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Development of Media and a Marketing Plan for the Machining, Sheet Metal and Welding Programs at Worcester Technical High School

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Development of Media and a Marketing Plan for the Machining, Sheet Metal and
Welding Programs at Worcester Technical High School

An Interactive Qualifying Project Report

submitted to the Faculty

of the

WORCESTER POLYTECHNIC INSTITUTE

in the partial fulfillment of the requirements for the

Degree of Bachelor of Science

by

Patrick S. Hill

and

Dennis W. Proulx

Date: April 29, 2008

Abstract:

Interest at Worcester Technical High School (WTHS) in the fields of Machining, Sheet Metal and Welding is disproportionately low when compared to the industrial demand for workers in these fields. This is most readily seen in the Sheet Metal and Machining shops, where enrollment is well below capacity. Throughout all three shops, many of the students do not express interest in pursuing careers in their respective fields. To help promote these programs, videos of the shops in action were created to aid the instructors in the recruitment of incoming freshman. Interviews with successful seniors at the school were also filmed. Lastly, a PowerPoint presentation highlighting the competitive wages of the metal fabrication fields was created. These tools have been provided to WTHS, as well as to the individual shop instructors, to spread positive information about these important trades. It is recommended that the shop instructors utilize these videos during exploratory week, where freshman sample the shop for one week as part of their decision making process. It is also proposed that these videos be placed on the schools website, so that prospective students and their parents can learn about these trades.

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Introduction:

Worcester Technical High School (WTHS) and Worcester Polytechnic Institute (WPI) have teamed up to improve the interest in the Machining, Sheet Metal and Welding shops. By increasing awareness about the metal fabrication fields, the shop instructors will be able to recruit a larger group of incoming students, and therefore improve the attendance and overall quality of the technical education for the students. While industry demand for skilled metal fabricators is high, interest in these careers is disproportionately low. This can be seen most readily in the Sheet Metal and Machining shops, where enrollment is much below capacity. The Welding shop is at capacity, but the interest among students of pursuing a career in welding appears to be low.

The goal of this project is to stimulate interest in these trades, and the careers the shops represent. Videos of the shops, including various student projects, will be produced. Videos of interviews with selected students will also be created. A PowerPoint presentation containing data regarding wages of various trades was constructed as well. These tools will be created in collaboration with the shop instructors, and a plan for utilizing them will be developed with input from the instructors. The utilization of these tools by the instructors during exploratory week, as well as the placement of these media on shop websites, will increase both knowledge and interest in the metal fabrication trades. Increased interest among students should not only increase enrollment in the shops, but increase the number of graduates pursuing careers in the metal fabrication industry.

Methodology

Identification of the Need:

Based upon discussions with Mr. Peter Crafts, the vocational director at WTHS, it was determined that the project would focus on the development of promotional media to improve the perception of the metal fabrication trades at WTHS. Enrollment in both the Machining and Sheet Metal programs is significantly below capacity, and interest in pursuing a career in the field of their shop was low among students in all three metal fabrication programs. Promotional media will highlight the daily activities of the metal fabrication trades at WTHS. Incoming freshman visiting the metal fabrication shops during the exploratory phase will be able to see what the shop has to offer without the directors spending valuable time showing each and every machine and process. The creation of a video will be able to show such topics in an easily conveyed, time efficient manner. This will allow the already limited time instructors have to be better utilized in hands-on projects. A Power Point presentation of salary data would be presented to current students in order to illustrate the opportunities of their selected trade. This Power Point is not a marketing tool as it would only be shown to enrolled students, however, it will easily convey projected success of an average professional in Metal Fabrication.

Approach:

In order to better understand the current situation within each of the three metal fabrication trades, the instructors were interviewed. It was informed that the flaws within the shop came from the lack of interest in the manufacturing fields. The instructors explained that there is currently demand for skilled tradesmen; however, this demand was not translating into rising enrollment in the trades. If incoming students better understood the opportunities that these particular fields provided, interest, and therefore enrollment, in the shops would increase.

Preliminary interviews with a small number of students from the Welding Shop reaffirmed the concept that the students were not fully aware of the potential success in their selected trade. The students explained that prior to their exploratory week in the shop, they had little knowledge of what the field actually entailed. These preliminary interviews proved to be a valuable step as they yielded two distinct approaches for increasing enrollment. First, promotion of the trade and corresponding professional field prior to one's arrival at WTHS can stimulate interest in not only the respective shop, but the idea of a technical high school. Second, the major influence of incoming freshmen's decisions for choosing a shop seems to lie in their experience during the exploratory week. Both of these approaches can easily be satisfied through the construction of promotional media.

A more in depth survey of eighty students in the three metal fabrication shops was performed and analyzed. This corresponding data can be seen in Appendix 2: Student Survey Data.

Promotional media can be presented in numerous fashions including video, audio, brochures and presentations. Since it was concluded that the media constructed was to be used during the exploratory week, its design must be entertaining and eye catching to the students. However, it must remain simple enough so that it can be created efficiently. Brochures were one possible avenue as they are easy to read and simple to produce. However, in the eyes of a teenage student, they are far from eye catching. The construction of a short video seemed to be much more entertaining. The produced video will be able to highlight many aspects of the trade in a manner that is both educationally beneficial and fun to the students. The purpose of the exploratory week is for freshmen to see each shop for one week. However, numerous limitations are involved with the exploration of the shops. Most of the equipment in the shops cannot be utilized without proper, and time consuming, safety training. Therefore, only relatively simple projects can actually be attempted during this week. It is a goal of this project to provide the students with an insight into the more complicated and rewarding projects that they would complete as members of the chosen shops. A promotional video will be able to highlight more difficult machines and procedures that students would not be able to work with during their exploratory week.

Since each department is promoted separately, each shop received their own unique video. It was decided that the videos would try to capture students in action in the shop, as well as still photos and pans of the equipment. Images of projects in progress, including time lapses of projects were also included. In order for students to appear on film, parental permission had to be obtained. A consent form was obtained from WTHS; and the form was sent home with students with an accompanying letter. The letter can be seen in Appendix 3: Letter to Parents for Video Permission.

In addition to the videos of the three shops, two students were interviewed on film. One of these young men was a senior in the electrical shop, and was planning to attend WPI in the fall. The other, a senior in the sheet metal shop, had been working for Crocker Architectural in Oxford, MA as part of Worcester Tech's cooperative education program. After graduation, he plans to continue to pursue a career in sheet metal at Crocker. The interviews with these two successful students will hopefully serve as an example to younger students as a way to illustrate the opportunities provided to them by this education. The concept of interviewing adults from the related industries was considered, but the idea was rejected. This is because it is easier to relate to someone closer in age to oneself. The use of interviews of these two students should prove to be exceptionally valuable as they give prospective freshmen an excellent look at two extremely successful career paths. The advantage of a technical high school is that a student has the training and knowledge to compete for a skilled job directly following graduation; or could further his education and explore a realm of new opportunities.

For many people, simply enjoying something is not necessarily enough to choose it as a career. A factor that often weighs heavily on job choices is salary. Making a good wage is important to most people, for it is necessary to financial stability, and often leads to a more comfortable life. While people often think of electrical, plumbing and medical as high paying trades, the metal fabrication fields offer very competitive wages. This project attempts to portray this information to incoming students. However, merely showing a young teen a list or table of wages and benefit packages is likely to be ineffective. Most students entering high school are not even old enough to work, and so little understanding wage levels can be expected of them. Therefore, a presentation was created comparing the average wages of metal fabrication workers with those of other

fields. Hopefully, students will know someone who works in one or some of the other fields, and recognize that metal fabrication workers are making as much or more.

Benefits

This project intends to not only benefit the administration and faculty of WTHS, but serves to better its students as well.

Benefits to the Administration are:

- Increased enrollment in the Machining, Sheet Metal and Welding shops.
- Easy to use promotional media.

Benefits to the Faculty are:

- Improved interest among students enrolled in the shops.
- Easy to use media for use during exploratory week, where time is short.
- Alleviates the need to show every machine or process when there is limited time.
- Increased enrollment means shops stay open.

Benefits to the Students are:

- Exposure to a detailed summary of these trades during exploratory week.
- Shops stay open so students can choose to learn a metal fabrication trade.
- Increased interest leads to better cooperation in the shops as a larger percent of the students wish to pursue their chosen trade.
- Salary data will increase motivation and ideally the pursuit of careers in these lucrative metal fabrication fields.

The construction and distribution of promotional media will allow instructors to better focus their time on hands-on projects. The videos will alleviate the need for instructors to demonstrate each and every machine and process within their shops. This will allow for more time to be spent on projects, instead of on procedure and regulation. Ideally, interest in the shop will increase, and student motivation and cooperation will

rise. Increased enrollment in the shops will allow the school to keep the shops open instead of closing them due to a low number of students. For the students, the produced videos will give a better idea of what to expect from the shop in years to come. Allowing the shops to remain open will give future students the opportunity to still enroll in the metal fabrication trades. Salary data will provide students with an idea on what to expect, should they become a professional in their selected trade.

Results:

Shop Videos:

The goal of this project was to stimulate interest in the Welding, Machining and Sheet Metal shops, as well as their respective industries. The final products of this project are not intended to completely renew interest in these fields all at once, but rather be an aid to the shop instructors as they promote their shops to incoming students year after year. This project therefore focused on the creation of videos and presentations that could be shown time and again, all the while remaining useful. Short of any unlikely, sweeping changes in the metal fabrication industries, the technologies and methods utilized throughout the films should remain modern for many years to come.

A unique video was created for each shop. The purpose of these videos was to highlight many of the tools, equipment and methods utilized throughout a student's career in these shops. Although this could be done in person, it would take hours to demonstrate all the processes shown in the video, but on film, they take mere minutes. This is useful because it not only is short enough to maintain the attention of young students, but it also allows much more time for the instructors to accomplish other things. Furthermore, when showing the video, the instructors can focus their attention on explaining the processes, instead of trying to focus on demonstrating the tasks as well.

For the Machining shop, the video contains footage of many of the machines in action. Lathes, mills, grinders, sharpeners all appear throughout the video. An advantage of the video is that it allows for the work of weeks to be compressed into minutes. For example, the spearheads being created by students on the lathes can be seen in differing stages of completion. This would be nearly impossible to show during exploratory week, as instructors only have five days to show the students the shop, and precious time could not be spent all on one machine. The ability of the instructor in the Machining shop to show the video without having to worry about demonstrating the processes is especially useful, as there is only one instructor there. Intermixed with the moving footage of the shop in action were still frames of various products, thus enabling the students to not only see the process, but realize the results of it. Unfortunately, video of the CNC machines

operating could not be obtained. This occurred because CNC machining is not taught until junior year at WTHS, and the shop had only freshman and sophomores enrolled in it. However, some still images of similar HAAS machines in operation were included.

For the welding shop, the video is very similar in terms of variety of content. MIG, TIG, and oxy-acetylene welding all appear on the film. Stick welding had to be excluded as the brightness and violence of the unshielded arc provided difficulties in filming. Also shown were some of the other necessary processes, such as grinding and utilizing jigs. Multiple finished and incomplete work pieces were also dispersed throughout the video. As with the machining video, the purpose was to compress as much footage of the shop into a short and entertaining package as possible. All the same benefits of having a video apply to this film as well.

Putting together the video of the sheet metal shop was the most difficult. Due to the nature of the field, the processes involved in sheet metal fabrication are somewhat slower than the other two trades. In addition, sheet metal fabrication is not as visually stimulating as the other shops. Unlike welding, where the metal is melted with either flames or electric arcs to join it together, sheet metal is more often folded and riveted together. In machining, metal is removed from a base piece of material, often throwing chips and sparks. In sheet metal, the metal is sheared and bent. Footage of students working on various projects was collected, but not to the same extent as the other two shops. Instead, the video focused more on some of the still images provided by one of the instructors, Kendal Sprauge. Many of the images, some striking, contributed visual appeal to a shop lacking exciting action.

It is worth noting that neither team member had any prior experience with video production. With the help of other WPI students, the team was able to film nearly three hours of footage and edit the raw clips into the short, respective shop videos.

Interviews:

To accompany the videos of each shop, interviews with two WTHS students were filmed. The purpose of these videos was to illustrate to potential students some of the various paths, and employment opportunities that can be taken upon graduating. One of the students, Robert Battalle, is a senior in the sheet metal shop. He is currently spending

every other week working at Crocker Architectural in Oxford as part of the cooperative education program at WTHS. Throughout the interview, he describes the importance of hard work and dedication, but also explains the rewards of these virtues. Co-op is an excellent opportunity provided to the students at Worcester Tech, but hard work is required if it is to be taken advantage of. The other student interviewed, Anthony Ducimo, is a senior in the electrical shop, and will be attending WPI in the fall as an electrical engineering student. He is also currently taking advantage of the co-op program, as he works every other week at Coughlin Electric in Worcester. Hopefully, seeing students be so successful who attended WTHS will impress upon students and parents that technical high school can be a useful stepping stone to industry or continuing education.

Wage Information:

The third and final product of this project was a Power Point presentation of average wages that students can expect in various fields. All the raw data was taken from the MassCIS website, which in turn was a compilation of data collected by the US Department of Labor. For high school students, many of whom are too young to even have a job, raw wage numbers probably won't be comprehended as they would by an adult in the workforce. However, by comparing the wages of metal fabrication workers with those of other popular industries, the numbers should be better understood. Hopefully, the students will know someone that works in one or many of the other industries, and will therefore be able to measure the wages of metal fabrication workers against those of someone they know. By seeing that working in the sheet metal industry in the Worcester area pays more than the average electrician or plumber, for example, the students may have a more positive outlook on the sheet metal shop as a means for them to achieve success. As it happens, Worcester, Massachusetts is an excellent place to be employed in the metal fabrication fields, as the wages locally are significantly higher on average than Massachusetts and the US in general.

Recommendations:

The products of this project are to be distributed to those parties at Worcester Technical High School who can best utilize them for the promotion of the Machining, Sheet Metal and Welding shops. Mr. Crafts, the vocational director at WTHS, and Dolores Anderson, the director of the cooperative education program, will both get a copy of all videos and the presentation on wage data. In addition, the instructors of all three shops will receive a copy of the two interviews, the presentation on wages, and their individual shop's video.

It is recommended that these videos and presentation be placed on the WTHS website as well as the websites of the individual shops so that anyone, including prospective students and their parents, can learn about these shops and their associated trades. The short video clips can also be posted on video hosting sites such as YouTube to allow for easier access for parents and students alike. It is also recommended that these videos and presentation be utilized during the exploratory weeks in the first semester of every year. When the videos are shown by the shop instructors to a group of students, they will be able to narrate along with the video, explaining what is going on in the film. Therefore, machines and processes do not necessarily need to be set up and performed, saving valuable time during the short exploratory weeks.

The videos will be presented to the shop instructors in two formats. The first will be as a Windows Media Video (wmv) file that cannot be changed. The second format will be as a Windows Movie Maker (wmm) file, and will allow the instructors to edit the videos to their liking, if they choose to do so. By leaving the option open for the instructors to change the videos, the videos can be optimized by the people that will be utilizing them.

References:

MassCIS: Massachusetts Department of Workforce Development

<http://masscis.intocareers.org/>

The website linked above is an invaluable tool for information regarding careers in the state of Massachusetts. The website contains wage information from the US Department of Labor compiled in an easy to access format. It also provides information about the required skill sets for various careers, as well as detailed descriptions of the professions. This website was recommended by Dolores Anderson, director of the cooperative education program at Worcester Technical High School.

Appendix 1: Wage Data for Various Fields

The chart below is a collection of wage information about various fields based upon their location. The 25th percentile, median, and 75th percentile wages are shown for various fields in the US, in Massachusetts, and in the Worcester area. The graphs following the chart show the variations in hourly wages between the different careers.

Career	Percentile	US (\$/hr)	US yr (\$)	Mass (\$/hr)	Mass yr (\$)	Worc (\$/hr)	Worc yr (\$)
Welding	25%	12.3	25590	14.22	29570	14.57	30310
	Median	15.1	31400	17.38	36150	18.19	37840
	75%	18.47	38410	21.21	44110	21.79	45320
Sheet Metal	25%	13.3	27660	16.94	35240	18.4	38270
	Median	17.96	37360	22	45750	26.17	54440
	75%	24.89	51760	29.71	61790	31.9	66340
Machinists	25%	13.14	27330	15.79	32840	15.73	32710
	Median	16.71	34770	18.9	39300	18.4	38270
	75%	20.82	43300	22.68	47170	21.21	44120
NC Machinists	25%	12.1	25170	14.62	30420	17.31	36010
	Median	15.23	31670	17.41	36220	21.1	43890
	75%	18.84	39190	20.89	43450	24.69	51360
Plumber	25%	15.62	32490	19.04	39610	18.32	38110
	Median	20.56	42770	25.68	53420	22.75	47310
	75%	27.54	57280	33.15	68960	27.71	57640
Carpenter	25%	13.55	28.19	18.33	38140	17.39	36180
	Median	17.57	36550	22.76	47340	20.47	42580
	75%	23.85	49600	28.76	59820	25.51	53070
Electrician	25%	16.07	33420	19.15	39830	20.39	42410
	Median	20.97	43610	25.11	52220	24.79	51560
	75%	27.71	57650	32.95	68530	28.5	59280
Nurse Asst.	25%	9.09	18900	11.24	23390	11.08	23040
	Median	10.67	22180	12.77	26560	12.63	26280
	75%	12.8	26630	14.43	30010	14.37	29880
Voc Ed Teacher	25%	15.7	32660	17.28	35940	14.26	29670
	Median	21.11	43910	20.98	43630	19.78	41130
	75%	27.55	57310	26.59	55300	22.33	46440
Auto Body	25%	13	27040	14.59	30340	13.86	28840
	Median	16.92	35180	19.65	40870	20.06	41720
	75%	22.33	46450	24.51	50990	24.17	50270
Auto Mechanic	25%	11.96	24880	13.78	28650	12.61	26230
	Median	16.24	33780	17.87	37180	15.35	31930
	75%	21.56	44840	23.04	47920	19.49	40540
Cashier	25%	6.99	14540	7.88	16390	7.95	16530
	Median	8.08	16810	8.77	18250	8.81	18330
	75%	9.44	19640	10.33	21490	10.38	21580
Cook (restaurant)	25%	8.11	16860	10.14	21100	9.01	18750
	Median	9.78	20340	12.29	25570	11.57	24070
	75%	11.67	24260	14.3	29740	13.9	28900
Child Care	25%	7.11	14790	8.79	18280	9.12	18960
	Median	8.48	17630	10.57	21990	10.7	22250
	75%	10.54	21930	12.9	26830	12.82	26660
EMT	25%	10.23	21290	13.15	27340	14.14	29410
	Median	13.01	27070	15.76	32790	16.84	35030
	75%	16.93	35210	19.35	40240	19.99	41570
Construction	25%	9.95	20690	15.09	31380	12.91	26850
	Median	12.66	26320	19.64	40860	15	31200
	75%	17.31	36010	24.7	51370	17.85	37120
Cosmo/ Hair	25%	7.92	16470	9.54	19850	9.3	19340
	Median	10.25	21320	12.95	26930	11.45	23820
	75%	13.75	28600	17	35370	16.17	33640
HVAC	25%	14.12	29370	18.4	38280	18.13	37700
	Median	18.11	37660	22.41	46610	20.28	42170
	75%	23.32	48510	27.63	57480	22.87	47570

Table 1: Wage Information for Various Careers in the US, Massachusetts, and the Worcester Area

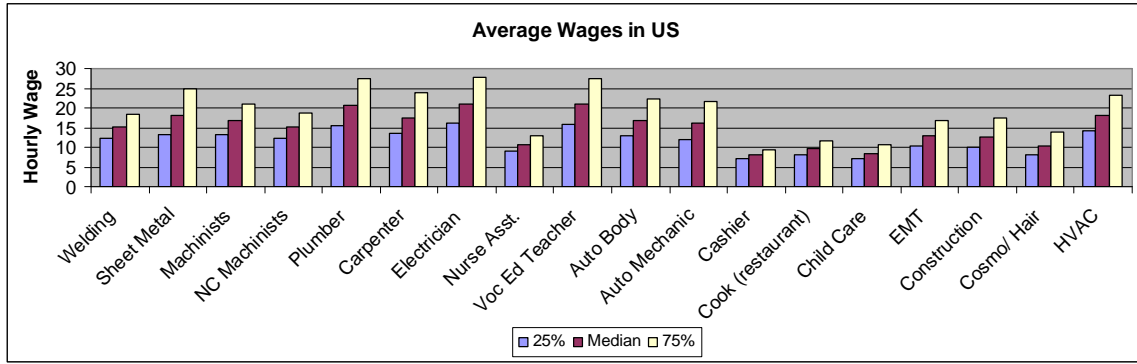


Figure 1: Wages Across the US

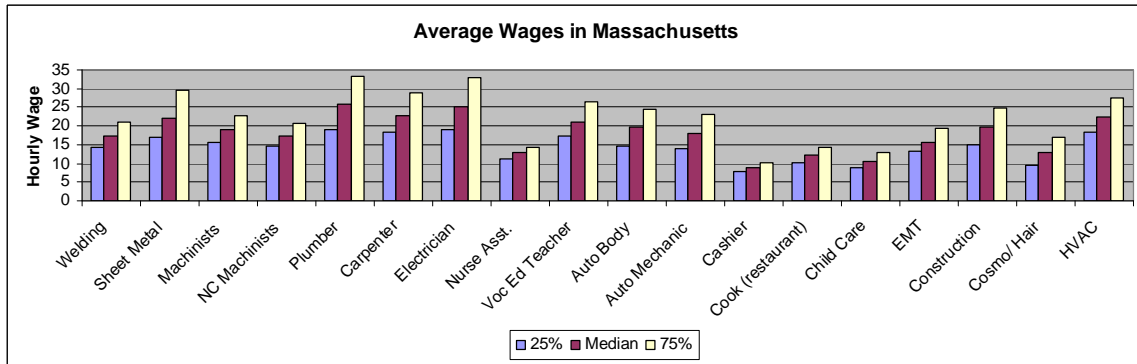


Figure 2: Wages in Massachusetts

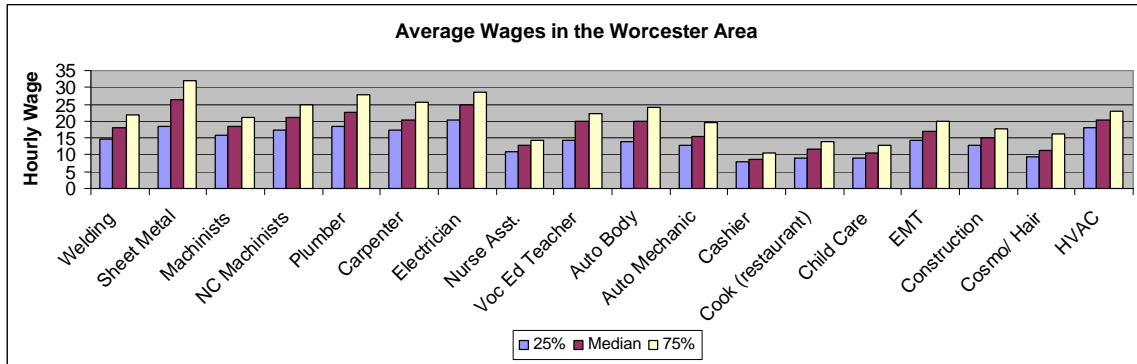


Figure 3: Wages in the Worcester Area

Appendix 2: Student Survey Data

Below is the survey distributed to students in the metal fabrication shops. A total of 80 surveys were collected and separated into the three respective shops. Data was then tabulated and plotted for better representation. The graphs constructed are shown below.

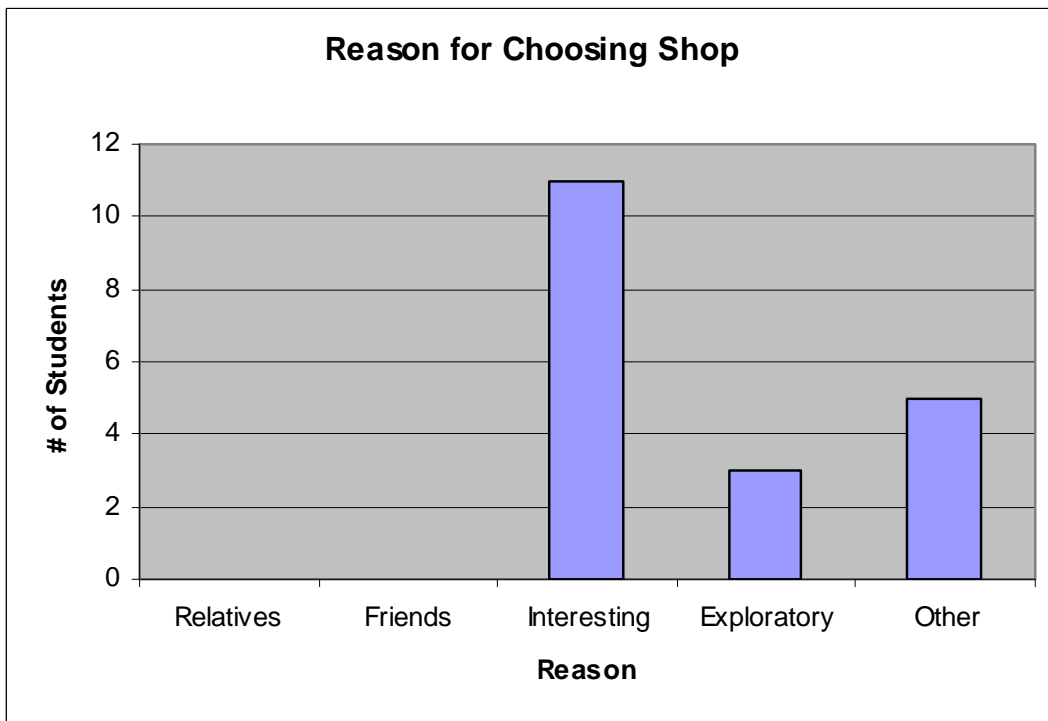
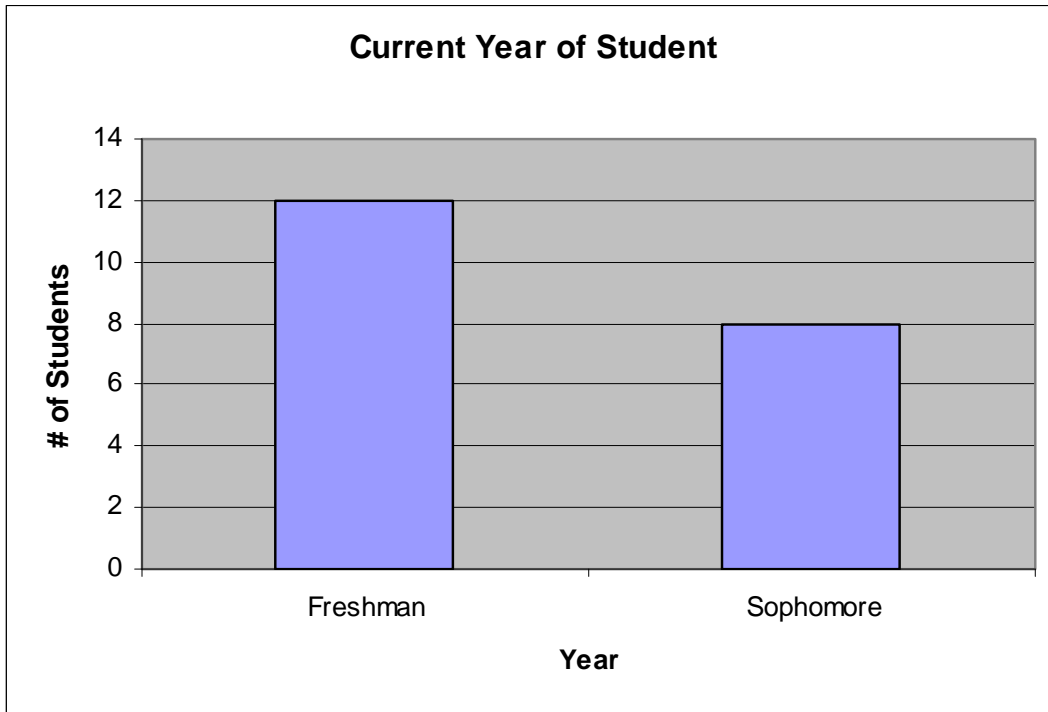
Survey Questions:

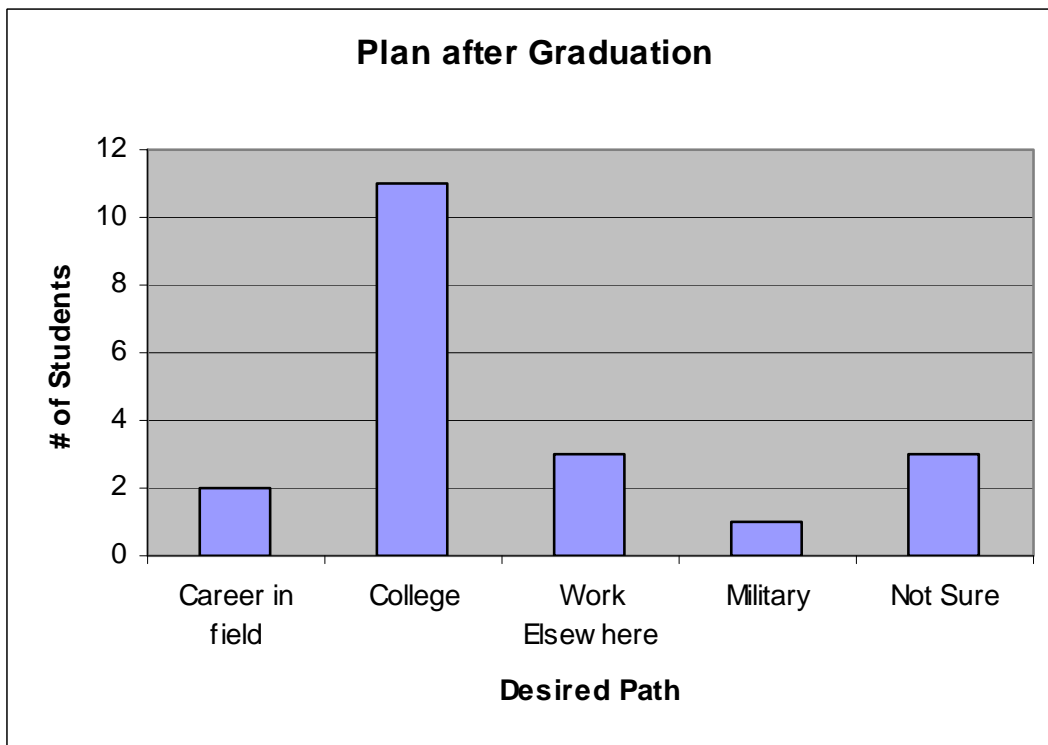
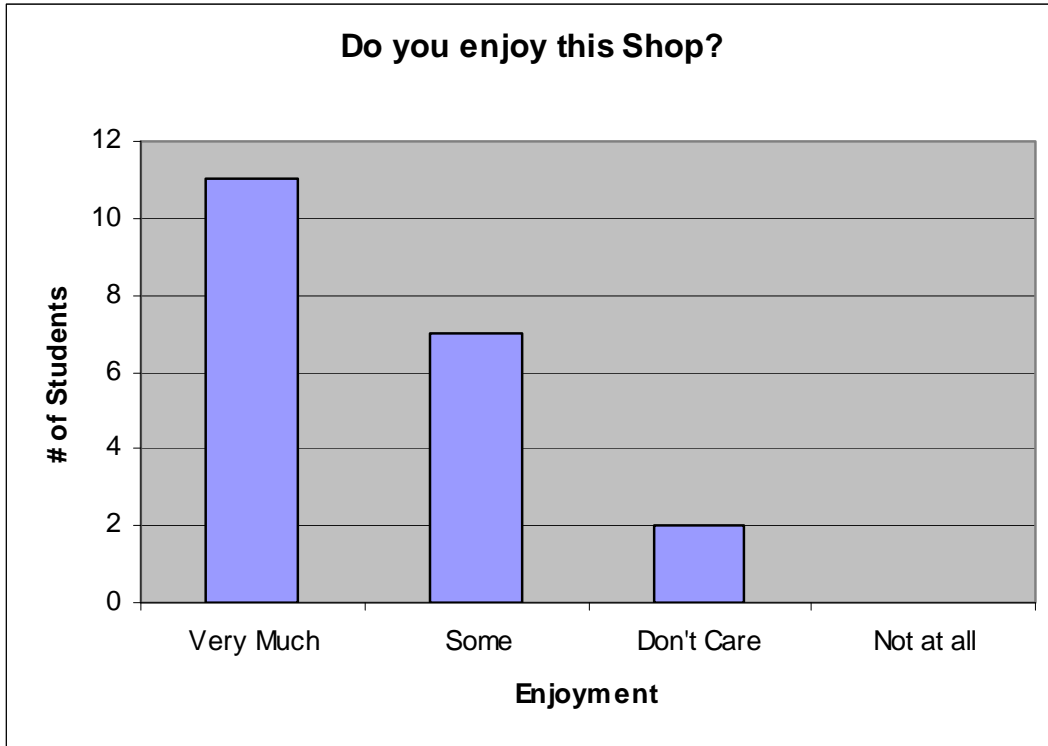
Shop: _____

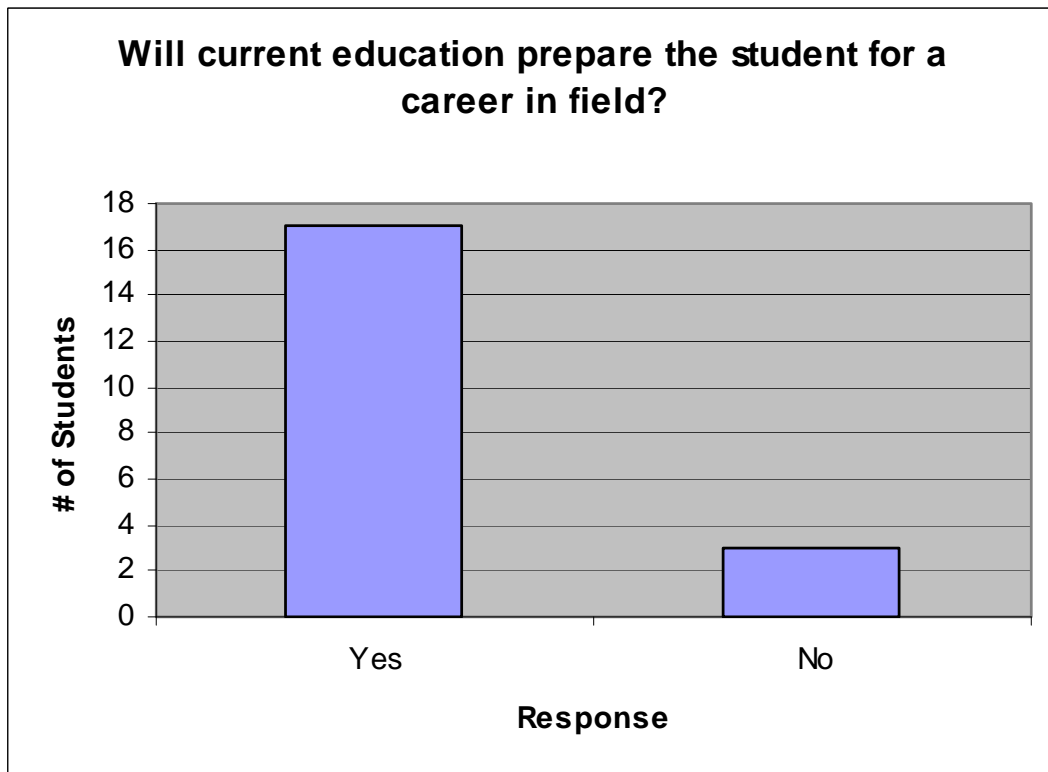
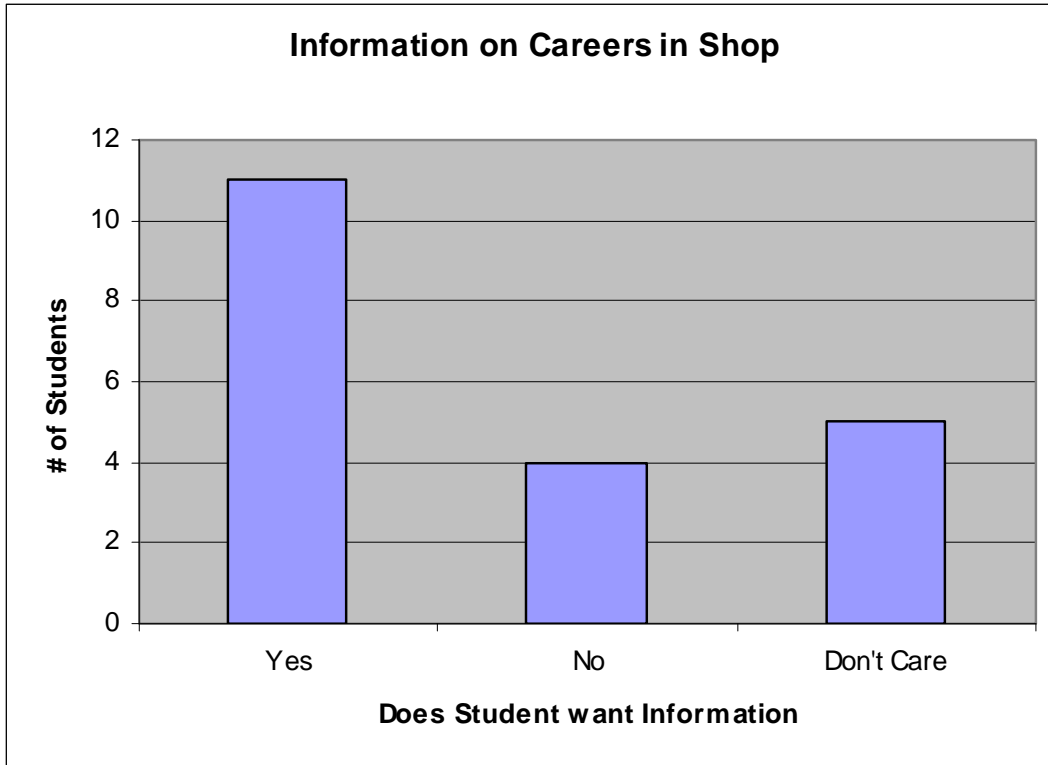
Please circle the best answer that represents you.

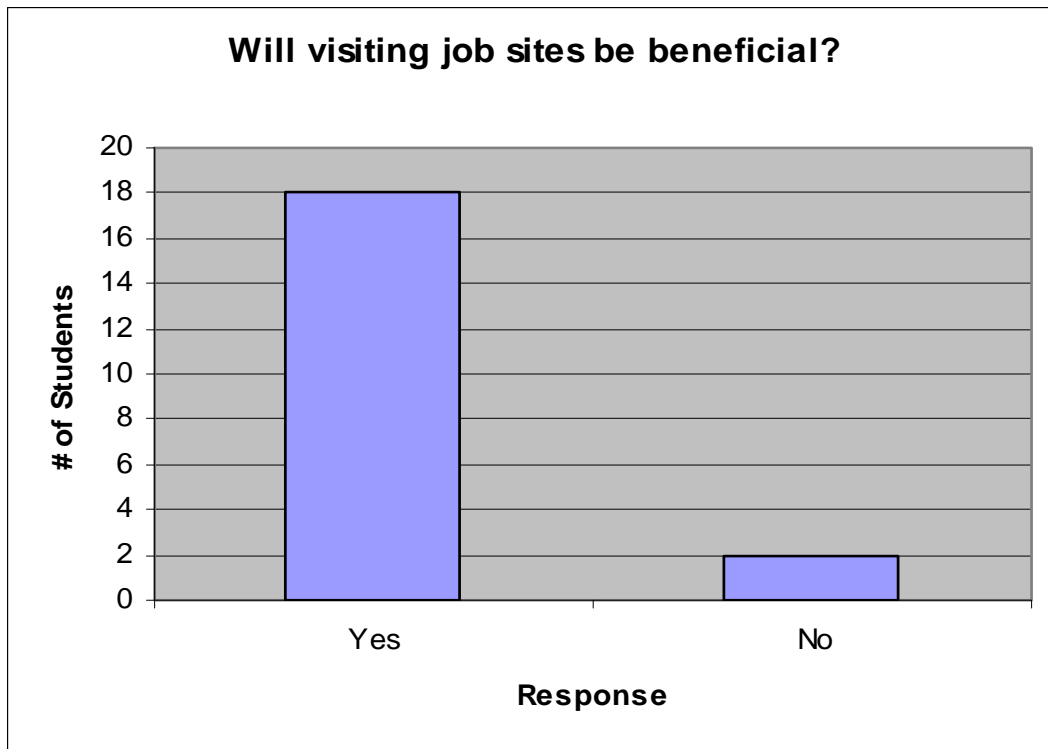
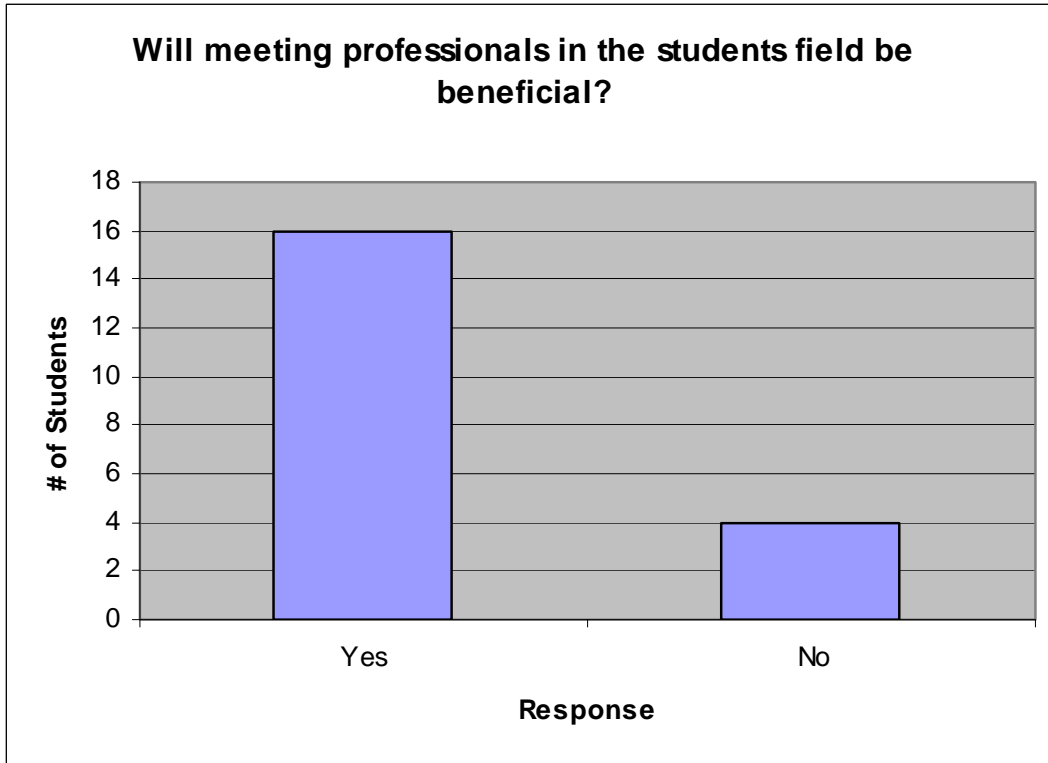
1. **What year are you in?**
 - a. Freshman
 - b. Sophomore
 - c. Junior
 - d. Senior
2. **Why did you pick your current shop?**
 - a. Relatives work in this field.
 - b. My friends are in this shop.
 - c. I thought it would be interesting.
 - d. Exploratory seemed fun.
 - e. Other: _____
3. **Do you enjoy this shop?**
 - a. Very Much
 - b. Some
 - c. Don't Care
 - d. Not at all
4. **What do you plan on doing when you graduate?**
 - a. Pursue a career in this field
 - b. College
 - c. Work somewhere else
 - d. Military
 - e. Not sure yet
5. **Would you like more information about careers related to your shop?**
 - a. Yes
 - b. No
 - c. Don't Care
6. **Do you feel what you are learning in this shop will prepare you for a career in this field?**
 - a. Yes
 - b. No
7. **Do you think meeting people working in your fields would be useful educationally?**
 - a. Yes
 - b. No
8. **Do you think visiting job sites would be useful educationally?**
 - a. Yes
 - b. No

Machining Shop Student Question Data:

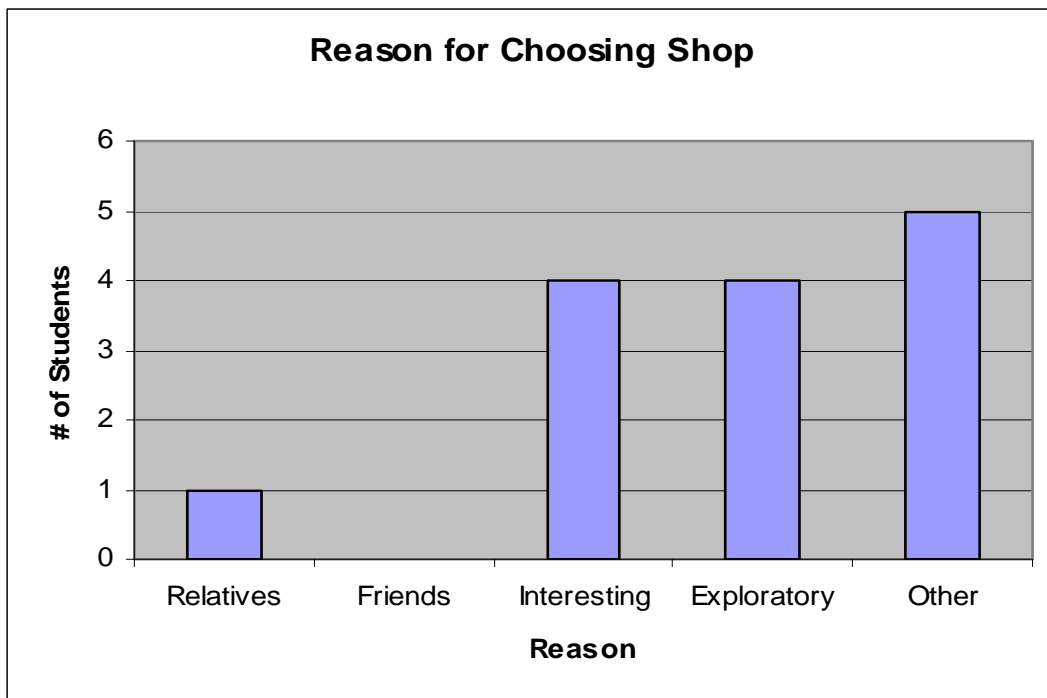
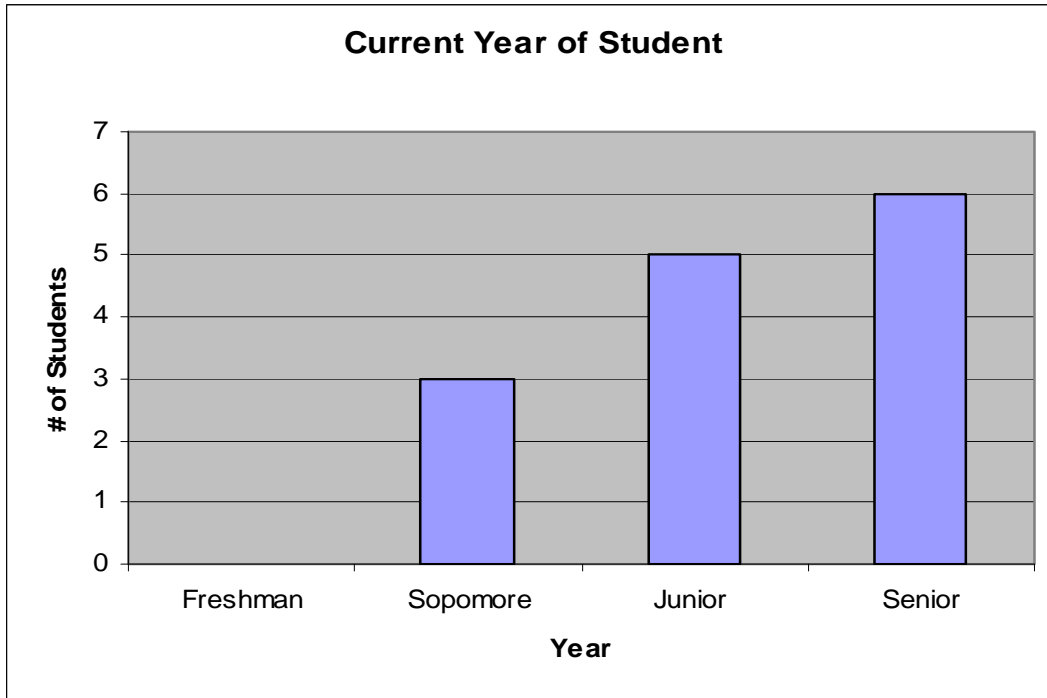


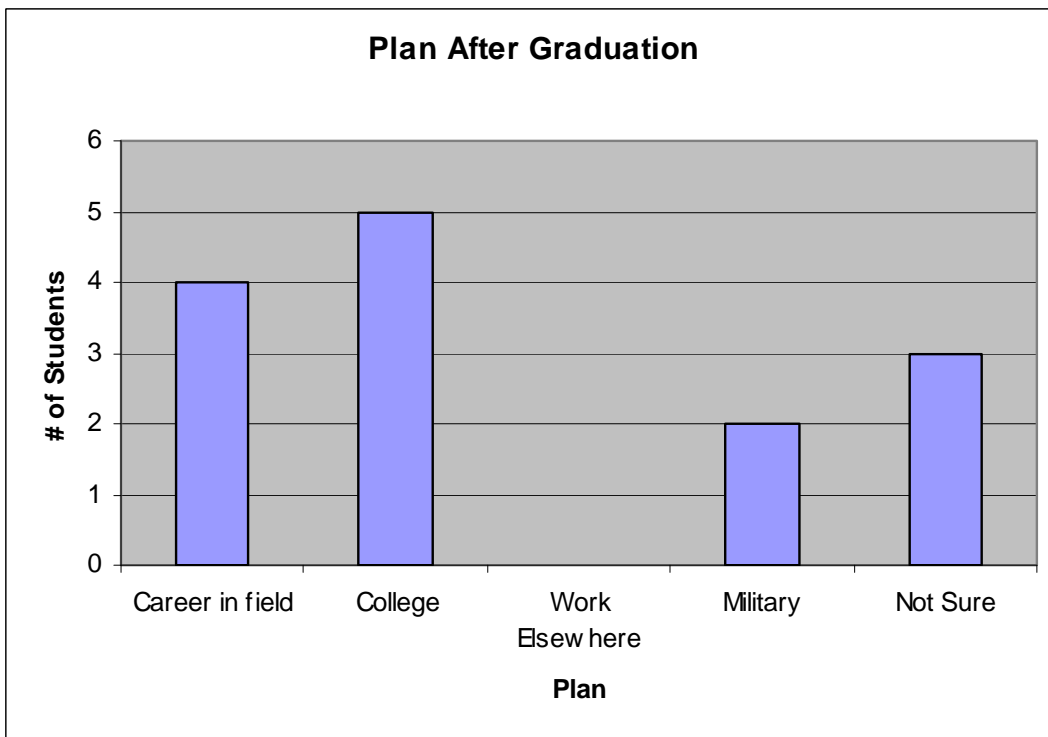
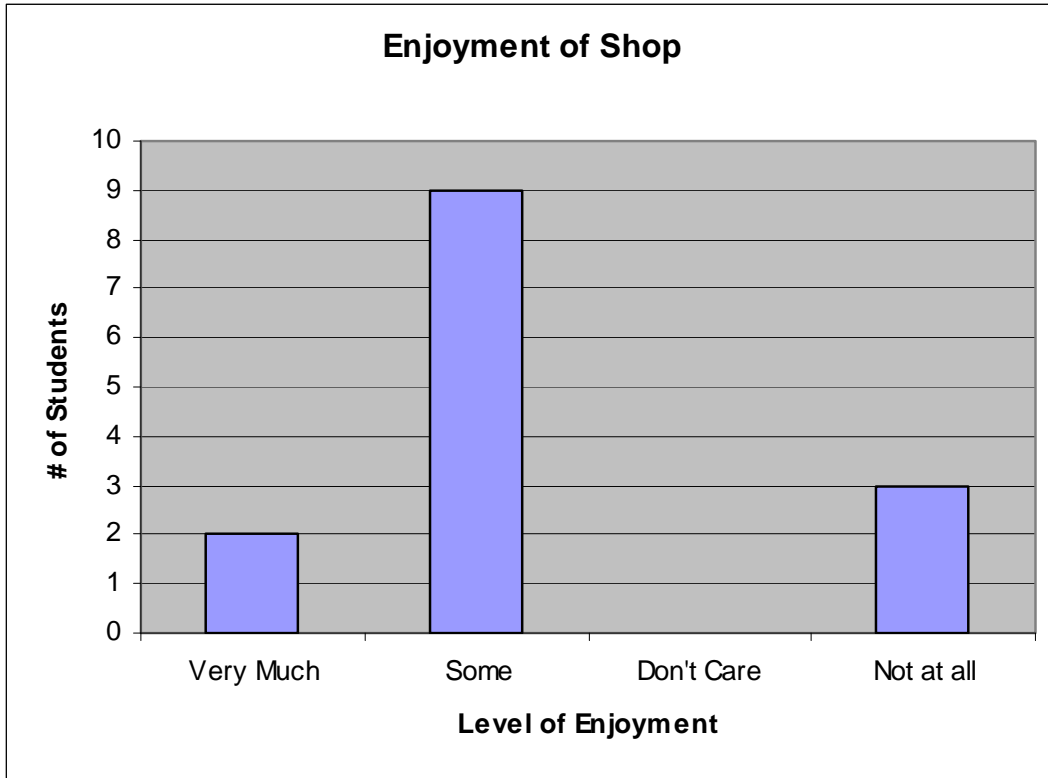


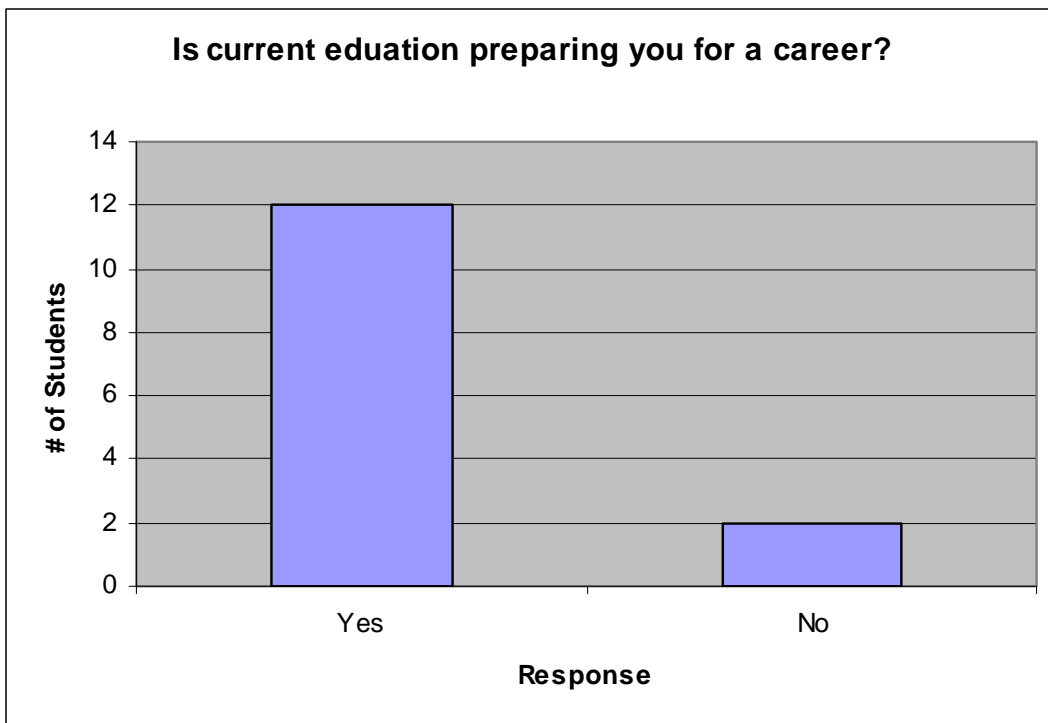
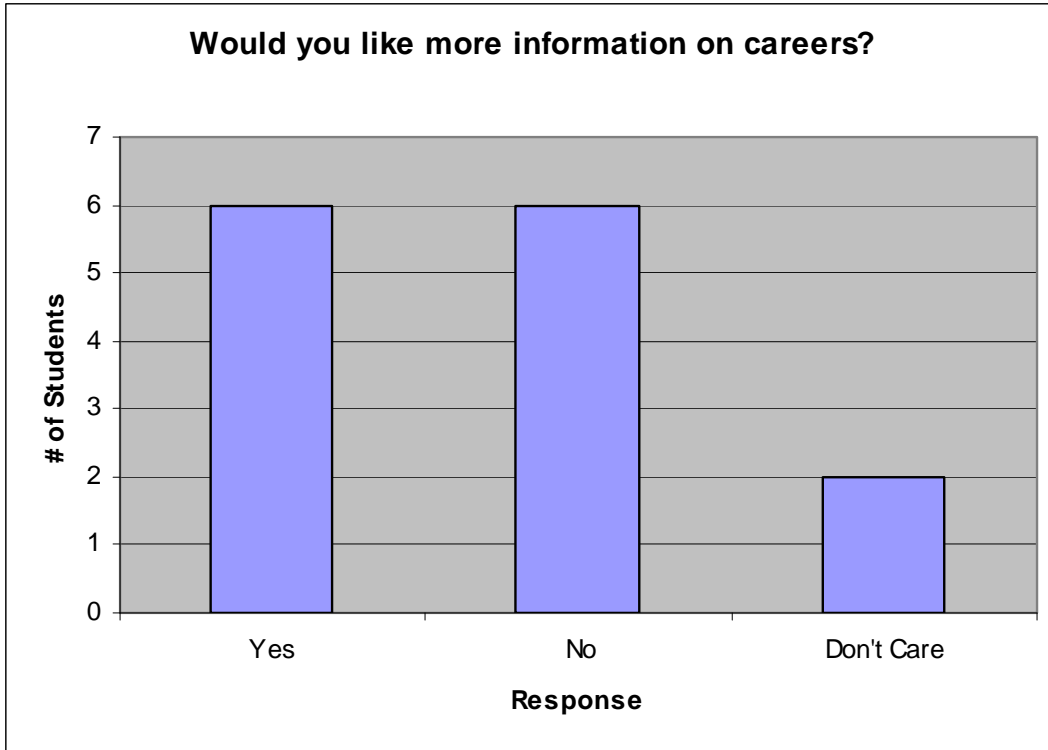


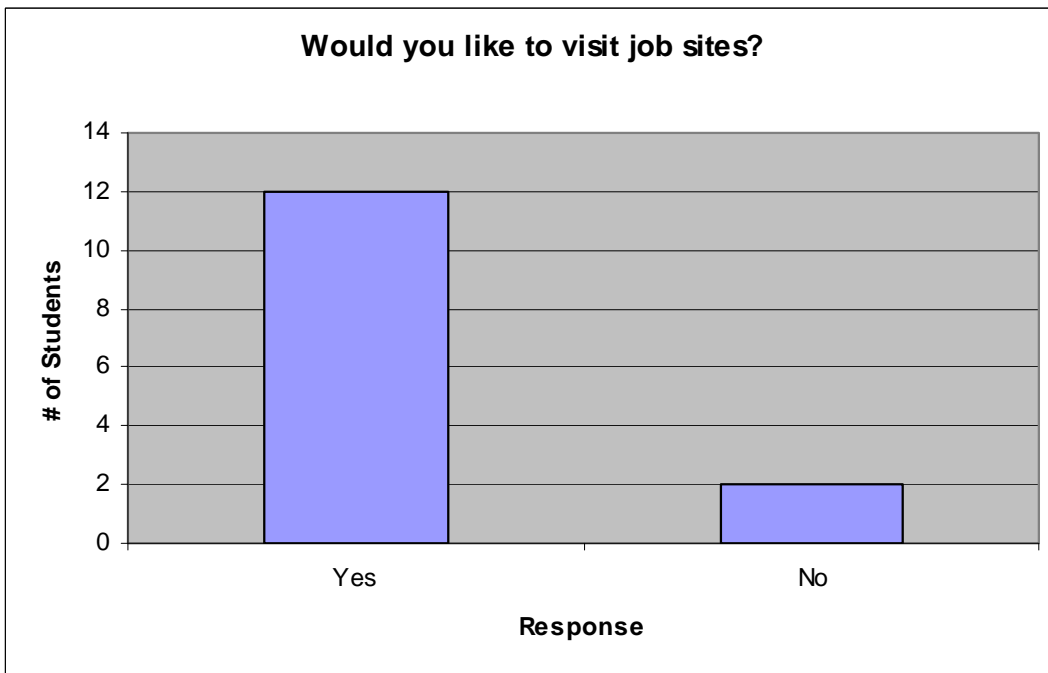
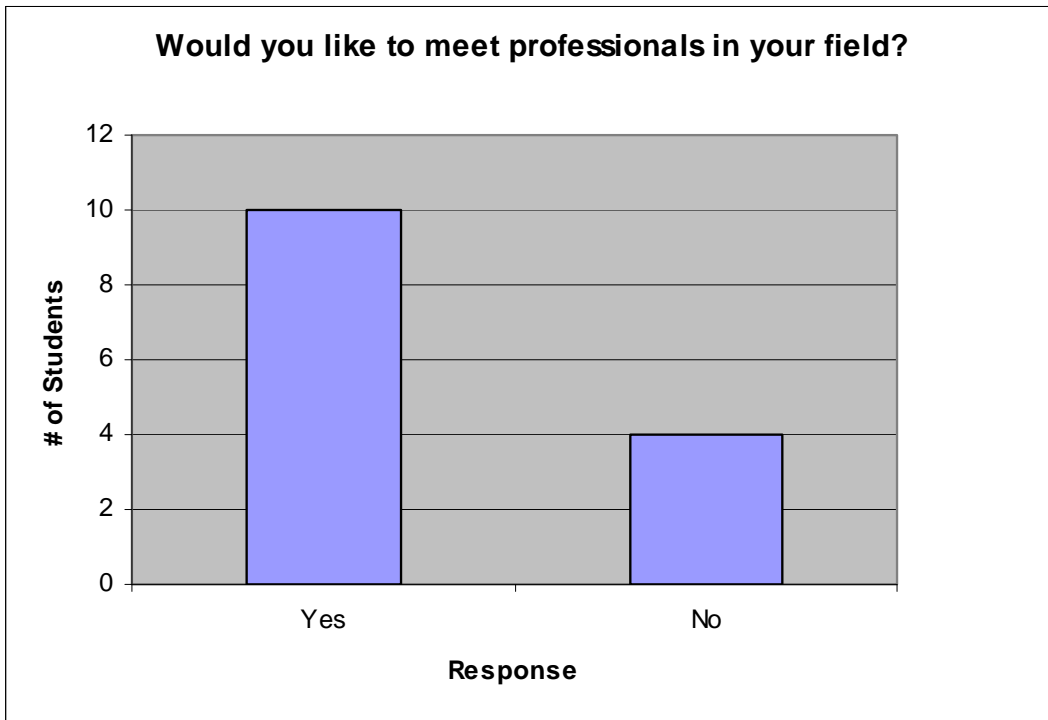


Sheet Metal Shop Student Question Data:

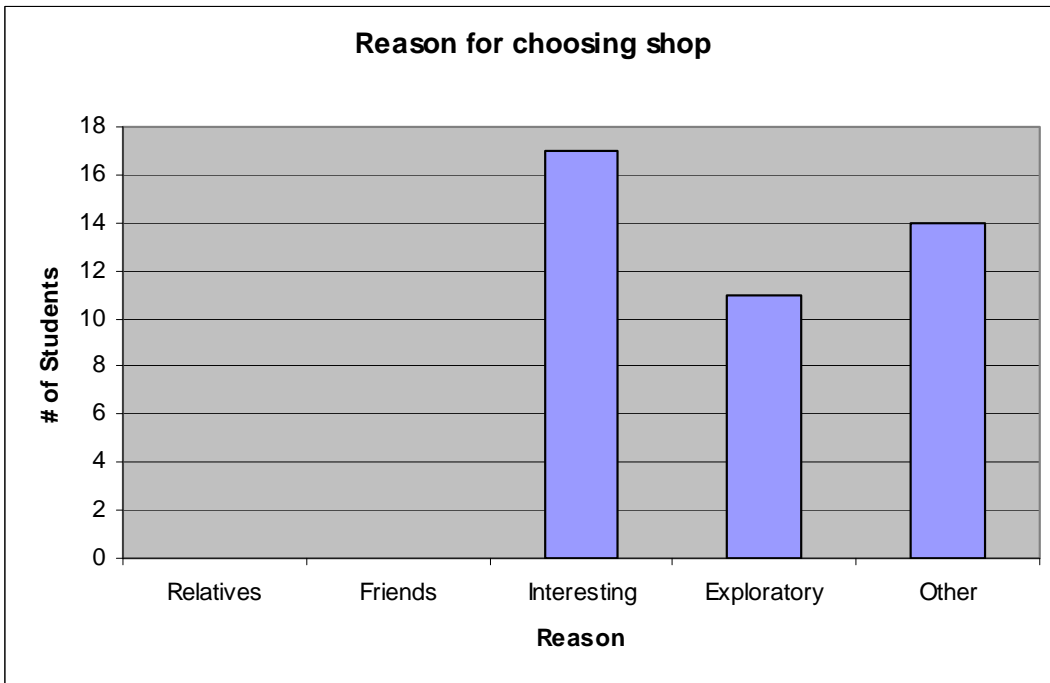
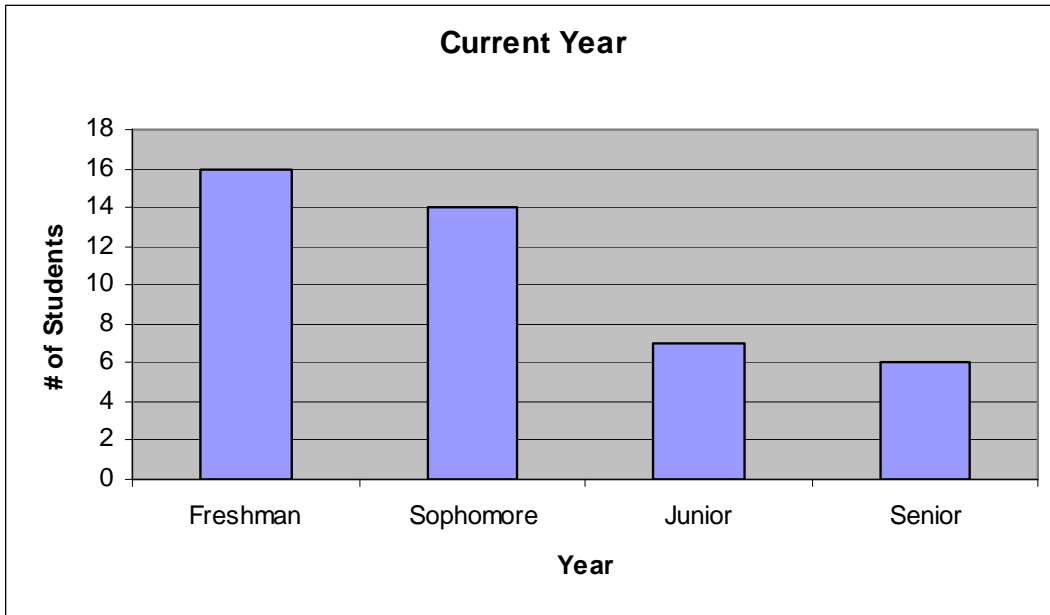


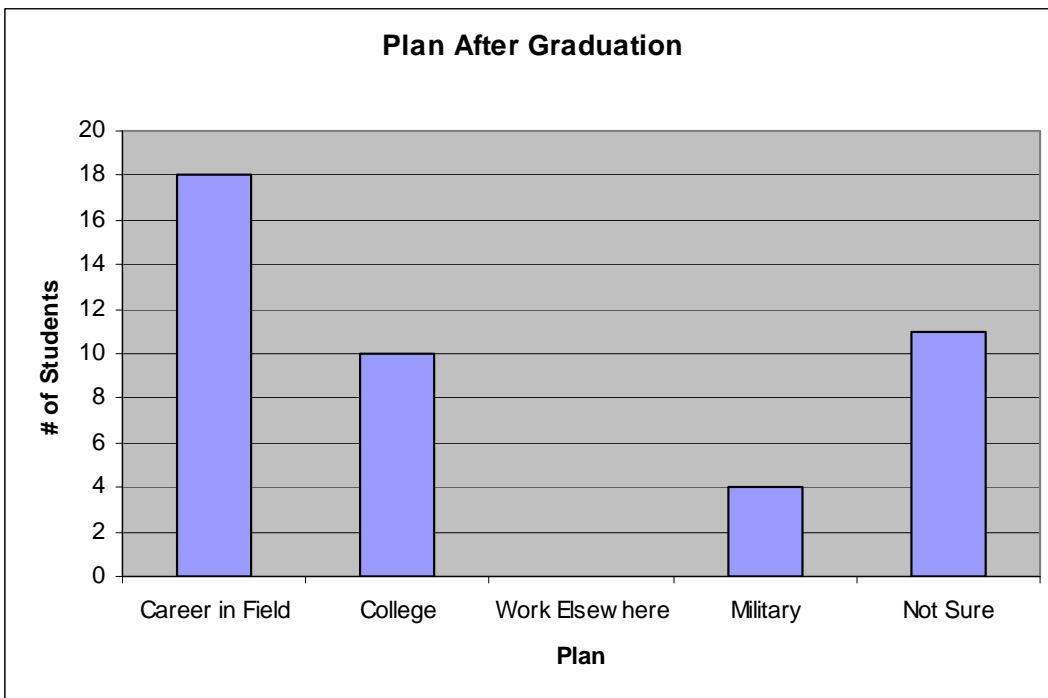
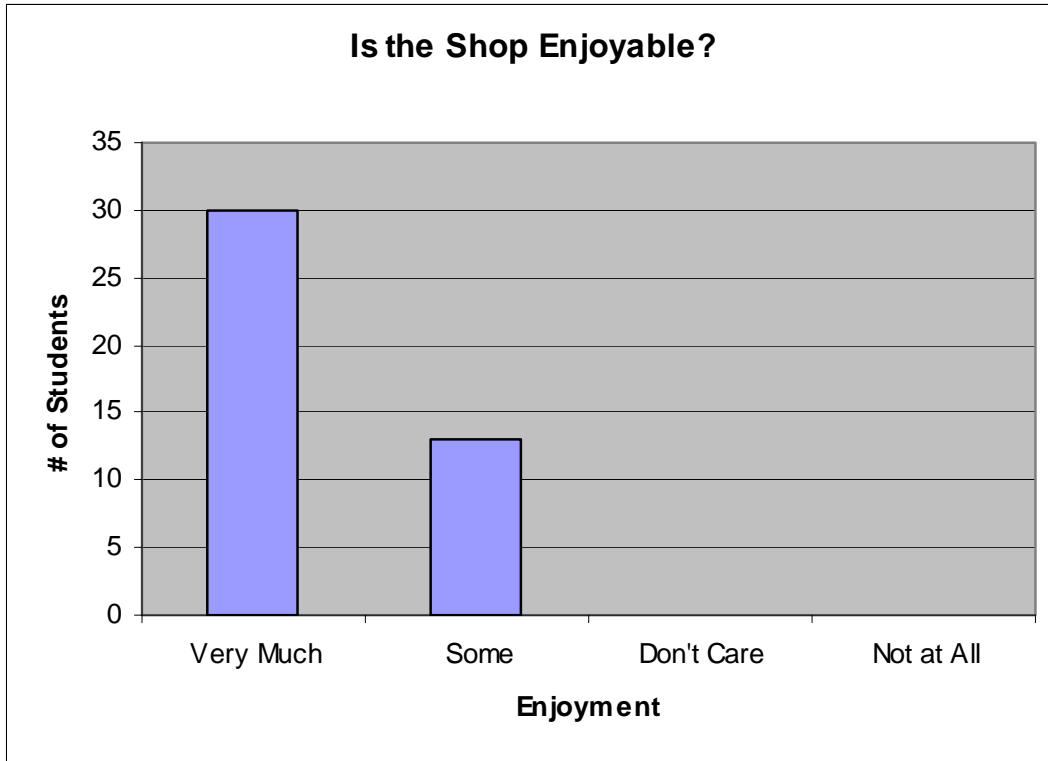


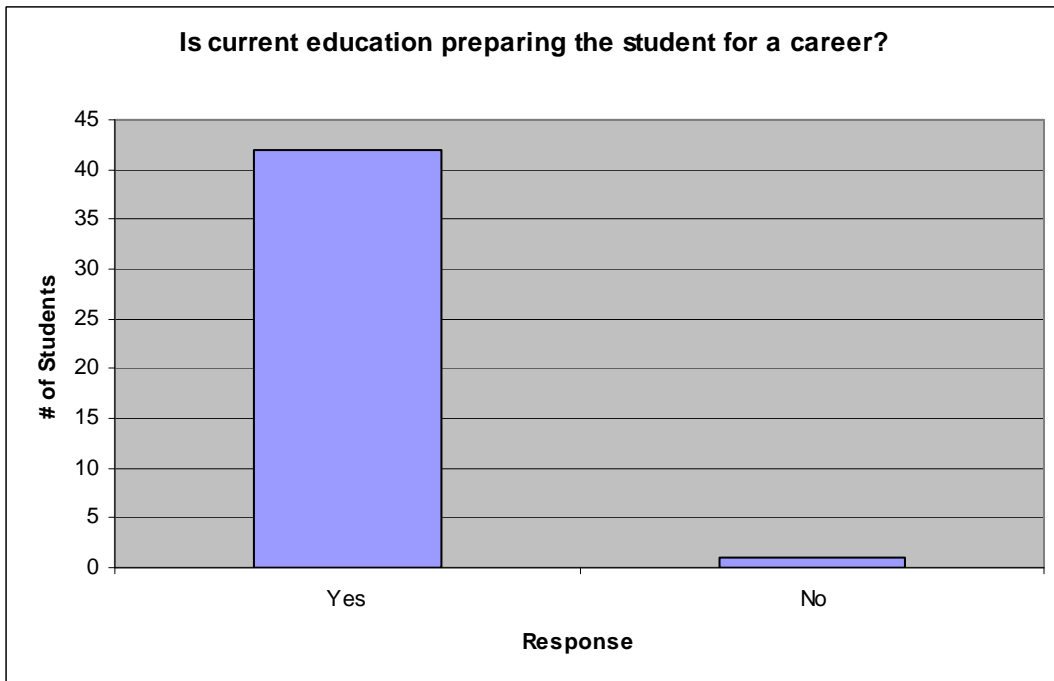
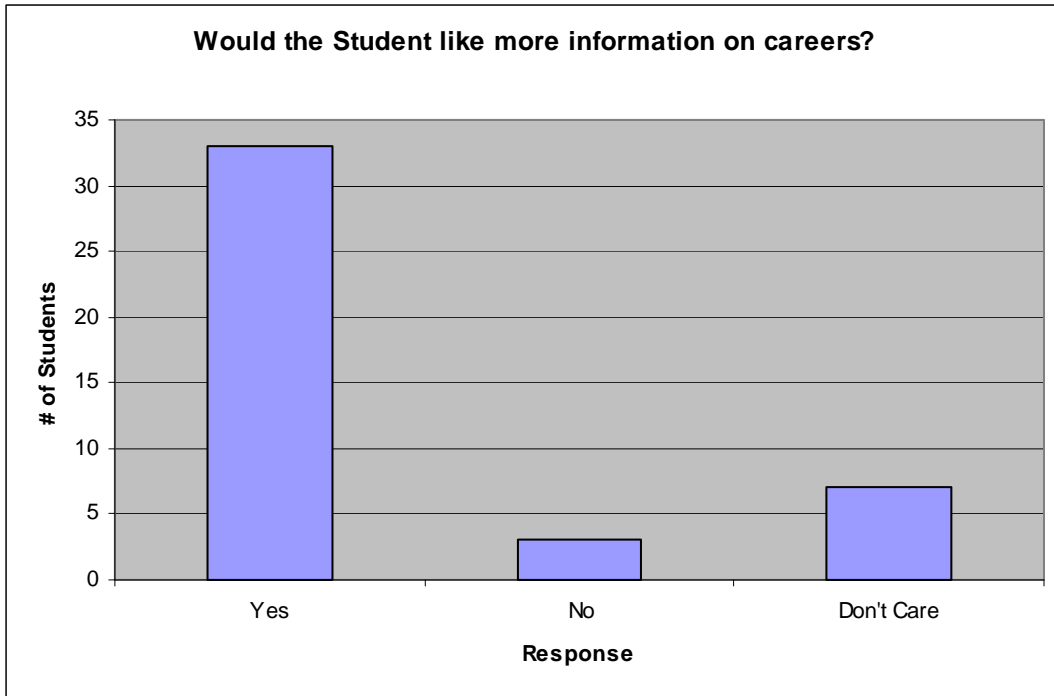


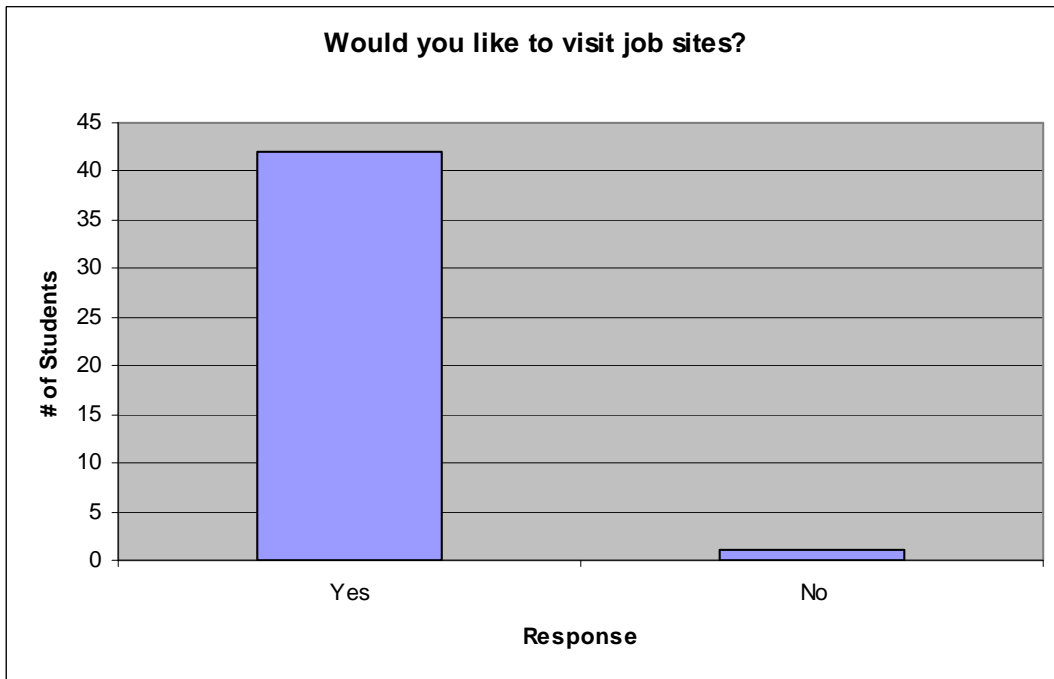


Welding Shop Student Question Data:









Appendix 3: Letter to Parents for Video Permission

April 3, 2008

Dear Parent or Guardian,

Worcester Technical High School has collaborated with students from Worcester Polytechnic Institute in order to promote the Metal Fabrication Departments at Worcester Technical High School. This project is designed to enhance the image and popularity of the Machining, Welding & Metals Technology, and Sheet Metal shops. The goal of this project is to not only attract more students into these fields, but to also give information to currently enrolled students about what paths they can follow in their respective futures. In order to facilitate these goals, a video is to be created highlighting the features of each field. This video will contain highlights from each department, interviews of students and still footage of the facilities in the school as well as previously completed projects. Attached to this document is a form seeking permission to use footage of your child in the construction of this video. We ask that you consider allowing your child to take place in this activity as it will not only better the student's individual experience, but will also benefit the experience of future students at Worcester Technical High School.

Thank You,

Patrick S. Hill
Dennis Proulx
Worcester Polytechnic Institute
Mechanical Engineering
Class of 2009