fun and stimulating.

At NTHS I learned about time-management, collaboration, project based learning. Things that will help me throughout my entire life time.

Everything that NTHS does is aimed at getting students prepared for the future.

Project-based learning allowed me to use the technology skills, and the oral presentation skills that I had developed, making me a more rounded individual and a better student.

Going to New Tech was the best two years of my life. Everything I learned while attending is useful in everyday life, especially the business world. I loved the small, intimate environment. It was always nice to know the teachers wanted to see you succeed.

SUMMARY

By far feedback from the responding alumni was positive. Alumni didn't hesitate to describe their experience at NTHS using words such as "great," "the best," and "perfect." Responding graduates were satisfied with their educational experience and preparation – 97% would choose to attend NTHS again. Based on comments from alumni, and from data in Table 4 showing that alumni valued the various components of the program, respondents also believed that the program had a positive effect on their personal and professional development.

The relatively few negative comments about the high school focused on teacher turnover and academic preparation for graduates interested in science or math. However, an impressive 47% of respondents were either majoring in STEM subject areas, or were working in STEM careers. These data suggest that graduates of NTHS received the necessary preparation to choose STEM subject areas and careers following their graduation.

Graduates often commented that they thought they were different from their peers in college and in the workplace. They mentioned feeling more mature, already knowing how to work with people regardless of whether or not they were friends. They felt secure in their abilities to present ideas whether in the college classroom or in a business environment. And they were often the go-to person for technology skill and use questions. Finally, a common response was that the skills and knowledge they learned while attending NTHS led to leadership positions in their place of work.

New Technology High School is grounded in learning for the 21st century skills and knowledge (<http://www.21stcenturyskills.org/>). Alumni strongly suggested in their feedback that the NTHS program was based on using appropriate technologies to teach, for communication, and as learning tools. A majority of graduates rated the use of technology as very valuable to their personal academic and career successes. Additionally, graduates believed that the overall environment of the school led to successful decision-making about postsecondary education and ultimate profession. Of particular value was the project-based curriculum, which integrated real-world skills and experiences within the core subject areas. Respondents mentioned acquiring collaboration skills, problem solving skills, and communication skills, all of which resulted in graduates developing critical thinking skills.

Graduates of New Technology High School consider themselves capable of working in a 21st Century setting, have the self-management skills to make decisions and engage challenging curricula and jobs. The level of technology competency they have attained

when they leave school has prepared them to move comfortably through a high tech environment with confidence.

As schools around the nation consider ways to adopt and incorporate 21st Century skills, they can look to the strategies that have been successfully implemented in NTHS. With the school having expanded in 2005 to a full 4-year program, one can expect to see more accomplishments and greater successes. And as future alumni look back on their high school experience, they, too, will likely recognize the valuable education that New Technology High School provided.

Appendix A – Alumni Survey (Survey was available online and as paper questionnaire.)

New Technology Foundation
New Technology High School Alumni Survey

New Technology Foundation needs your help! The Foundation is interested in gathering your thoughts about the New Technology High School program and its impact on your postsecondary education and/or current career. As evaluators for the project, we would like to learn how New Technology High School (NTHS) influenced your life following high school graduation.

ROCKMAN ET AL is an independent, educational research and consulting firm, specializing in learning and technology. Your feedback is important to the success of the program. All your responses will be kept confidential.

Once you return this 10 to 15 minute survey your email address will be entered into a random drawing for one of five **Amazon.com gift certificates valued at \$50.00 each.**

Section A. Background

Name _____ Gender: ☐ M ☐ F

Email _____ (Required for drawing)

When did you graduate from NTHS? _____

How many years did you attend NTHS? _____

Section B. Goals

1. Think back on your plans before you attended NTHS, were you planning to:	
Attend a 2 year community college	☐
Attend a 4 year college/university	☐
Join the military	☐
Begin a career	☐
Other:	☐

2. Did you follow your plans? ☐ Yes (skip to Section D.) ☐ No (complete #3, below, then proceed to Section D.)

3. If you did not follow your high school plan or followed it partially, what did you do instead?	
Attend a 2 year community college	☐
Attend a 4 year college/university	☐
Join the military	☐
Begin a career	☐
Other:	☐

Section C. High School Preparation

Please think back to your high school experience. How valuable were the following NTHS characteristics in:

- successfully earning your high school diploma
- being successful in college or other postsecondary schooling
- preparing you for the workplace and in your career

Please rate each statement as it pertains to its value.

Characteristics		Not at all valuable	Somewhat valuable	Valuable	Very valuable	Not Applicable
1. Attending a small school where you are well known by peers and teachers.	High School	☐	☐	☐	☐	☐
	Postsecondary	☐	☐	☐	☐	☐
	Career	☐	☐	☐	☐	☐
2. Working with teams on large projects (collaboration).	High School	☐	☐	☐	☐	☐
	Postsecondary	☐	☐	☐	☐	☐
	Career	☐	☐	☐	☐	☐
3. Regularly presenting information in front of groups.	High School	☐	☐	☐	☐	☐
	Postsecondary	☐	☐	☐	☐	☐
	Career	☐	☐	☐	☐	☐
4. Reflecting on and describing your abilities in a digital portfolio.	High School	☐	☐	☐	☐	☐
	Postsecondary	☐	☐	☐	☐	☐
	Career	☐	☐	☐	☐	☐
5. Successfully completing an internship.	High School	☐	☐	☐	☐	☐
	Postsecondary	☐	☐	☐	☐	☐
	Career	☐	☐	☐	☐	☐
6. Using technology as a tool for learning, communicating, and work.	High School	☐	☐	☐	☐	☐
	Postsecondary	☐	☐	☐	☐	☐
	Career	☐	☐	☐	☐	☐
7. Taking college courses while still in high school.	High School	☐	☐	☐	☐	☐
	Postsecondary	☐	☐	☐	☐	☐
	Career	☐	☐	☐	☐	☐
8. Experiencing an environment that required high levels of personal responsibility, respect for others & time management.	High School	☐	☐	☐	☐	☐
	Postsecondary	☐	☐	☐	☐	☐
	Career	☐	☐	☐	☐	☐
9. Having a one to one computer ratio in your classrooms.	High School	☐	☐	☐	☐	☐
	Postsecondary	☐	☐	☐	☐	☐
	Career	☐	☐	☐	☐	☐
10. Using real world projects to make classroom learning relevant and interesting.	High School	☐	☐	☐	☐	☐
	Postsecondary	☐	☐	☐	☐	☐
	Career	☐	☐	☐	☐	☐

Use the space below to add any explanation or comment of your ratings in the table above.

11. Now think about the 10 characteristics listed in the table above.

Choose 2 that have proven to be the most valuable to you.

1 small school	2 collaboration with peers	3 presenting to groups	4 digital portfolio	5 internship	6 technology skills and use	7 college courses	8 overall environment	9 personal computer	10 project-based learning
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

11a. Please explain briefly how the two characteristics you chose were valuable beyond high school.

Section D. Postsecondary Education

1. Are you currently attending a college/university or training program? ☐ Yes ☐ No (if No, skip 2,3,4.)

2. What type of school, college/university are you attending?

☐ Training program/school	☐ 2 yr. college	☐ 4 yr. college/university	☐ Graduate/professional school
---	--	--	--

3. When do you anticipate graduating? _____

4. What is your primary area of study? _____

If you completed a degree or graduated from a 2 yr. or 4 yr. college/university, complete 5,6,7. If not, skip to Section E.

5. How long after you graduated from NTHS did you enroll in a school, college, or university?

☐ Within the first yr. after graduation	☐ 1 to 2 yrs. after graduation	☐ 3 to 4 yrs. after graduation	☐ Did not attend college
---	--	--	--

6. What is the highest level of education you have earned since graduating high school?

Diploma or degree from a training program	☐
Associate Degree	☐
BA or BS	☐
MA or MS	☐
PhD or professional degree (e.g. law, medicine)	☐

7. From which college or university did you graduate? _____

Section F. Career

(If you are in school full time skip to section F)

1. How much do you work now?

☐ Full time	☐ Part-time	☐ Unemployed
------------------------------------	------------------------------------	-------------------------------------

2. What is your primary job? _____

3. What is your approximate annual salary?

☐ under \$30,000	☐ \$30,000 to \$50,000	☐ \$51,000 to \$75,000	☐ \$76,000 to \$100,000	☐ over \$100,000
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4. What level of education is required for your current job?

Training program/school	☐
2 yr. college	☐
4 yr. College/university	☐
Graduate/Professional school	☐
None is required	☐

Section F. Technology Use and Preparation

1. How prepared were you to use or do the following technology-based activities after graduating from NTHS?

	Not at all prepared	Somewhat prepared	Prepared	Very Prepared
Do basic computer trouble shooting (freezes, lost documents, etc)	☐	☐	☐	☐
Create a complex document (e.g. newsletter) on the computer.	☐	☐	☐	☐
Use data processing programs (Excel, databases)	☐	☐	☐	☐
Use presentation software (PowerPoint, Hyperstudio, Photoshop)	☐	☐	☐	☐
Use peripheral equipment (digital camera, scanner, video camera)	☐	☐	☐	☐
Find, insert and manipulate graphics	☐	☐	☐	☐
Create an edited video/iMovie	☐	☐	☐	☐
Use computational tools (graphing calculator, probeware)	☐	☐	☐	☐
Create an e-portfolio	☐	☐	☐	☐
Create a Web site	☐	☐	☐	☐

Section G. Overall

1. To what extent do you believe that ...

	Not at all	A little	Some	A great deal
Attending NTHS impacted your decision to apply to college or university	☐	☐	☐	☐
NTHS influenced your decisions about your primary area of study or employment	☐	☐	☐	☐
You have been able to apply what you learned at NTHS to your academic or career life after high school	☐	☐	☐	☐

2. Please give a brief example of how you have applied what you learned at NTHS.

3. Did attending NTHS (as opposed to a more traditional school) create any special challenges for you when you entered college or work? ☐ Yes, please explain below. ☐ No
4. What skills and/or programs would you have liked to have had more experience using, or learning to use, while attending NTHS?
5. If you had to do it over again, would you attend New Technology High School?
☐ Yes ☐ No
Why?

Thank you!