Analyzing Student Experiences in the Green Bay Area Public School District's Engineering and Manufacturing Academy

by

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ABSTRACT

The purpose of a career academy is to provide a general knowledge base about a specific field such as engineering, health care, education, or business. The academy courses then integrate the career-related content into academic and technical courses. Career Academies are logical places to bring academic and vocational education together. Together they present the opportunity to show students the connections between school studies and work. This enables students to begin pursuing a career interest while meeting admission requirements at two and four year colleges and universities. The goal of this study was to analyze students' experiences in the Engineering and Manufacturing Academy in the Green Bay Area Public School District. Also it was to determine the participation rates in academy and non-academy courses.

On a survey given to students enrolled in Introduction to Engineering Design, it was found that only 6% of the students are currently or have previously

taken one of the academy courses. As far as enrollment in non-academy courses only 17% of the students surveyed indicated that they have taken or a currently taking a course. The students who did sign up for a Technology and Engineering class found them beneficial over 75% of the time towards their post-high school plans.

The most important recommendation of this study is to develop a way to inform students, administrators, and guidance counselors of the importance and career benefits of enrolling in the Engineering Academy courses and other non-academy Technology and Engineering courses.

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Chapter I: Introduction

Career and Technical Education Synopsis:

Career and Technical Education (CTE) is a general title for many programs intended to prepare students for becoming productive members of the work force. Some of these programs include Technology and Engineering, Family and Consumer Sciences, Business Education, and Marketing Education. Although CTE in the United States may be regarded as originating in the early twentieth century, the historical roots of the field go back much further in history (Foster, 1995). In its earliest form, CTE can be traced back thousands of years to when ancient man imitated each other's behavior for the sake of survival. Parents passed on crucial skills to their offspring, who passed those skills on to future generations (Foster, 1995). This passing on of key skills from generation to generation was the first basic CTE program.

As formal schooling took over the job of educating youth, two kinds of education have evolved: education for work and education for culture. For many years, education for work was carried on almost entirely through practical experiences with tools, materials, utensils, and machines in the home, field, shop, store, or factory (Scott & Sarkees-Wircenski, 2004). As the United States was developing, CTE evolved through numerous movements and ideas toward what it is today. One of the earliest forms of CTE was that of apprenticeship. This consisted of a master passing on his/her knowledge and skills of a trade to a younger apprentice for a period of time until that person was skilled enough to go out on his/her own. While apprenticeship continued as a viable means of technical training, there was a push towards formal vocational education. Schools began to implement career training of their own, yet students had to choose between a vocational education tract and a track which would prepare them for entrance into a college. This kind of arrangement was the standard until a new idea about vocational education

came about in the latter part of the twentieth century. This new concept of education for work was known as Career Academies (Scott & Sarkees-Wircenski, 2004).

History of Career Academies

The first Career Academy was developed in the late 1960's in Philadelphia, PA (Career Academies Support Network, 2005). The United States was in a time of unrest and the nation was seeking an effective way to meet the educational and vocational needs of students. Charles Browser, Executive Director of the Philadelphia Urban Coalition, along with the Philadelphia Electric Company (PECO) and Pennsylvania Bell (Bell), created the first academy model in 1969 (Mittelsteadt & Reeves, 2003). These groups witnessed first-hand a legitimate need for change in the way the youth of Philadelphia were being educated and prepared for entry into the work force. It was becoming increasingly difficult to find motivated and trainable entry-level employees. Browser brought together influential members of business and industry to work in conjunction with the Philadelphia School District to develop a model career education program. This group worked to link core academic skills to career training. PECO and Bell lent executives to help set up and manage the program (Career Academies Support Network, 2005).

The first academy opened its doors in 1969 at Edison High School in Philadelphia. It was called The Academy of Applied Electrical Science and 30 tenth-grade students were enrolled. An Electrical Academy was chosen due to the influence and amount of jobs offered by PECO and Bell. The Academy was set up as an independent not-for-profit corporation with a Board of Governors to oversee operations (Career Academies Support Network, 2005).

Soon after the Electrical Academy was opened, a second one, the Philadelphia Business Academy, was started at University City High School. Following soon after in 1975 an Automotive Academy was started at West Philadelphia High School. After several other

academies were started, the academy model was moved to California with two additional programs being established in San Francisco. Since then, Career Academies have spread across the nation and around the globe. Currently there are roughly 2500 Career Academies located around the United States (Career Academies Support Network, 2005).

Career Academy Overview

Among the many facets of CTE in secondary schools is the initiative of Career Academies. Career Academies are often referred to as high school based "schools-within-schools." These academies differ from both core academic courses and traditional vocational education courses. Core academic courses generally prepare students for entry into a college or university, while traditional vocational education courses prepare students for a job in a specific career. In contrast, Career Academies prepare high school students for career opportunities and for entry into two and four year colleges and universities (National Career Academy Coalition, 2002; McAndrews, Andeson, 2002; Career Academies, 2006).

Career Academies provide a general knowledge base about a specific field such as engineering, health care, education, or business. The academy courses then integrate the career-related content into academic and technical courses. Career Academies are logical places to bring academic and vocational education together. Together they present the opportunity to show students the connections between school studies and work (Lewis, 2005). This enables students to begin pursuing a career interest while meeting admission requirements at two and four year colleges and universities (Career Academies Support Network, 2005). Career Academies emphasize the use of small learning communities within the larger school building. The students involved in a career academy generally take courses together taught by a team of teachers from vocational and general education disciplines. These small communities lead to more

individualized instruction and instill a sense of belonging into the students (Cavanagh, 2006; Career Academies Support Network, 2005). Finally, academies strive to form partnerships within business and industry, the community, and local colleges. These relationships bring resources and career specific knowledge from outside the high school to aid in student learning, motivation, and achievement (Kemple & Manpower Demonstration Research Corp., 2004).

Career Academies in the Green Bay Area Public School District

The Green Bay Area Public School District in Northeast Wisconsin first started its Career Academies in 2001. There are four academies with one located at each of the school district's four high schools. West High School has an Education Academy, Preble High School has an Engineering and Manufacturing Academy, East High School has a Health Services Academy, and Southwest High School has an International Business Academy. The Green Bay academies are open to both juniors and seniors enrolled in any of the four high schools. Students wishing to attend an academy not offered at their school have the option to travel to the corresponding school to participate in the required courses. The academies feature technical career-focused classes taught by a vocational education teacher and related academic classes taught by regular academic teachers. Business and industry partnerships are kept to insure that the courses are teaching real world concepts and ideas. Opportunities such as job shadowing and applied/work-related learning experiences further round out students' educational opportunities (Green Bay Public School District, 2007).

Students interested in one of the Green Bay academies take an introductory course to explore their career interests. Each academy has Concurrent Enrollment Program (CEP) required academy courses that students would take if they are interested in the complete academy program. CEP courses are college-level courses taught by high school teachers meeting specific

criteria and with post-secondary certification. CEP course offerings provide students an opportunity to earn high school and college credit upon meeting the course expectations as agreed upon between the post-secondary institution and the Green Bay Public School District. Students who complete the required academy courses receive an academy certificate in addition to a high school diploma, and in many instances college credit (Green Bay Public School District, 2007).

Overview of the Engineering and Manufacturing Academy

The Engineering and Manufacturing Academy is designed to prepare students for careers in the engineering and manufacturing industries. Students are taught self-regulated thinking, analytical problem-solving, and creative thinking skills to solve problems. In addition, students are taught how to design and produce products, create complex technical drawings, analyze data, and control equipment using computers. Engineering academy courses include: Introduction to Engineering Design, Leadership Studies in Integrated Manufacturing, Engineering Graphics, and Engineering Design and Development (Green Bay Public School District, 2007).

Although the academy is located at Preble High School, several of the required courses are offered at each of the four high schools. Other required academy courses are taught only at Preble, including Leadership Studies in Integrated Manufacturing, Engineering Graphics, and Engineering Design and Development. If a student does not actually attend Preble High School, he/she has the option of traveling there during the school day to take the necessary courses. Although the Engineering and Manufacturing Academy at Preble has been in existence since 2001 and has approximately 400 students participating in it, there has been no systematic data collection to determine students' experience in the program.

Statement of the Problem

The Green Bay Area Public School District Engineering and Manufacturing Academy has been in existence since 2001. To date, there has not been a study done to analyze student experiences in the academy courses.

Purpose of the Study

The purpose of this study is to identify students' experiences in the Engineering and Manufacturing Academy in the Green Bay Area Public School District. Collecting data on participation in academy courses, participation in other technology and engineering courses, and completion rates will also be explored. Data will also be acquired to identify what type of Career Academy, other then the existing one, students would be interested in attending. Data was obtained from students enrolled in the Green Bay Area Public Publics Schools Engineering and Manufacturing Academy through the utilization of a voluntary survey during the spring semester of 2009.

Research Questions

The questions to be answered by this study are:

1. To what extent are students enrolled in an academy course aware of the total curriculum of the Engineering and Manufacturing Academy?
2. What academy courses have students taken or are currently enrolled in and do they feel taking the course is beneficial towards their post-high school plans?
3. What other Technology and Engineering courses have the students taken or are currently enrolled in and do they feel taking the course is beneficial towards their post-high school plans?

4. To what extent are students' post-high school plans related to Engineering and Manufacturing careers?
5. If the Engineering and Manufacturing Academy is not working, what type of academy would the students like to see offered instead?

Importance of the Study

This study is important for the following reasons:

1. The goal of a Career Academy is to start students on a career path while still in high school. In the Green Bay Area Public Schools, a considerable amount of resources are allocated for operating the academies. If they are not achieving their goal, resources are being wasted and the District potentially needs to make some adjustments.
2. The Academies are organized for students to take all of the courses and receive an academy certificate along with their diploma. If students are not taking all of the required courses, there is a problem and the Academy course sequence may need to be restructured.
3. The Academies are in place in order to serve the needs of the entire school population. If only a small percentage of students are taking advantage of them, then potential modifications need to be made in order to make the Academies more appealing to more students.
4. There are roughly 2500 Career Academies located throughout the United States. Other school districts with academies may benefit from the research examining the effectiveness of the academies.

Limitations of the Study

In conducting research, there will be some limitations in obtaining the data needed to form a conclusion. The following points will serve as possible limitations to this study.

1. The survey will be administered to students in one of the four Green Bay Area Public High Schools who are currently enrolled in one of the Engineering and Manufacturing Academy courses. Potential future students or past participants will not be included.

2. The survey will be administered to students during a school day. The researcher has no control over student attendance that day or other internal and external factors that will influence the amount of responses available.

3. This study will utilize the responses given by students enrolled in Engineering and Manufacturing academy courses. Outside factors independent of this research may influence student answers to the survey questions. These factors have not been foreseen or revealed to the researcher at the time of the study.

4. Given the nature of high school students, many of them will not understand the importance of filling out the survey. This may lead to incomplete answers and a lack of sincerity in responses.

5. Students surveyed will be enrolled in an Engineering and Manufacturing academy course. Because of the limitations of this sample, generalizations cannot be made for all of the Green Bay Area Public Schools Career Academies.

Definition of Terms

The following terms are listed throughout the chapters of this paper. This portion will serve as a reference for each term.

Apprenticeship - one who is learning a trade, art, or calling by practical experience under skilled workers (Merriam Webster, 2007).

Career Academies - a high school or college in which special subjects or skills are taught relating to a specific career (Merriam Webster, 2007).

Career and Technical Education- courses that focus on exploration of the self in relation to the world of work. Students discover their interests, talents, abilities, and the niches where their talents and abilities might best be used (Wisconsin Department of Public Instruction, 2007).

Core Academics - the term core academic subjects means English, reading or language arts, mathematics, science, foreign languages, civics and government, economics, history, and geography (United States Department of Education, Title IX Office, 2007).

Information Technology - the technology involving the development, maintenance, and use of computer systems, software, and networks for the processing and distribution of data (Webster's 2007).

Not-for-profit - not conducted or maintained for the purpose of making a profit (Merriam Webster, 2007).

Vocational Education – (also called Career and Technical Education (CTE)) prepares learners for careers that are based in manual or practical activities. Traditionally this type of education is non-academic and totally related to a specific trade, occupation, or vocation (United Stated Department of Education, Office of Vocational and Adult Education, 2007).

Chapter II: Review of Literature

This chapter will begin by discussing the growing shortage of qualified engineers and scientists in the United States. It will analyze graduation rates as a possible cause of this problem. To help remedy this problem, many schools are looking at two possible paths. The first path is technology and engineering education at the secondary school level. This review will examine why this movement is so appealing and how the engineering field can benefit from it. This review will also explore the second path, namely, what is being done at the high school level to prepare students for post-secondary engineering education. Finally, this chapter will conclude with a discussion of another path, namely pre-engineering academies and the part they play in preparing students for an engineering career and post-secondary education.

Shortage of Engineers

In the next several decades, the United States as well as the rest of the world will face a growing shortage of scientists and engineers. These scientists and engineers are critically necessary to deal with the ever increasing civil, environmental, manufacturing, energy, communication, and health-care challenges that will continue to arise (Plumb& Reis, 2007). A study done by the American Society for Engineering Education indicated that the number of engineering graduates and students enrolling in engineering at universities across the United States does not meet the need for qualified engineers in industry (Grose, 2006). A National Science Foundation ("NSF") study found that between 1990 and 2000, science and engineering occupations grew at an average annual rate of 3.6%. This was more than triple the rate of growth of other occupations (National Science Board, 2008). The same NSF study also found that science and engineering occupations are projected to grow by 26% from 2004 to 2014 (National

Science Board, 2008). These statistics suggest that the problem of finding qualified engineers and scientists will continue to exist for the near future.

A factor contributing to the lack of engineers is the decline of students enrolling in post-secondary engineering programs in institutions in the United States. In 1985, 103,225 freshmen enrolled in engineering programs in schools across the United States. In comparison, only 100,411 freshmen enrolled in 2005; that is a 3% decline over the past 20 years (National Science Board, 2008). The number of students who graduate with a degree in engineering is also on the decline. In 1985, 77,572 students received a bachelor's degree in an engineering field. In 1995, 10 years later, 66,133 students received a bachelor's degree in engineering (National Science Board, 2008). That results in a 15% decline in bachelor degrees awarded over the past 10 years. Another troubling statistic is that only about two-thirds of freshmen who enroll in an engineering program go on to actually graduate with a bachelors degree in engineering (Plumb & Reis, 2007). These enrollment and graduation numbers at first glance seem to be largely insignificant, but taking into consideration the projected growth of science and engineering careers, these numbers illustrate a growing problem.

Another problem facing the engineering field is that as the baby boom generation continues to age, retirements are on the increase. Twenty-six percent of all science and engineering degree holders in the labor force are over 50 years old (National Science Board, 2008). Also by age 62, half of those with engineering degrees will have left full-time employment (National Science Board, 2008). This means that in the next decade, science and engineering fields will lose more than 25% of their workforce to retirement. Experienced engineers are hard to replace; one cannot just be substituted for another. Industry experience is highly specific and hard to recreate (Paul, 2006).

Another reason for the shortage of engineers in the Unites States is that of a persistent image problem. A recent study done by consultants A.T. Kearney of 2,800 youth in Silicon Valley, found that 73% were aware of high tech jobs, but only 32% wanted to follow that career path (Grimes, 2005). When asked about engineering and technical careers, the youth responded with terms like intimidating and uninteresting. Many pictured engineers as "socially awkward" and "obsessed with work" (Grimes, 2005).

Policy groups fear that this decline in engineers will dethrone the United States as the technology powerhouse of the world and the U.S. will have to concede leadership to possibly China or India (Lynn & Salzman, 2007). Annual numbers show that China and India are graduating roughly 600,000 and 350,000 engineers respectively per year (Paul, 2006). Theses numbers are monumentally more than the United States in a given year. Many people are weighing in on what can be done to solve this growing problem. John Greengal, Director of Communications for the Semiconductor Industry Association believes that several things must be done to address this problem. One is to strengthen elementary and secondary math and science education. Second, engineering students must be encouraged to stay with their programs and receive their degrees. Finally we need to train new and experienced engineers with the most needed skills to stay with the changing technological world (Paul, 2006). Legand Burge, Dean of the College of Engineering, Architecture, and Physical Sciences at Tuskegee University stated that there needs to be more of a national commitment to improve the teaching of technology at the pre-collegiate level to get young people more interested in science, technology, engineering and math (STEM) degrees (cited in Grose, 2006, p.29).

The shortage of engineers can be linked to declining college enrollments, less degrees being awarded, retirements, and lingering image problems. It is clear that this

issue must be addressed at an early age during students' education. It is too late to try and make a difference once a student reaches a post-secondary school.

Technology Education

The basic theory behind technology education is universally accepted. According to the International Technology Education Association (2000), technology education is defined as problem-based learning utilizing math, science, and technology principles. The Wisconsin Model Academic Standards for Technology Education states that, "Technology education in the high school must go beyond constructing physical objects. Students must develop an understanding of the nature of technology, technological systems, design and ingenuity, and the impact of technology" (Wisconsin Department of Public Instruction, 1998).

While technology education is being taught today at almost every high school and middle school across the United States, it has been estimated that 1000 technology education departments are now implementing pre-engineering courses into their curriculum (Blais, 2004). The ultimate goal of technology education is to produce technologically literate citizens (Pearson & Young, 2002). The National Academy of Engineering wrote that one characteristic of a technologically literate citizen is that he/she understands basic engineering concepts and terms such as systems, constraints, and trade-offs. When the Standards of Technological Literacy's Content for the Study of Technology was released in March of 2000, it highlighted the importance of technology education and the need for students to receive an education which lends itself to technological literacy (Dearing, 2004). Engineers and leaders in technology education developed these standards. The standards were of enough importance that they were endorsed by the National Academy of Engineers. The standards have provided a way to move technology education and engineering closer together and to help show the connection of how

the engineering profession can benefit from technologically literate students (ITEA, 2000). Engineering and technology education are both about the application of concepts (Roman, 2006). Technology education is thought of as the study of the world as designed by humans. Therefore, engineering can be viewed as the creation and implementation of the human designed world (Roman, 2006). By considering this, it can be inferred that technology education and engineering share the same basic make-up. They both combine science, math, and technology with other issues to achieve an end result (Roman, 2006).

There are several reasons why the engineering profession wants pre-engineering programs implemented at the secondary school level and vice-versa. Some school districts and even entire states have changed the name of technology education to technology and engineering education. This is to strengthen the connection that already exists between the two areas. One reason given by the engineering population is that not enough students are enrolling in college engineering majors. According to Lewis, "Pre-engineering education involves course work in subjects that draw from the work of engineers and promises engineering careers as likely futures of the students who pursue these courses" (Lewis, 2004, p. 22). Those students who do enroll in engineering programs are often lacking the required math and science skills to be successful. In current pre-engineering classrooms, high academic rigor and relevance is prevalent. The problems students face in pre-engineering are based in the real world and are strongly tied to math and science concepts (Rogers & Rogers, 2005). Students are also exposed to preliminary engineering concepts and coursework which aid them in deciding if a career in engineering is right for them. It is much better to find out that engineering is not for them at the high school level than after spending a few years and a considerable amount of money in post-secondary education. A rationale given by technology education teachers for pre-engineering education is

that of the standards movement in education. There is increasing pressure being put on schools to have their students achieve certain academic benchmarks (Lewis, 2004). By requiring students to obtain specific requirements, subjects thought of as non-academic are at risk of being cut. Past the middle school level, technology education is an elective and in most states not a graduation requirement. By offering pre-engineering courses, schools legitimize technology education in the high school setting. Pre-engineering courses also offer a way to tie technology and engineering to math and science which will strengthen technology's position in secondary schools (Lewis, 2004).

There are currently several pre-engineering movements taking place in the nation's middle and high school technology education departments. For example, one of the major movements is called Project Lead the Way and the Stony Brook model. Project Lead The Way contains several courses that are incorporated into the middle school and high school years. These courses complement math and science college preparatory programs to establish a solid background in engineering and technology (PLTW, 2008). The Stony Brook Model features two four-year course sequences in architecture and engineering. Technical courses vary but each share common math and science courses (Imagine 101, n.d.) As the engineering shortage continues to increase, more models will continue to emerge across the United States.

The concepts and skills taught in secondary technology and engineering courses overlap with those found to be beneficial for success in post-secondary engineering programs and in an engineering field. In order to reverse the current engineering shortage, students need to be exposed to these concepts and skills at an early stage of their schooling. Technology and engineering classes in elementary, middle, and high school are an excellent opportunity for students to begin to learn about what an engineering career can offer them.

Pre-Engineering and Career Academies

Students in secondary schools often do not make a connection between what they learn in the classroom and its application to the real-world (Emeagwall, 2004). To help solve this dilemma, the Career Academy model was established as a viable high school reform model to address many of the problems that have plagued schools (Emeagwall, 2004).

The main features of a Career Academy are fairly easy to explain, although not as easy to implement in a school. Academies are often referred to as a school within in a school or a learning community (Hoye & Stem, 2008). Around 30-60 students take a preset sequence of courses together taught by a small group of teachers. The same teachers cover all of the academy grade levels so the teachers have the opportunity to work with students for more then one year. Career Academies are designed to provide hands-on learning opportunities in which rigorous academic skills are applied across the arts, sciences, and technology (Adams, 2006).

Thousands of students are pursuing highly focused technical studies and are enrolled in a Career Academy. These academies are highly focused on a particular theme or career pathway such as engineering, health care, and business. The programs generally are offered as an innovative curriculum option within a school and often prepare students for careers that require further education at the collegiate level (Adams, 2006). Students participating in a Career Academy are afforded the opportunity to obtain the technical and workplace skills required for successful employment and the pursuit of higher education (Adams, 2006). Students are also engaged outside of schools in experiences related to the academy theme. These opportunities could include field trips, job shadowing, and internships. Many local employers are active in deciding what direction the academy will take by participating in advisory boards and committees (Hoye & Stem, 2008).

Some of these programs also enable students to earn college credits while fulfilling their high school diploma requirements. "Career Academies are logical places to bring academic and vocational education together," noted Charles Dayton, former coordinator of the Career Academy Support Network. They also allow schools to avoid tracking students into inflexible programs "and they show kids the connections between studies and work"(Lewis, 2005). By bridging the gap between school and the world of work in a way that leads to academic achievement, Career Academies have been successful in engaging many students who would otherwise be indifferent to or possibly lost from school (National Career Academy Coalition, 2009).

To meet academic standards set forth by the No Child Left Behind legislation, many schools are doubling up on mathematics and English classes for low performing students, noted Charles Dayton (Viadero, 2008). This is making it more difficult for students to fit career and technical education classes into their schedules and for schools to continue to offer them. A recent study released suggests that educators and students may not have to make those kinds of trade-offs to get the same academic results along with exposure to career and vocations (Viadero, 2008). The 15-year study, conducted by the Manpower Demonstration Research Corporation, tracked over 1,400 students who applied in the mid-1990s to one of nine Career Academies in seven cities ranging from Baltimore, Maryland to Watsonville, California (Hoye & Stem, 2008). Researchers found that by the time the academy students reached the 12th grade, they had gained an academic edge over non-academy students. Compared to their control group peers, academy students were more likely to have stayed in school and to have better attendance records (Viadero, 2008). The research also showed that even though career academy students are no more likely to than peers from traditional high school programs to graduate and go on to college,

they make more money than students who do not attend academies (Hoye & Stem, 2008). Eight years after high school, when most participants were about 26, the academy group had average earnings of 11% or $2,099 a year higher than the control group (Eckholm, 2008). "The findings show that you can make an investment in high school that has a measurable payoff in earnings well after," said James J. Kemple, the author of the study and an education specialist at Manpower Demonstration Research Corporation (Eckholm, 2008). The study suggests that the academy experience, apart from the increased educational achievement, promoted greater success in the job market for academy participants (Viadero, 2008). One possible factor contributing to the students' success is the exposure that the academies provide to a range of adults in real work places stated J.D. Hoye, head of the National Academy Foundation. "The students see what work is like, and they build a network of caring adults at school and in the workplaces", said Ms. Hoye (Eckholm, 2008).

The more than 2,500 Career Academies across the United States have a common set of standards developed by six national organizations, namely (1) Career Academy Support Network, (2) National Academy Foundation, (3) National Career Academy Coalition, (4) National Center for Education and the Economy, (5) Southern Regional Education Board, and (6) the Talent Development High Schools. These standards fall in line with No Child Left Behind's emphasis on preparing students for postsecondary education (Lewis, 2005). The Career Academy National Standards of Practice include standards on defining an academy's mission and goals, how to structure an academy, and what is needed from a school and its' district in order to maintain a successful academy (National Career Academy Coalition, 2009). Other standards of practice consist of what type of faculty and staff to include, what type professional development to offer for the staff, and how to create a governing structure that

incorporates the views of all stakeholders. Additionally, the national standards of practice requires that an academy have curriculum and instruction that meets or exceeds external standards of practice and college entrance requirements, and the academy has ties with its' host community, employers, and members of higher education. Finally the standards stress that student assessment and data collection is necessary to continually improve the academy (National Career Academy Coalition, 2009).

According to research by the National Alliance for Pre-Engineering Programs, the dropout rate in colleges of engineering and engineering technology programs exceeds 50 percent in the first two years (Techniques, 2004). Two factors contributing to this high number are that students do not have an understanding of what engineers do and they did not take the right combination of high school courses to prepare them to succeed in this rigorous course of study (Techniques, 2004). Pre-Engineering Academies in secondary schools strive to help students achieve success in engineering degree programs and post-secondary engineering technology programs and create some interest and excitement about engineering as a possible career. These pre-engineering programs give students a "taste" of what types of things they will experience if they continue to study engineering at the post-secondary level. Students can then better decide if this is a career path suited for them before making a time and financial commitment at a college or university.

Chapter III: Methodology

Introduction

This chapter will begin with a brief description of the research method used to complete the present study. The chapter will then include a description of the population and sample chosen for this study, along with an explanation of the instrument and data collection procedure used to implement the study. Furthermore, an account of the data analysis method used will be provided. Finally, this chapter will conclude with the identified methodological limitations.

Description of Research Method

This was a descriptive study that analyzed student experiences in the Green Bay Area Public School District's Engineering and Manufacturing Academy. The study further investigated the enrollment and completion rate of academy courses versus non-academy technology and engineering courses. This study also looked at to what extent the academy courses influence students' post-secondary education. Finally the study explored alternative Career Academy configurations that appear to be of interest to students.

Sample Selection

The population for this research study included students participating in the Engineering and Manufacturing Academy in the four high schools located in the Green Bay Area Public School District. The high schools vary in size from 1000 to 2200 students. The academy includes four core courses, including: (1) Introduction to Engineering Design; (2) Leadership Studies in Integrated Manufacturing; (3) Engineering Graphics; and (4) Engineering Design and Development. This study surveyed students enrolled in an Introduction to Engineering Design course at each of the high schools in the spring semester of 2009. Class sizes range from 15 to 25 students, consisting of grades 9 through 12.

Instrumentation

Data was collected using a researcher-developed survey. The researcher consulted with other technology and engineering instructors to insure that the questions were properly worded and would elicit appropriate responses from the participants. Colleagues were consulted for determining what other possible Career Academy configurations could be offered. Several regular and special education teachers evaluated the survey for readability and to insure that the questions could be understood by someone other than a technology and engineering teacher. A final step in the creation of this survey instrument was to have a group of students not contained in the sample population, take the survey. This was to insure that the questions were worded properly and could be easily understood.

The survey instrument was a four-page (printed back to back) eight and one half by eleven-inch packet containing 34 questions. In the first section, the first question asked students what year of high school they were currently in. The second question asked about the student's immediate future plans after graduating from high school. The third and fourth questions inquired about the student's knowledge of the Engineering and Manufacturing Academy. Students were able to answer using a four point Likert-type scale indicating their level of knowledge about the academy.

In the second section of the instrument, questions five through eight dealt with the student's participation in the academy courses. Each question dealt specifically with the four academy courses offered. These questions gave the student the opportunity to indicate whether he/she had or had not taken the course. If the student answered yes, then he/she used a four point Likert-type scale to indicate how beneficial the student felt that the class was towards his/her

immediate post-high school plans. If the student answered no, then he/she indicated whether he/she was aware or unaware that the course was offered.

The third section of the instrument, questions 9 through 29 dealt with the student's participation in non-academy Technology and Engineering courses offered in the Green Bay School District. These questions again gave the student the opportunity to indicate whether he/she had or had not taken the course. If the student answered yes, then he/she used a four point Likert-type scale to idicate how beneficial he/she felt that the class was towards his/her immediate post-high school plans. If the student answered no, then he/she indicated whether they were aware or unaware that the course was offered.

In the last section of the instrument, questions 30 through 34 asked the students to express the extent of their interest, using a four point Likert-type scale, in five other possible Career Academy configurations.

Data Collection

Since the subjects for this study were high school students, most of whom were minors, a letter of consent was sent home with each student. The bottom portion of the letter was to be signed by the student's parent or guardian and returned to the student's Introduction to Engineering Design instructor the following day. Data was collected during the Introduction to Engineering Design courses at each of the four Green Bay Public School District high schools. At the beginning of class, each student who returned a signed permission slip was given a survey. Each schools Introduction to Engineering Design instructors administered the procedure. Upon completion, the students placed the survey into an envelope. The surveys were returned to the researcher later that week.

Data Analysis

The data collected was analyzed using two types of statistics -- frequencies and percentages. For questions one and two, the frequency of the responses was tabulated and the mean values were calculated. The responses to questions three and four were assigned a numerical value according to the Likert-type scale values. The "very informed" response was given a value of four (4), the "informed" response was given a value of three (3), the "somewhat informed" response was given a value of two (2), and the "very uniformed" response was given a value of one (1). The mean value was then calculated for each of these items. The higher the mean value indicated a higher agreement with the statement.

The data analyzed for questions five thru twenty-nine had two components. The percentages of the responses to the "yes" and "no" questions were calculated. The responses to the second portion of questions five through twenty-nine were assigned a numerical value according to the Likert-type scale values. The "very beneficial" response was given a value of four (4), the "beneficial" response was given a value of three (3), the "somewhat beneficial" response was given a value of two (2), and the "not beneficial" response was given a value of one (1). The higher the mean value indicated a higher agreement with the statement.

Finally, the responses to questions thirty through thirty-four were assigned a numeric value according to the Likert-type scale values. The "very interested" response was given a value of four (4), the "interested" response was given a value of three (3), the "somewhat interested" response was given a value of two (2), and the "not interested" response was given a value of one (1).

Summary

This chapter has provided the reader with a description of the research methodology, the subject selection, and the creation of the survey instrument. It also included details regarding the data collection and analysis procedures that were used.

Chapter IV: Results

Introduction

This chapter presents the results of this research study analyzing student experiences in the Green Bay Area Public School District's engineering and manufacturing academy. It provides information pertaining to the study population and participation. It also includes a section on the research questions addressed in this study.

Participants

There were ninety students enrolled in Introduction to Engineering Design throughout the Green Bay Area Public School District (35 students at Preble High School, 20 students at Southwest High School, 18 students at East High School, and 17 students at West High School). A letter of consent and permission slip was sent to each of these student's parents or guardians in May of 2009. Eighty-three students (92.2%) returned the permission slip and were given the survey during the last week in May 2009. The survey was administered during the students' Introduction to Engineering Design course.

Curricular Awareness

Research question one inquired as to what extent students enrolled in an academy course are aware of the total curriculum of the Engineering and Manufacturing Academy.

Survey questions three and four dealt with this question. The results indicated that 4% (n=4) of the 83 students felt that they were "very informed" about the Engineering and Manufacturing academy, 41% (n=34) felt they were "informed," 43% (n=36) felt they were "somewhat informed," and 12% (n=10) felt that they were "very uniformed." The mean value for question number three was 2.36, falling between "somewhat informed" and "informed." In addition, 6% (n=5) of the 83 students felt "very informed" about what classes were required to

receive an academy certificate, 24% (n=20) felt "informed," 51% (n=42) felt they were "somewhat informed," and 19% (n=16) felt "very uniformed." The mean value for question four was 2.16, falling between "somewhat informed" and "informed." A detailed item analysis for all items can be found in Appendix C.

Current Enrollments

Research question two focused on what academy courses students have taken or are currently enrolled in and whether they feel taking the course is beneficial towards their post-high school plans.

Survey questions five through eight dealt with this question. Students first had to indicate whether they had or had not taken a course. The frequency of the "yes" responses is indicated in Table 1. If the students responded that they had taken the course, they also had to indicate how beneficial they felt the class was towards their post-high school plans. Of the students who responded "yes" and have or are currently taking Introduction to Engineering Design, 28% (n= 23) felt that it was "very beneficial" towards their post-high school plans. In addition, 46% (n=38) felt it was "beneficial," 20% (n=17) felt it was "somewhat beneficial," and 6% (n=5) felt it was "not beneficial" towards their post-high school plans. No students indicated that they have or are currently taking Leadership Studies in Integrated Manufacturing or Engineering Graphics. Of the students who responded that they have taken or are currently enrolled in Engineering Design and Development, 20% (n=1) of students found it to be "very beneficial" and 80% (n=1) found it to be "beneficial" to their post-high school plans.

Table 1

Enrollment in Academy Courses

Course	# of Yes Responses	% of Total
Introduction to Engineering Design	83	100
Leadership Studies in Integrated Manufacturing	0	0
Engineering Graphics	0	0
Engineering Design and Development	5	6.02

Note. Percentage is based on 83 actual responses. The classes listed are in the order in which they appeared on the survey.

Post High School Planning

Research question three focused on what other Technology and Engineering courses the students have taken or are currently enrolled in and whether they feel taking the course is beneficial to their post-high school plans.

Survey questions nine through twenty-nine dealt with this question. Students first had to indicate whether they had or had not taken a course. The frequency of the "yes" responses is indicated in Table 2.

Table 2

Enrollment in other Technology and Engineering Courses

Course	# of Yes Responses	% of Total
Introduction to Technology	7	8.43%
Engineering Applications	6	7.22%
Advanced Engineering Design	14	16.89%
Woodworking	14	16.89%
Advanced Woodworking	7	8.43%
Home Ownership	1	1.20%
Metal Fabrication and Restoration	7	8.43%
Machine Tool	6	7.22%
Welding	7	8.43%
Small Engines	14	16.89%
Vehicle Service	5	6.02%
Auto Ownership	5	6.02%
Digital Electronics	2	2.40%
Composites and Plastics	0	0%
Civil Engineering and Architecture	14	16.89%
Residential Architecture	5	6.02%
Residential Construction	0	0%
Printing Processes	2	2.40%
Printing Production	0	0%
Video Production and Special Effects	3	3.61%

3-D Animation and Game Design	12	14.45%

Note. Percentage is based on 83 actual responses. The classes listed are in the order in which they appeared on the survey.

If the students responded that they are currently taking a course, they then had to indicate how beneficial they felt that the class was to their post-high school plans. The responses as to how beneficial the students felt the classes were towards their post high school plans are indicated in Table 3.

Table 3

How beneficial students felt the course was towards their high school plans.

Course	Not	Somewhat	Beneficial	Very
Introduction to Technology	0%	28.57%	57.14%	14.28%
Engineering Applications	0%	16.67%	33.33%	50%
Advanced Engineering Design	0%	0%	50%	50%
Woodworking	7.14%	14.28%	64.28%	14.28%
Advanced Woodworking	0%	14.28%	71.42%	14.28%
Home Ownership	0%	0%	100%	0%
Metal Fabrication	0%	14.28%	57.14%	28.57%
Machine Tool	0%	0%	33.33%	66.67%
Welding	0%	14.28%	42.85%	42.85%
Small Engines	14.28%	21.42%	42.85%	21.42%
Vehicle Service	0%	0%	40%	60%
Auto Ownership	0%	0%	60%	40%
Digital Electronics	50%	0%	50%	0%

Composites and Plastics	0%	0%	0%	0%
Civil Engineering	14.28%	42.85%	21.42%	21.42%
Residential Architecture	0%	60%	40%	0%
Residential Construction	0%	0%	0%	0%
Printing Processes	0%	0%	0%	100%
Printing Production	0%	0%	0%	0%
Video Production and Special Effects	66.67%	0%	33.33%	0%
3-D Animation and Game Design	8.33%	16.66%	50%	25%

Note. Percentage is based on how many students responded yes to have already taken or are currently enrolled in the class. The classes listed are in the order in which they appeared on the survey.

Future Plans for Engineering and Manufacturing Careers

Research question four inquired as to what extent students' post-high school plans are related to Engineering and Manufacturing careers.

Survey question two dealt with this question. Students had to identify their post-high school plans by selecting a choice from a list of seven options. The frequency of responses for each option is indicated in table 4.

Table 4

Post High School Plans

Post High School Plans	# of Responses	% of Total
Four- year school with a major related to technology, engineering, or a technical field.	45	54.21%
Four –year school with a major unrelated to technology, engineering, or a technical field.	13	15.66%
Two-year school with a major related to technology, engineering, or a technical field	12	14.45%
Two-year school with a major unrelated to technology, engineering, or a technical field	3	3.61%
Entering the workforce with a job related to technology, engineering, or a technical field	0	0%
Entering the workforce with a job unrelated to technology, engineering, or a technical field	2	2.40%
Entering the military	8	9.63%

Note. Percentage is based on 83 actual responses.

Almost seventy percent (69.87%) of students surveyed plan on attending a four year school. As indicated by table four, more than half (54.21%) of the participants in the survey intend to go to a four year school to pursue a major related to technology, engineering, or a technical field. More than fourteen percent (14.45%) plan on attending a two-year school with a major related to technology, engineering, or a technical field.

Preference for Other Type of Academies

Research question five asked if the Engineering and Manufacturing Academy was working, and, if not, what type of academy students would like to see offered instead.

Survey questions thirty through thirty-four dealt with this question. Students were asked to express their interest in other possible career academies other than the existing Engineering and Manufacturing Academy. The results are indicated in Table 5.

Table 5

Student interest in other possible career academies

Academy	Not	Somewhat	Interested	Very
Construction/Woods	21.68%	45.78%	27.71%	4.81%
Manufacturing/Metals	19.27%	36.14%	37.34%	7.22%
Engineering/Design	6.02%	21.68%	32.53%	39.75%
Graphics Design	14.45%	26.50%	33.73%	25.30%
Transportation/Vehicle	21.68%	36.14%	27.71%	14.45%

Note. Percentage is based on 83 actual responses.

As indicated by the table, almost forty percent (39.75% n=33) of students surveyed would be "very interested" in an engineering/design academy. Of the eighty-three students, over thirty percent (32.53% n=27) would be "interested," roughly twenty-two percent (21.68% n=18) would be "somewhat interested" and only six percent (6.02% n=5) would "not be interested" in an engineering/design academy if it was offered. The mean values for the responses are displayed in Table 6. By examining the mean values of the responses, students were the most interested in an engineering/design academy, followed by graphics design, a transportation/vehicle, then a manufacturing/metals, and finally a construction/woods academy.

Table 6

Mean values to student interest in possible academies.

Academy	Mean value
Construction/Woods	2.15
Manufacturing/Metals	2.32
Engineering/Design	3.06
Graphics Design	2.69
Transportation/Vehicle	2.34

Note. Based on 83 actual responses.

Chapter V: Discussions, Conclusions, and Recommendations

Introduction:

This chapter will serve as a summary of the research study. It will include a discussion of the research questions, the data collected, and any conclusions and recommendations that can be made. Finally any recommendations for further study will be discussed.

Curricular Awareness

Research question one focused on to what extent students enrolled in an academy course are aware of the total curriculum of the Engineering and Manufacturing Academy. The data showed that the most frequently indicated response was "somewhat informed." Students gave this response 43% of the time, with respect to general knowledge about the engineering and manufacturing academy, and 51% of the time with respect to knowing what classes are required to receive an academy certificate. Based on the data, it can be concluded that students are not fully aware of what the engineering and manufacturing academy has to offer and what is required to complete the academy course sequence. Based on the above conclusions, it is recommended that students be made more aware of the engineering and manufacturing academy and what it has to offer. For this to be accomplished it will take the cooperation of three groups of people: Technology and Engineering instructors; guidance counselors; and school administrators. The Technology and Engineering instructors need to inform the students in their classes about what the academy has to offer and advise them what classes are required. The Technology and Engineering instructors also need to inform the guidance counselors about the academy, what classes are required, and what type of student would be likely to succeed in those classes. This will give the counselors the knowledge that they need to advise the students about classes and scheduling. Finally, the Technology and Engineering instructors need to work with

the school administration in order for the administrators to understand what type of support is needed to enroll more students in the academy courses and what is needed to maintain a successful career academy.

Current Enrollments

Research question two focused on what academy courses have students taken or are currently enrolled in and whether they feel taking the course is beneficial to their post-high school plans. The data showed that out of four required academy courses, only 6% of students surveyed have taken or are currently taking any of the classes (This does not include Introduction to Engineering Design where the survey was administered). Of the 6% of the students who have taken or currently are taking one of the academy courses, 62% of them felt it was "beneficial" to their post-high school plans and 24% felt it was "very beneficial." Based on the data, it can be concluded that students are not following through with the academy course sequence. It can also be concluded that the majority of the students who do take the academy courses find them to be beneficial to their post-high school plans. When the students were asked if they were aware that these courses were being offered, over 62% of them answered no. Based on the above conclusions, two things can be recommended. The first is that students need to be made more aware of what the academy has to offer because students who do take the courses find them valuable; more students simply need to be made aware of them. It is plausible that the students enrolled in the first academy course, Introduction to Engineering Design, are unaware that they are even part of the engineering and manufacturing academy. The awareness level can be increased through a partnership between Technology and Engineering instructors, guidance counselors, and school administrators. These groups all need to be fully aware of what courses are being offered and everyone should have a common goal in mind. The second

recommendation is for the academy coordinators to evaluate the required academy courses and the sequence in which the classes are offered. These courses are not appealing or do not seem to be of importance to the majority of students who take the first academy course (Introduction to Engineering Design). The academy coordinators possibly need to revise or change what courses are being offered to appeal to more of the students. They could also look into what classes and skills some of the post-secondary schools would like to see in a student entering their institution. This would hopefully increase the participation level of students in the academy.

Post High School Planning

Research question three focused on what other Technology and Engineering courses have students taken or are currently enrolled in and whether they feel taking the course is beneficial towards their post-high school plans. The data showed that out of twenty-one non-academy courses offered, four classes were tied for the highest number of surveyed students enrolled in them. Roughly 17% of the students indicated that they have or are currently taking either, Advanced Engineering Design, Woodworking, Small Engines, or Civil Engineering and Architecture. The data also showed that when the students were asked how beneficial the courses were to their post-high school plans, students responded "beneficial" 46% of the time followed by "very beneficial" 39% of the time. Based on the data, it can be concluded that of the students surveyed in the Introduction to Engineering Design course, very few of them have taken or are currently enrolled in other Technology and Engineering courses. It can also be concluded that the students who responded that they have taken a non-academy Technology and Engineering course appear to find those classes worthwhile. Based on the conclusions two things can be recommended. The first is to make students more aware of what other Technology and Engineering courses are available. Instructors should spend time with the students in the

introduction class to find out what their career goals and interests are and then recommend other classes that would be valuable for them to take. The second recommendation would be to attempt to make some of these classes appealing to more students. It may be possible to restructure the academy to incorporate some of the other more "traditional" Technology and Engineering classes. The title is the Engineering and Manufacturing Academy – there may be a need to add some manufacturing type courses to the academy. This could possibly entice more students to continue on and complete the academy course sequence while still staying within the Engineering and Manufacturing realm.

Future Plans for Engineering and Manufacturing Careers

Research question four focused on to what extent students' post-high school plans related to Engineering and Manufacturing careers. The data showed that over 54% of the students surveyed indicated that they plan on attending a four-year school with a major related to technology, engineering, or a technical field. Additionally, over 14% of the students surveyed indicated that they planned on attending a two-year school with a major related to technology, engineering, or a technical field. Based on the data, it can be concluded that that the majority of the students enrolled in the Introduction to Engineering Design course are planning on pursuing a career in a technical or engineering field. It can also be concluded that these students are not taking the Technology and Engineering classes that would better prepare them for college level work in a technical or engineering related major. Based on the above conclusions, a recommendation can be made. Students are going on to pursue careers in technology and engineering but are missing out on some great opportunities to take more Technology and Engineering classes in high-school. These courses could provide valuable experience and knowledge that would place them ahead of students who do not have similar classes available to

them. Many students do not know that these Technology and Engineering courses would be valuable for them to take and do not realize that they may be required to take very similar courses in college. The Technology and Engineering instructors need to work with the guidance counselors and the students to make them aware of how useful these courses could be for them. Additionally, the instructors could provide the students and counselors with "career clusters" which map out what courses should be taken throughout high-school depending on a student's career goals. The instructors could also take some time to sit down with the students and find out what they want to do after high school. They could then make course recommendations to the students and advise them on what skills would be necessary for pursing this career. It seems like this should be the job of a guidance counselor but they may be less knowledgeable about a technical or engineering field than a Technology and Engineering instructor.

Preference for Other Type of Academies

Research question five focused on whether the Engineering and Manufacturing Academy is effective and, if not, what type of academy students would like to see offered instead. The data showed that most interest was shown in an Engineering/Design Academy with over 72% of the students surveyed indicating that they were "interested" or "very interested in it." Based on the data, it can be concluded that there are students interested in being part of an Engineering/Design Academy. Based on the above conclusions, a recommendation can be made. Presently, there is an Engineering and Manufacturing Academy already in place, but as the data illustrates, students are not taking the courses and fulfilling the requirements. The current academy structure and required courses need to be reevaluated. Local businesses, industry, and post-secondary educational institutions could be consulted as to what skills and knowledge students should posses for success in a technical or engineering related field. Courses can then be

added to the academy to give students the opportunity to obtain these skills. The justification for having an academy like this could then be backed up with advice and data from the colleges and industry. Students and parents would likely then see the importance of enrolling in these classes. This would hopefully increase the number of students enrolling in the academy courses and increase the number of students completing the academy course sequence.

Recommendations for Further Study

The study of reasons for why students enroll in particular Technology and Engineering courses and their perceptions of those courses warrants further study. This could be beneficial to the Technology and Engineering Department as well as the guidance department. It could become a yearly study to determine changes in student participation and perceptions. Finally, a study of what skills and knowledge would be beneficial to students pursuing a degree in a technical or engineering related field would be useful. Post-secondary schools and related industries and employers should be surveyed to determine what skills students should possess to succeed. The data could be analyzed and the courses and curriculum could be altered to meet the changing needs.

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Appendix A: Consent Letter

Spring, 2009

Dear Parent or Guardian,

This letter is to inform you of a research project being done in the Green Bay Public School District. The research is being done to analyze the student experience in the Engineering and Manufacturing Academy. The information gathered will be used as part of a Master's Thesis and will be used in determining the effectiveness of the current academy structure. The information will be obtained through the students currently enrolled in Introduction to Engineering Design by taking a short survey. The survey will ask students to indicate what Academy courses along with what Technology and Engineering courses they have taken. The students will also be asked to analyze their experiences in the courses and their perception of the classes regarding their benefit pertaining to academics, future schooling, and careers.

Participation in this is voluntary, and students may choose not to participate without any adverse consequences. The more information obtained, the more beneficial the results will be to the school district, the technology and engineering department, and to future students. The student's identity will be strictly confidential and all published results will be anonymous, complied statistics. There will be no risks to the students completing the survey.

Questions or concerns about the research study should be addressed to the researcher, Andrew Belongia at 920-492-2600, e-mail: abelongi@greenbay.k12.wi.us or the research advisor Mike Galloy at 715-232-2108, e-mail: galloym@uwstout.edu. Questions about the rights of research subjects can be addressed to Sue Foxwell, Director, Research Services, 152 Vocational Rehabilitation Bldg. UW-Stout, Menomonie, WI 54751, phone (715)-232-2477, e-mail: foxwells@uwstout.edu.

Students will be completing the survey during their Introduction to Engineering Design class the third week in May. Please complete the bottom of this letter indicating your permission allowing your child to participate in this study. Please have your child return the bottom portion of this letter to their Introduction to Engineering Design instructor by May 1, 2009.

Sincerely,
Andrew Belongia
Researcher

I do/do not (circle one) agree to allow my child, _____ to participate in this study.

Signature_____ Date_____

Appendix B: Survey Instrument

Student Perceptions of the Green Bay Public Schools Engineering and Manufacturing Academy

Thank you for your willingness to participate in this study. Your involvement is completely voluntary. Your answers will be kept completely anonymous and your identity will never be associated with your responses.

1. What year are you currently in school?
   Please mark appropriate response:

   9_____ 10_____ 11_____ 12_____

2. What are your post-high school plans?
   Please mark most appropriate response:

   ____ Four-year school with a major related to technology, engineering, or a technical field.

   _____ Four-year school with a major unrelated to technology, engineering, or a technical field.

   _____ Two-year school with a major related to technology, engineering, or a technical field.

   _____ Two-year school with a major unrelated to technology, engineering, or a technical field.

   _____ Entering the workforce with a job related to technology, engineering, or a technical field.

   _____ Entering the workforce with a job unrelated to technology, engineering, or a technical field.

   _____ Entering the military

The following questions ask about the Engineering and Manufacturing Academy and your participation in the required courses. The questions also ask how beneficial you feel the classes are towards your post-high school plans and if you were aware that the course was offered.

3. How informed are you about the Engineering and Manufacturing Academy found in the Green Bay Public Schools? (Please circle appropriate response)

   Very uniformed: *Somewhat informed:* *Informed:* *Very informed:*

   1 2 3 4

4. How informed are you about the classes required to receive an academy certificate? (Please circle appropriate response)

   Very uniformed: *Somewhat informed:* *Informed:* *Very informed:*

   1 2 3 4

5. Have you already taken or are currently enrolled in **Introduction to Engineering Design**? (Please mark appropriate response)

   Yes _____ No _____

   If you answered yes, how beneficial towards your post-high school plans do you feel this course was? (Please circle appropriate response)

   Not beneficial *Somewhat beneficial* *Beneficial* *Very beneficial:*
   1 2 3 4

   If you answered no, were you aware that this class was even offered? (Please mark appropriate response) Yes _____ No _____

6. Have you already taken or are currently enrolled in **Leadership Studies in Integrated Manufacturing**? (Please mark appropriate response)

   Yes _____ No _____

   If you answered yes, how beneficial towards your post-high school plans do you feel this course was? (Please circle appropriate response)

   Not beneficial *Somewhat beneficial* *Beneficial* *Very beneficial*
   1 2 3 4

   If you answered no, were you aware that this class was even offered? (Please mark appropriate response)

   Yes _____ No _____

7. Have you already taken or are currently enrolled in **Engineering Graphics**? (Please mark appropriate response)

   Yes _____ No _____

   If you answered yes, how beneficial towards your post-high school plans do you feel this course was? (Please circle appropriate response)

Not beneficial:	*Somewhat beneficial*	*Beneficial*	*Very beneficial:*
1	2	3	4

   If you answered no, were you aware that this class was even offered? (Please mark appropriate response)

   Yes _____ No _____

8. Have you already taken or are currently enrolled in **Engineering Design and Development**? (Please mark appropriate response)

   Yes _____ No _____

   If you answered yes, how beneficial towards your post-high school plans do you feel this course was? (Please circle appropriate response)

Not beneficial:	*Somewhat beneficial*	*Beneficial*	*Very beneficial:*
1	2	3	4

   If you answered no, were you aware that this class was even offered? (Please mark appropriate response)

   Yes _____ No _____

The following questions will ask about your participation in other Technology and Engineering courses. The questions will also ask how beneficial you felt the classes were towards your post-high school plans and if you were aware that the course was offered.

9. Have you already taken or are currently enrolled in **Introduction to Technology**? (Please mark appropriate response)

   Yes _____ No _____

   If you answered yes, how beneficial towards your post-high school plans do you feel this course was? (Please circle appropriate response)

Not beneficial:	*Somewhat beneficial*	*Beneficial*	*Very beneficial:*
1	2	3	4

   If you answered no, were you aware that this class was even offered? (Please mark appropriate response)

   Yes _____ No _____

10. Have you already taken or are currently enrolled in **Engineering Applications**? (Please mark appropriate response)

    Yes _____ No _____

    If you answered yes, how beneficial towards your post-high school plans do you feel this course was? (Please circle appropriate response)

Not beneficial:	*Somewhat beneficial*	*Beneficial*	*Very beneficial:*
1	2	3	4

    If you answered no, were you aware that this class was even offered? (Please mark appropriate response)

    Yes _____ No _____

11. Have you already taken or are currently enrolled in **Advanced Engineering Design**? (Please mark appropriate response)

    Yes _____ No _____

    If you answered yes, how beneficial towards your post-high school plans do you feel this course was? (Please circle appropriate response)

Not beneficial:	*Somewhat beneficial*	*Beneficial*	*Very beneficial:*
1	2	3	4

    If you answered no, were you aware that this class was even offered? (Please mark appropriate response)

    Yes _____ No _____

12. Have you already taken or are currently enrolled in **Woodworking**? (Please mark appropriate response)

Yes _____ No _____

If you answered yes, how beneficial towards your post-high school plans do you feel this course was? (Please circle appropriate response)

Not beneficial:	*Somewhat beneficial*	*Beneficial*	*Very beneficial:*
1	2	3	4

If you answered no, were you aware that this class was even offered? (Please mark appropriate response)

Yes _____ No _____

13. Have you already taken or are currently enrolled in **Advanced Woodworking**? (Please mark appropriate response)

Yes _____ No _____

If you answered yes, how beneficial towards your post-high school plans do you feel this course was? (Please circle appropriate response)

Not beneficial:	*Somewhat beneficial*	*Beneficial*	*Very beneficial:*
1	2	3	4

If you answered no, were you aware that this class was even offered? (Please mark appropriate response)

Yes _____ No _____

14. Have you already taken or are currently enrolled in **Home Ownership**? (Please mark appropriate response)

Yes _____ No _____

If you answered yes, how beneficial towards your post-high school plans do you feel this course was? (Please circle appropriate response)

Not beneficial:	*Somewhat beneficial*	*Beneficial*	*Very beneficial:*
1	2	3	4

If you answered no, were you aware that this class was even offered? (Please mark appropriate response)

Yes _____ No _____

15. Have you already taken or are currently enrolled in **Metal Fabrication and Restoration**? (Please mark appropriate response)

Yes _____ No _____

If you answered yes, how beneficial towards your post-high school plans do you feel this course was? (Please circle appropriate response)

Not beneficial:	*Somewhat beneficial*	*Beneficial*	*Very beneficial:*
1	2	3	4

If you answered no, were you aware that this class was even offered? (Please mark appropriate response)

Yes _____ No _____

16. Have you already taken or are currently enrolled in **Machine Tool**? (Please mark appropriate response)

Yes _____ No _____

If you answered yes, how beneficial towards your post-high school plans do you feel this course was? (Please circle appropriate response)

Not beneficial:	*Somewhat beneficial*	*Beneficial*	*Very beneficial:*
1	2	3	4

If you answered no, were you aware that this class was even offered? (Please mark appropriate response) Yes _____ No _____

17. Have you already taken or are currently enrolled in **Welding**? (Please mark appropriate response)

Yes _____ No _____

If you answered yes, how beneficial towards your post-high school plans do you feel this course was? (Please circle appropriate response)

Not beneficial:	*Somewhat beneficial*	*Beneficial*	*Very beneficial:*
1	2	3	4

If you answered no, were you aware that this class was even offered? (Please mark appropriate response)

Yes _____ No _____

18. Have you already taken or are currently enrolled in **Small Engines**? (Please mark appropriate response)

Yes _____ No _____

If you answered yes, how beneficial towards your post-high school plans do you feel this course was? (Please circle appropriate response)

Not beneficial:	*Somewhat beneficial*	*Beneficial*	*Very beneficial:*
1	2	3	4

If you answered no, were you aware that this class was even offered? (Please mark appropriate response)

Yes _____ No _____

19. Have you already taken or are currently enrolled in **Vehicle Service**? (Please mark appropriate response)

Yes _____ No _____

If you answered yes, how beneficial towards your post-high school plans do you feel this course was? (Please circle appropriate response)

Not beneficial:	*Somewhat beneficial*	*Beneficial*	*Very beneficial:*
1	2	3	4

If you answered no, were you aware that this class was even offered? (Please mark appropriate response)

Yes _____ No ____

20. Have you already taken or are currently enrolled in **Auto Ownership**? (Please mark appropriate response)

Yes _____ No _____

If you answered yes, how beneficial towards your post-high school plans do you feel this course was? (Please circle appropriate response)

Not beneficial:	*Somewhat beneficial*	*Beneficial*	*Very beneficial:*
1	2	3	4

If you answered no, were you aware that this class was even offered? (Please mark appropriate response)

Yes _____ No _____

21. Have you already taken or are currently enrolled in **Digital Electronics**? (Please mark appropriate response)

Yes _____ No _____

If you answered yes, how beneficial towards your post-high school plans do you feel this course was? (Please circle appropriate response)

Not beneficial:	*Somewhat beneficial*	*Beneficial*	*Very beneficial:*
1	2	3	4

If you answered no, were you aware that this class was even offered? (Please mark appropriate response)

Yes _____ No _____

22. Have you already taken or are currently enrolled in **Composites and Plastics**? (Please mark appropriate response)

Yes _____ No _____

If you answered yes, how beneficial towards your post-high school plans do you feel this course was? (Please circle appropriate response)

Not beneficial:	*Somewhat beneficial*	*Beneficial*	*Very beneficial:*
1	2	3	4

If you answered no, were you aware that this class was even offered? (Please mark appropriate response)

Yes _____ No _____

23. Have you already taken or are currently enrolled in **Civil Engineering and Architecture**? (Please mark appropriate response)

Yes _____ No _____

If you answered yes, how beneficial towards your post-high school plans do you feel this course was? (Please circle appropriate response)

Not beneficial:	*Somewhat beneficial*	*Beneficial*	*Very beneficial:*
1	2	3	4

If you answered no, were you aware that this class was even offered? (Please mark appropriate response)

Yes _____ No _____

24. Have you already taken or are currently enrolled in **Residential Architecture**? (Please mark appropriate response)

Yes _____ No _____

If you answered yes, how beneficial towards your post-high school plans do you feel this course was? (Please circle appropriate response)

Not beneficial:	*Somewhat beneficial*	*Beneficial*	*Very beneficial:*
1	2	3	4

If you answered no, were you aware that this class was even offered? (Please mark appropriate response)

Yes _____ No _____

25. Have you already taken or are currently enrolled in **Residential Construction**? (Please mark appropriate response)

Yes _____ No _____

If you answered yes, how beneficial towards your post-high school plans do you feel this course was? (Please circle appropriate response)

Not beneficial:	*Somewhat beneficial*	*Beneficial*	*Very beneficial:*
1	2	3	4

If you answered no, were you aware that this class was even offered? (Please mark appropriate response)

Yes _____ No _____

26. Have you already taken or are currently enrolled in **Printing Processes**? (Please mark appropriate response)

Yes _____ No _____

If you answered yes, how beneficial towards your post-high school plans do you feel this course was? (Please circle appropriate response)

Not beneficial:	*Somewhat beneficial*	*Beneficial*	*Very beneficial:*
1	2	3	4

If you answered no, were you aware that this class was even offered? (Please mark appropriate response)

Yes _____ No _____

27. Have you already taken or are currently enrolled in **Printing Production**? (Please mark appropriate response)

Yes _____ No _____

If you answered yes, how beneficial towards your post-high school plans do you feel this course was? (Please circle appropriate response)

Not beneficial:	*Somewhat beneficial*	*Beneficial*	*Very beneficial:*
1	2	3	4

If you answered no, were you aware that this class was even offered? (Please mark appropriate response)

Yes _____ No _____

28. Have you already taken or are currently enrolled in **Video Production and Special Effects**? (Please mark appropriate response)

Yes _____ No _____

If you answered yes, how beneficial towards your post-high school plans do you feel this course was? (Please circle appropriate response)

Not beneficial:	*Somewhat beneficial*	*Beneficial*	*Very beneficial:*
1	2	3	4

If you answered no, were you aware that this class was even offered? (Please mark appropriate response)

Yes _____ No _____

29. Have you already taken or are currently enrolled in **3-D Animation and Game Design**? (Please mark appropriate response)

Yes _____ No _____

If you answered yes, how beneficial towards your post-high school plans do you feel this course was? (Please circle appropriate response)

Not beneficial:	*Somewhat beneficial*	*Beneficial*	*Very beneficial:*
1	2	3	4

If you answered no, were you aware that this class was even offered? (Please mark appropriate response)

Yes _____ No _____

The following questions will ask about what type of Career Academy you would be interested in being part of if it was offered in the Green Bay School District.

30. How interested would you be in a **Construction/Woods Academy**? (Please circle appropriate response)

Not interested:	*Somewhat interested*	*Interested*	*Very interested:*
1	2	3	4

31. How interested would you be in a **Manufacturing/Metals Academy**? (Please circle appropriate response)

Not interested:	*Somewhat interested*	*Interested*	*Very interested:*
1	2	3	4

32. How interested would you be in an **Engineering/Design Academy**? (Please circle appropriate response)

Not interested:	*Somewhat interested*	*Interested*	*Very interested:*
1	2	3	4

33. How interested would you be in a **Graphics Design Academy**? (Please circle appropriate response)

Not interested:	*Somewhat interested*	*Interested*	*Very interested:*
1	2	3	4

34. How interested would you be in a **Transportation/Vehicle Academy**? (Please circle appropriate response)

Not interested:	*Somewhat interested*	*Interested*	*Very interested:*
1	2	3	4

Appendix C: Item Analysis

Question number one on the survey asked students "What year are you currently in school?" 26.5% (n=22) of the survey participants were freshman, 12.04% (n=10) were sophomores, 31.32% (n=26) were juniors and 30.12% (n=25) were seniors.

Questions two asked students to indicate "What are your post-high school plans" by choosing from a list of seven options. 54.21% (n=45) of the students indicated that they were intending to attend a four-year school with a major related to technology, engineering, or a technical field. 15.66% (n=13) of students planned on attending a four-year school with a major unrelated to technology, engineering, or a technical field. 14.45% (n=12) planned on attending a two-year school with a major related to technology, engineering, or a technical field, while 3.61% (n=3) intended on attending a two-year school with a major unrelated to technology, engineering, or a technical field. No students responded that they planned on entering the work force after high school with a job related to technology, engineering, or a technical field, but 2.40% (n=2) of the respondents planned on entering the workforce with a job unrelated to technology, engineering, or a technical field. Finally 9.63% (n=8) of students surveyed responded that they planned on entering the military after high school.

Question three asked, "How informed are you about the engineering and manufacturing academy found in the Green Bay Public Schools?" Students were to respond using a Likert type scale. 12.04% (n=10) felt very uniformed, 43.37% (n=36) felt somewhat informed, 40.96% (n=34) felt informed, and 4.81% (n=3) felt very informed.

Question four asked, "How informed are you about which classes are required to receive an academy certificate". Students were to respond using a Likert type scale. 19.27% (n=16) of

respondents stated that they felt very uniformed, 50.60% (n=42) felt somewhat informed, 24.09% (n=20) felt informed, and 6.02% (n=5) felt informed.

Survey questions five through eight asked students to indicate their participation in the required academy courses. If they answered that they have taken or are currently enrolled they then had to indicate using a Likert type scale how beneficial they felt that the class was towards their post-high school plans. If the students indicated that they had not taken the class they then had to indicate whether or not they were aware that the class was even offered.

Question five asked, "Have you taken or are currently enrolled in Introduction to Engineering Design?" The results were as follows, 100% (n=83) of students responded yes. (Note: The survey was administered during this class) Of the students who responded yes, 6.02% (n=5) of the students felt the class was not beneficial towards their post-high school plans, 20.48% (n=17) felt it was somewhat beneficial, 45.78% (n=38) felt it was beneficial, and 27.71% (n=23) felt it was very beneficial.

Question six asked, "Have you taken or are currently enrolled in Leadership Studies in Integrated Manufacturing?" The results are as follows, 100% (n=83) of the students responded no. Of those students 15.66% (n=13) indicated that they were aware that the class was offered, and 84.33% (n=70) indicated that they were unaware that the course was offered.

Question seven asked, "Have you taken or are currently enrolled in Engineering Graphics?" The results are as follows, 100% (n=83) of the students responded no. Of those students 37.34% (n=31) indicated that they were aware that the class was offered, and 62.65% (n=52) indicated that they were unaware that the course was offered.

Question eight asked, "Have you already taken or are currently enrolled in Engineering Design and Development?" The results are as follows, 6.02% (n=5) of the students responded

yes, and 93.97% responded no. Of the students who responded yes, 80% (n=4) felt it was beneficial towards their post-high school plans, and 20% (n=1) felt it was very beneficial. Of the students who responded no, 57.69% (n=45) were aware that the class was offered, and 42.30% (n=33) were unaware that the class was offered.

Survey questions nine through twenty-nine asked students to indicate their participation in other Technology and Engineering courses. If they answered that they have taken or are currently enrolled they then had to indicate using a Likert type scale how beneficial they felt that the class was towards their post-high school plans. If the students indicated that they had not taken the class they then had to indicate whether or not they were aware that the class was even offered.

Question nine asked, "Have you taken or are currently enrolled in Introduction to Technology?" The results are as follows, 8.43% (n=7) of students responded yes, and 91.56% (n=76) responded no. Of the students who responded yes 28.57% (n=2) said it was somewhat beneficial towards their post-high school plans, 57.14% (n=4) thought it was beneficial, and 14.28% (n=1) thought it was very beneficial. Of the students who responded no, 59.21% (n=45) were aware that the class was offered and 40.07% (n=31) were unaware that the class was offered.

Question ten asked, "Have you taken or are currently enrolled in Engineering Applications?" The results are as follows, 7.22% (n=6) of students responded yes, and 92.77% (n=77) responded no. Of the students who responded yes 16.66% (n=1) thought it was somewhat beneficial towards their post-high school plans, 33.33% (n=2) thought it was beneficial, and 50% (n=3) thought it was very beneficial. Of the students who responded no, 46.75% (n=36) were aware that the class was offered and 53.24% (n=41) were unaware that the class was offered.

Question eleven asked, "Have you taken or are currently enrolled in Advanced Engineering Design?" The results are as follows, 16.86% (n=14) of students responded yes, and 83.13% (n=69) responded no. Of the students who responded yes, 50% (n=7) thought it was beneficial towards their post-high school plans, and 50% (n=7) thought it was very beneficial. Of the students who responded no, 86.95% (n=60) were aware that the class was offered and 13.04% (n=9) were unaware that the class was offered.

Question twelve asked, "Have you taken or are currently enrolled in Woodworking?" The results are as follows, 16.86% (n=14) of students responded yes, and 83.13% (n=69) responded no. Of the students who responded yes 17.14% (n=1) said it was not beneficial towards their post-high school plans, 14.28% (n=2) thought it was somewhat beneficial, 64.28% (n=9) thought it was beneficial and 14.28% (n=2) thought it was very beneficial. Of the students who responded no, 98.55% (n=68) were aware that the class was offered and 1.44% (n=1) were unaware that the class was offered.

Question thirteen asked, "Have you taken or are currently enrolled in Advanced Woodworking?" The results are as follows, 8.43% (n=7) of students responded yes, and 91.56% (n=76) responded no. Of the students who responded yes 14.28% (n=1) said it was somewhat beneficial towards their post-high school plans, 71.42% (n=5) thought it was beneficial, and 14.28% (n=1) thought it was very beneficial. Of the students who responded no, 88.15% (n=67) were aware that the class was offered and 11.84% (n=9) were unaware that the class was offered.

Question fourteen asked, "Have you taken or are currently enrolled in Home Ownership?" The results are as follows, 1.20% (n=1) of students responded yes, and 98.79% (n=82) responded no. Of the students who responded yes 100% (n=1) thought it was beneficial

towards their post-high school plans. Of the students who responded no, 67.46% (n=56) were aware that the class was offered and 31.32% (n=26) were unaware that the class was offered.

Question fifteen asked, "Have you taken or are currently enrolled in Metal Fabrication and Restoration?" The results are as follows, 8.43% (n=7) of students responded yes, and 91.56% (n=76) responded no. Of the students who responded yes 14.28% (n=1) said it was somewhat beneficial towards their post-high school plans, 57.14% (n=4) thought it was beneficial, and 28.57% (n=2) thought it was very beneficial. Of the students who responded no, 48.68% (n=37) were aware that the class was offered and 51.31% (n=39) were unaware that the class was offered.

Question sixteen asked, "Have you taken or are currently enrolled in Machine Tool?" The results are as follows, 7.22% (n=6) of students responded yes, and 92.77% (n=77) responded no. Of the students who responded yes 33.33% (n=2) said it was beneficial towards their post-high school plans, 66.67% (n=4) thought it was very beneficial. Of the students who responded no, 53.24% (n=41) were aware that the class was offered and 46.75% (n=36) were unaware that the class was offered.

Question seventeen asked, "Have you taken or are currently enrolled in Welding?" The results are as follows, 8.43% (n=7) of students responded yes, and 91.56% (n=76) responded no. Of the students who responded yes 14.28% (n=1) said it was somewhat beneficial towards their post-high school plans, 42.85% (n=3) thought it was beneficial, and 42.85% (n=3) thought it was very beneficial. Of the students who responded no, 78.94% (n=60) were aware that the class was offered and 21.05% (n=16) were unaware that the class was offered.

Question eighteen asked, "Have you taken or are currently enrolled in Small Engines?" The results are as follows, 16.86% (n=14) of students responded yes, and 83.13% (n=69)

responded no. Of the students who responded yes 14.28% (n=2) said it was not beneficial towards their post-high school plans, 21.41% (n=3) thought it was somewhat beneficial, 42.85% (n=6) thought it was beneficial, and 21.41% (n=3) thought it was very beneficial. Of the students who responded no, 84.05% (n=58) were aware that the class was offered and 15.94% (n=11) were unaware that the class was offered.

Question nineteen asked, "Have you taken or are currently enrolled in Vehicle Service?" The results are as follows, 6.02% (n=5) of students responded yes, and 93.97% (n=78) responded no. Of the students who responded yes 40% (n=2) said it was beneficial towards their post-high school plans, and 60% (n=3) thought it was very beneficial. Of the students who responded no, 57.69% (n=45) were aware that the class was offered and 42.30% (n=33) were unaware that the class was offered.

Question twenty asked, "Have you taken or are currently enrolled in Auto Ownership?" The results are as follows, 6.02% (n=5) of students responded yes, and 93.97% (n=78) responded no. Of the students who responded yes 60% (n=3) said it was beneficial towards their post-high school plans, and 40% (n=2) thought it was very beneficial. Of the students who responded no, 58.97% (n=46) were aware that the class was offered and 41.02% (n=32) were unaware that the class was offered.

Question twenty-one asked, "Have you taken or are currently enrolled in Digital Electronics?" The results are as follows, 2.40% (n=2) of students responded yes, and 97.59% (n=81) responded no. Of the students who responded yes 50% (n=1) said it was not beneficial towards their post-high school plans, and 50% (n=1) thought it was beneficial. Of the students who responded no, 56.79% (n=46) were aware that the class was offered and 43.20% (n=35) were unaware that the class was offered.

Question twenty-two asked, "Have you taken or are currently enrolled Composites and Plastics?" The results are as follows, 100% (n=83) of the students responded no. Of the students who responded no, 33.73% (n=28) were aware that the class was offered and 66.26% (n=55) were unaware that the class was offered.

Question twenty-three asked, "Have you taken or are currently enrolled in Civil Engineering and Architecture?" The results are as follows, 16.86% (n=14) of students responded yes, and 83.13% (n=69) responded no. Of the students who responded yes 14.28% (n=2) said it was not beneficial towards their post-high school plans, 42.85% (n=6) thought it was somewhat beneficial, 21.42% (n=3) thought it was beneficial and 21.24% (n=3) thought it was very beneficial. Of the students who responded no, 86.95% (n=60) were aware that the class was offered and 13.04% (n=9) were unaware that the class was offered.

Question twenty-four asked, "Have you taken or are currently enrolled in Residential Architecture?" The results are as follows, 6.02% (n=5) of students responded yes, and 93.97% (n=78) responded no. Of the students who responded yes 60% (n=3) said it was somewhat beneficial towards their post-high school plans, and 40% (n=2) thought it was beneficial. Of the students who responded no, 69.23% (n=54) were aware that the class was offered and 30.76% (n=24) were unaware that the class was offered.

Question twenty-five asked, "Have you taken or are currently enrolled in Residential Construction?" The results are as follows, 100% (n=83) of students responded no. Of the students who responded no, 46.98% (n=39) were aware that the class was offered and 53.01% (n=44) were unaware that the class was offered.

Question twenty-six asked, "Have you taken or are currently enrolled in Printing Processes?" The results are as follows, 2.40% (n=2) of students responded yes, and 97.59%

(n=81) responded no. Of the students who responded yes 100% (n=2) said it was very beneficial towards their post-high school plans. Of the students who responded no, 33.33% (n=27) were aware that the class was offered and 66.67% (n=54) were unaware that the class was offered.

Question twenty-seven asked asked, "Have you taken or are currently enrolled in Printing Production?" The results are as follows, 100% (n=83) of students responded no. Of the students who responded no, 27.71% (n=23) were aware that the class was offered and 72.28% (n=60) were unaware that the class was offered.

Question twenty-eight asked, "Have you taken or are currently enrolled in Video Production and Special Effects?" The results are as follows, 3.61% (n=3) of students responded yes, and 96.38% (n=80) responded no. Of the students who responded yes 66.67% (n=1) said it was not beneficial towards their post-high school plans, 33.33% (n=1) thought it was beneficial. Of the students who responded no, 58.75% (n=47) were aware that the class was offered and 41.25% (n=33) were unaware that the class was offered.

Question twenty-nine asked, "Have you taken or are currently enrolled in 3-D Animation and Special Effects?" The results are as follows, 14.45% (n=12) of students responded yes, and 85.54% (n=71) responded no. Of the students who responded yes 8.33% (n=1) said it was not beneficial towards their post-high school plans, 16.67% (n=2) thought it was somewhat beneficial, 50% (n=6) thought it was beneficial and 25% (n=3) thought it was very beneficial. Of the students who responded no, 69.01% (n=49) were aware that the class was offered and 30.98% (n=22) were unaware that the class was offered.

Question thirty asked, "How interested would you be in a Construction/Woods Academy?" Students were to respond using a Likert type scale. The results are as follows,

21.68% (n=18) were not interested, 45.78% (n=38) were somewhat interested, 27.71% (n=23) were interested, and 4.81% (n=4) were very interested.

Question thirty-one asked, "How interested would you be in a Manufacturing/Metals Academy?" Students were to respond using a Likert type scale. The results are as follows, 19.27% (n=16) were not interested, 36.14% (n=30) were somewhat interested, 37.34% (n=31) were interested, and 7.22% (n=6) were very interested.

Question thirty-two asked, "How interested would you be in an Engineering/Design Academy?" Students were to respond using a Likert type scale. The results are as follows, 6.02% (n=6) were not interested, 21.68% (n=18) were somewhat interested, 37.53% (n=27) were interested, and 39.75% (n=33) were very interested.

Question thirty-three asked, "How interested would you be in a Graphics/Design Academy?" Students were to respond using a Likert type scale. The results are as follows, 14.45% (n=12) were not interested, 26.50% (n=22) were somewhat interested, 33.73% (n=28) were interested, and 25.30% (n=21) were very interested.

Question thirty-four asked, "How interested would you be in a Transportation/Vehicle Academy?" Students were to respond using a Likert type scale. The results are as follows, 21.68% (n=18) were not interested, 36.14% (n=30) were somewhat interested, 27.71% (n=23) were interested, and 14.45% (n=12) were very interested.