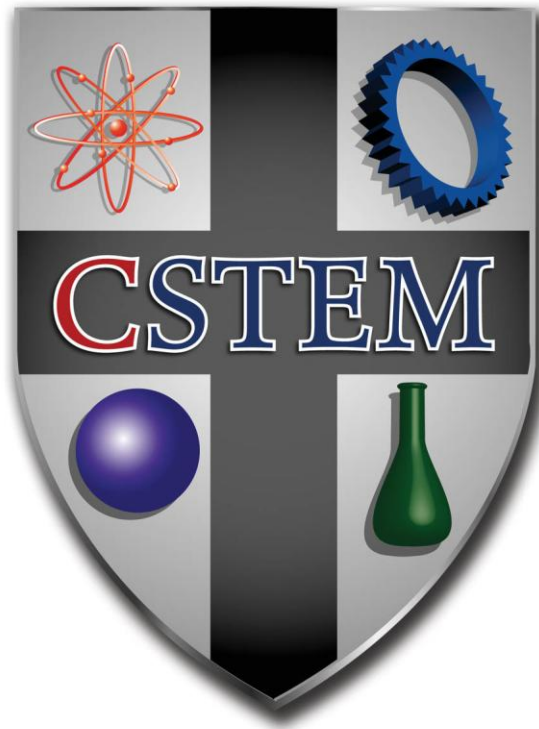


CSTEM Teacher & Student Support Services
Shell • Schlumberger Sea Turtle Robotics Project



Report Developed By
Dr. Emiel Owens and
Dr. James Johnson
STATLAB DATA SERVICES

The present project will be evaluated at two time periods. The initial evaluation of the project is based on two descriptive instruments developed by CSTEM Teacher & Student Support Services. The first instrument was a student survey divided into sections (1) student demographics (2) knowledge of engineering fields and (3) interest in robotics. The second survey was a teacher's instrument that measures (1) grade level taught (2) their gender (3) if they had ever been employed in a STEM field, and (4) interest in STEM programs. Therefore this report will evaluate the project at the first time period describing the student and the teacher survey. Finally, this report will examine the objectives listed below. It should be noted that some sections did have missing data.

CSTEM Objectives outcomes include:

- Increase in students' knowledge of STEM fields.
- Strengthen student's STEM skills.
- Increase student's interest in robotics.
- Increase student's interest in learning more about science and technology.
- Increase student's interest in careers that uses science and engineering.
- Enhancement of teacher STEM skills through training
- Build and support STEM teacher collaborations
- Encourage students to explore interest in STEM

Demographics of Students

The total sample in the present study was 207 students, representing 30 schools. Table 1 describes the overall distribution of the sample across school levels. In this case there were 83 elementary students which represent about 40 percent of the students in the sample. There were 80 middle school students along with 43 high school students. Middle school students represent about 39 percent of the students. Finally, high school level students represented about 21 percent of the sample

Table 1
Grade Level, Frequency, and Percentage
Overall

Grade Level	Number	Percentage
Elementary	83	40.1
Middle School	81	39.1
High School	43	20.8
Total	207	100%

Figure 1, graphically describes the grade level make-up of the students contained in the present study.

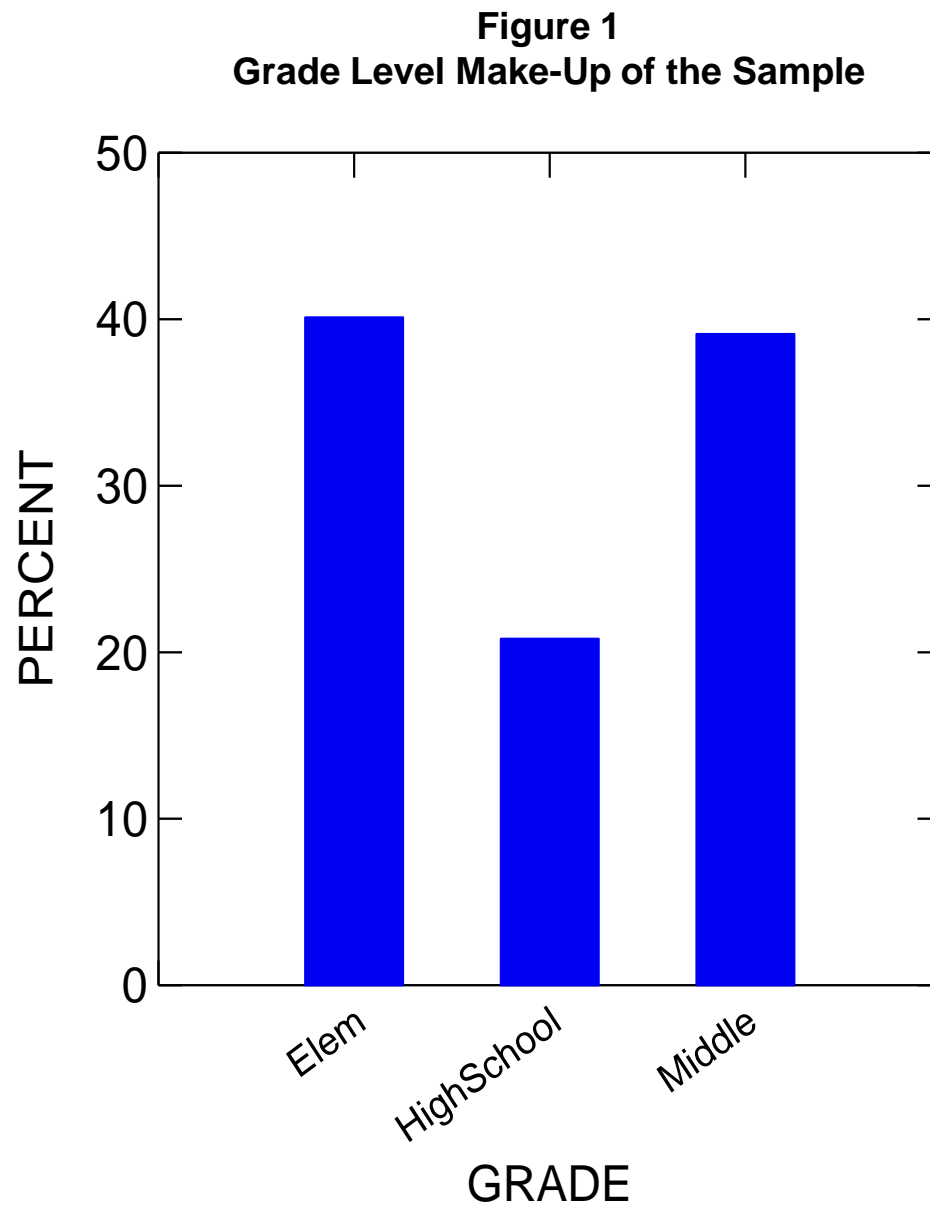


Table 2 describes the distribution of the overall sample across gender. There were 115 male students in the sample and 90 female students. Males represented about 55 percent in the sample. Females represented about 44 percent of the sample. There were two students that did not indicate their gender. These two students represented less than 1 percent of the sample

Table 2
Gender, Frequency and Percentage
Overall

Gender	Number	Percentage
Males	115	55.5
Females	90	43.5
Missing	2	1.0
Total	207	100%

Figure 2, graphically represents the gender make-up of the students contained in the present study.

Figure 2
Gender Make-Up of the Sample

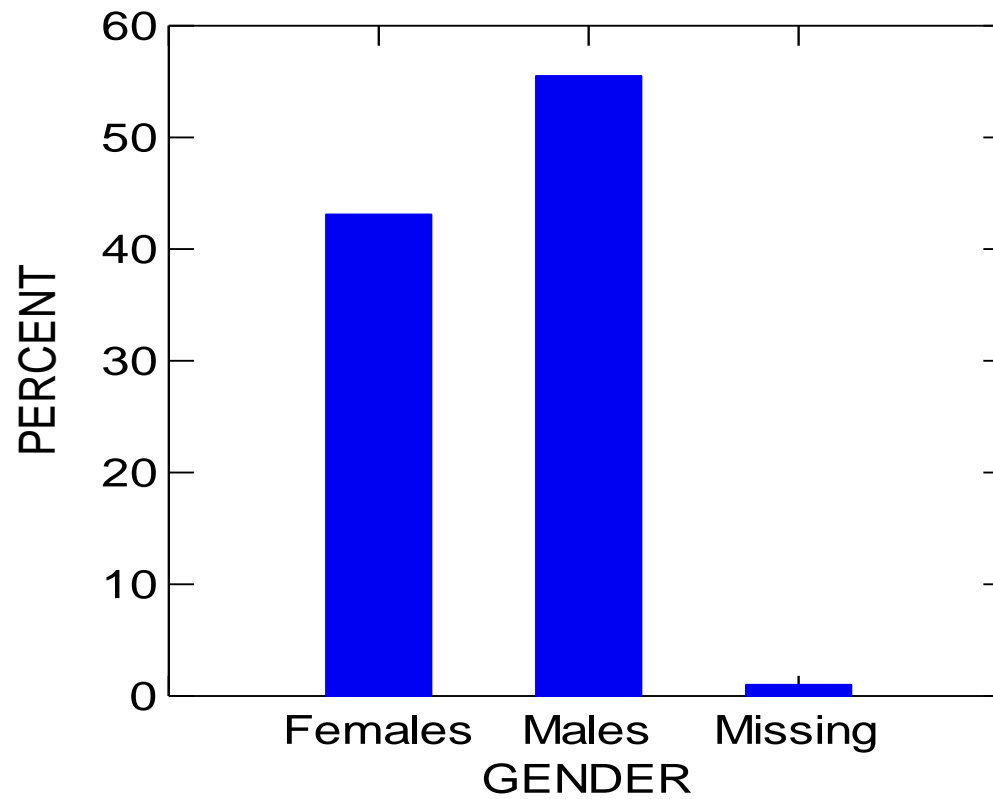


Table 3 represents ethnicity levels in the present sample. Hispanic students represented the largest proportion in the sample (about 48%) with 99. The second largest percent (about 38%) in the sample was African-American students. The total number of African-Americans in the survey was 78. Asian and Caucasian students represented about 5 percent and 4 percent respectively. Seven of the students selected the option “Other” as an indicator of their ethnicity. Finally, there were 4 cases where the student’s race was not indicated.

Table 3
Ethnicity, Frequency and Percentage
Overall

Ethnicity	Number	Percentage
African-American	78	37.7
Hispanic	99	47.8
Caucasian/White	8	3.9
Asian	11	5.3
Other	7	3.4
Missing	4	1.9
Total	207	100%

Figure 3, graphically represents the ethnic make-up of the students contained in the present study.

Figure 3
Ethnicity Make-Up of the Sample

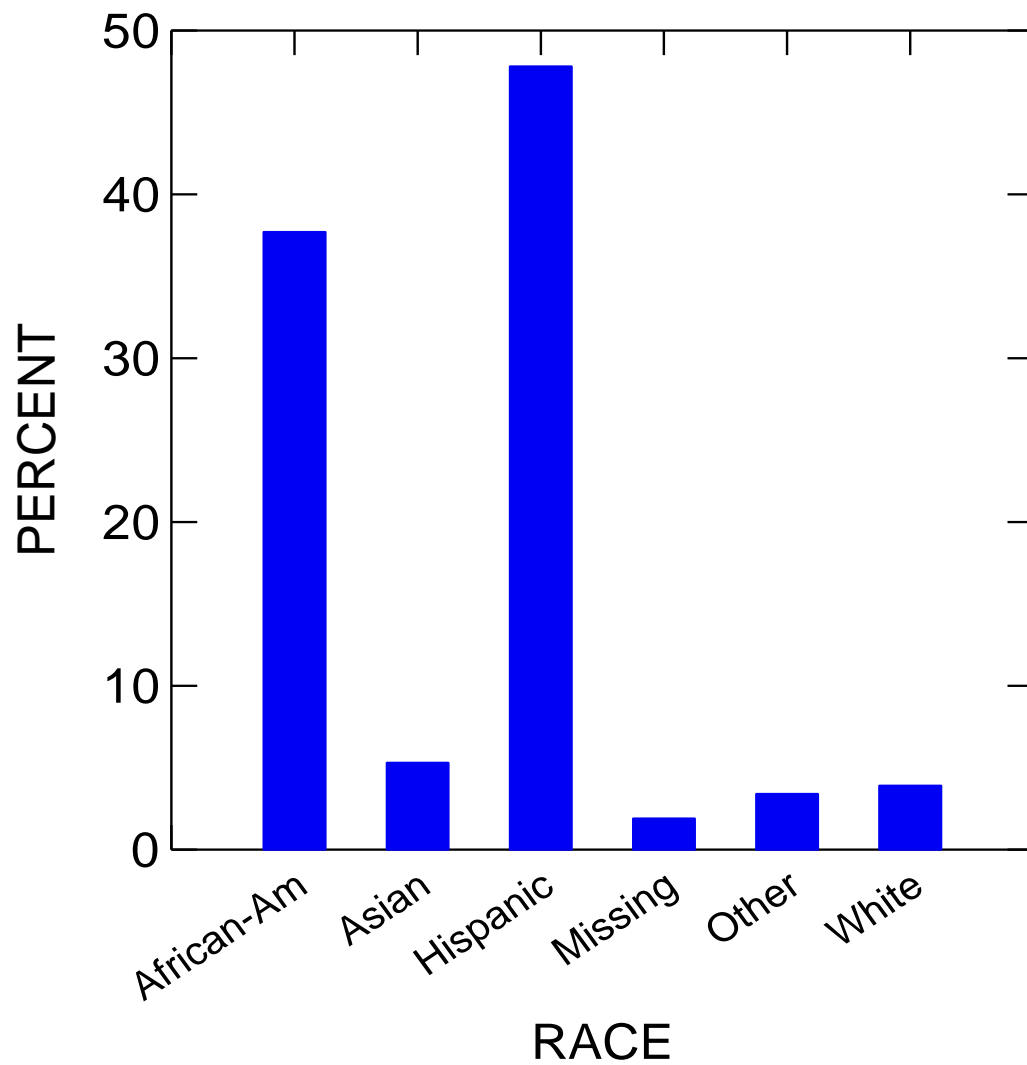


Figure 4 graphically represent ethnic groups and the gender make-up of the sample.

Figure 4
Ethnic Groups and Gender

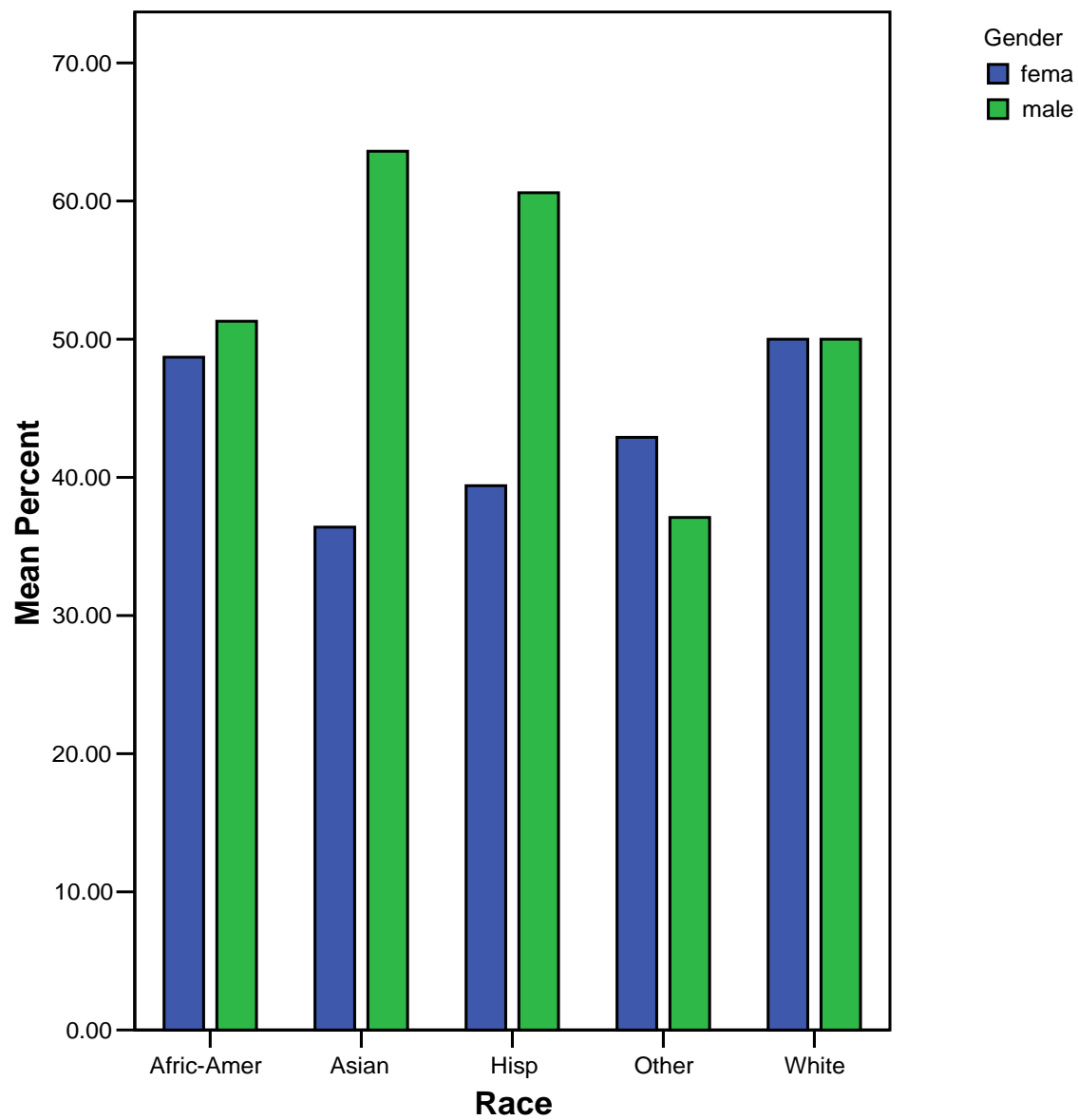


Figure 5 graphically represents school levels across ethnicity.

Figure 5
School Level and Ethnicity

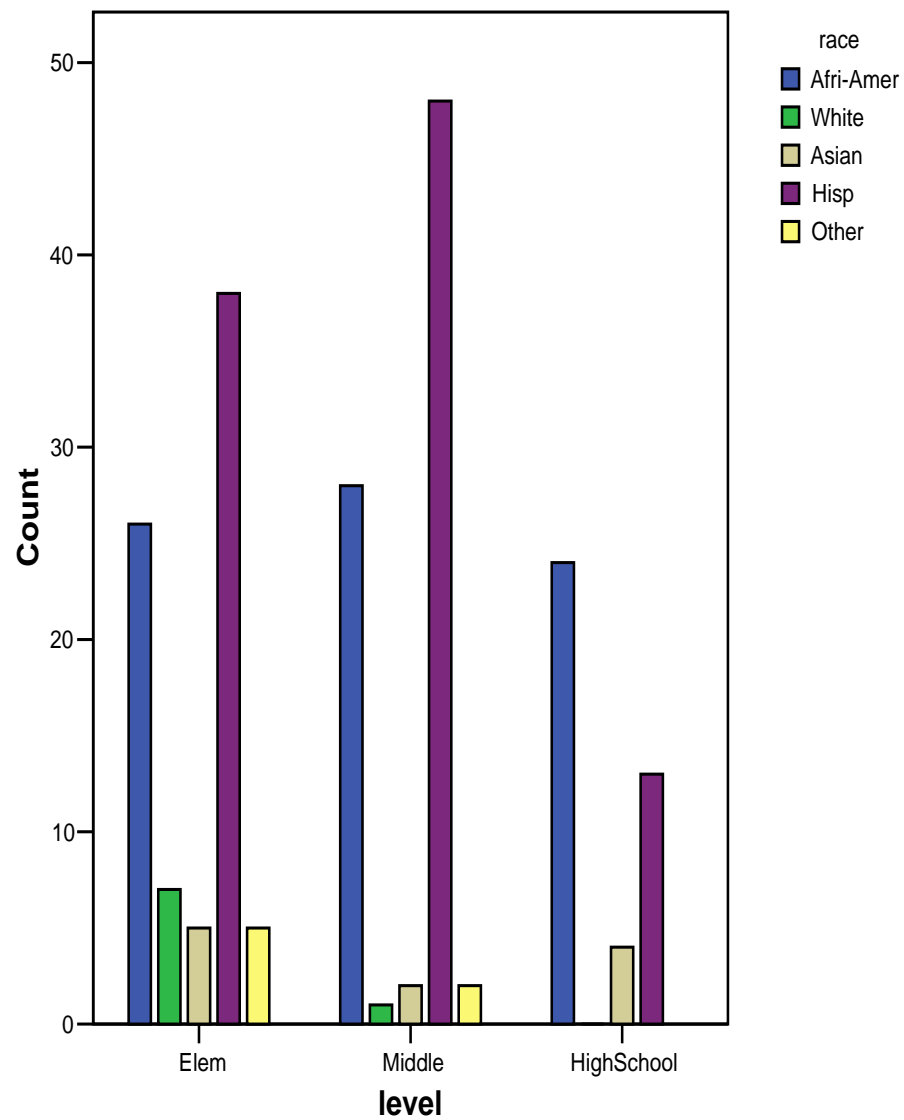


Figure 6 graphically represents school level across gender.

Figure 6
School Level and Gender

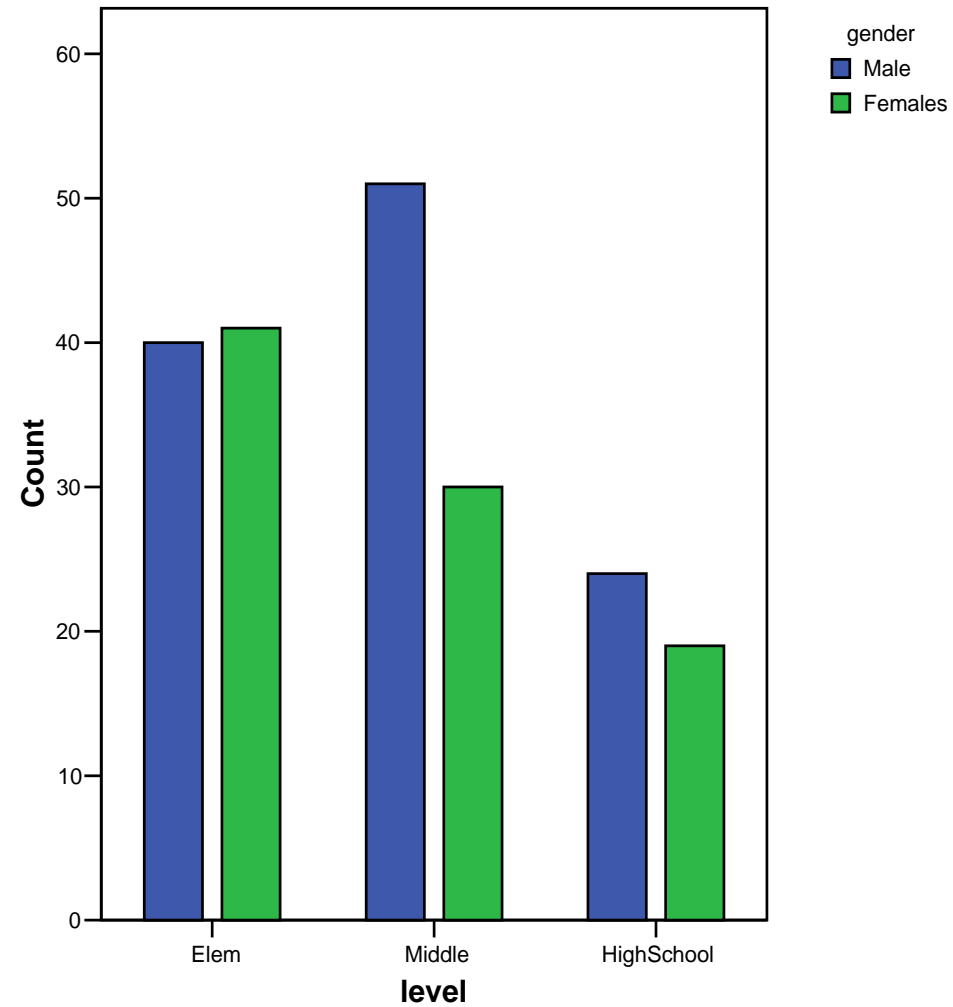


Figure 6a & 6b graphically represents ethnicity across gender.

Figure 6a and 6b
School Level, Ethnicity and Gender

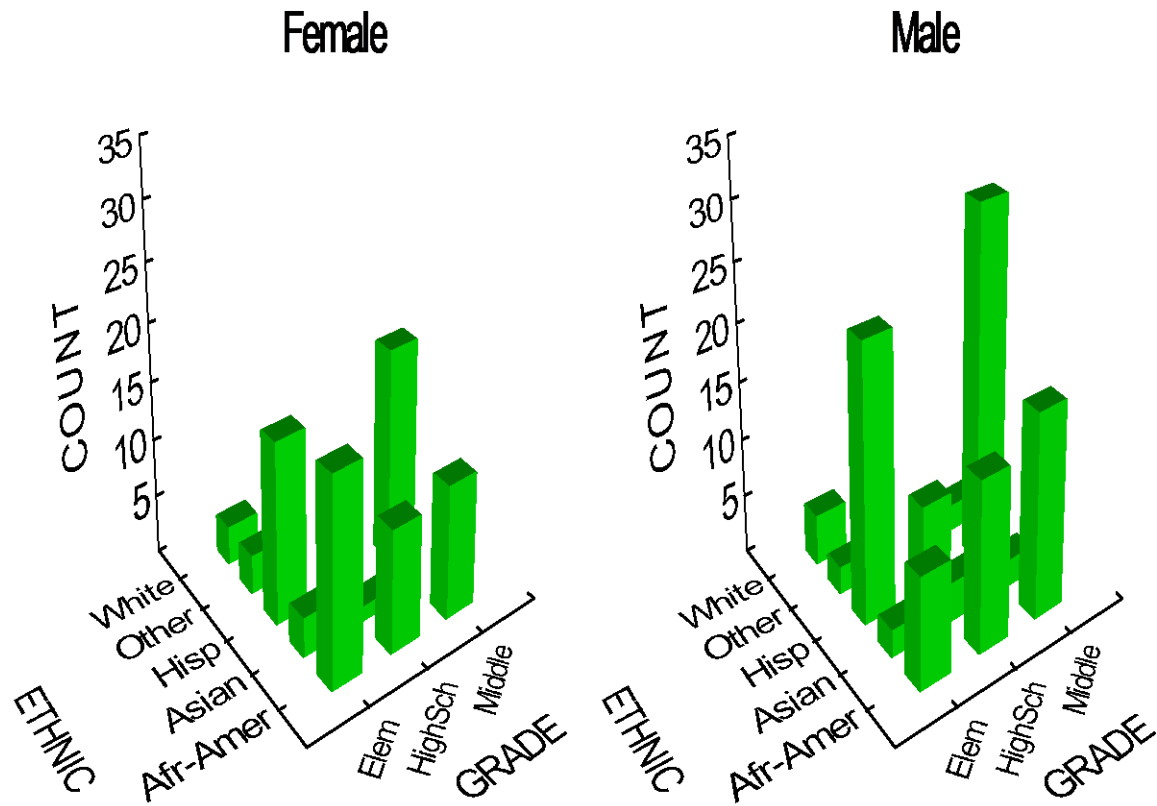


Figure 7 graphically represents Knowledge of Engineering Fields for the total sample.

Figure 7
Students' Knowledge of the Areas of Engineering

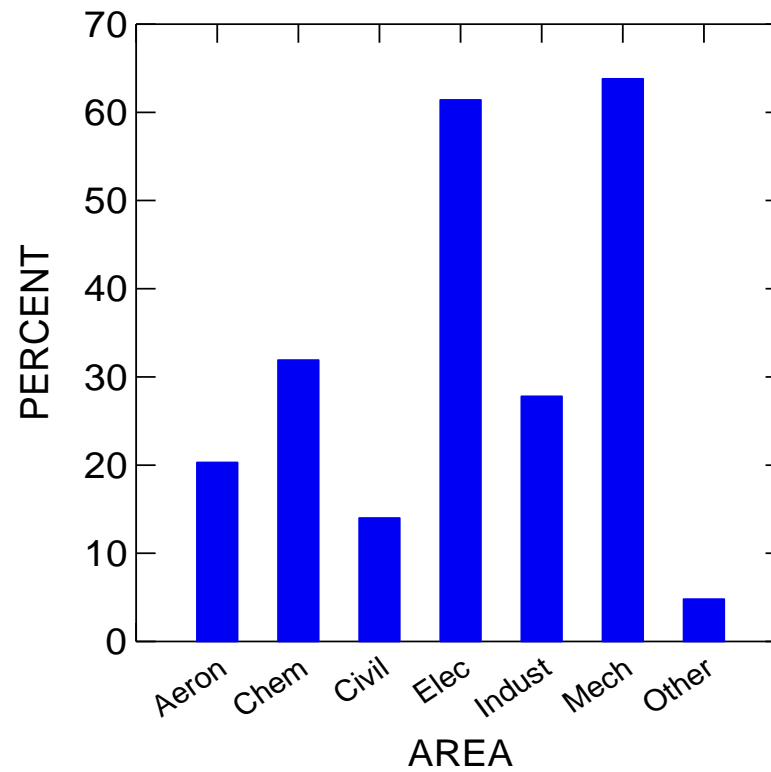


Figure 8 graphically represents student knowledge of the different areas across grade level.

Figure 8
Students' Knowledge of the Areas of
Engineering Across Grade Levels

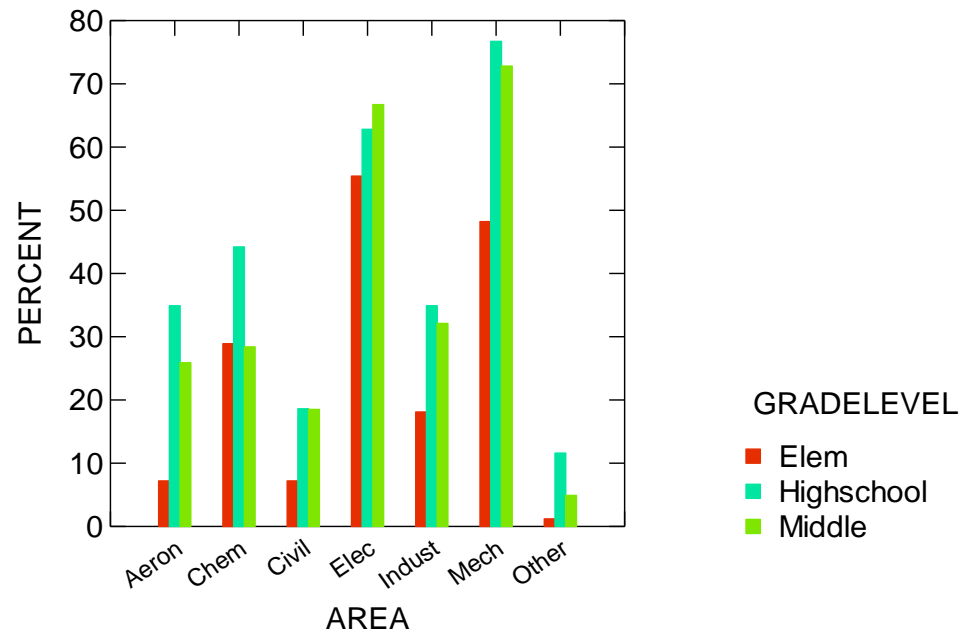


Figure 9 graphically represent **elementary school student's** knowledge of the different areas of engineering across ethnicity.

Figure 9
Elementary School Students' Knowledge of Areas in Engineering
By Ethnicity

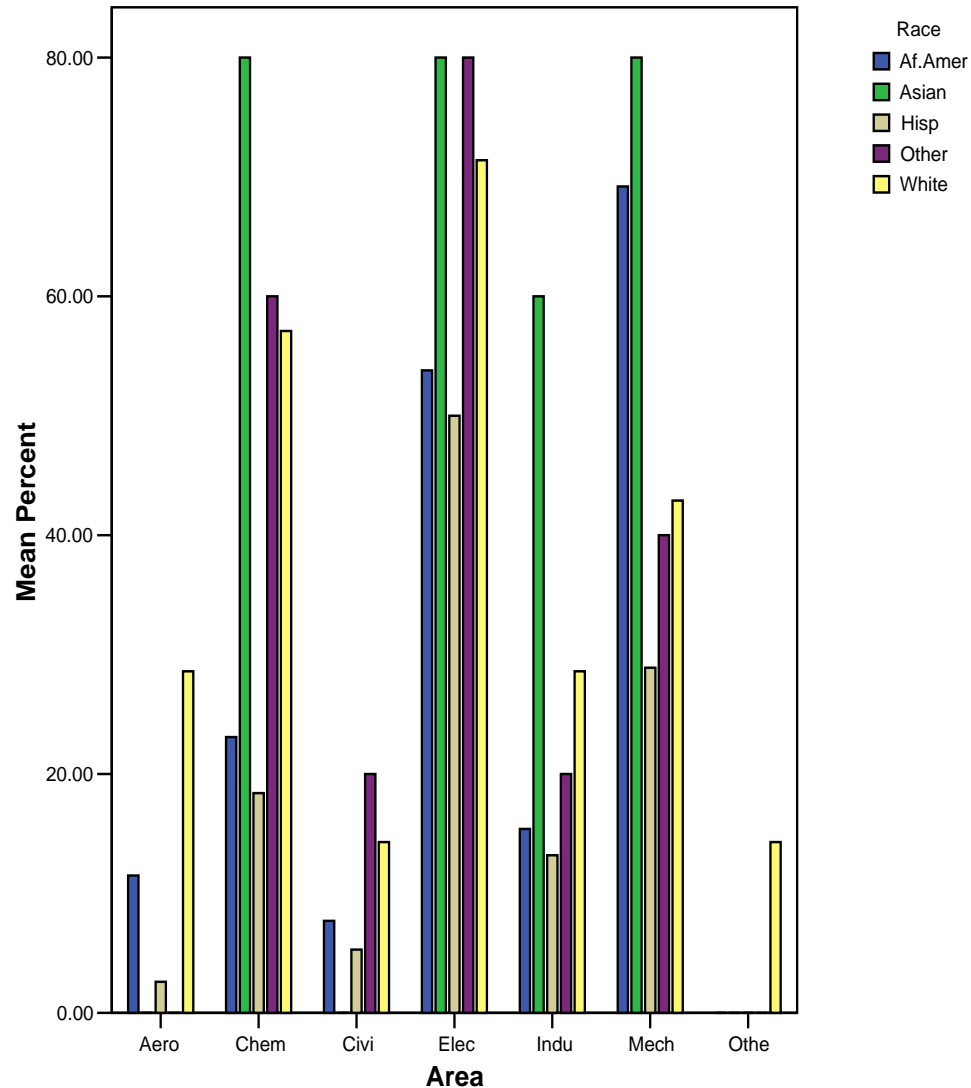


Figure 10
Middle School Students' Knowledge of Areas in Engineering
By Ethnicity

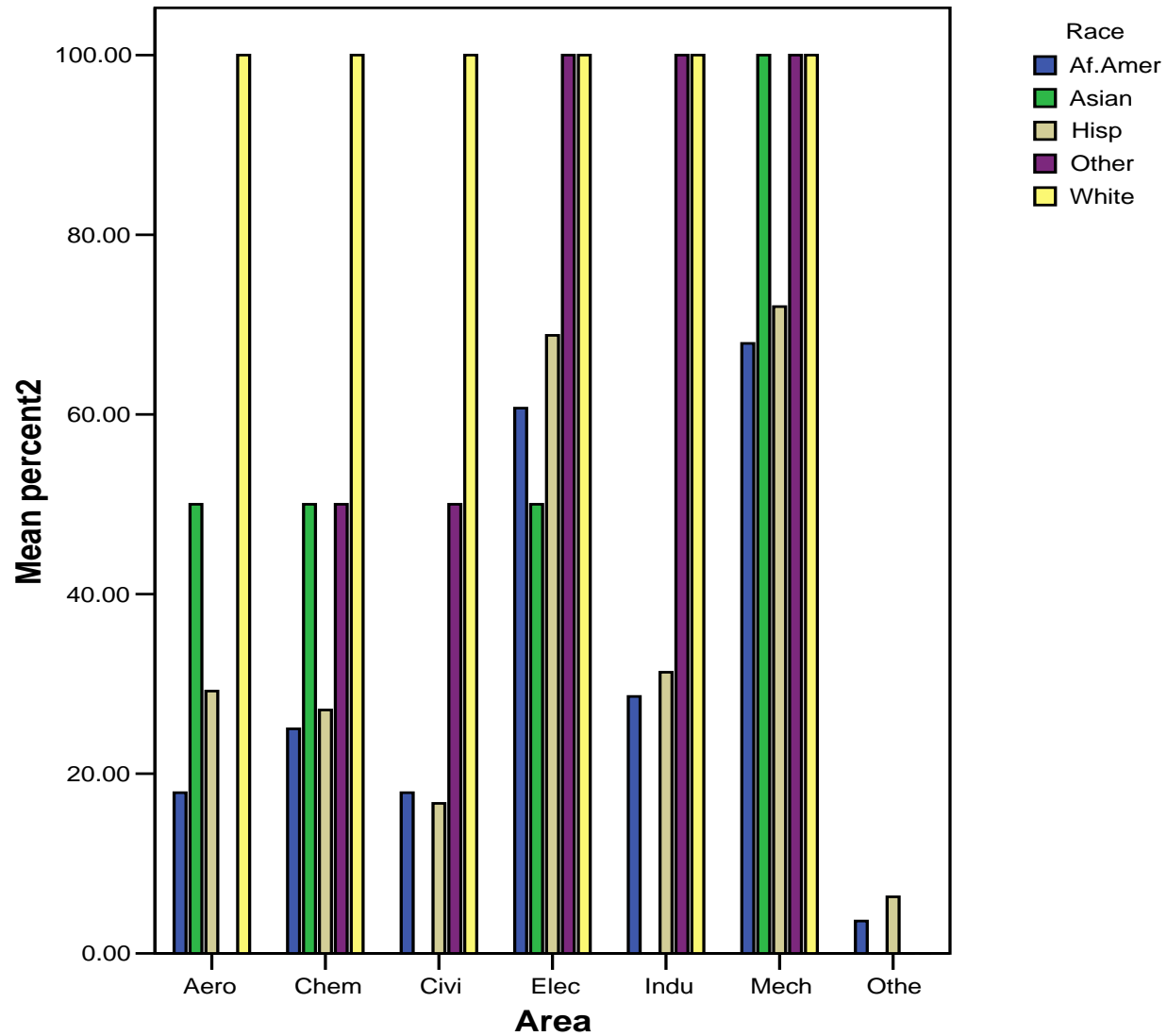


Figure 11 graphically represent **high school student's** knowledge of the different areas of engineering across ethnicity.

Figure 11
High School Students' Knowledge of Areas in Engineering
By Ethnicity

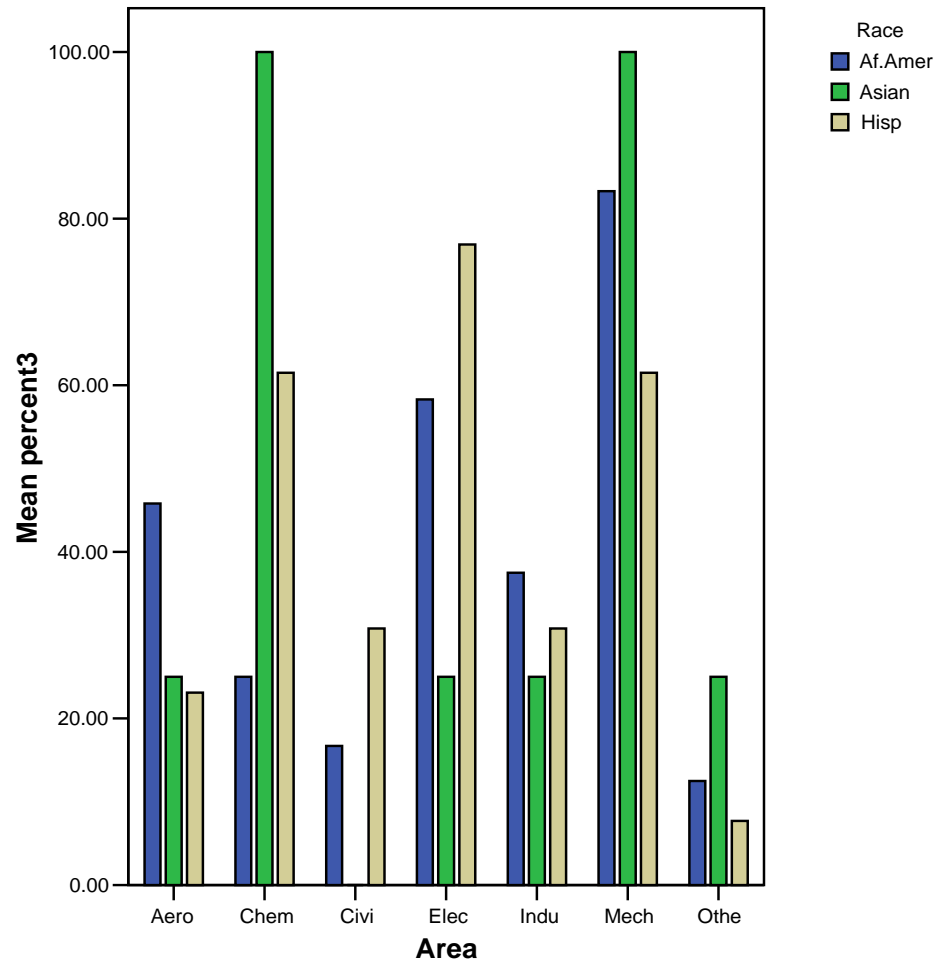


Figure 11 graphically represent **elementary school student's** knowledge of the different areas of engineering across gender.

Figure 11
Elementary School Students' Knowledge of Areas in Engineering
By Gender

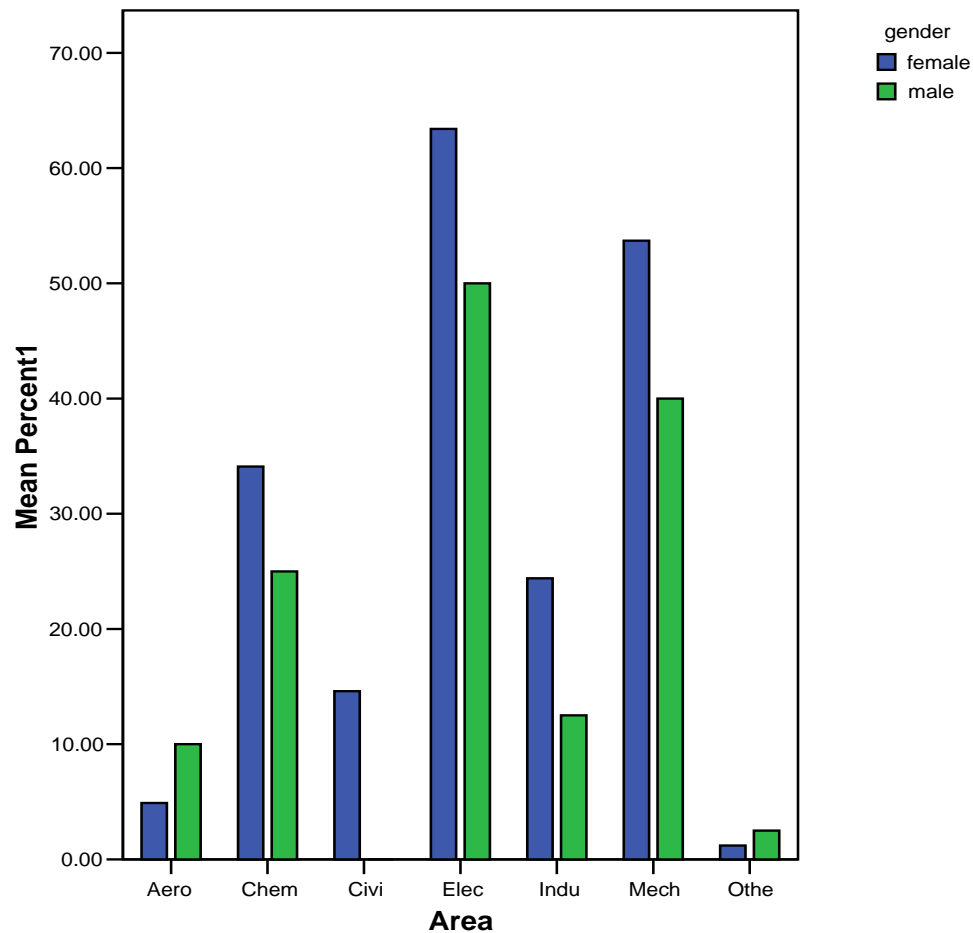


Figure 12 graphically represents **middle school student's** knowledge of the different areas of engineering across gender.

Figure 12
Middle School Students' Knowledge of Areas in Engineering
By Gender

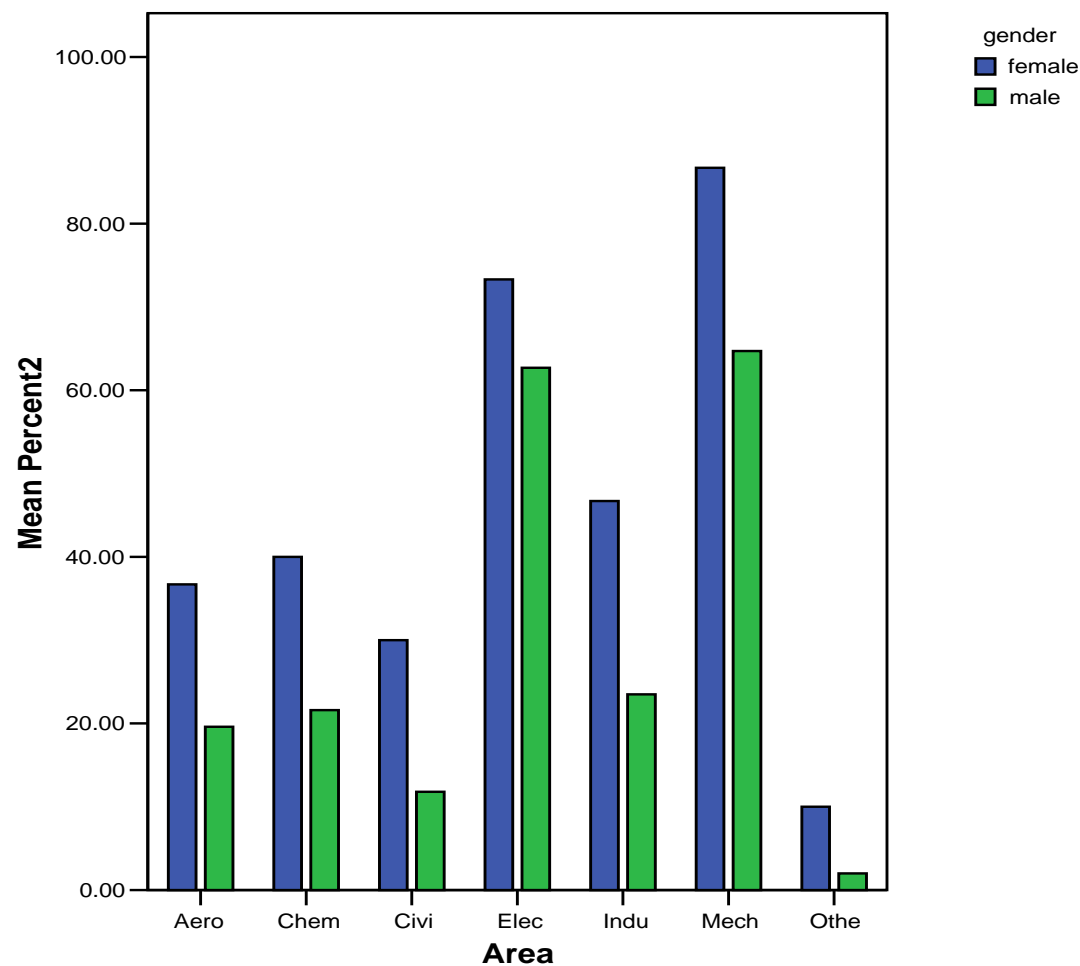


Figure 13 graphically represent **high school student's** knowledge of the different areas of engineering across gender.

Figure 13
High School Students' Knowledge of Areas in Engineering
By Gender

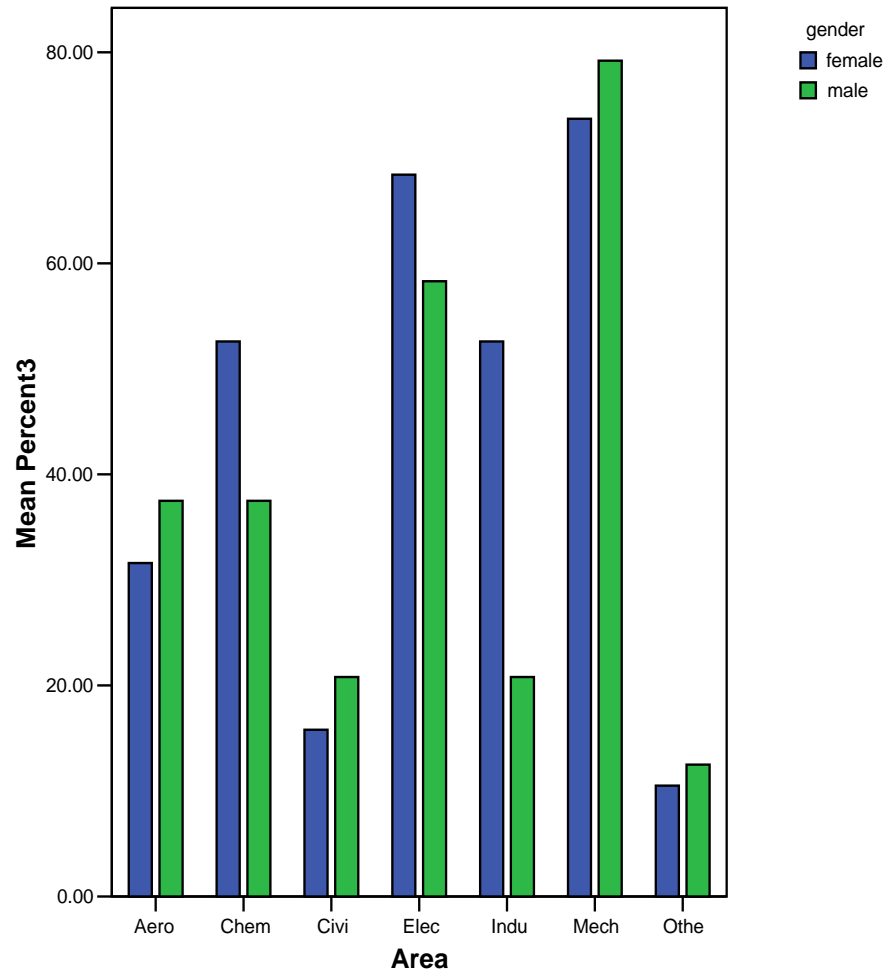


Table 14 reports student’s responses to item 7, which ask why they wanted to join the robotics team.

Table 14
Reasons for Joining the Robotics, Percent of Students that Said Yes to Each Question

Questions	YES	NO
I want to learn more about science and technology	75.0%	25.0%
I am interested in a job or career that uses science and engineering	33.3%	66.7%
I like working on a team project	43.5%	56.5%
I am good with operating computers	24.6%	75.4%
I want to learn more about engineering	32.9%	67.1%
I want to become an engineer	17.9%	82.1%
I like putting things together	60.9%	39.1%

Figure 15 graphically represent the percentage of students that answered yes to each question.

Figure 15
Reasons for Joining the Robotics, Percent of Students that Said Yes
By Question

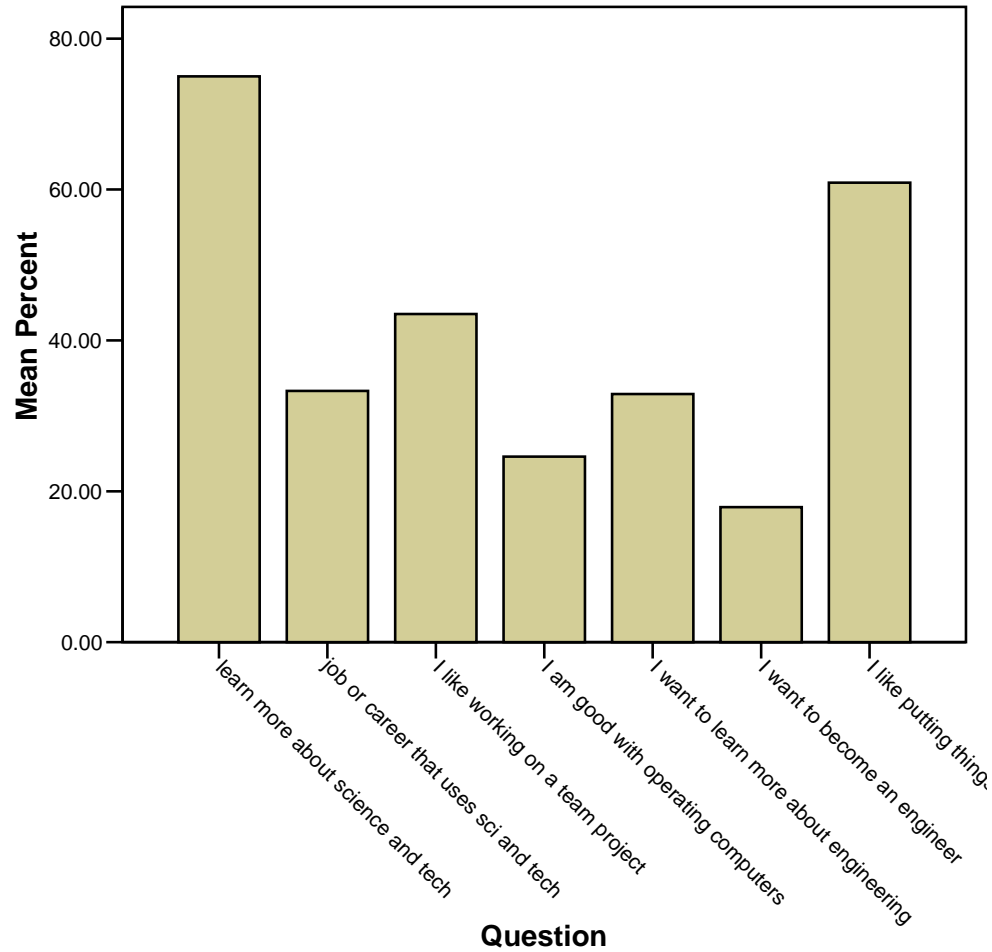


Figure 16 graphically represent the percentage of students that answered yes to each question by grade level.

Figure 16
Why you joined the robotics team by Grade Level

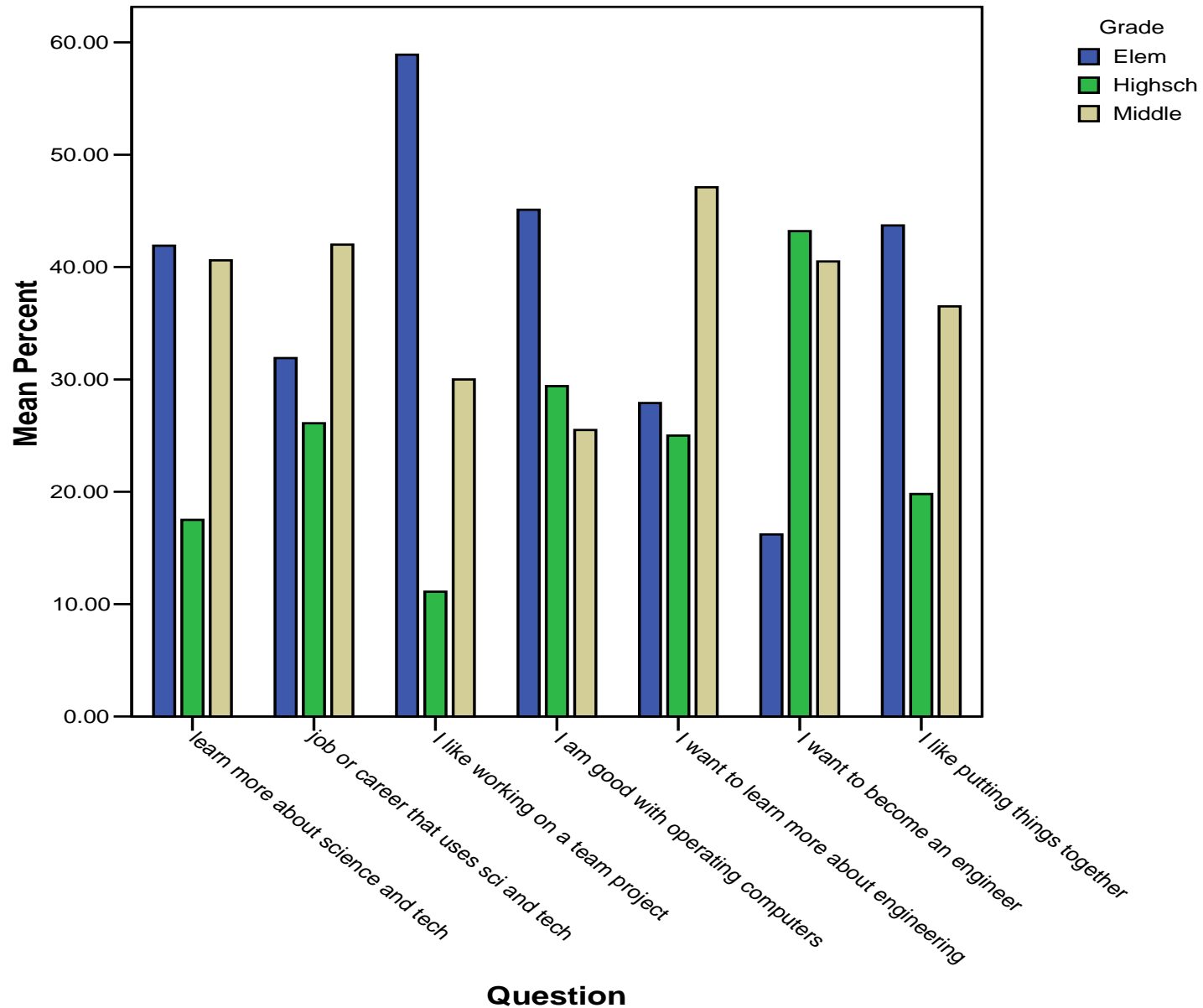


Figure 17 graphically represent the percentage of students that answered yes to each question by ethnicity.

Figure 17
Why you joined the robotics team by Ethnicity

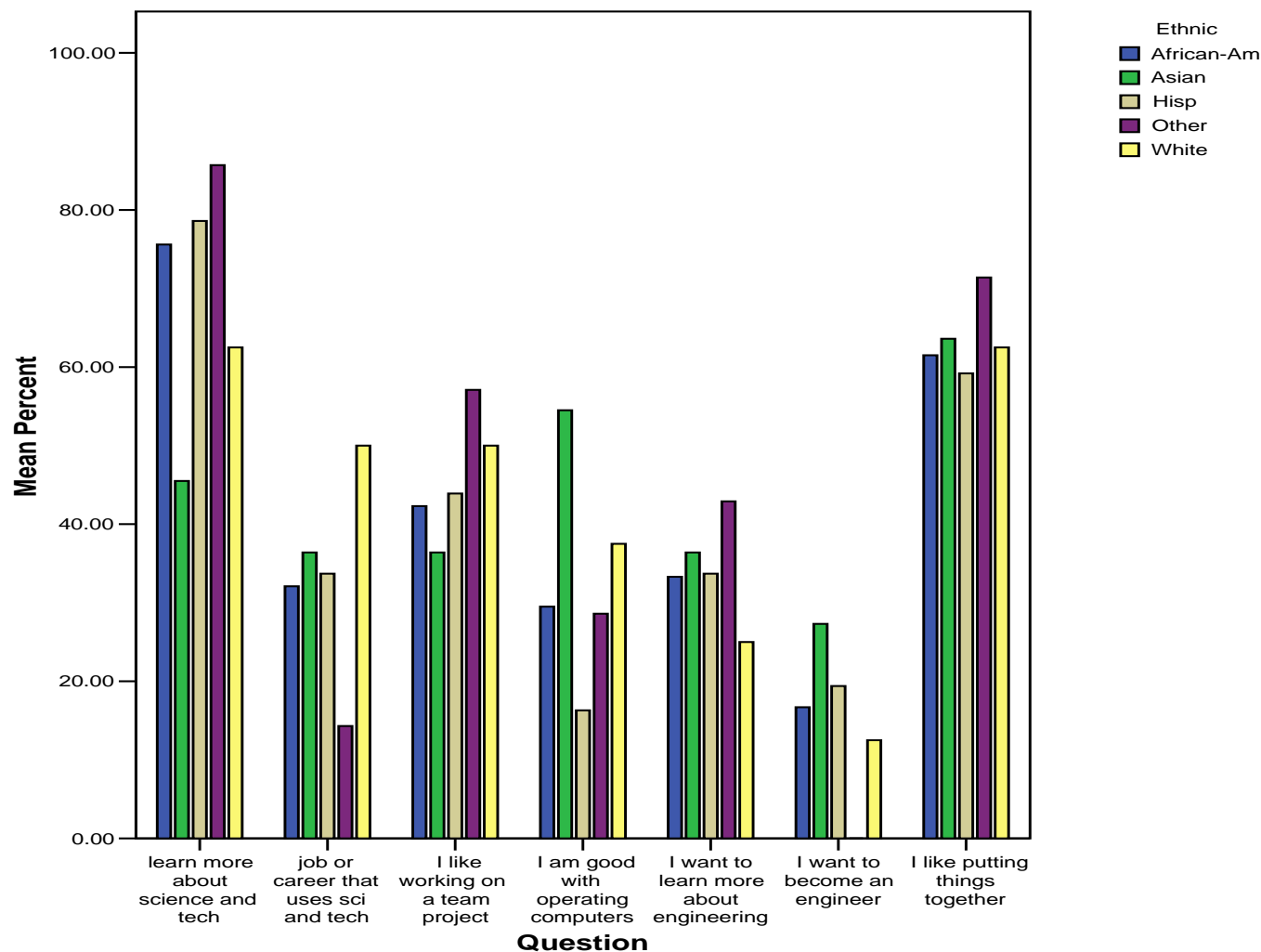


Figure 18 graphically represent gender percentages of the teachers included in the sample.

Figure 18
Gender Percentages

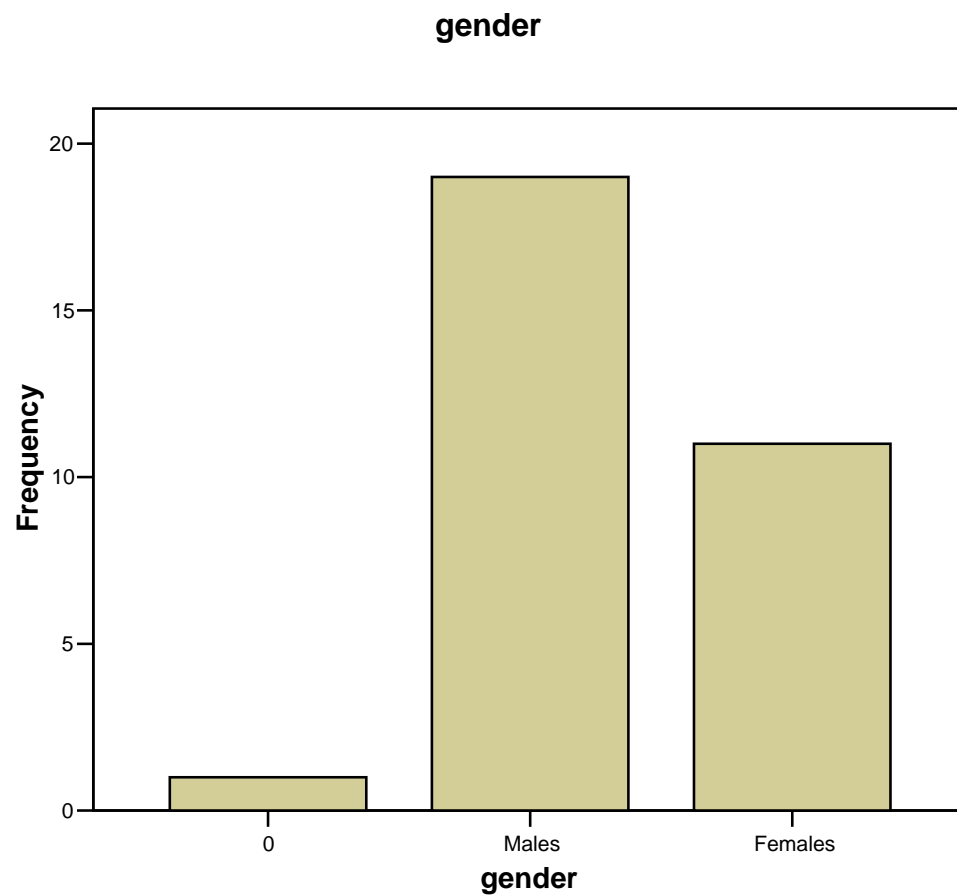


Figure 19 graphically represents the percentage of teachers reporting they had worked in a STEM area.

Figure 19
Number of Teachers Previously Employed in STEM Area

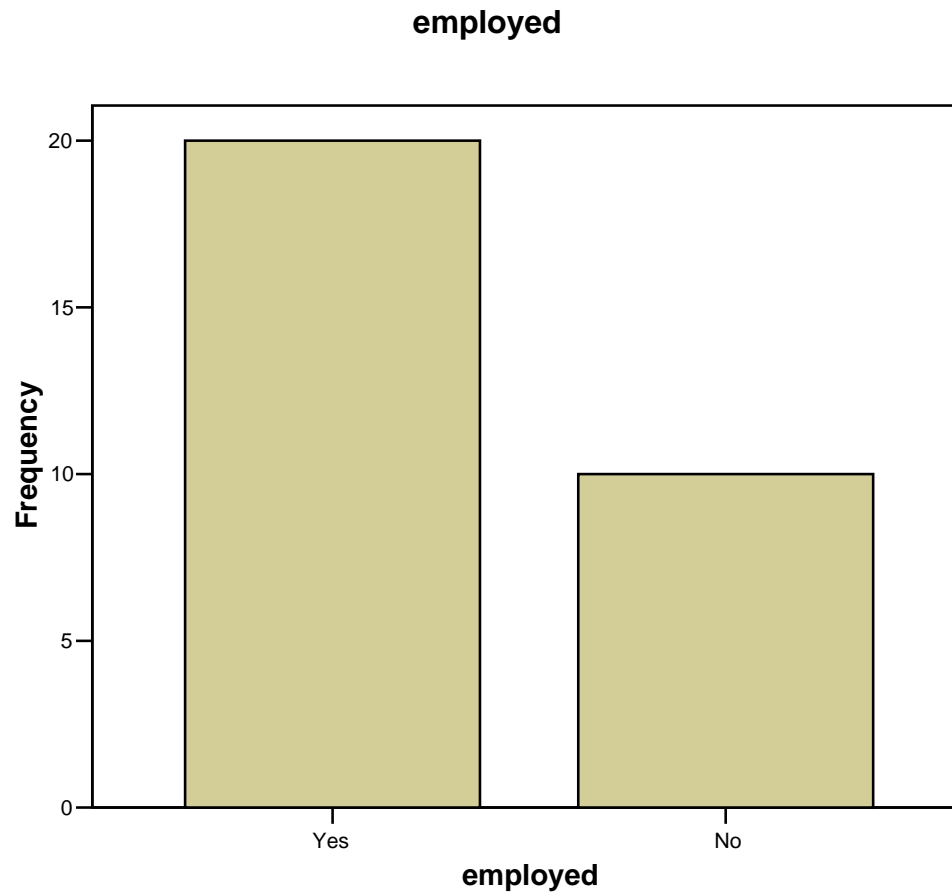


Figure 20, graphically represents the percentage of teachers who have been employed in a STEM areas by gender .

Figure 20
Number of Teachers Previously Employed in STEM Area by Gender

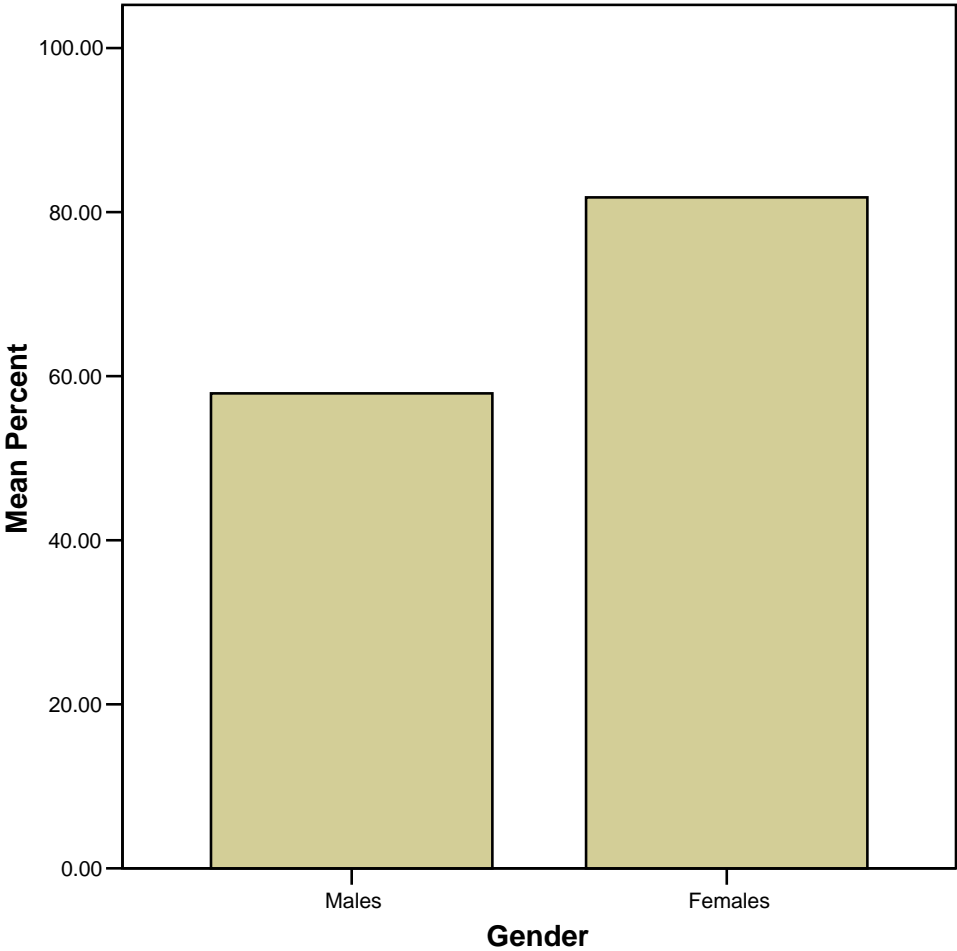


Figure 21, graphically represents the percentage of teachers who have been employed in a STEM areas by grade level.

Figure 21
Number of Teachers Previously Employed in STEM Area by Grade Level

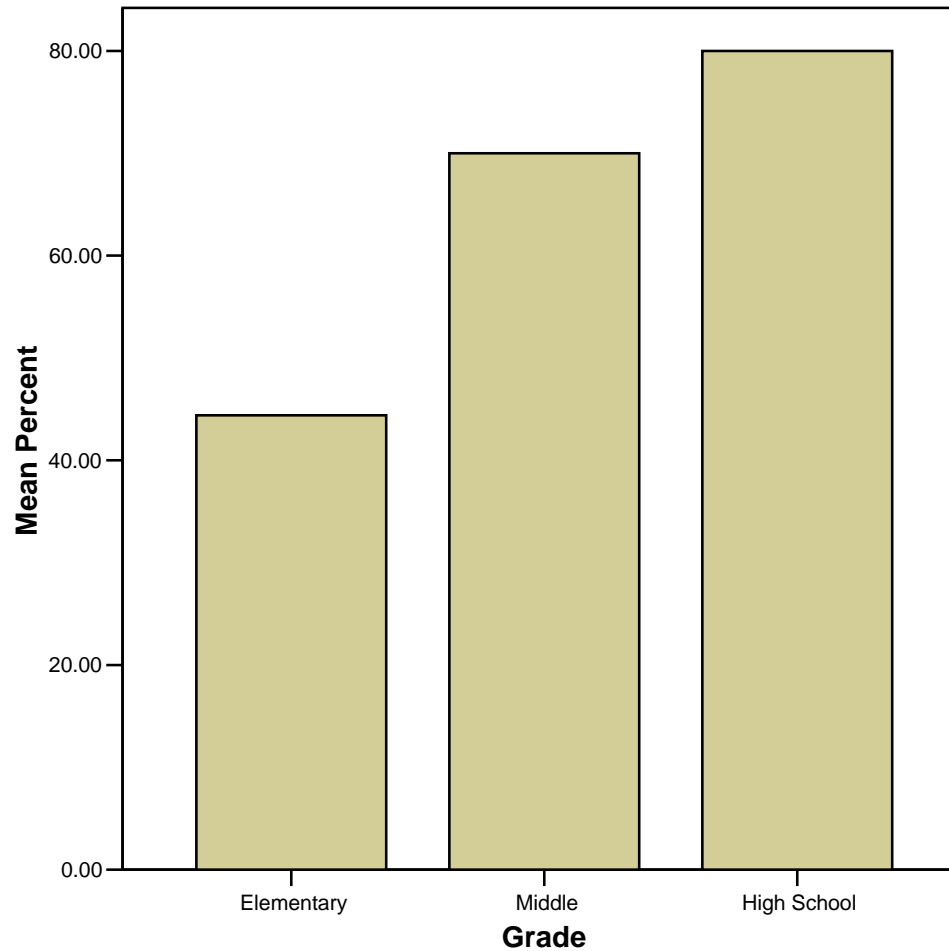


Figure 22, graphically represents the percentage of teachers who have been employed in a STEM areas by grade level .

Figure 22
Number of Teachers Previously Employed in STEM Area by Grade Level and Gender

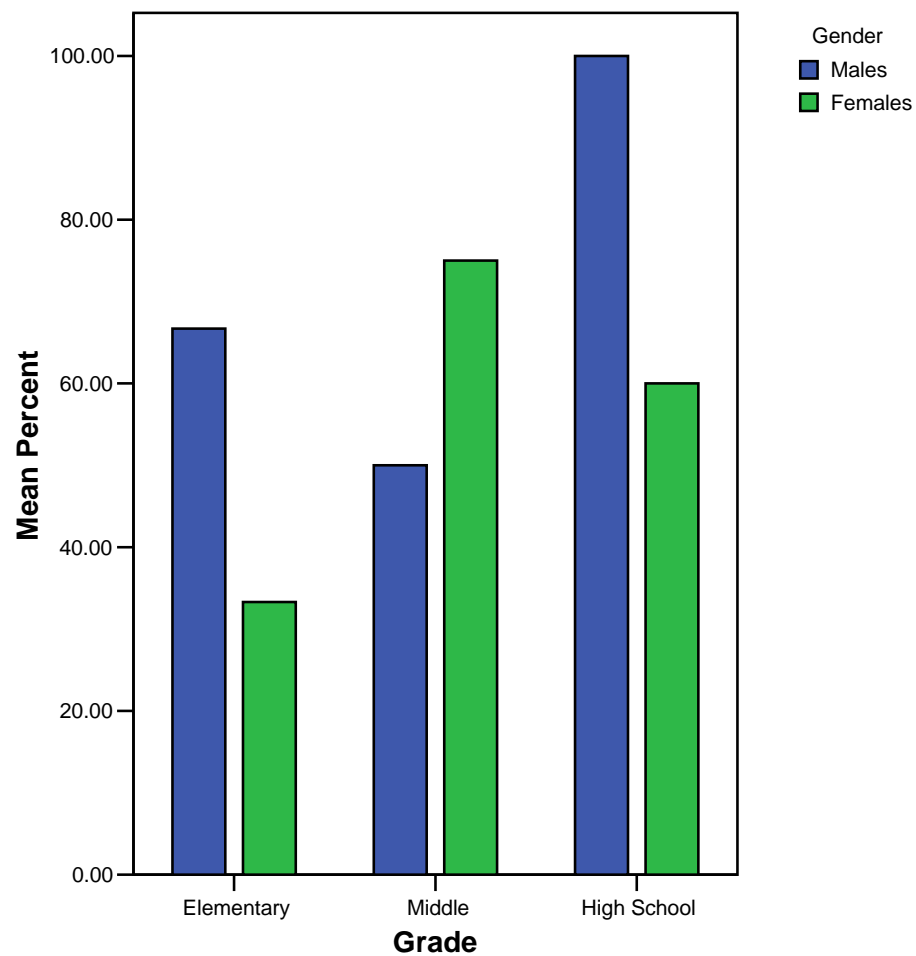


Figure 23 graphically represents the percentage of students on free or reduced lunch programs.

Figure 23
Percentage of Students on Free or Reduced Lunch Programs

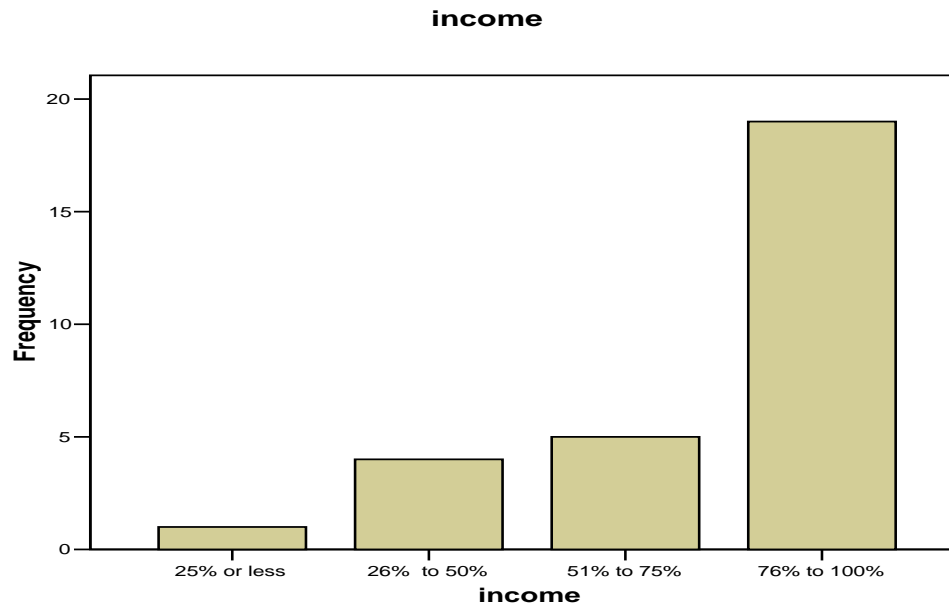


Figure 24 graphically represents the number of teachers that have been involved with a robotics program.

Figure 24
Involved with Robotics Program

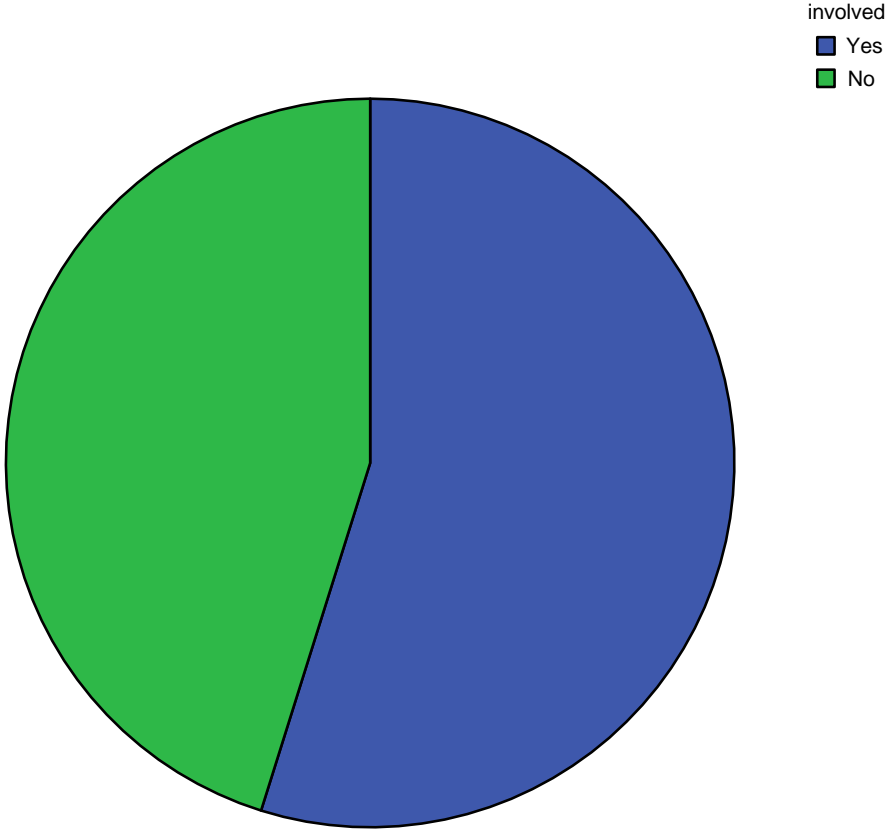


Figure 25 graphically represents how teachers learned about the Shell • Schlumberger Sea Turtle Robotics Competition.

Figure 25
How teachers learned about the Shell • Schlumberger Sea Turtle Robotics Competition

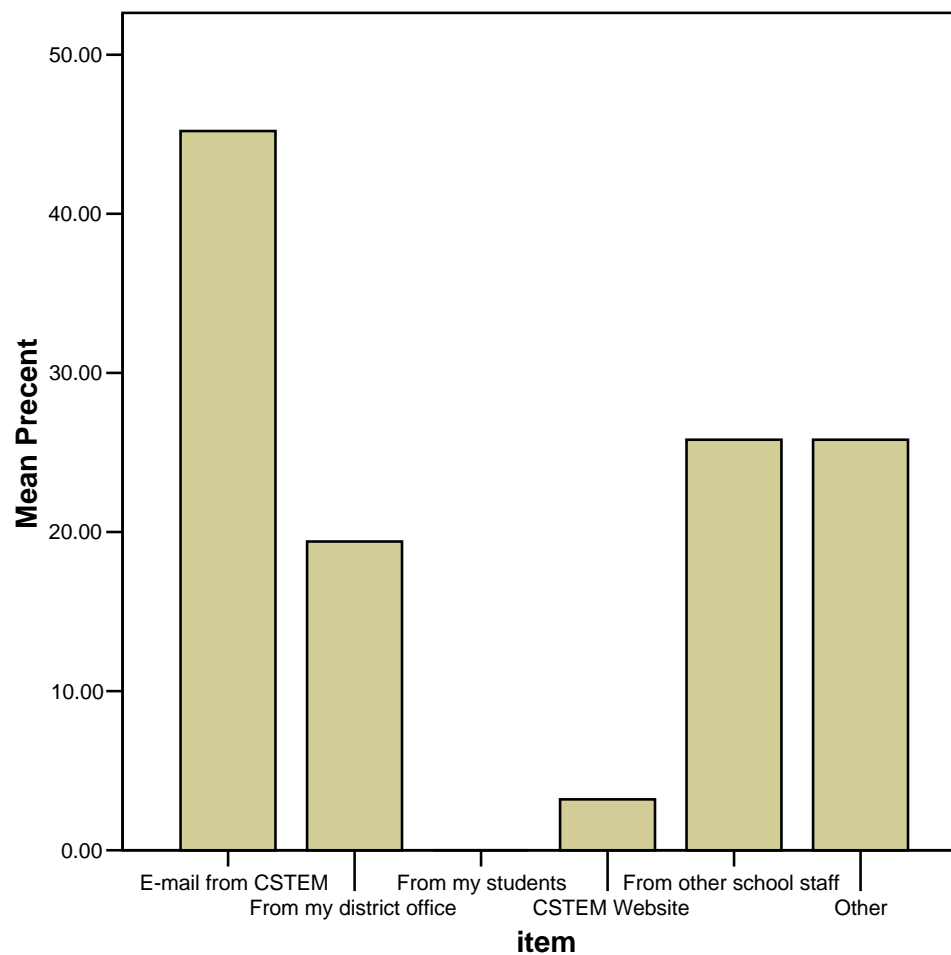


Figure 26 graphically represents why teachers decided to lead a Schlumberger * Shell Sea Turtle Robotics Competition team.

Figure 26
Why teachers decided to lead a Shell • Schlumberger Sea Turtle Robotics Competition team

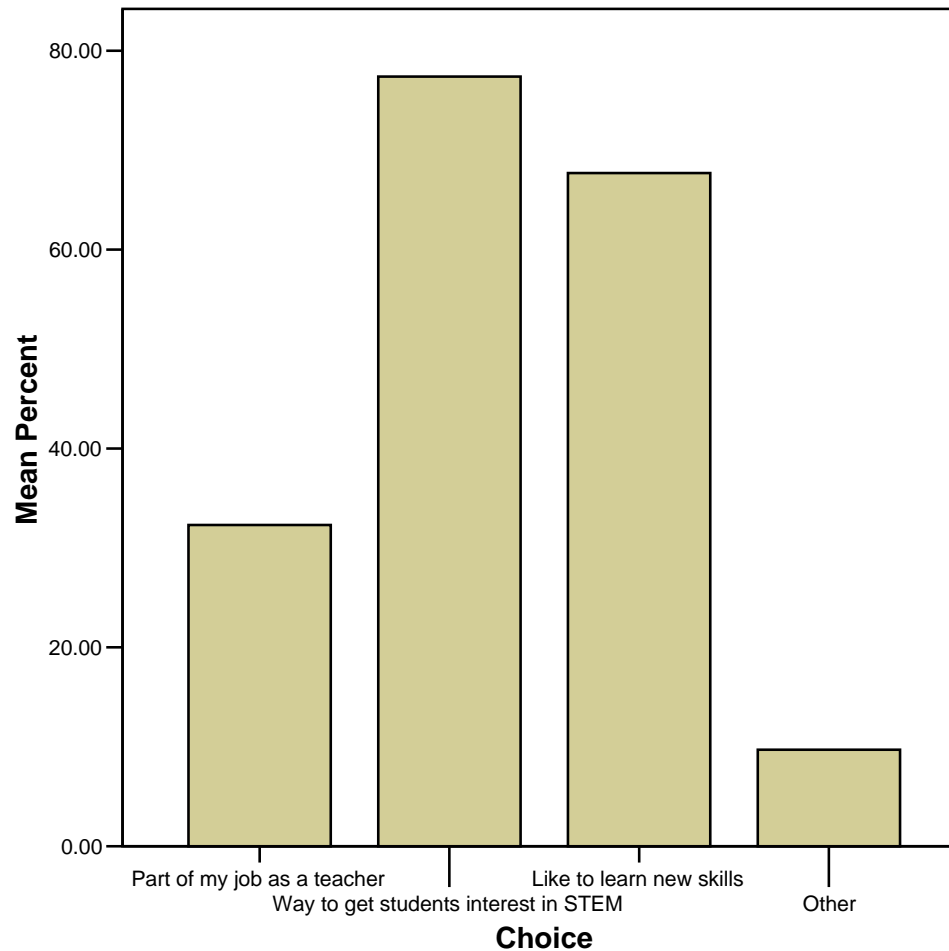
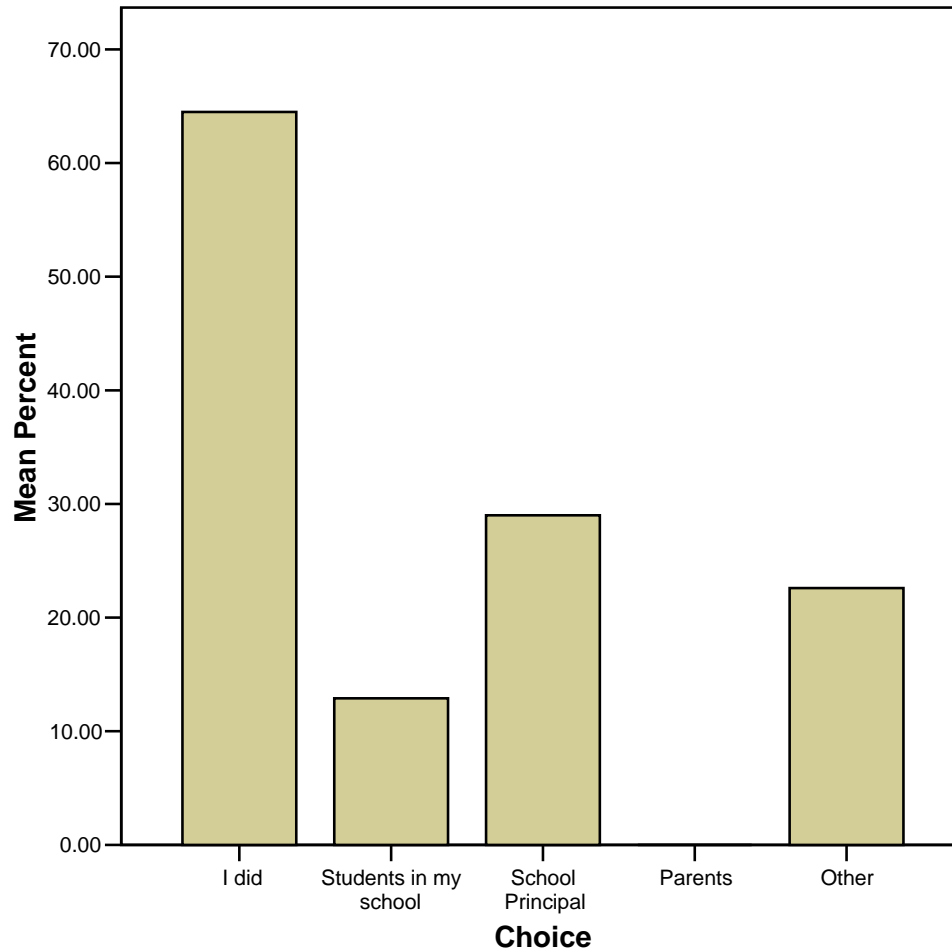


Figure 27 graphically represents who prompted the formation of the team.

Figure 27
Who prompted the formation of the team.



Design of the Evaluation

To evaluate this project, the present study will use a repeated measure design. In the case participants were surveyed at the beginning of the project and there will be a follow-up survey at the conclusion of the study. Issues that arise with this design is centered around mortality and maturation. Mortality, in this case is students that dropout or transfer out of the program before the completion of the project. Maturation is the impact of the treatment over time. Although we have very little control over mortality issues, we can somewhat control maturation by limiting the time between treatment and evaluation.

Data

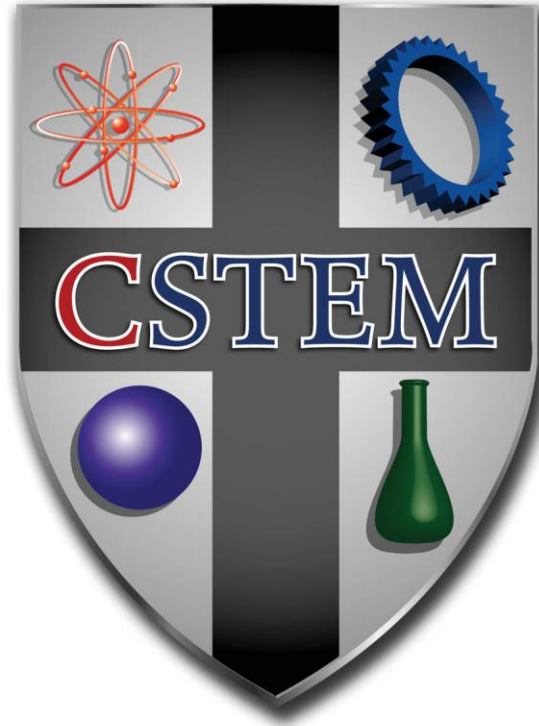
The data for the present study came from students enrolled in 30 schools in the Houston Independent School District. Each student was asked to complete a self-reporting instrument developed by CSTEM. There were a total of 207 students that completed the survey. About 40 percent of the students were in elementary grades compared to about 39 percent in middle school. The remaining 21 percent were enrolled in high schools. The ethnic make-up of the sample was primarily Hispanic and African-American students, representing 48 and 38 percent respectively. It should be noted the sample size for Asian, Caucasian/White and other races are rather small. Furthermore, when you divide the ethnic make-up and do gender comparisons the results become even more suspicious. However the sample may be a representation of Houston Independent School District due the fact that the sample does include primarily Hispanic and African-American. Therefore, to generalize the results to any other race other than Hispanic and African-American students might become ambiguous.

Summary of the Objectives

The first objective addressed in this project was student's overall knowledge of STEM fields. The results indicate as educational levels increase so does knowledge of what engineers do in the different fields. Moreover, middle school students have more knowledge of what engineers do compared to elementary students, and high school students have higher knowledge compared to middle school students. When the data is divided by grade level and ethnicity, Hispanic students followed by African-Americans tend to have the least knowledge of what engineers do compared

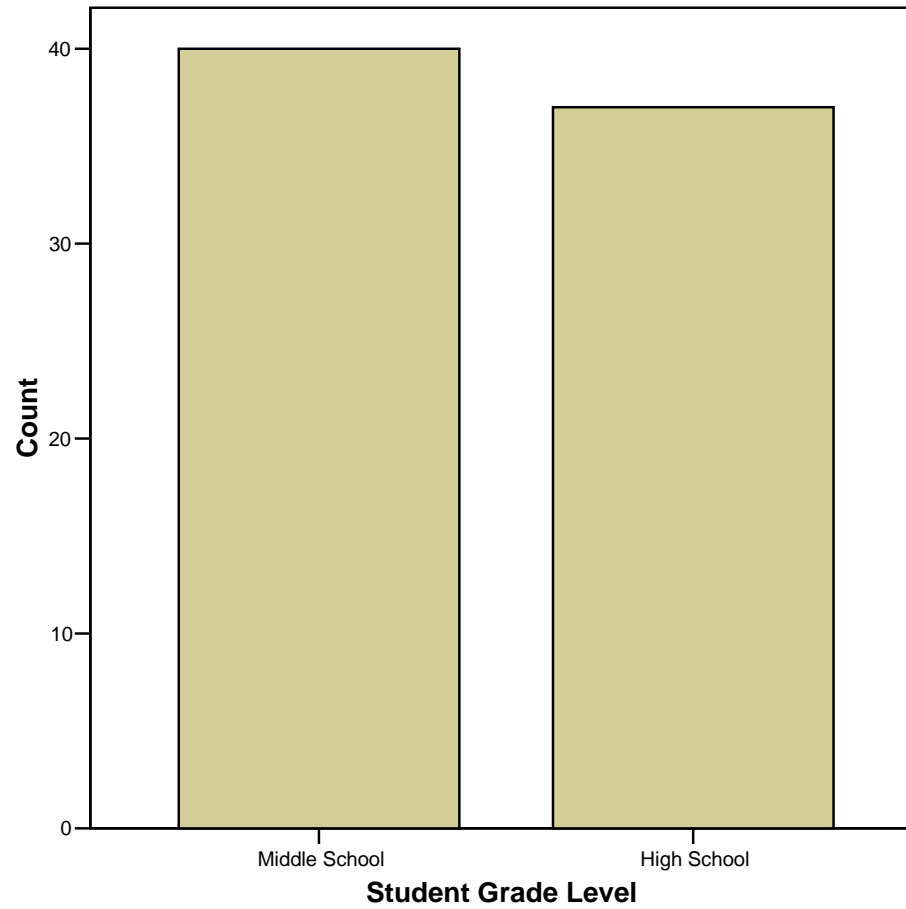
CSTEM Teacher & Student Support Services

Shell • Schlumberger Sea Turtle Robotics Project

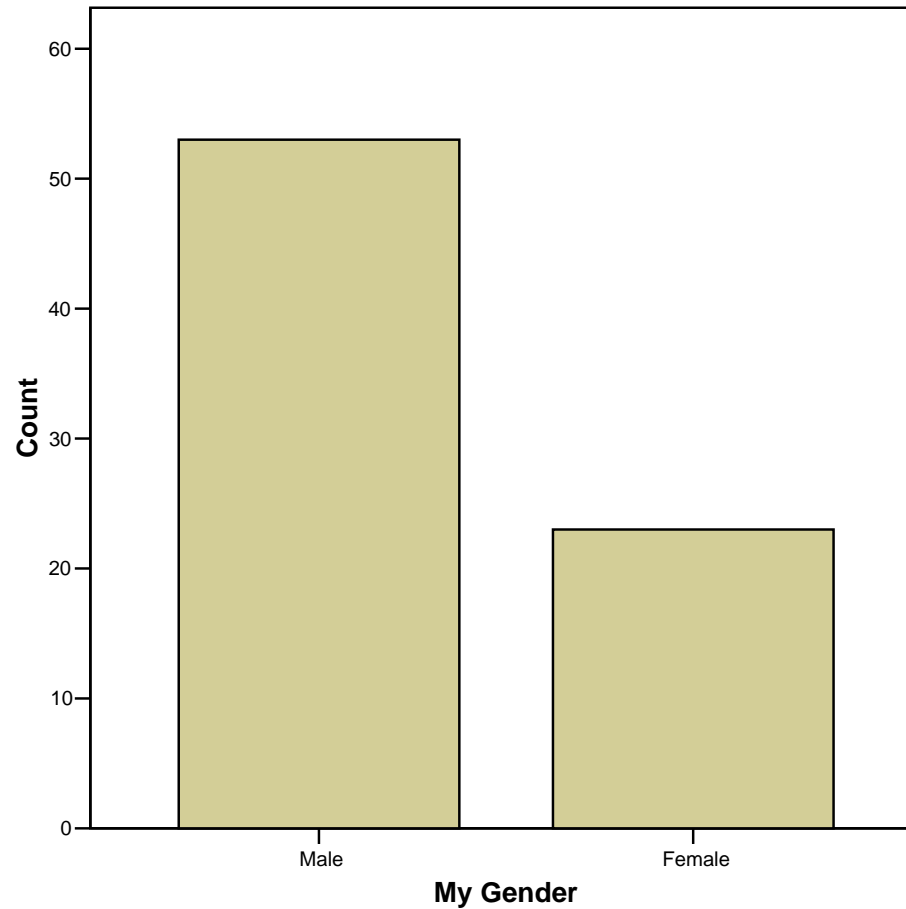


**Follow-Up Report Developed By
Dr. Emiel Owens and
Dr. James Johnson
STATLAB DATA SERVICES**

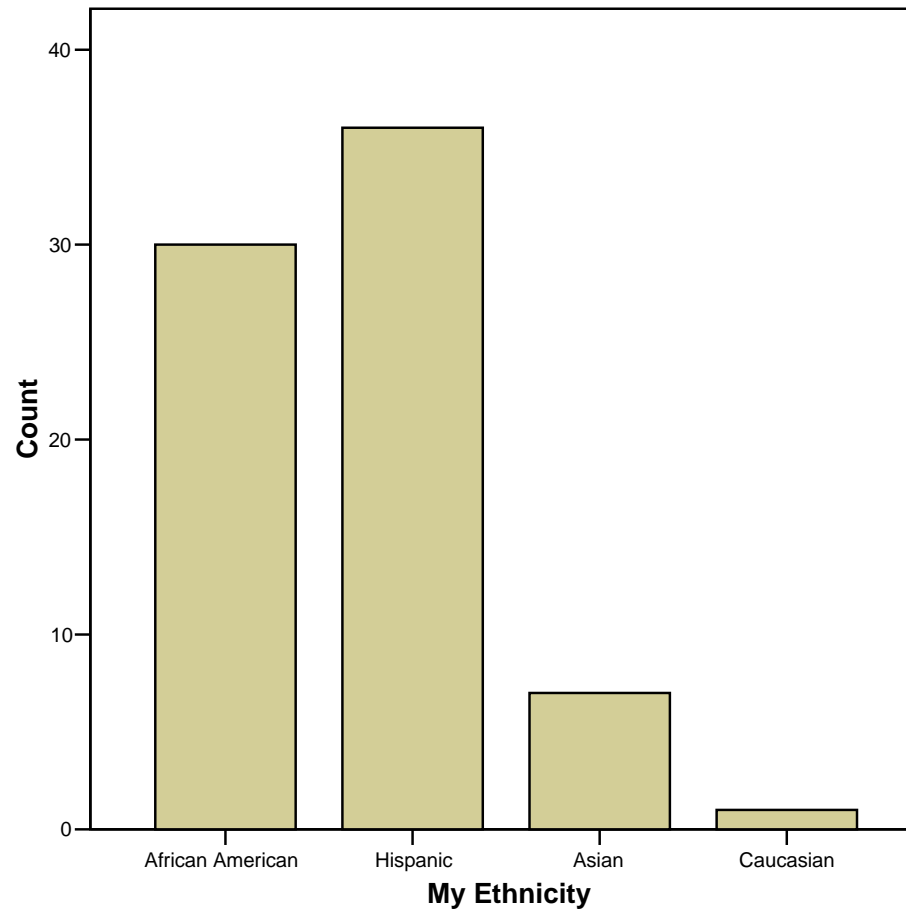
Grade Level, Frequency, and Percentage Overall



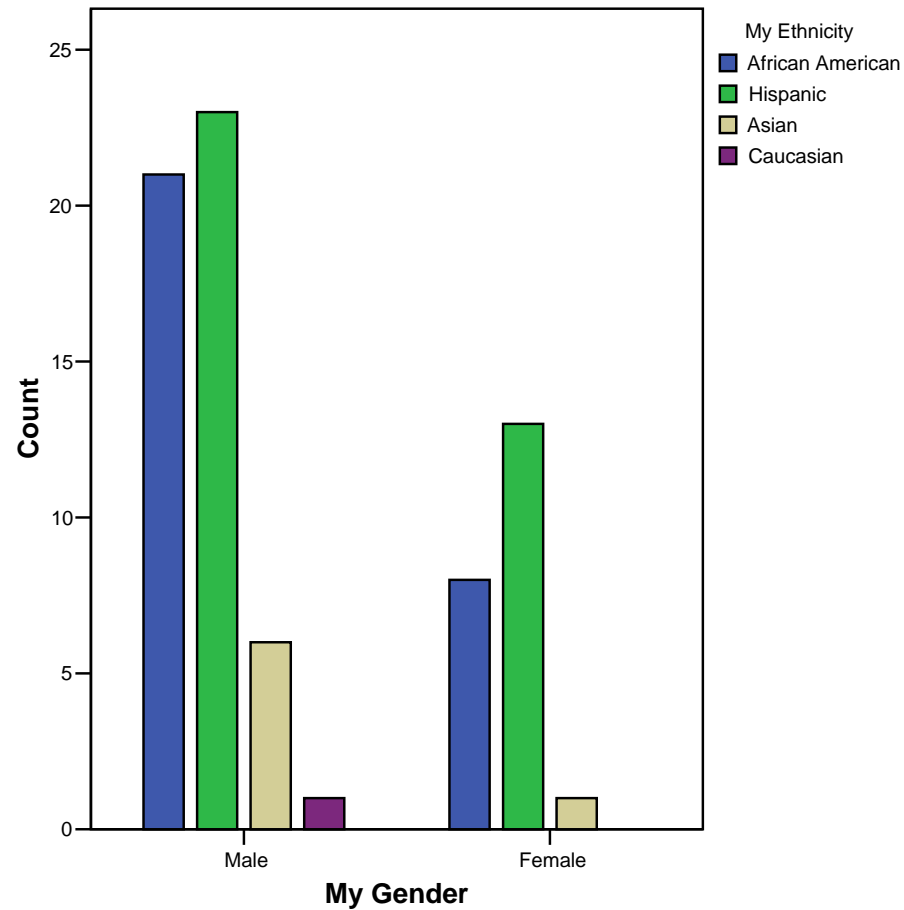
Gender Make-Up of the Sample



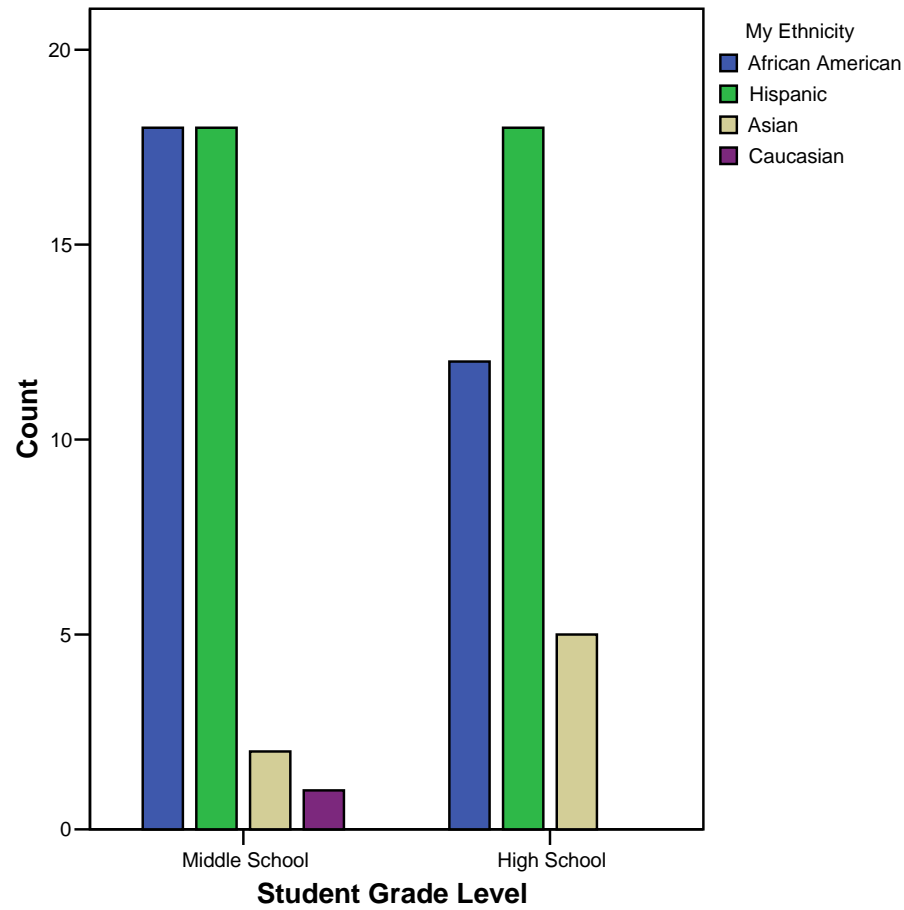
Ethnicity, Frequency and Percentage Overall



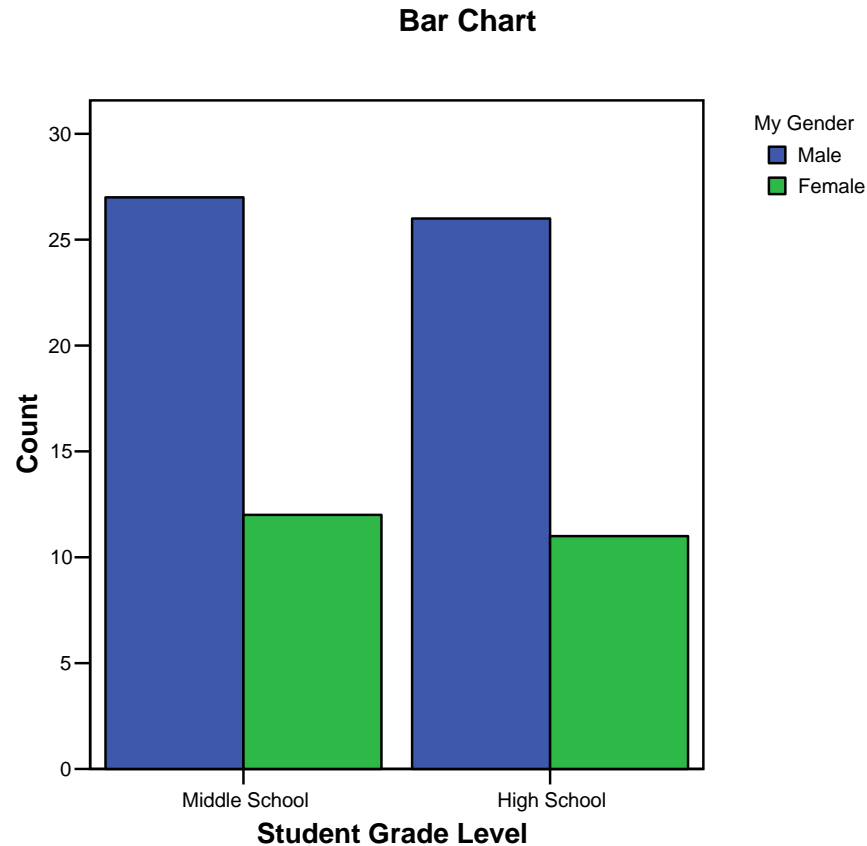
My Ethnicity * My Gender Crosstabulation



My Ethnicity * Student Grade Level Crosstabulation

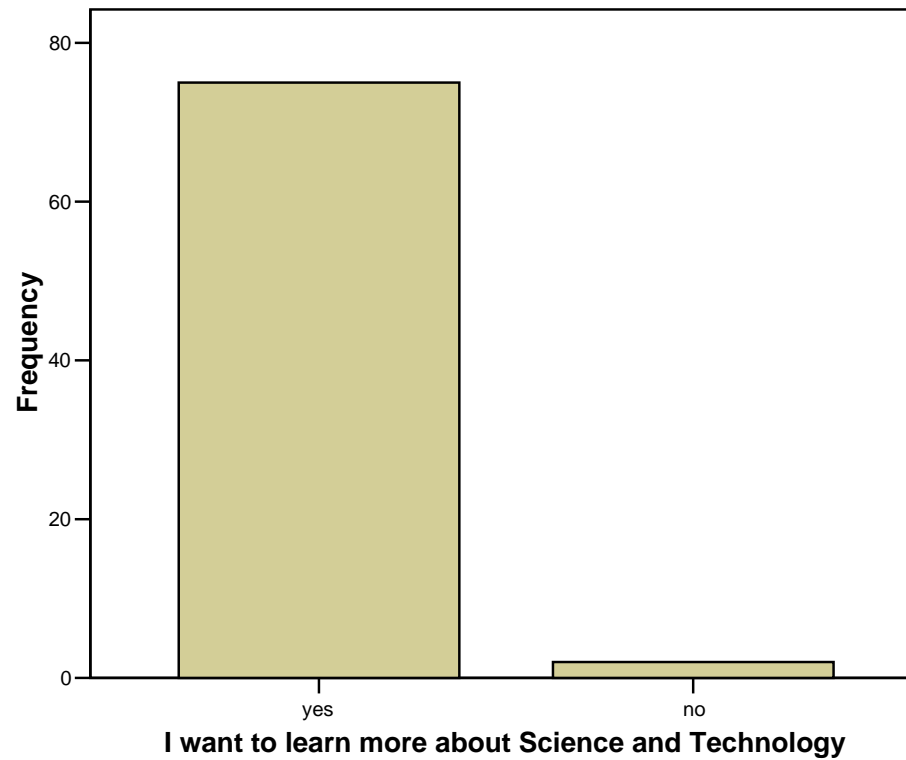


Student Grade Level * My Gender Crosstabulation



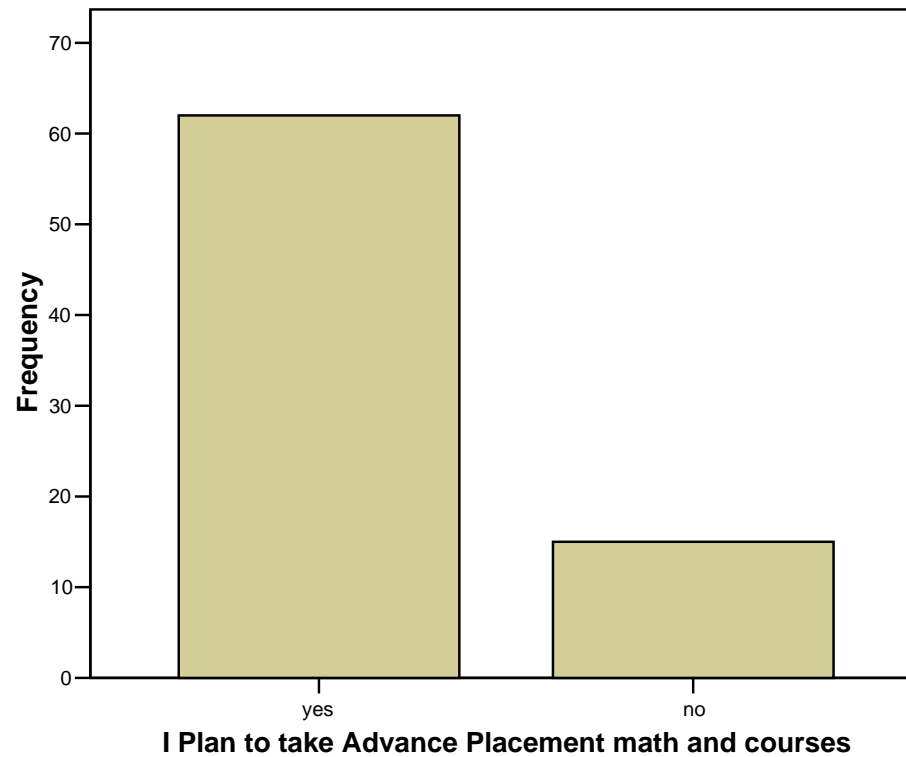
Student Survey

I want to learn more about Science and Technology



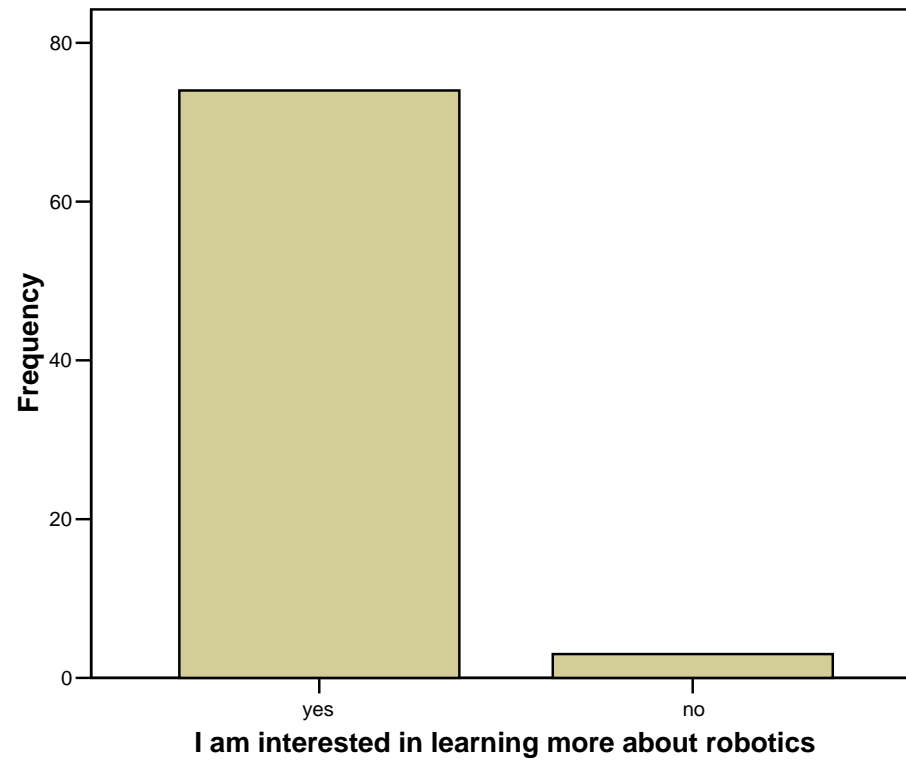
Student Survey

I Plan to take Advance Placement math and courses



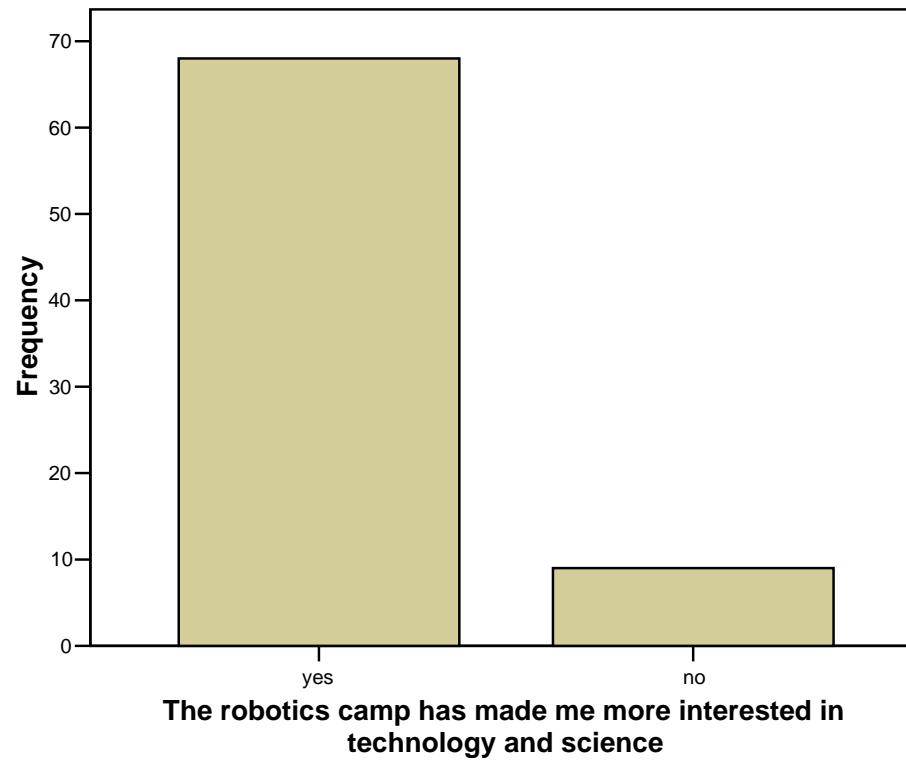
Student Survey

I am interested in learning more about robotics



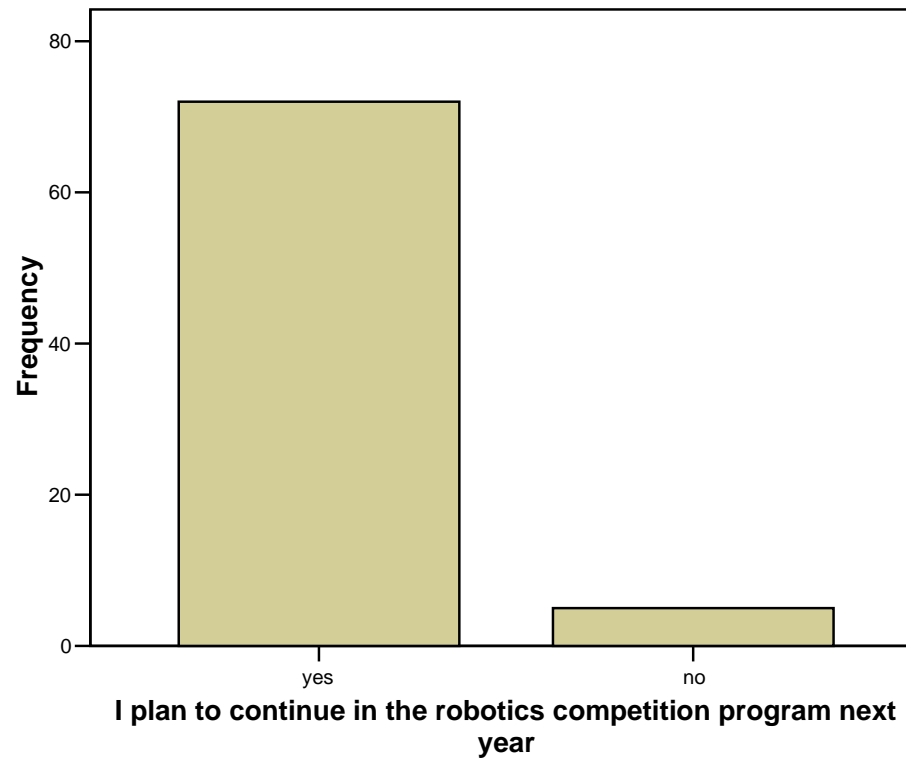
Student Survey

The robotics camp has made me more interested in technology and science



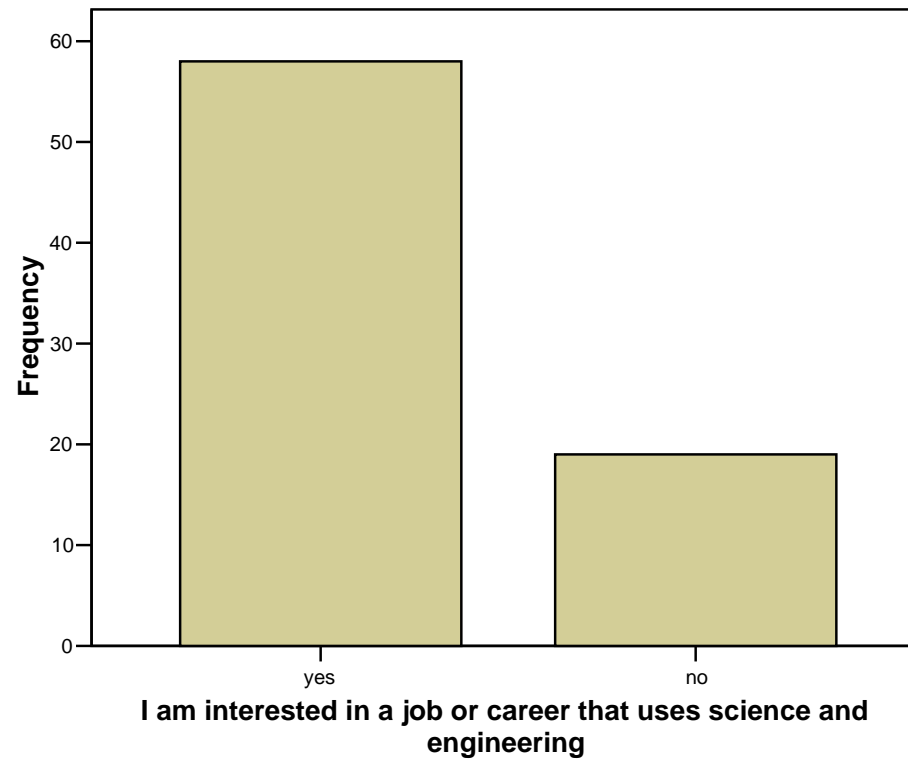
Student Survey

I plan to continue in the robotics competition program next year



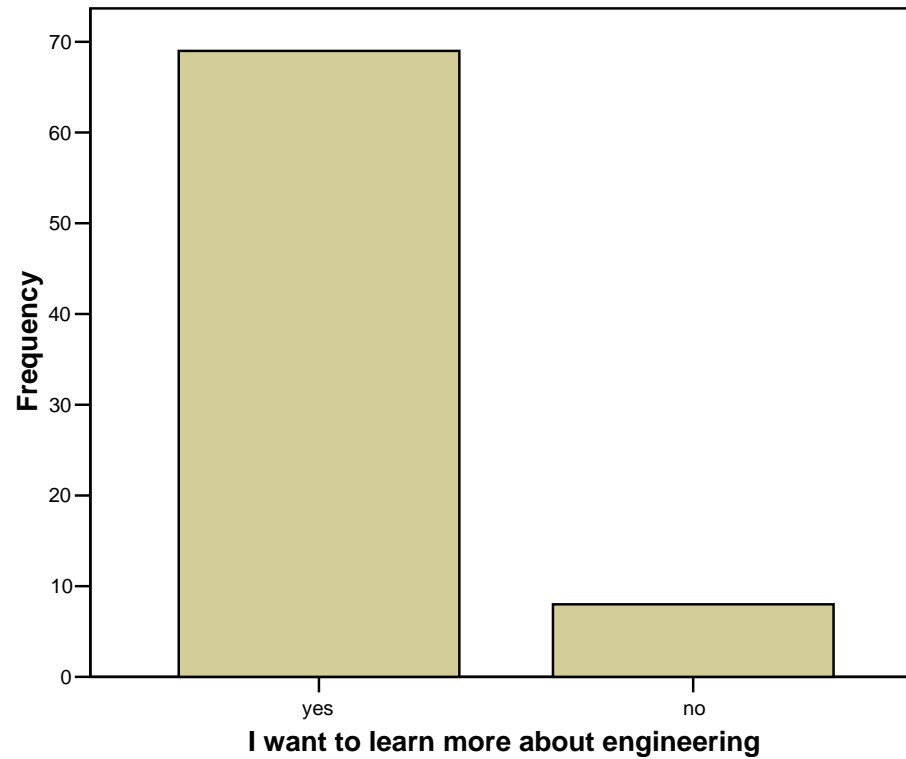
Student Survey

I am interested in a job or career that uses science and engineering



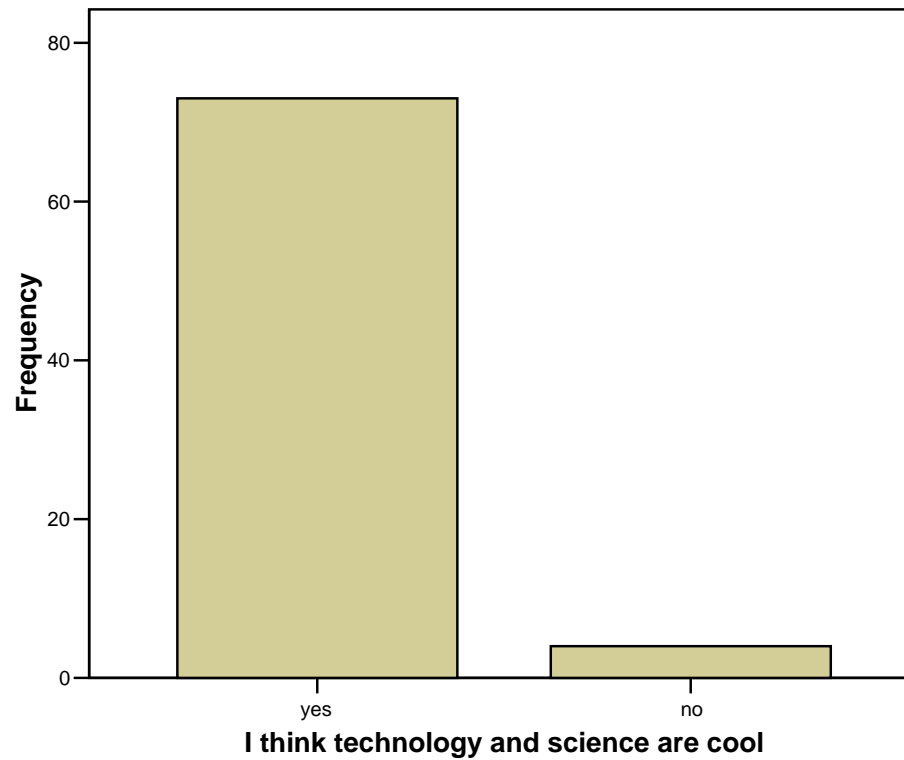
Student Survey

I want to learn more about engineering

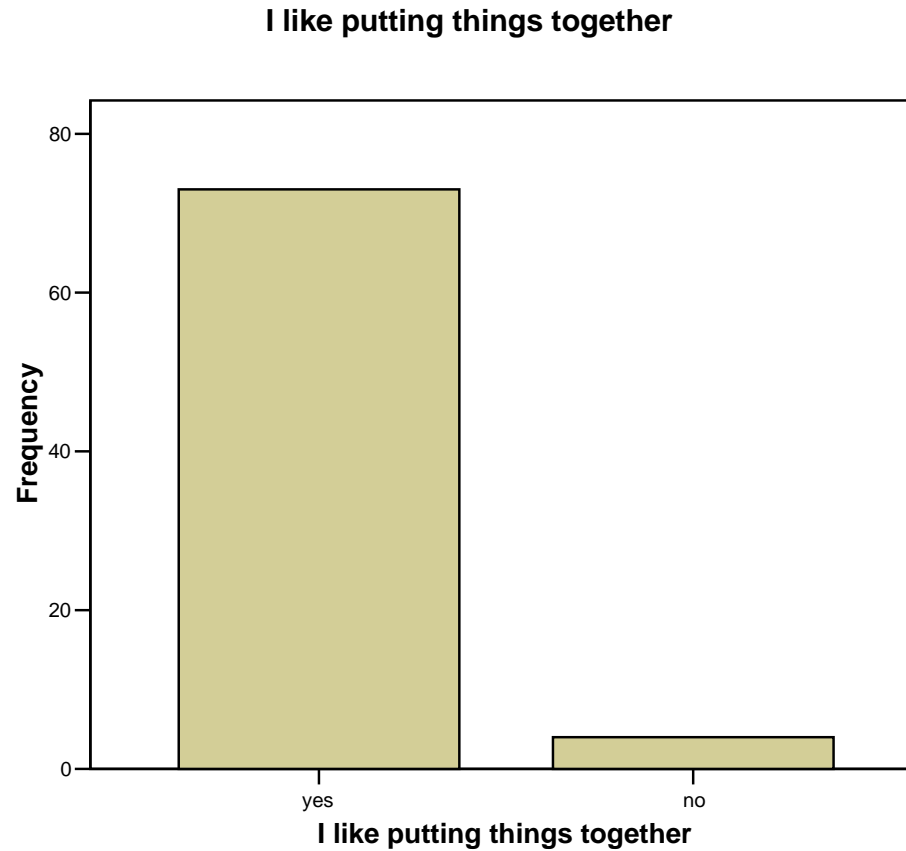


Student Survey

I think technology and science are cool

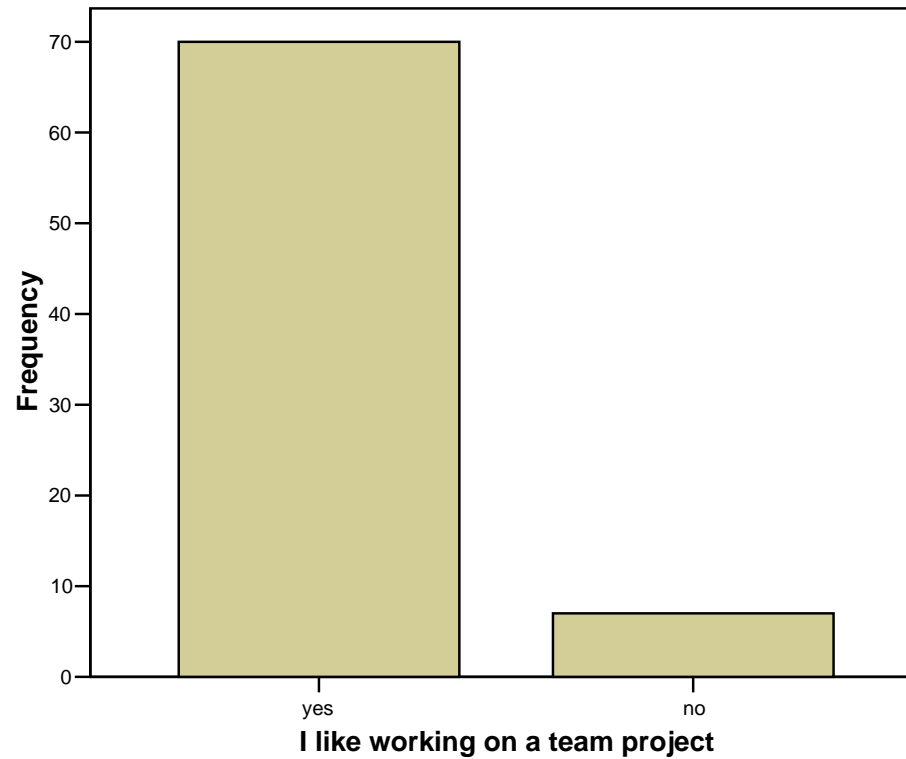


Student Survey



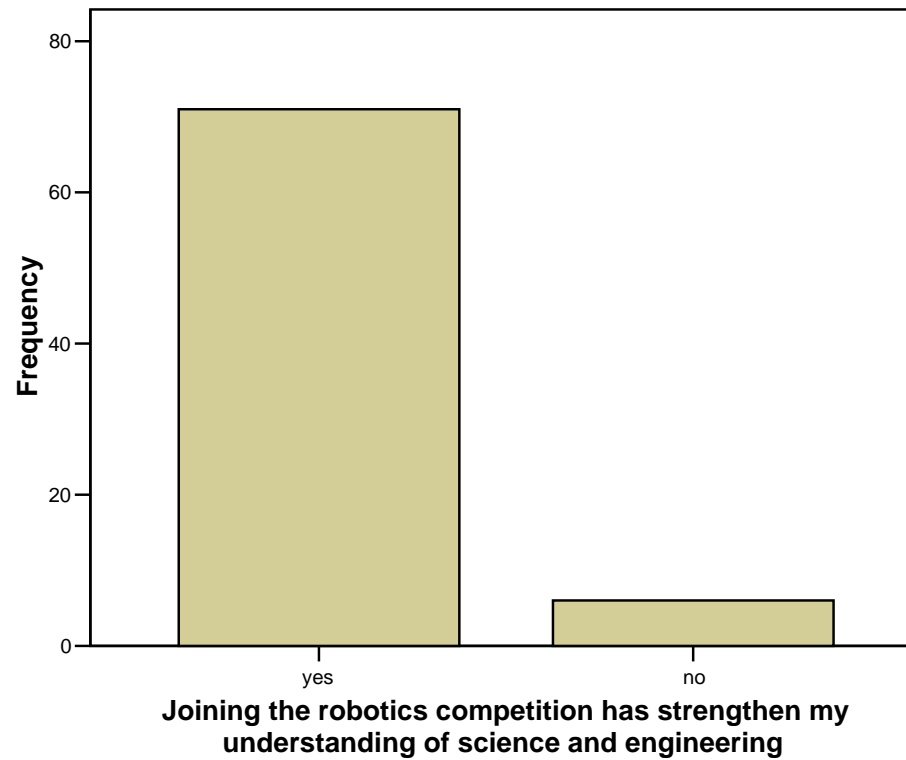
Student Survey

I like working on a team project



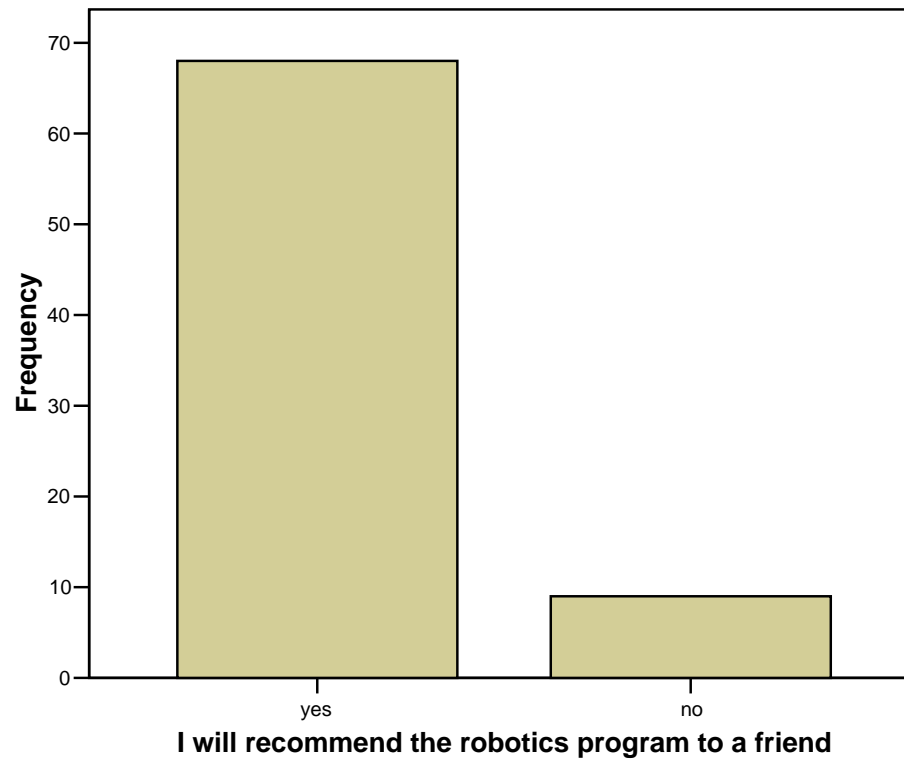
Student Survey

Joining the robotics competition has strengthen my understanding of science and engineering

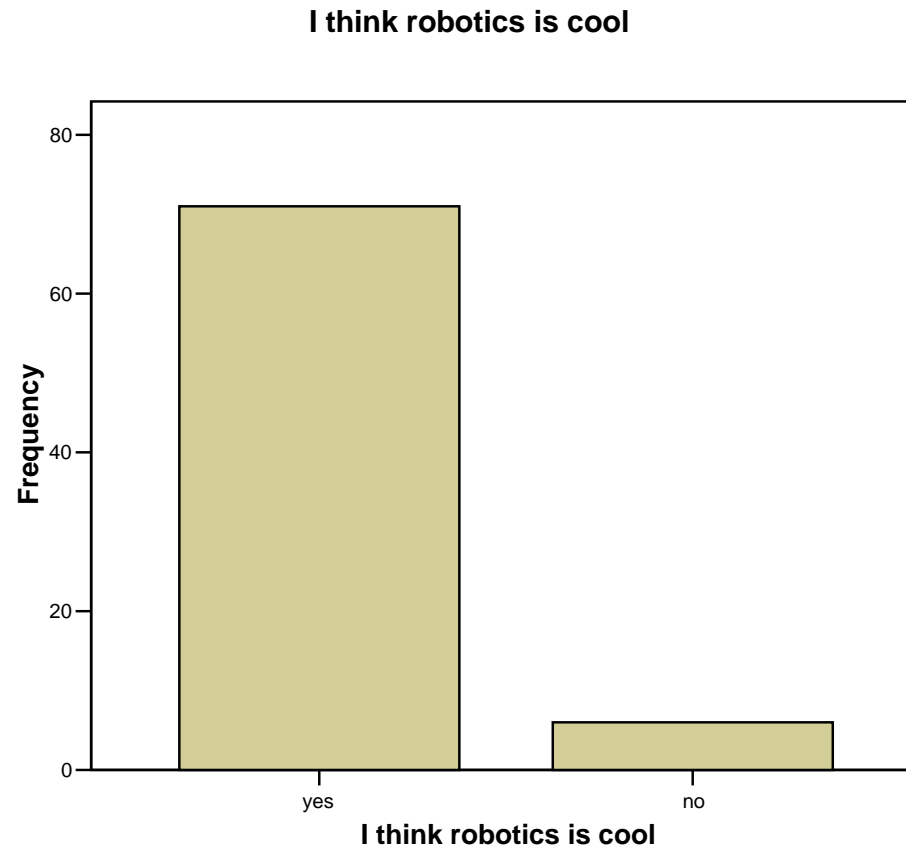


Student Survey

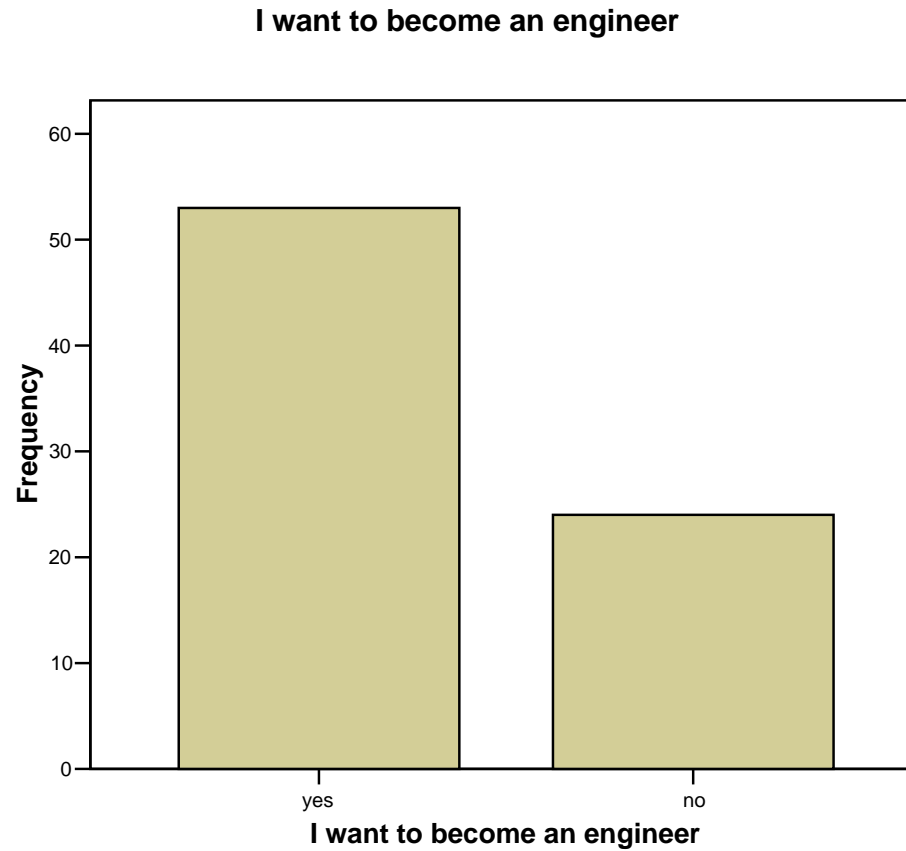
I will recommend the robotics program to a friend



Student Survey

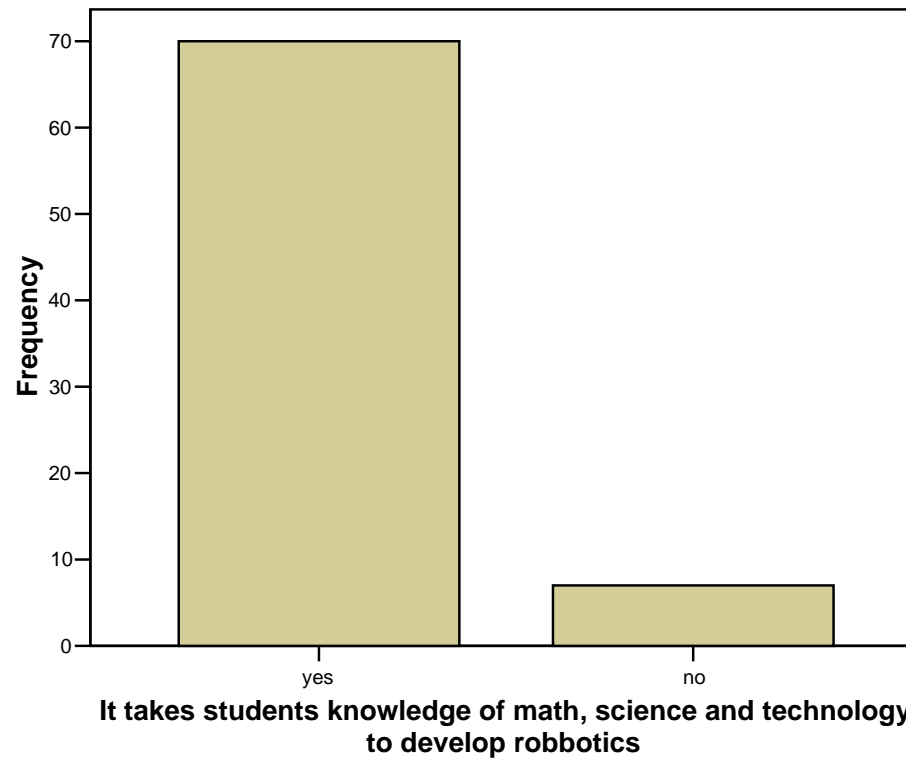


Student Survey



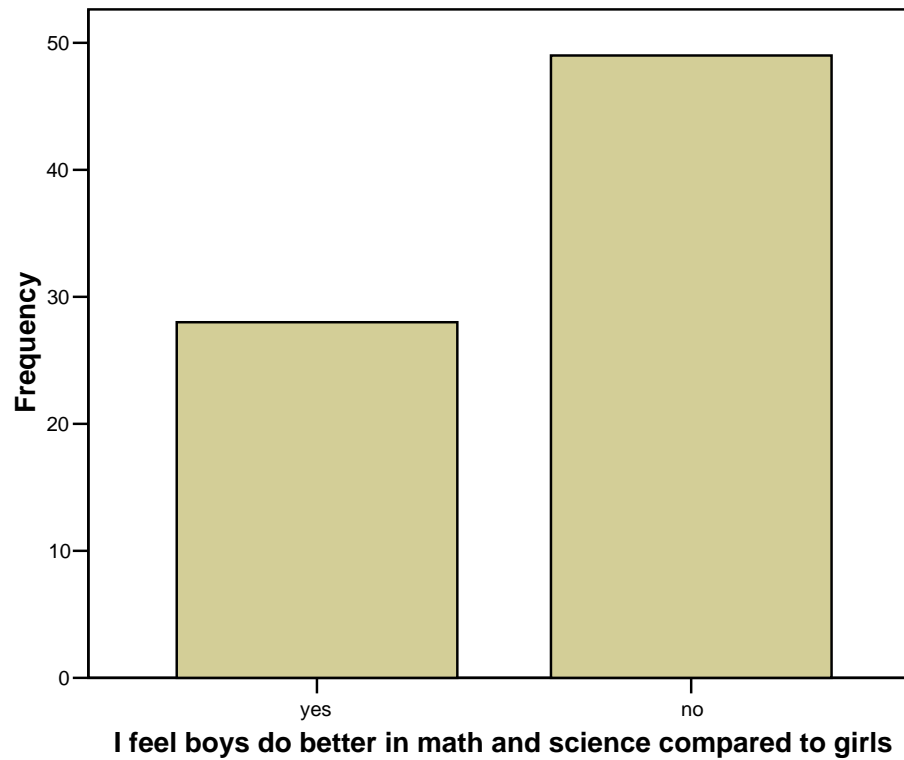
Student Survey

It takes students knowledge of math, science and technology to develop robotics



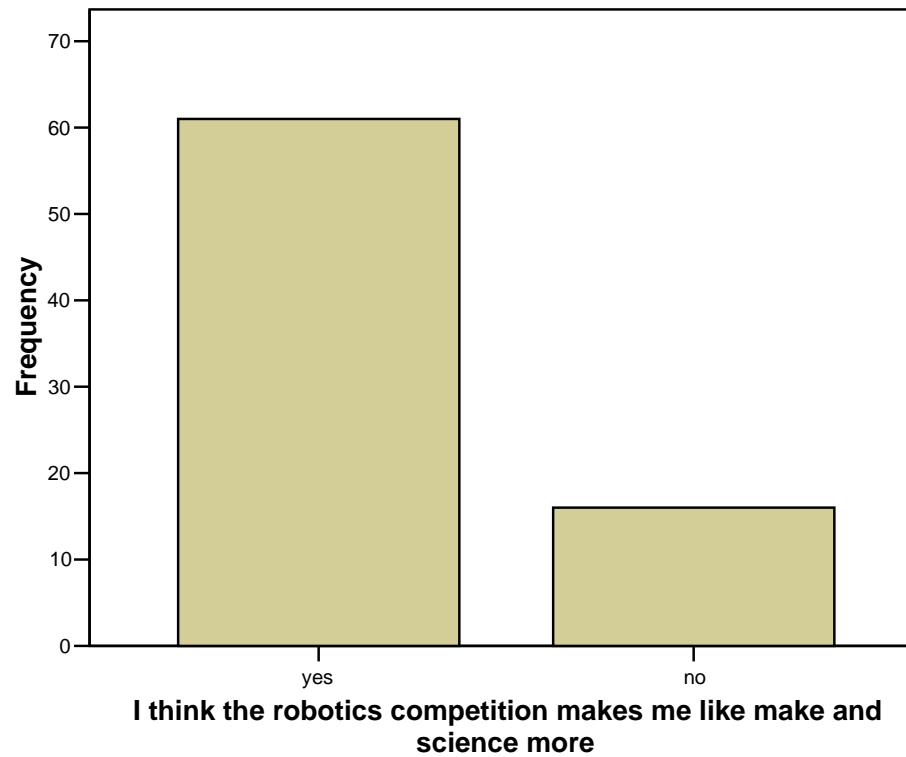
Student Survey

I feel boys do better in math and science compared to girls



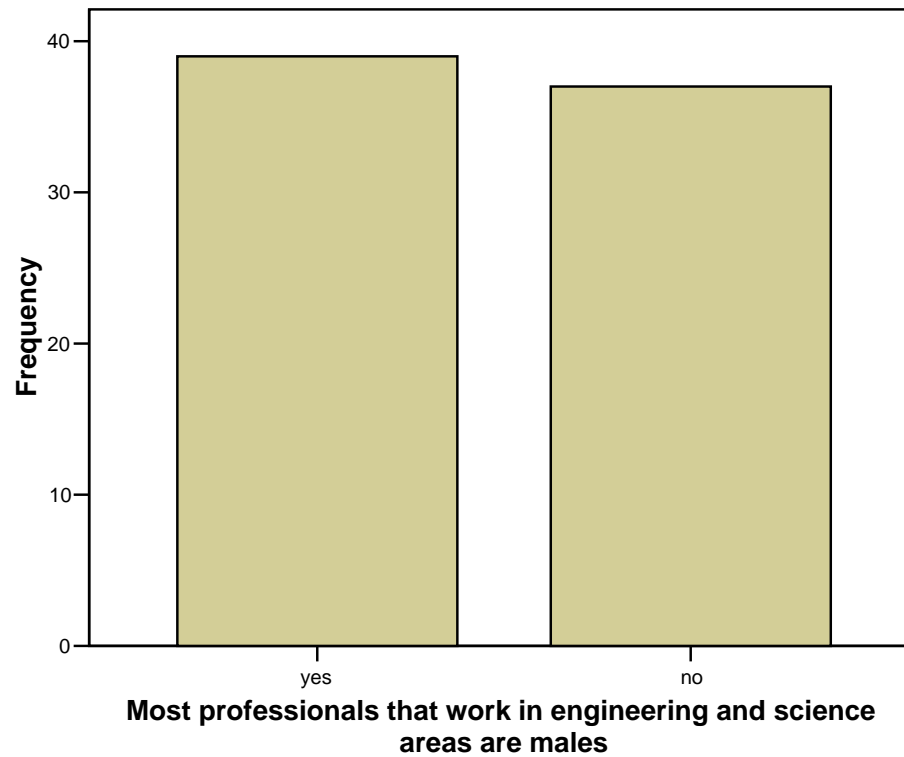
Student Survey

I think the robotics competition makes me like make and science more



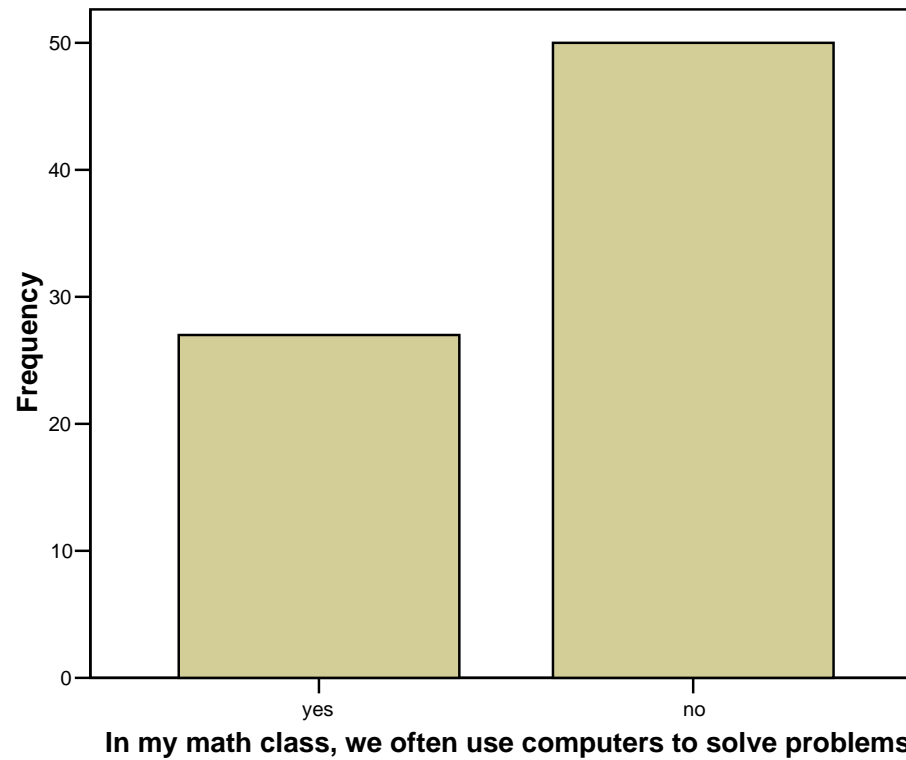
Student Survey

**Most professionals that work in engineering and science areas
are males**



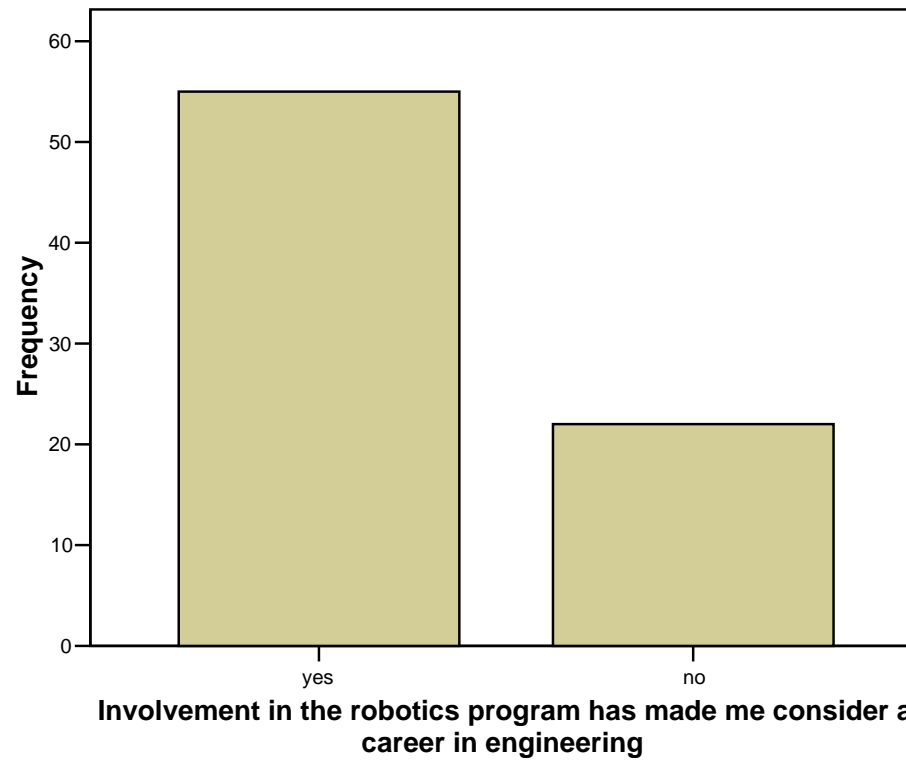
Student Survey

In my math class, we often use computers to solve problems

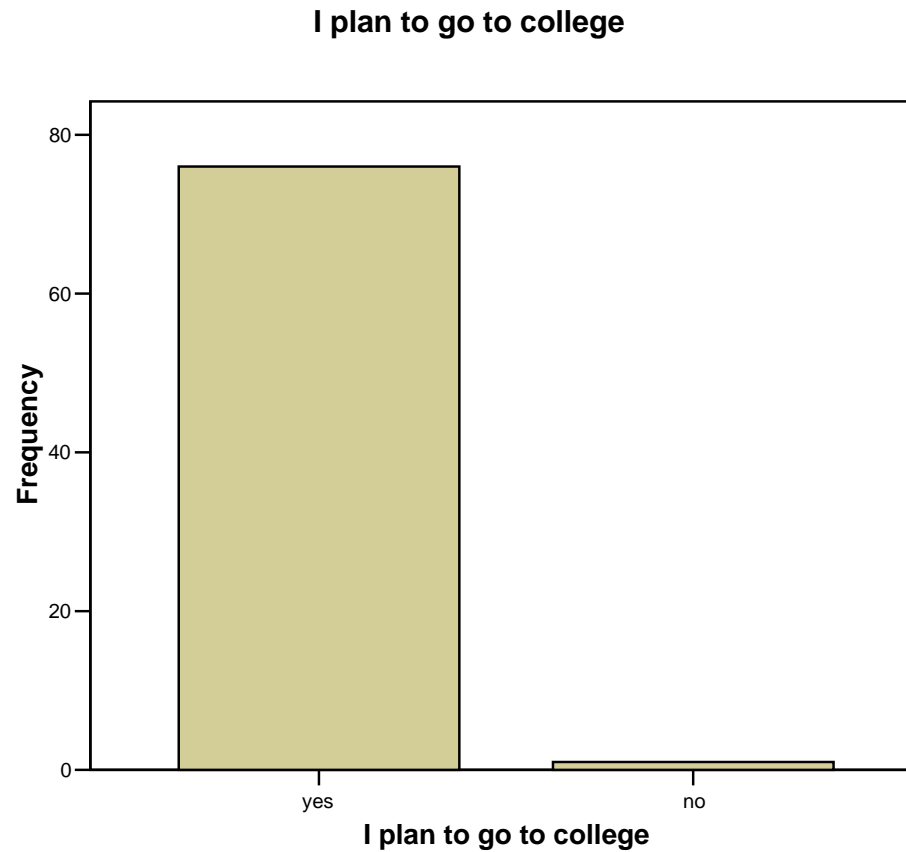


Student Survey

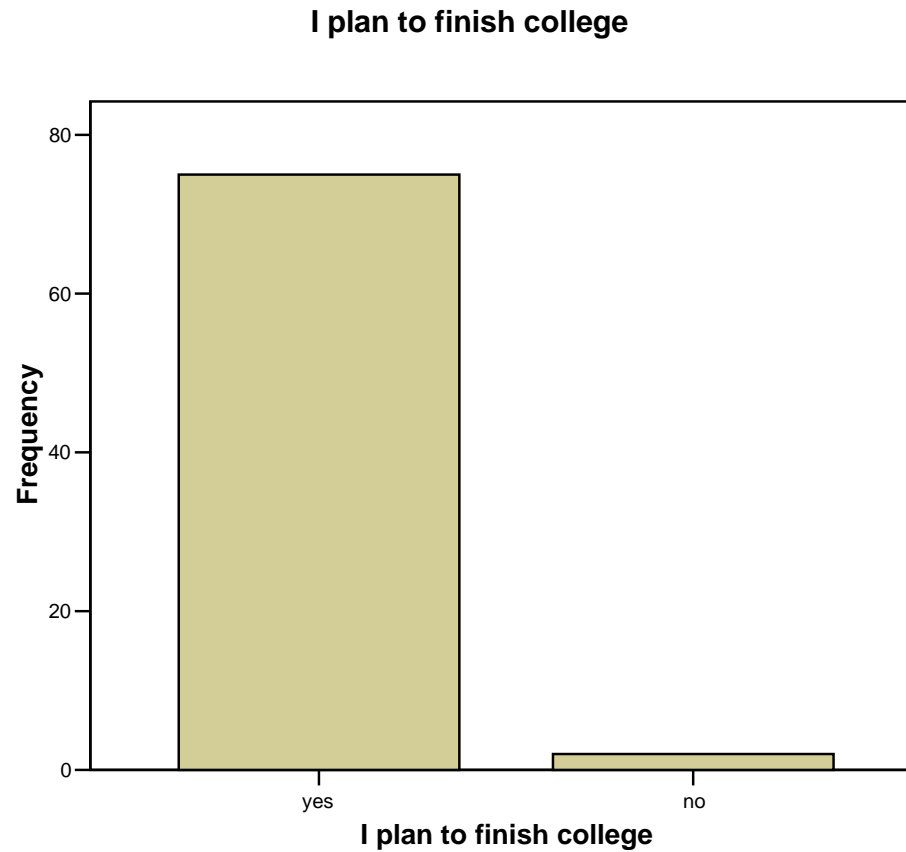
Involvement in the robotics program has made me consider a career in engineering



Student Survey

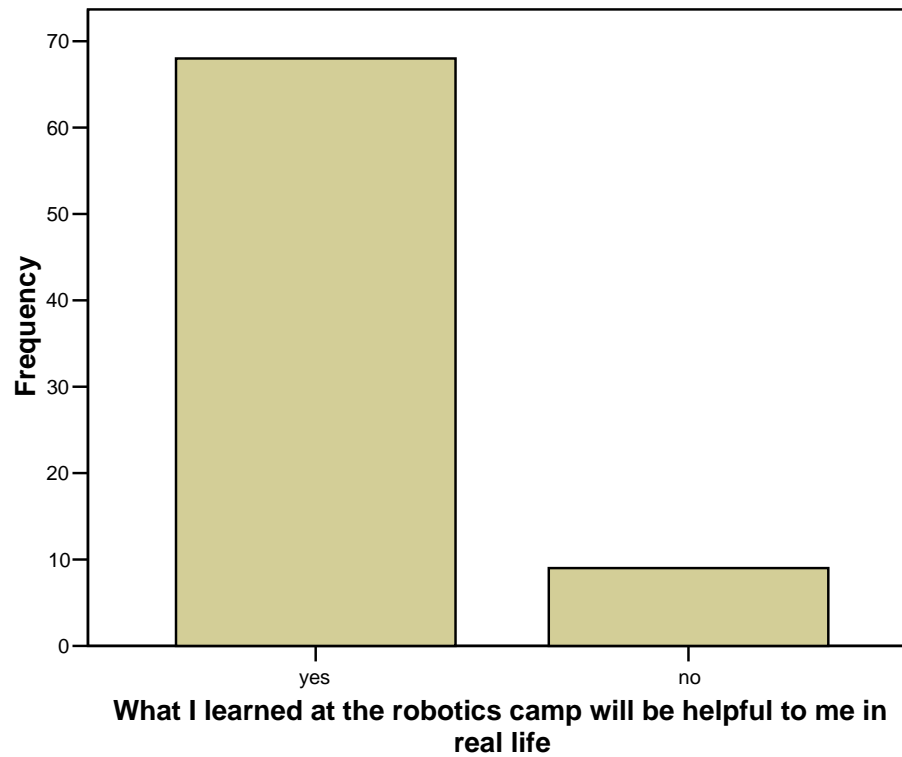


Student Survey



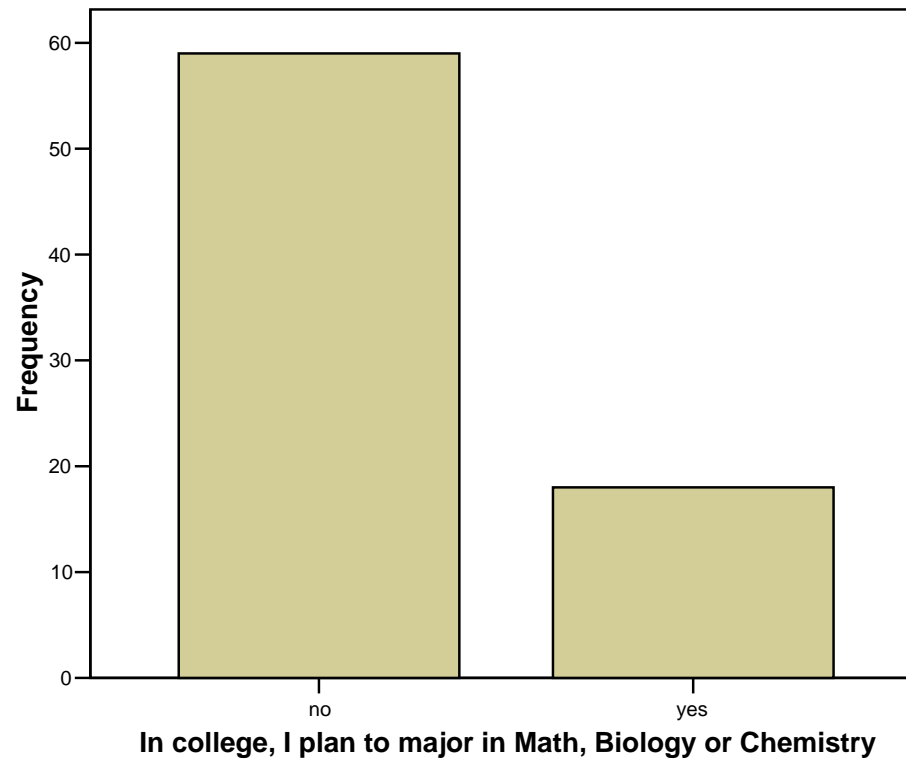
Student Survey

What I learned at the robotics camp will be helpful to me in real life



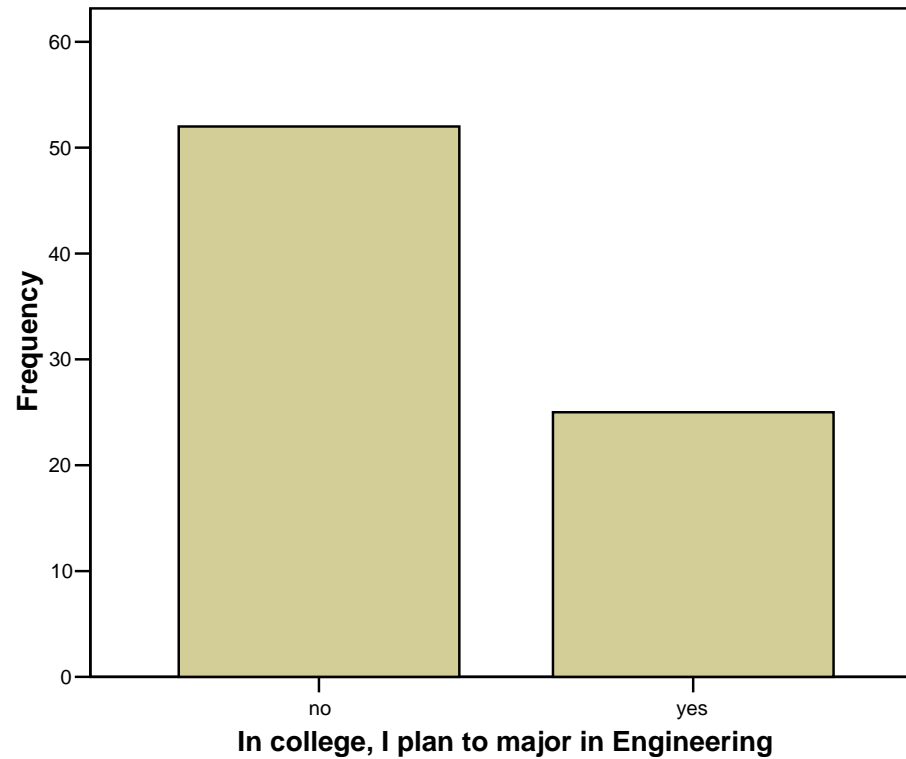
Student Survey

In college, I plan to major in Math, Biology or Chemistry



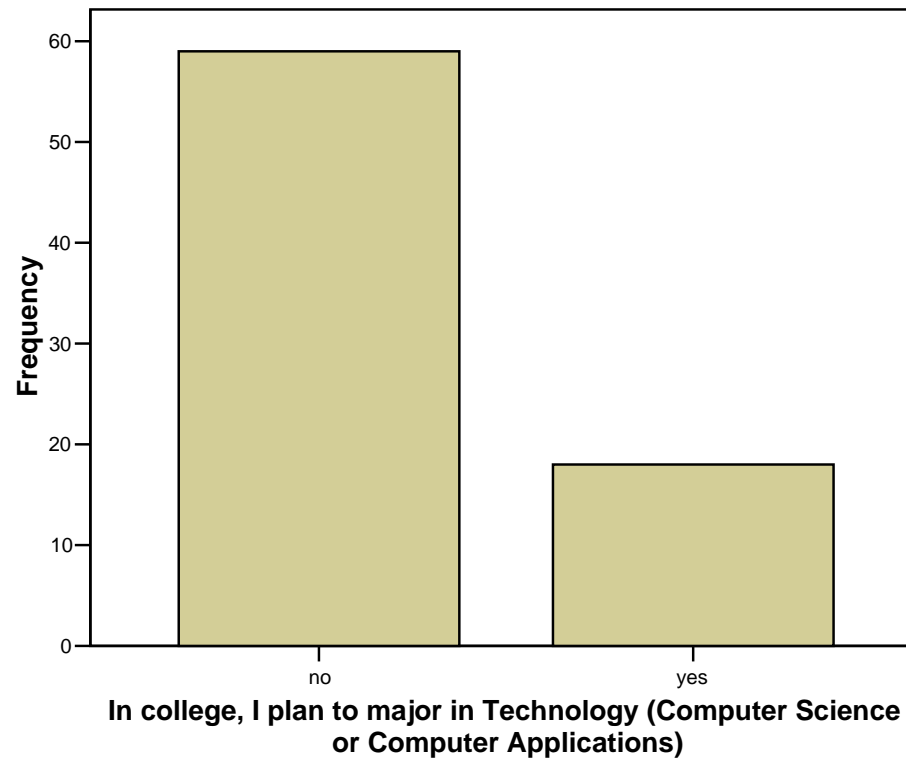
Student Survey

In college, I plan to major in Engineering



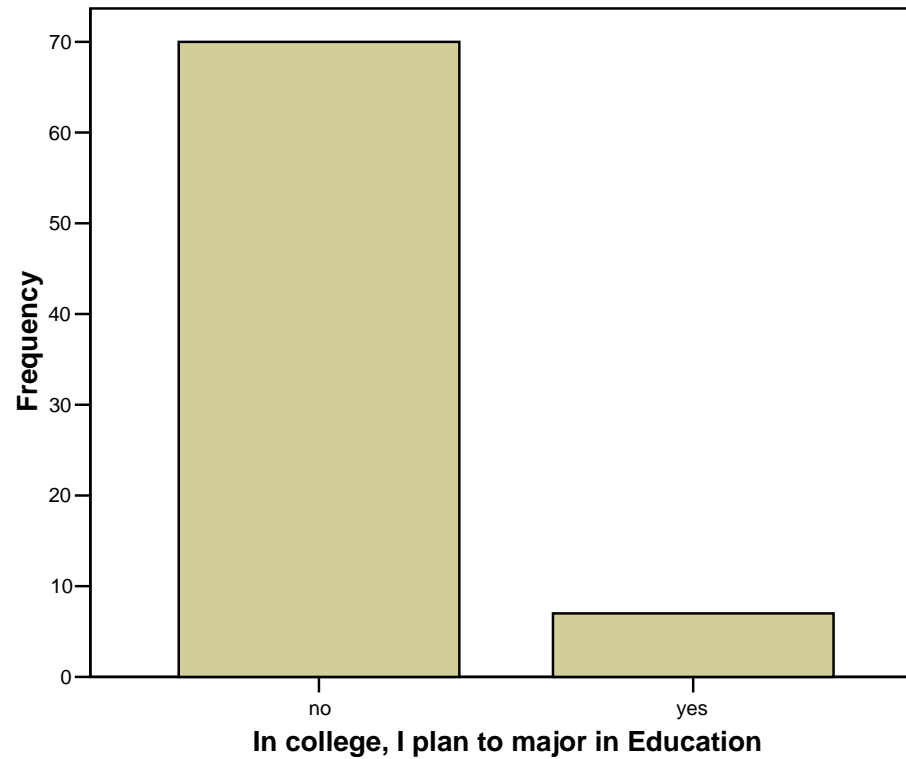
Student Survey

In college, I plan to major in Technology (Computer Science or Computer Applications)



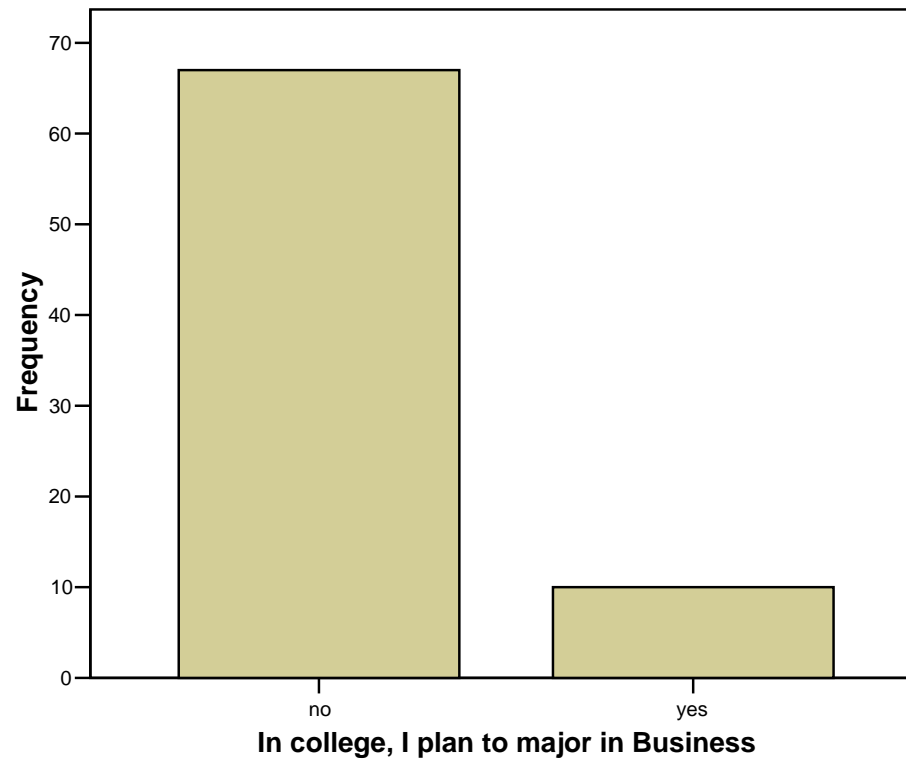
Student Survey

In college, I plan to major in Education



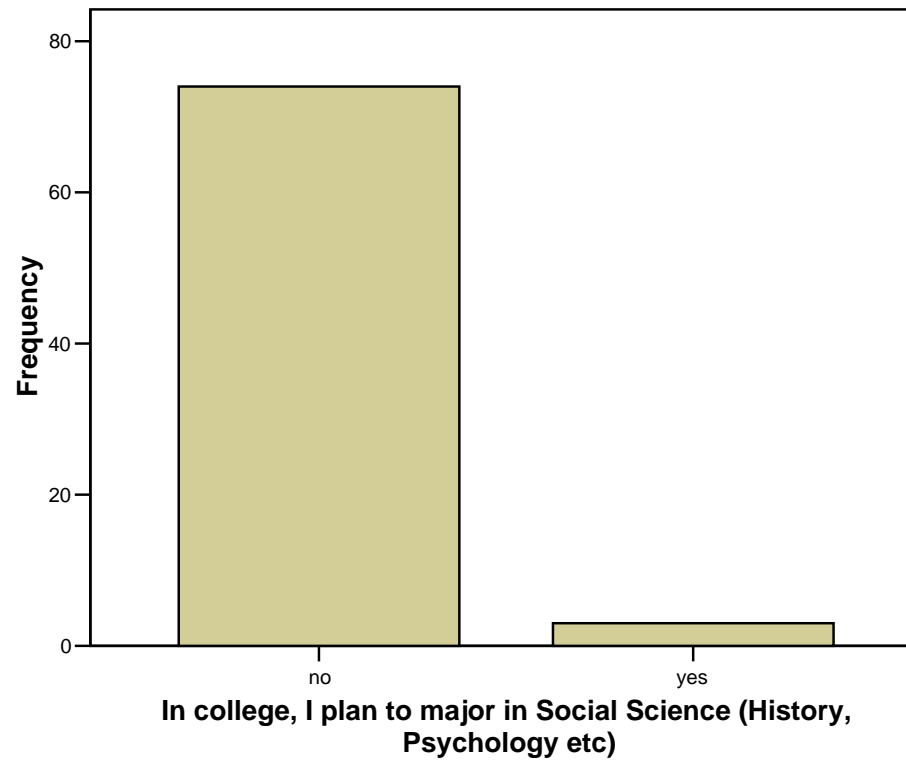
Student Survey

In college, I plan to major in Business

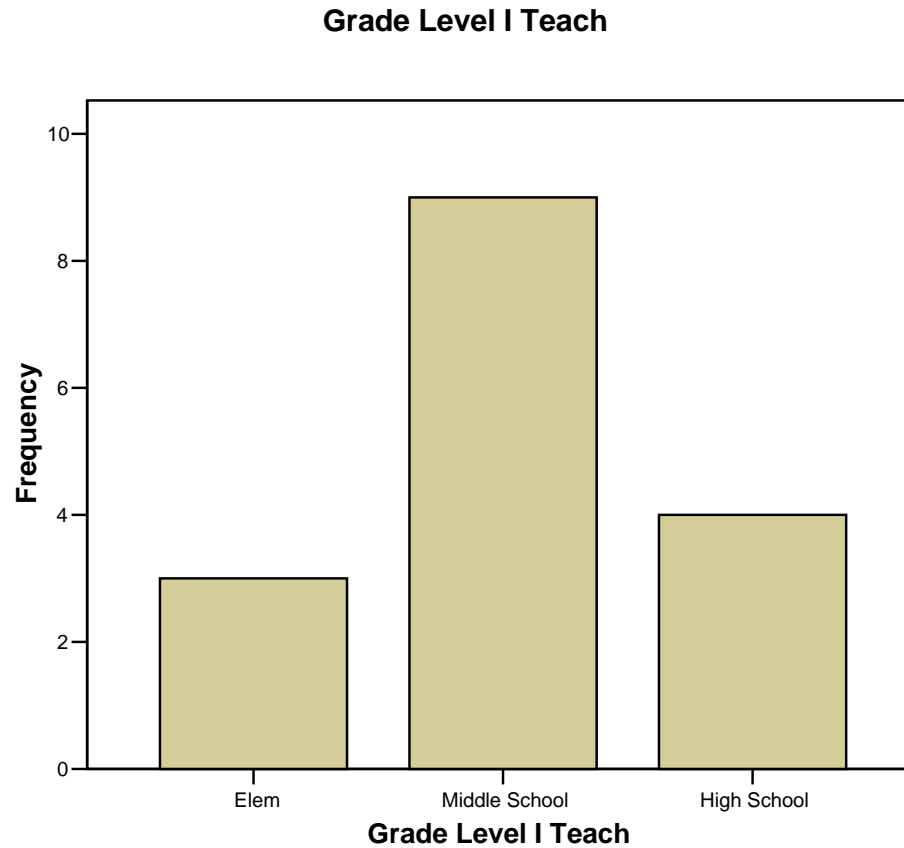


Student Survey

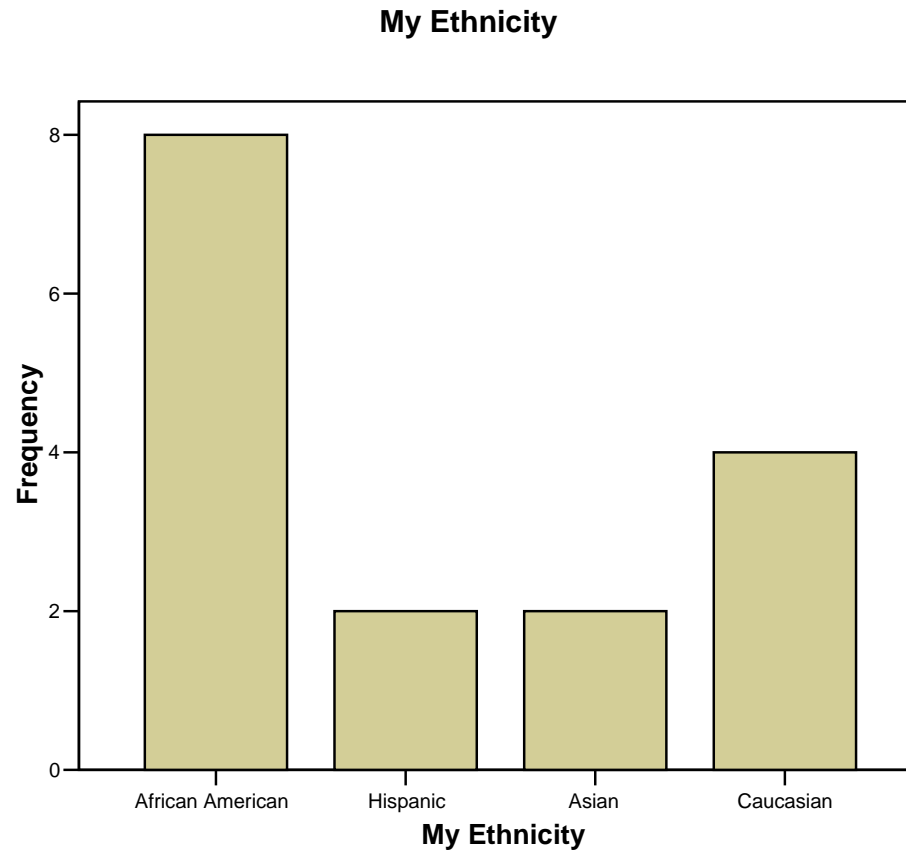
In college, I plan to major in Social Science (History, Psychology etc)



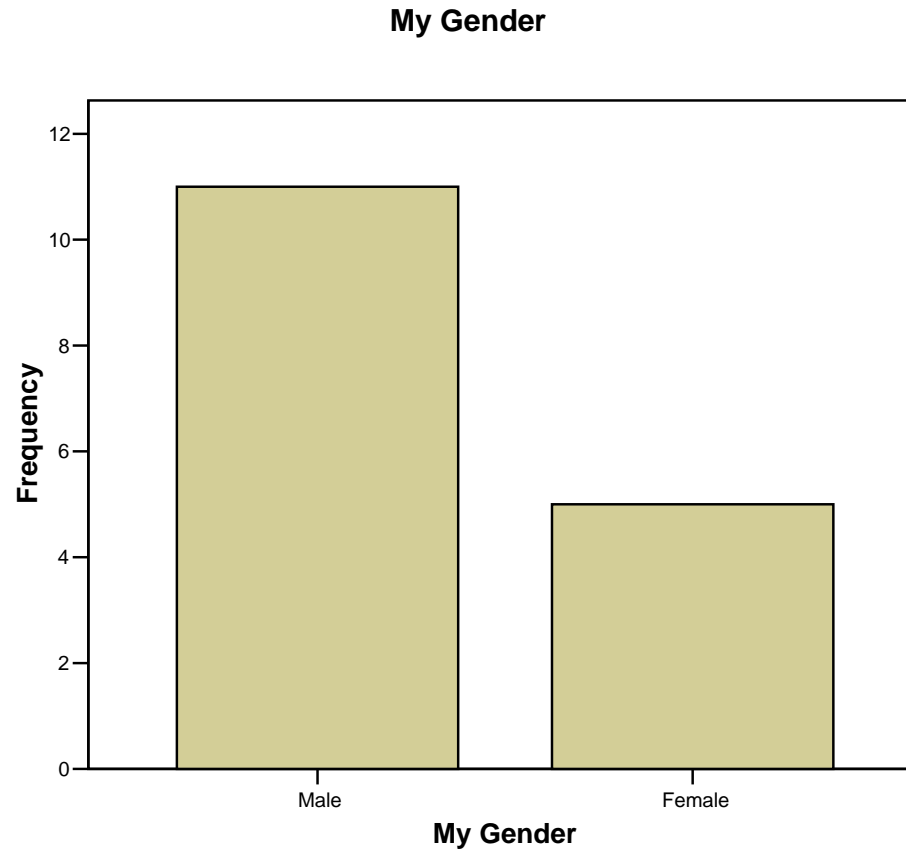
Teacher Survey



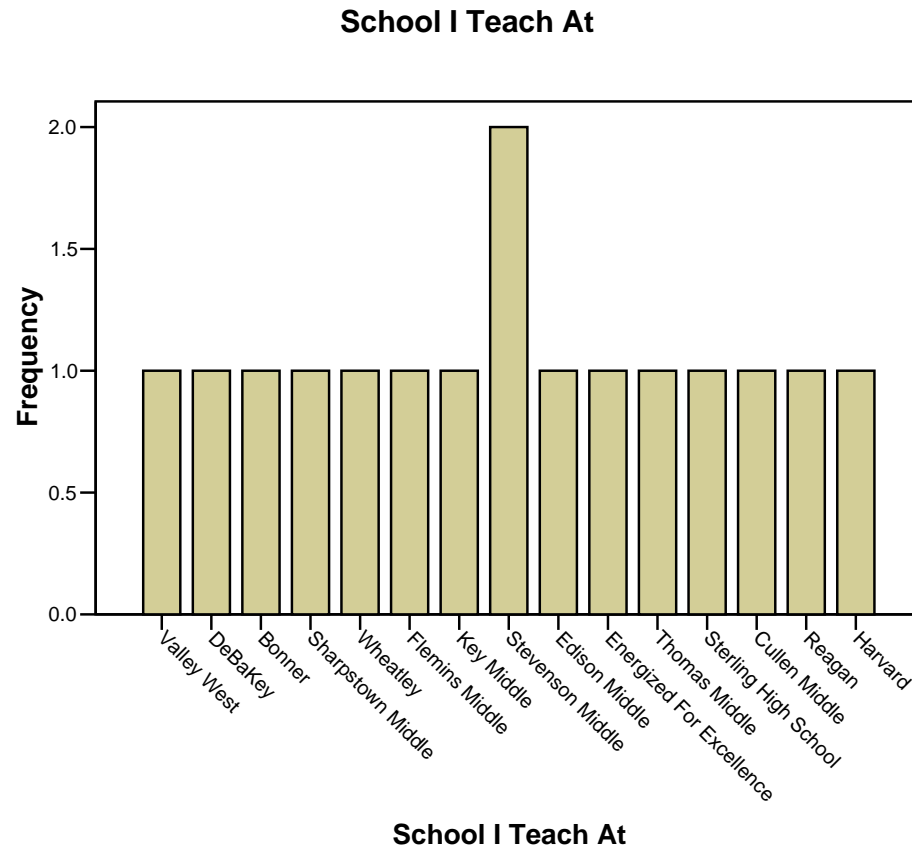
Teacher Survey



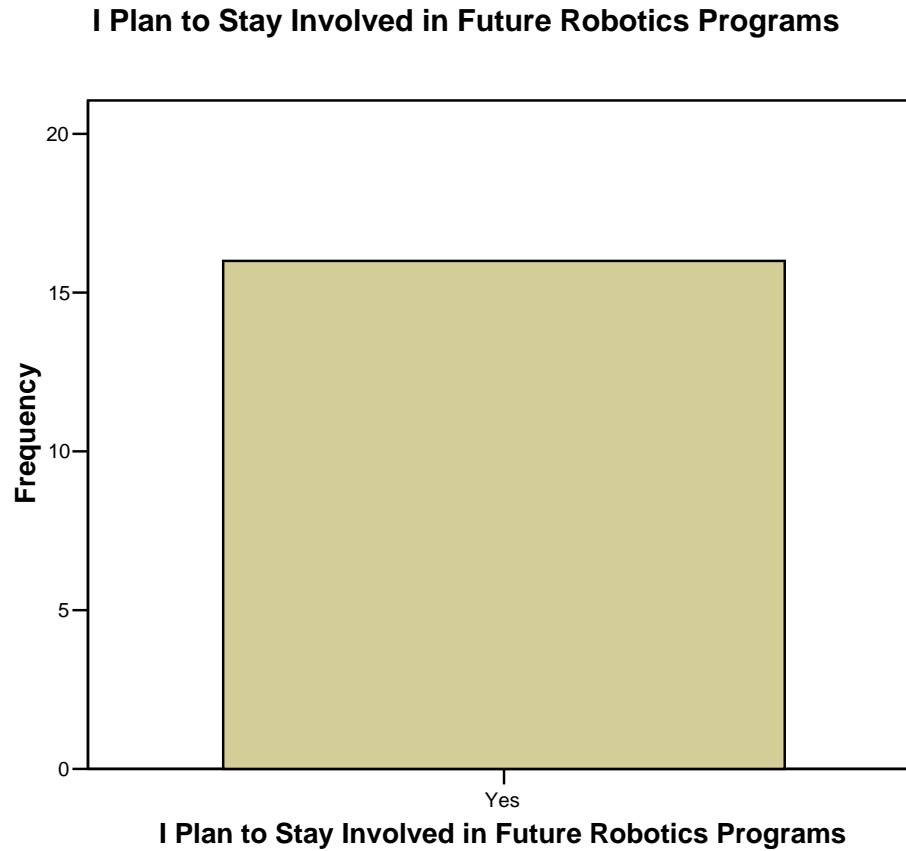
Teacher Survey



Teacher Survey

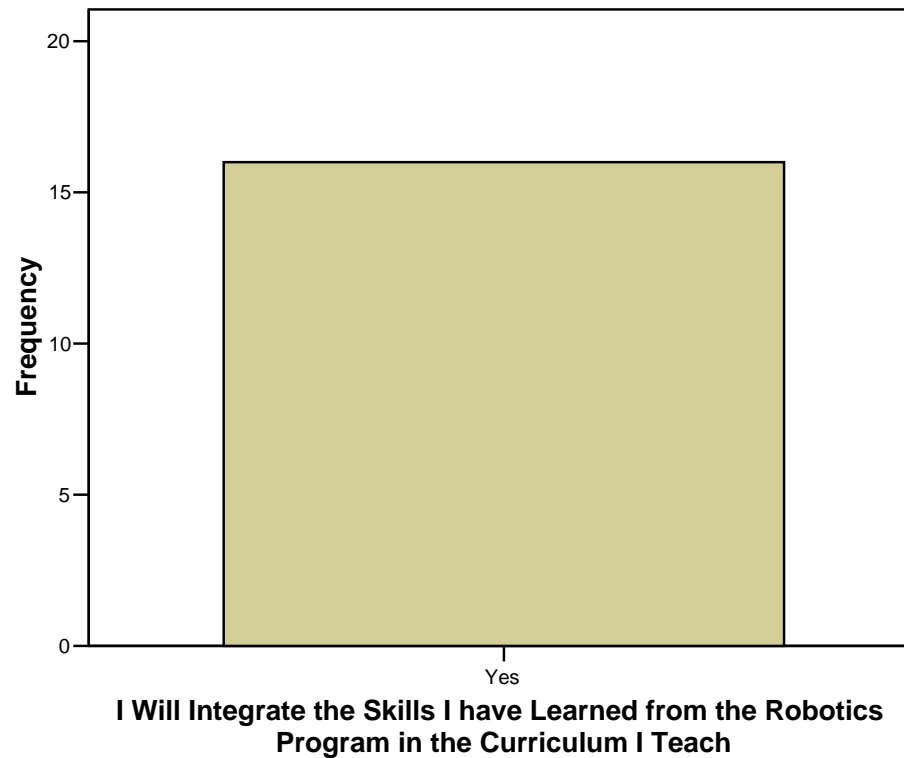


Teacher Survey



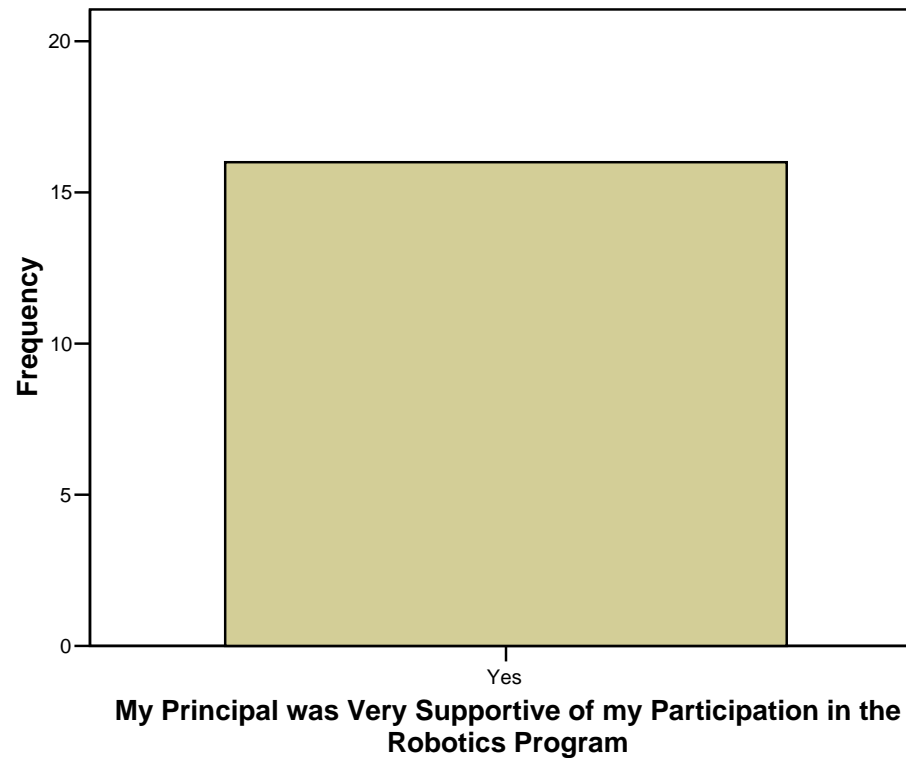
Teacher Survey

I Will Integrate the Skills I have Learned from the Robotics Program in the Curriculum I Teach



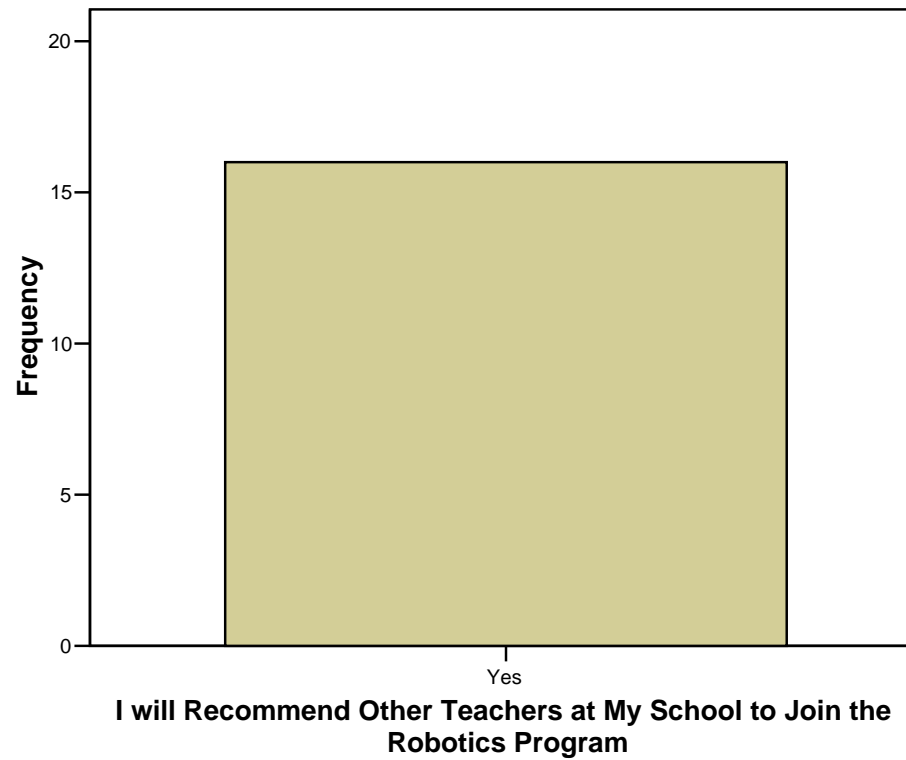
Teacher Survey

My Principal was Very Supportive of my Participation in the Robotics Program



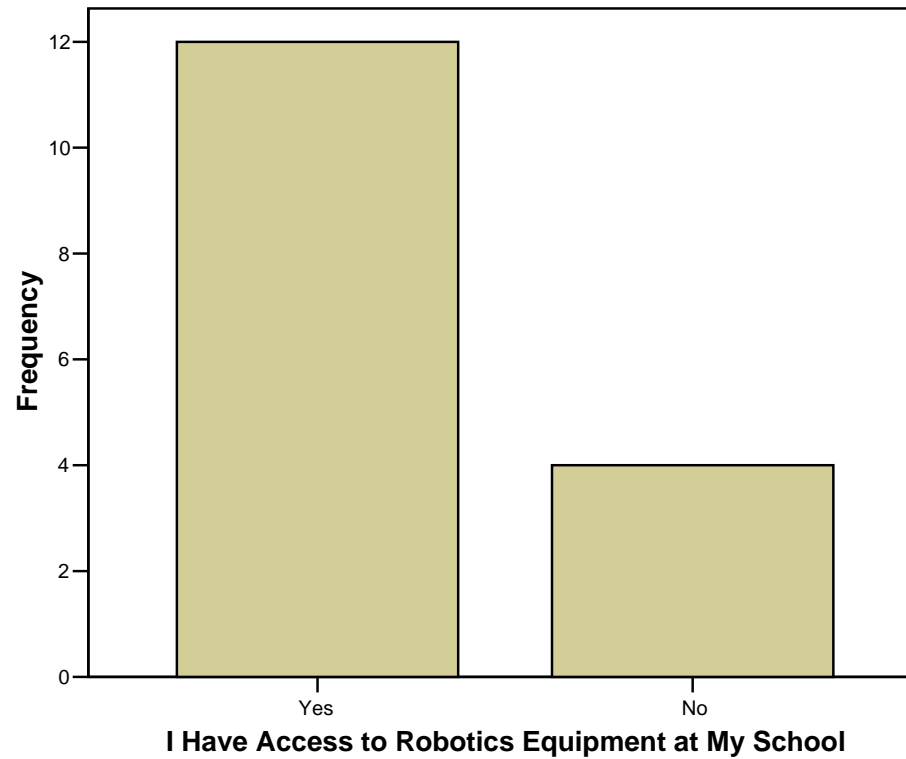
Teacher Survey

I will Recommend Other Teachers at My School to Join the Robotics Program



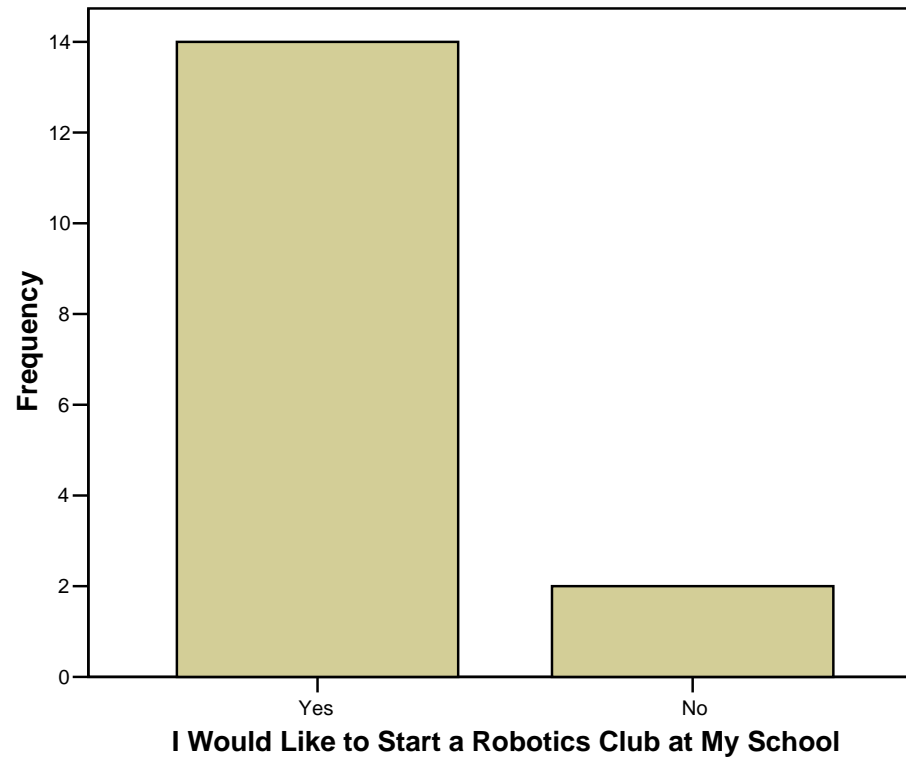
Teacher Survey

I Have Access to Robotics Equipment at My School



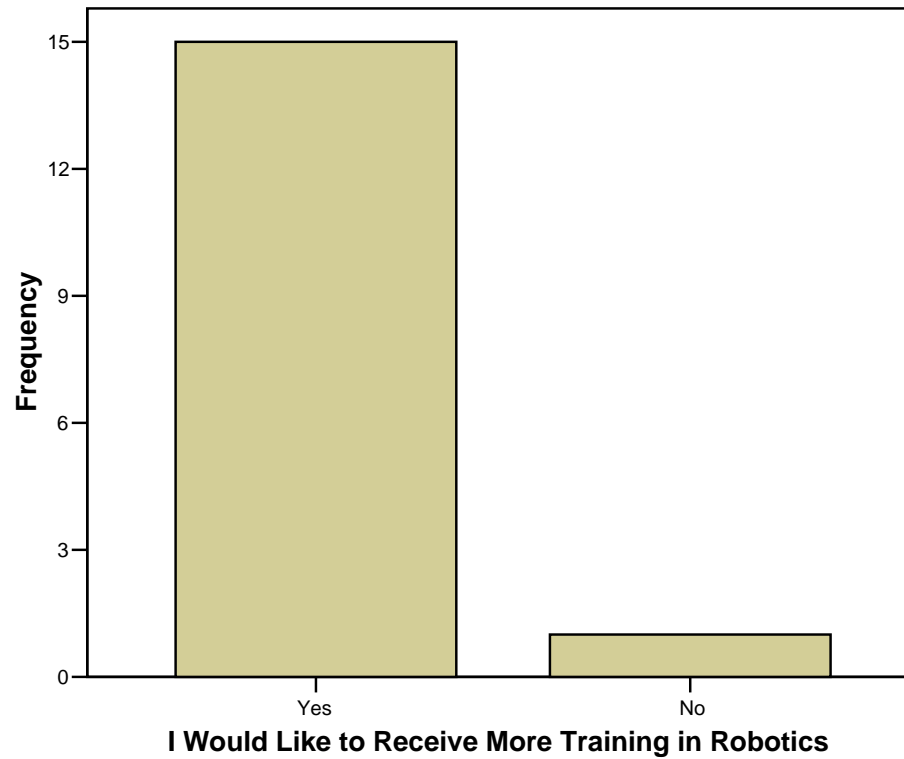
Teacher Survey

I Would Like to Start a Robotics Club at My School



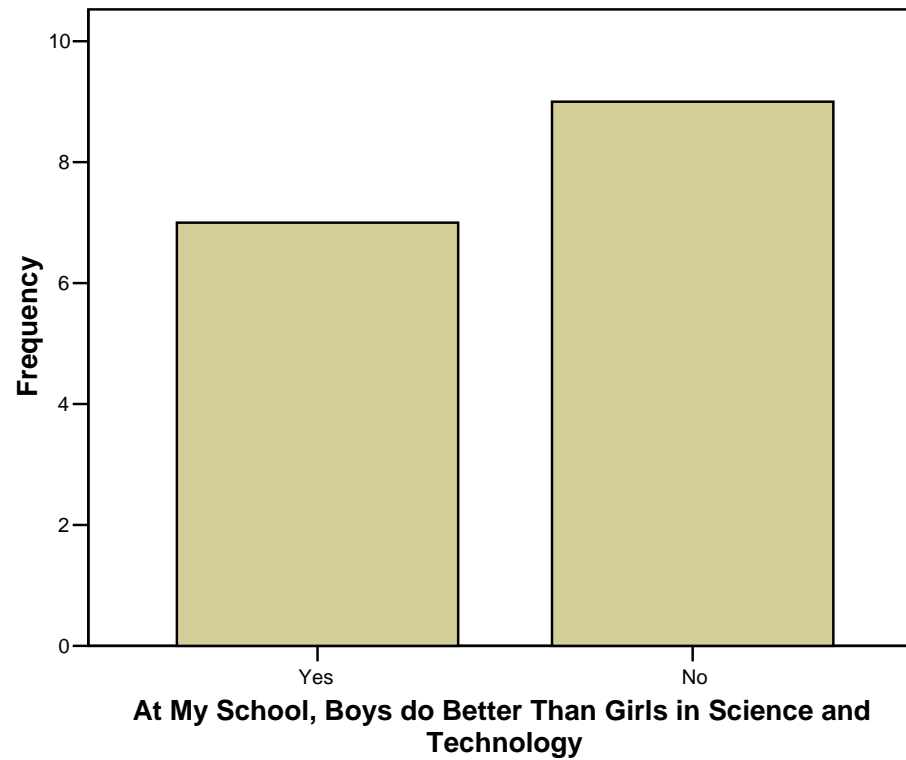
Teacher Survey

I Would Like to Receive More Training in Robotics



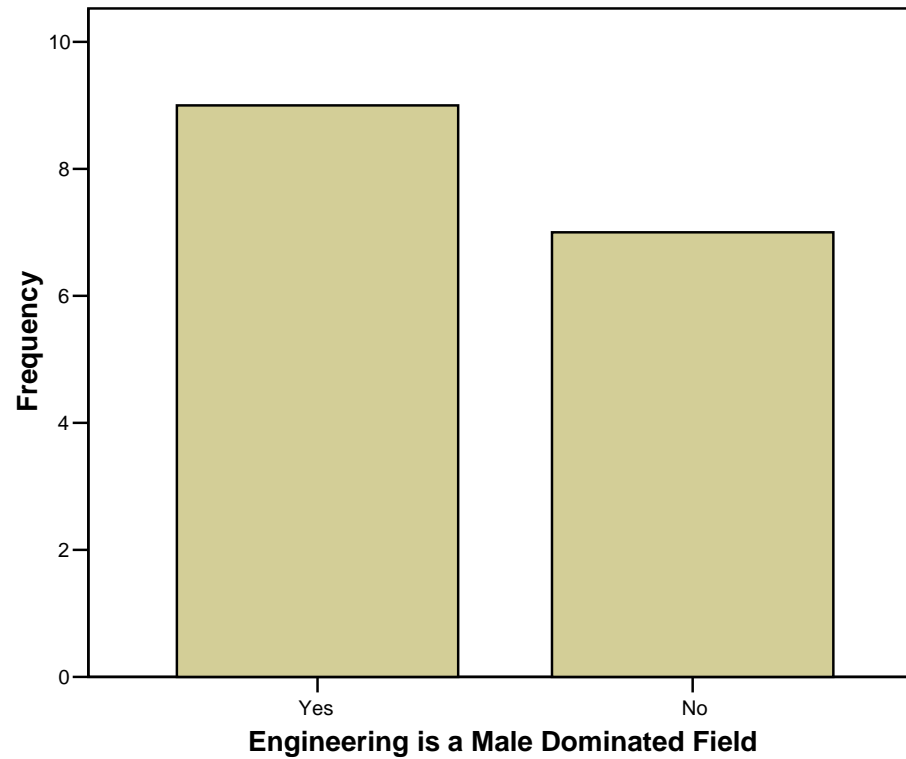
Teacher Survey

At My School, Boys do Better Than Girls in Science and Technology



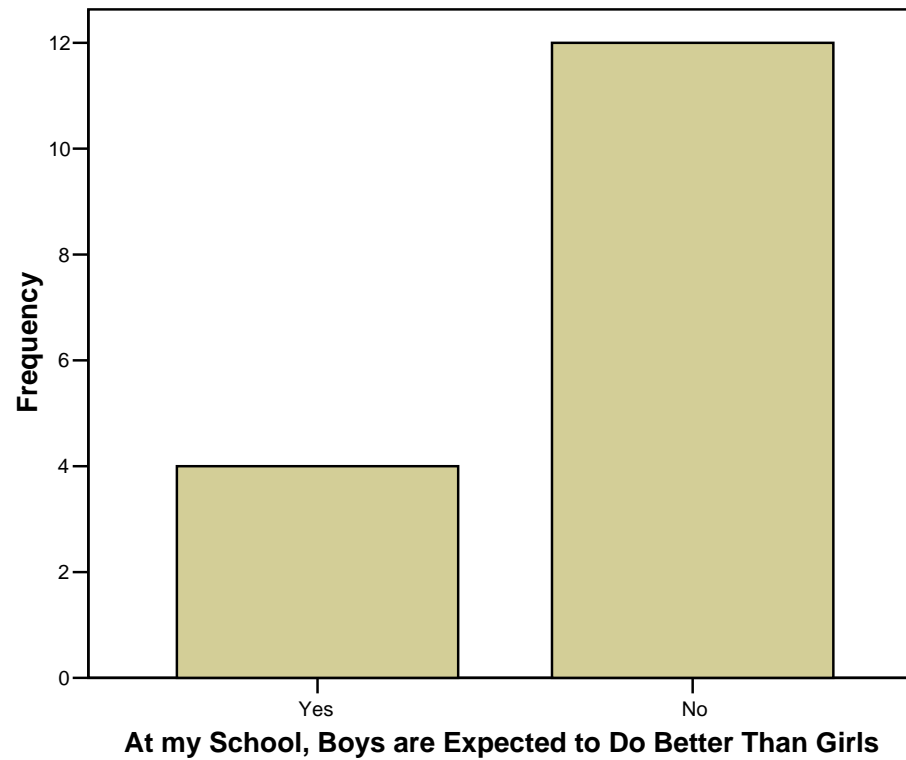
Teacher Survey

Engineering is a Male Dominated Field



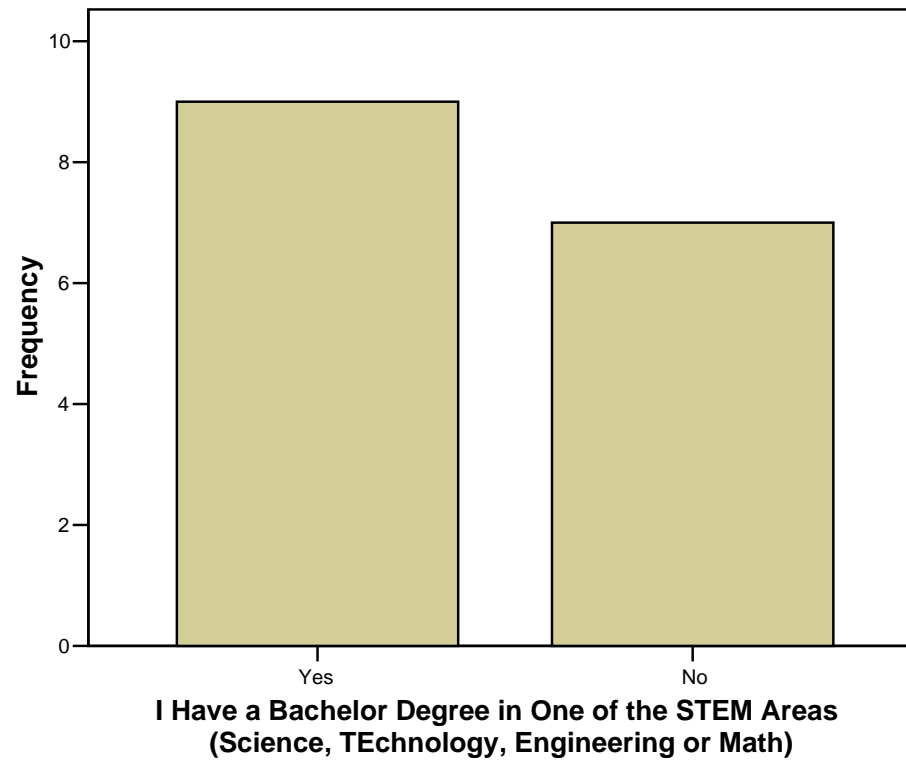
Teacher Survey

At my School, Boys are Expected to Do Better Than Girls



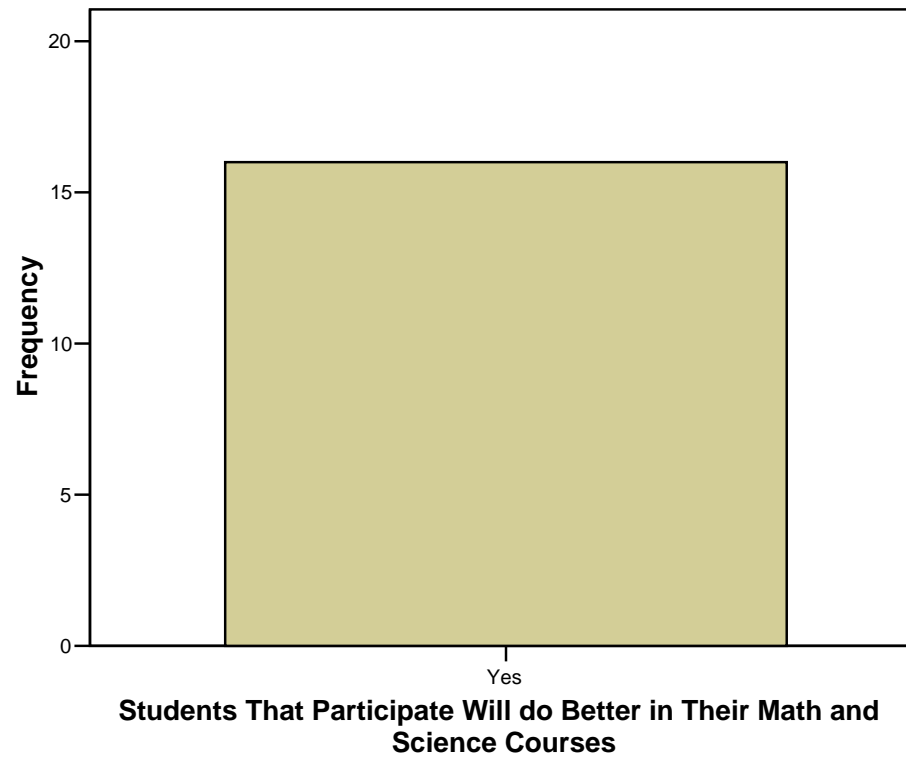
Teacher Survey

I Have a Bachelor Degree in One of the STEM Areas (Science, TEchnology, Engineering or Math)

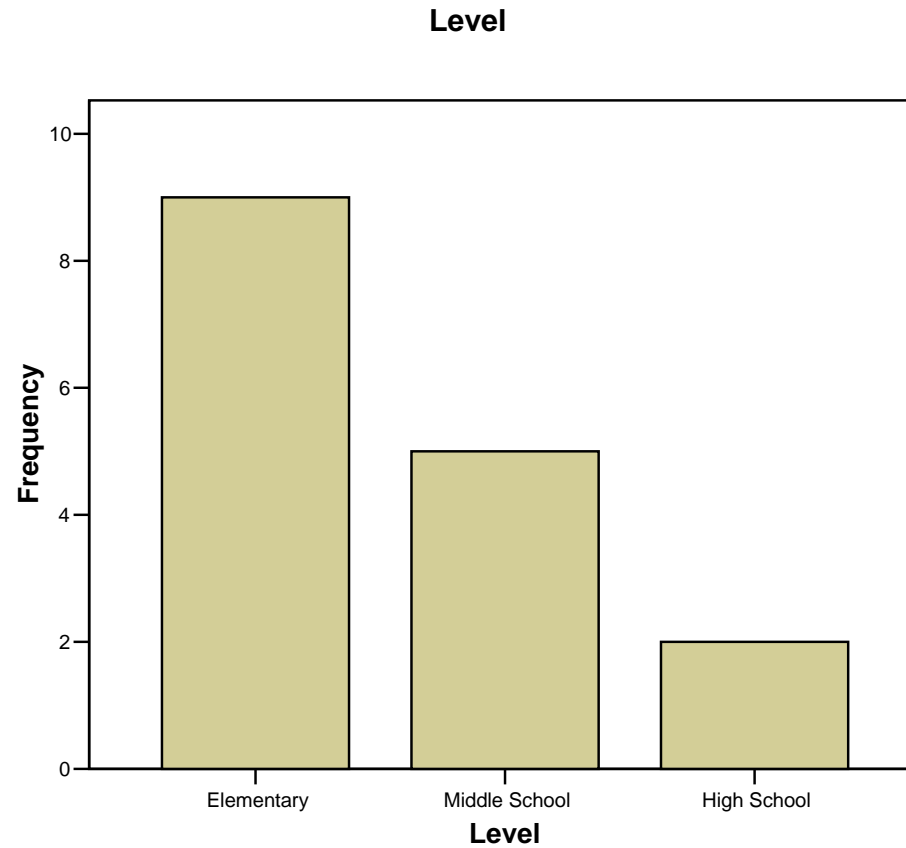


Teacher Survey

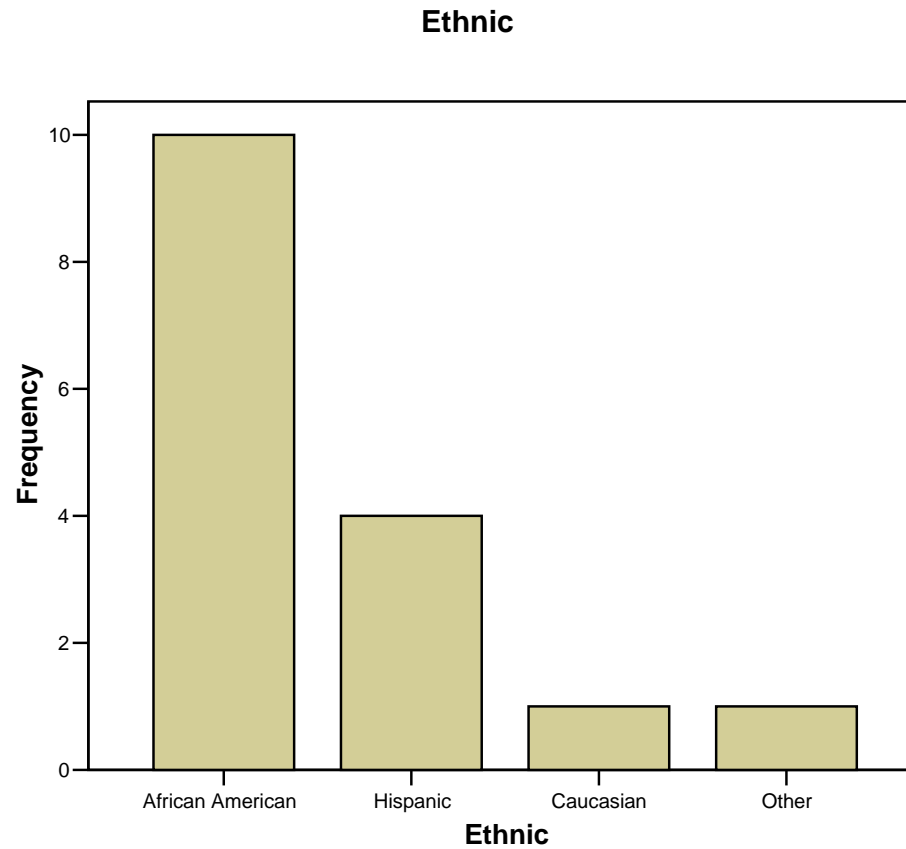
Students That Participate Will do Better in Their Math and Science Courses



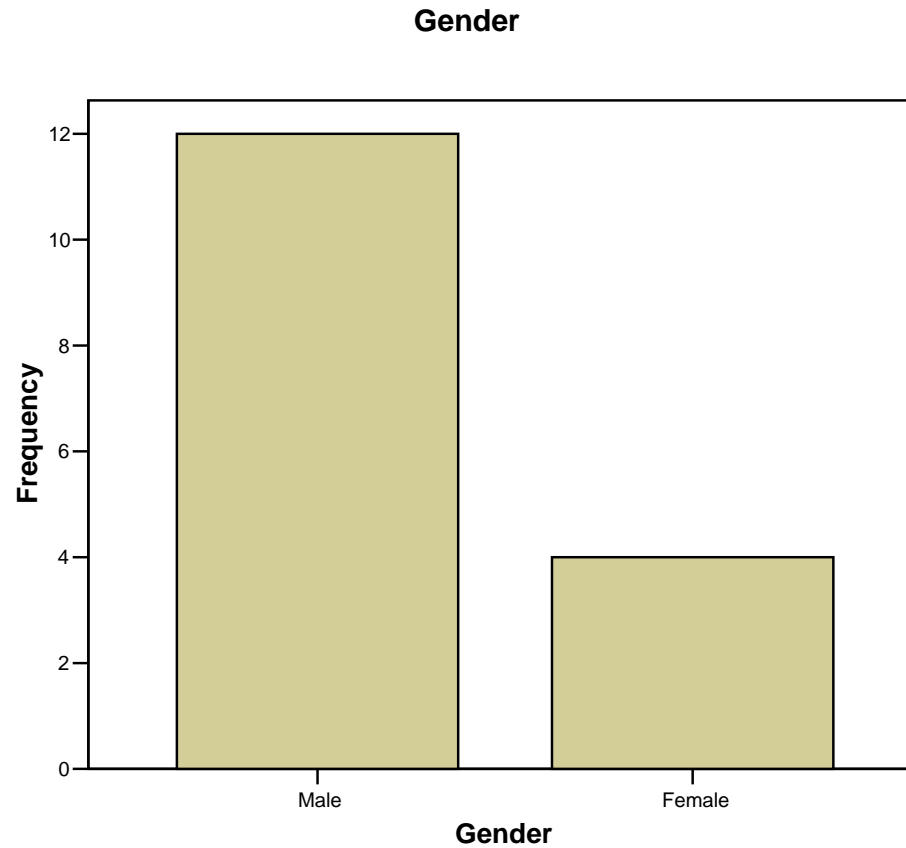
Administrator Survey



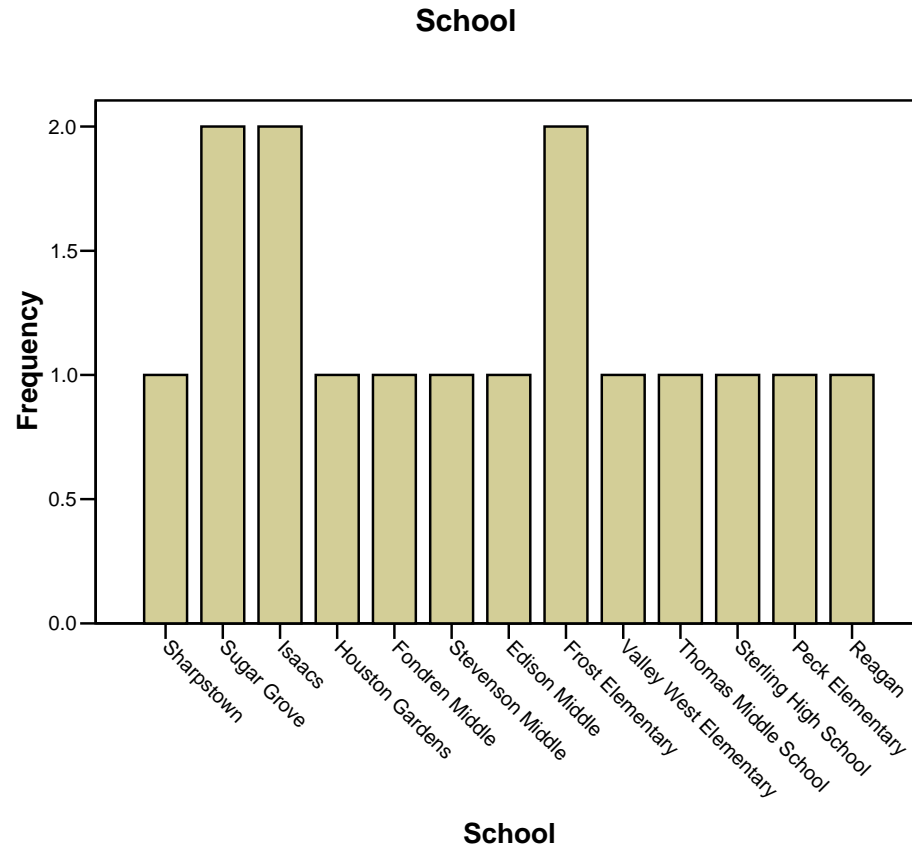
Administrator Survey



Administrator Survey

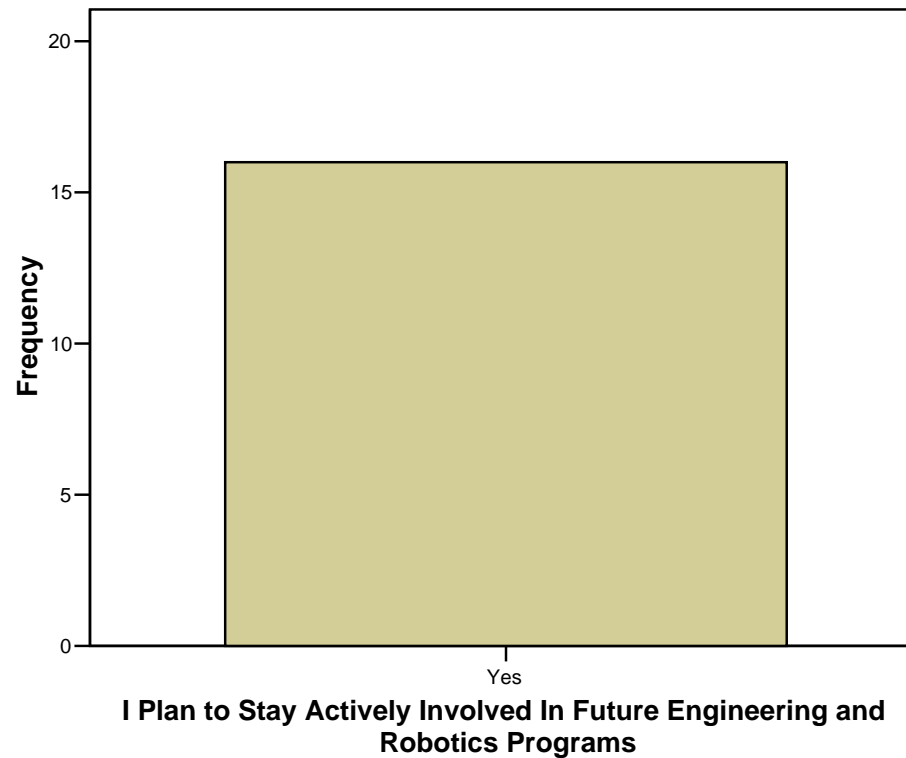


Administrator Survey



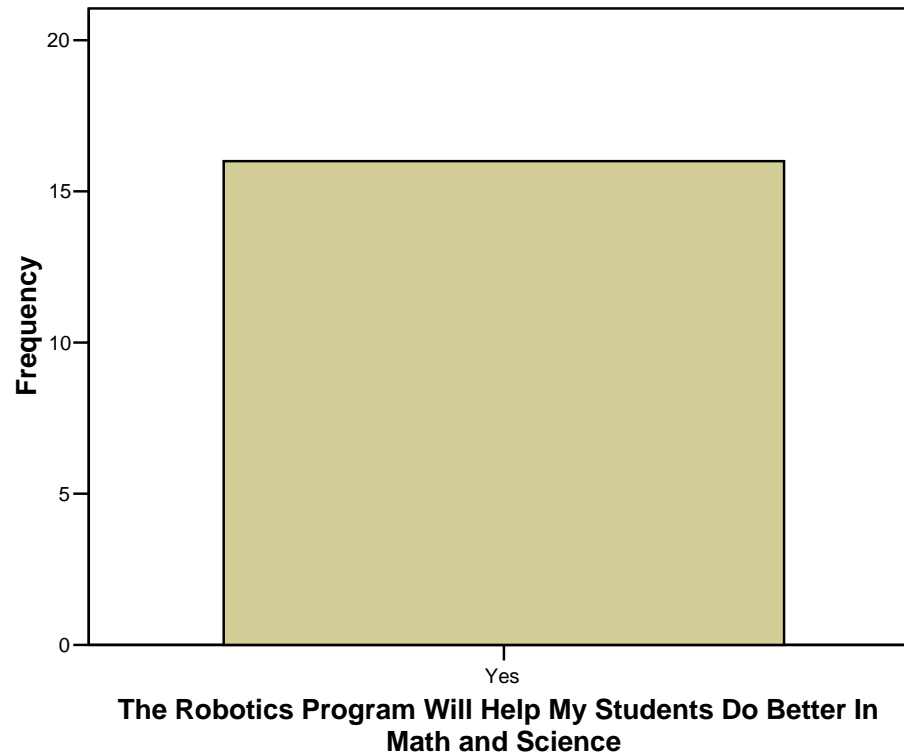
Administrator Survey

I Plan to Stay Actively Involved In Future Engineering and Robotics Programs

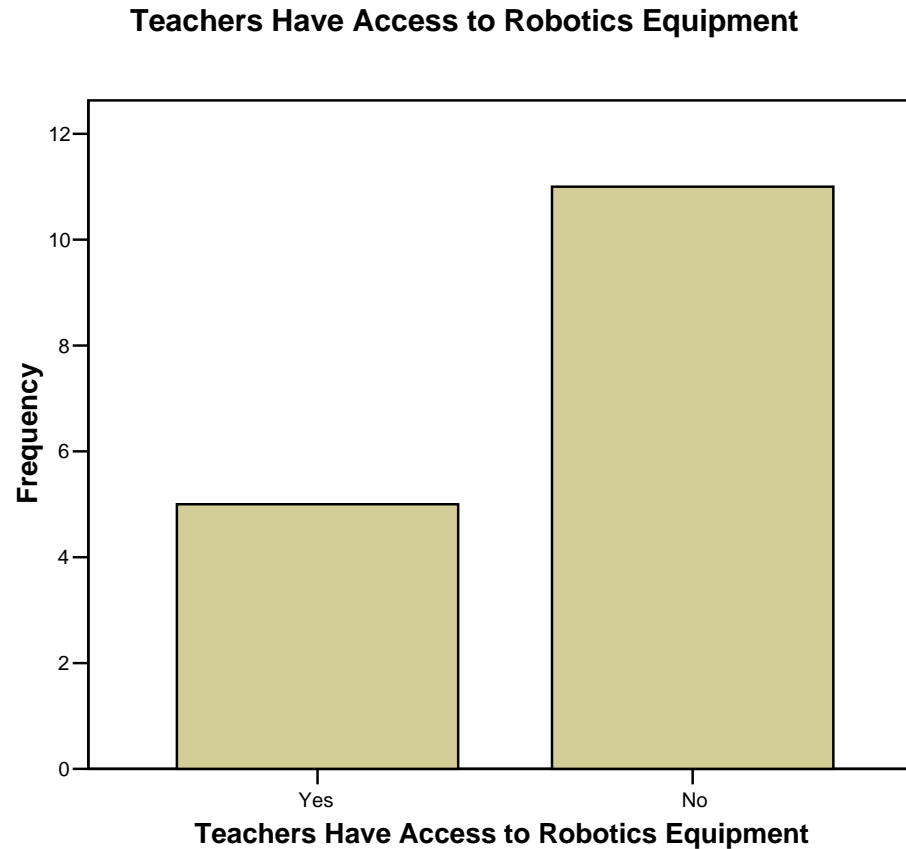


Administrator Survey

The Robotics Program Will Help My Students Do Better In Math and Science

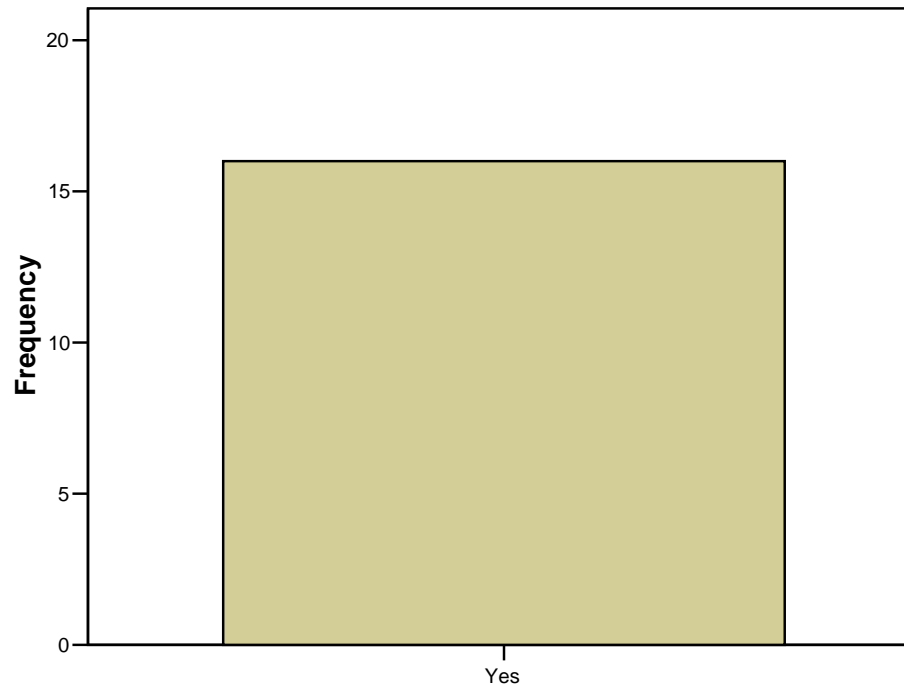


Administrator Survey



Administrator Survey

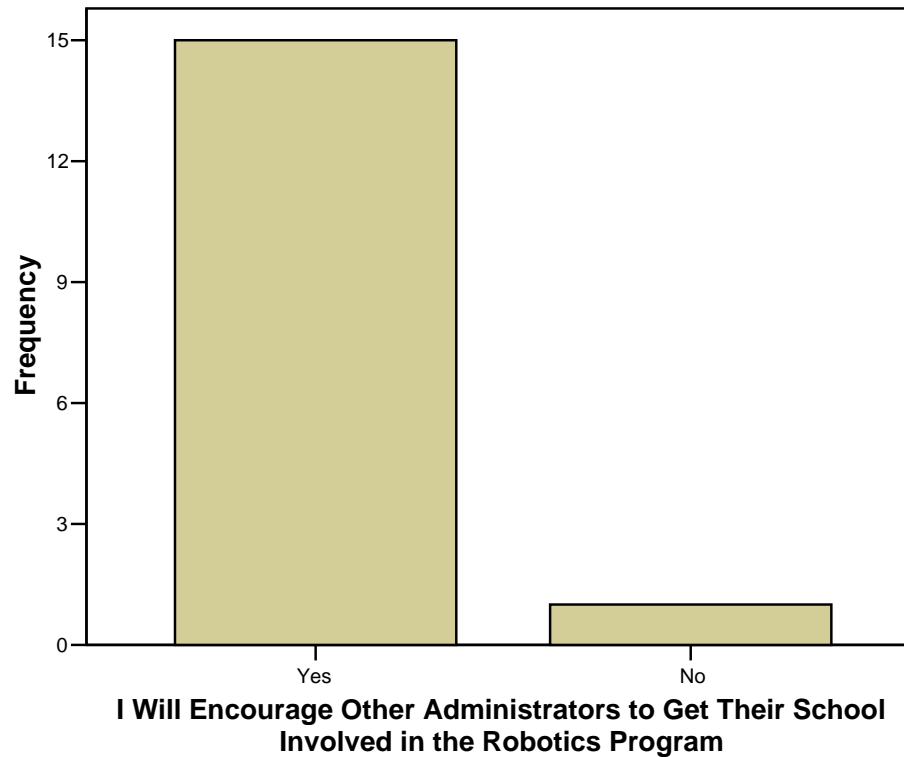
I Will Encourage More Faculty Members at My School to Get Involved in The Robotics Program



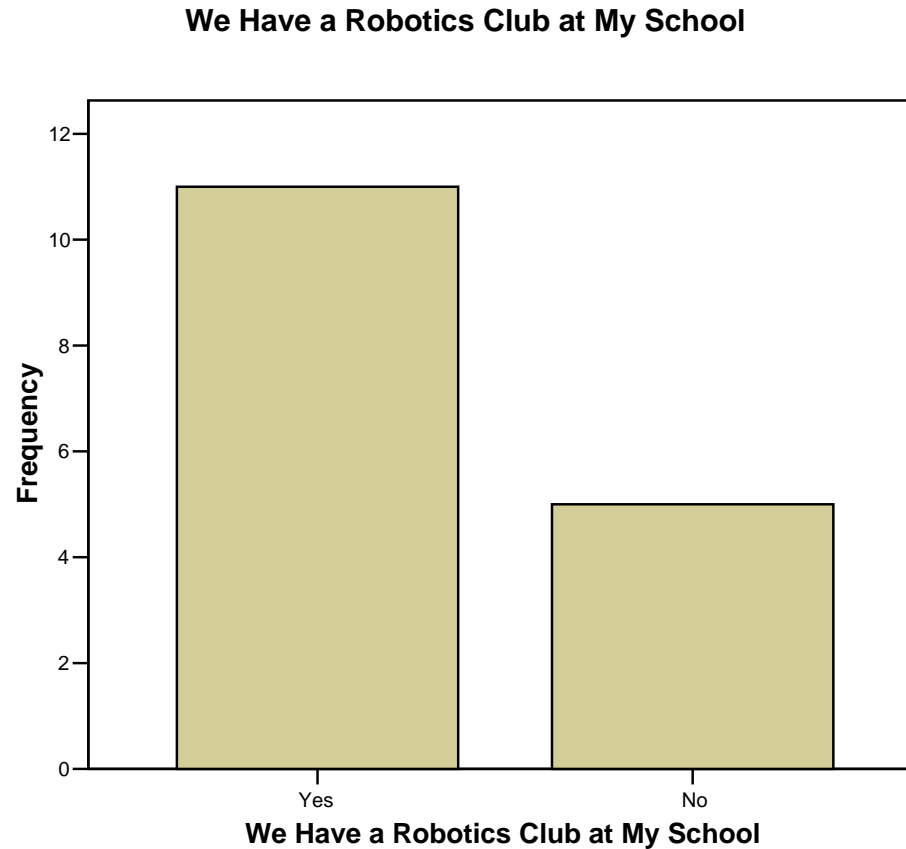
I Will Encourage More Faculty Members at My School to Get Involved in The Robotics Program

Administrator Survey

I Will Encourage Other Administrators to Get Their School Involved in the Robotics Program

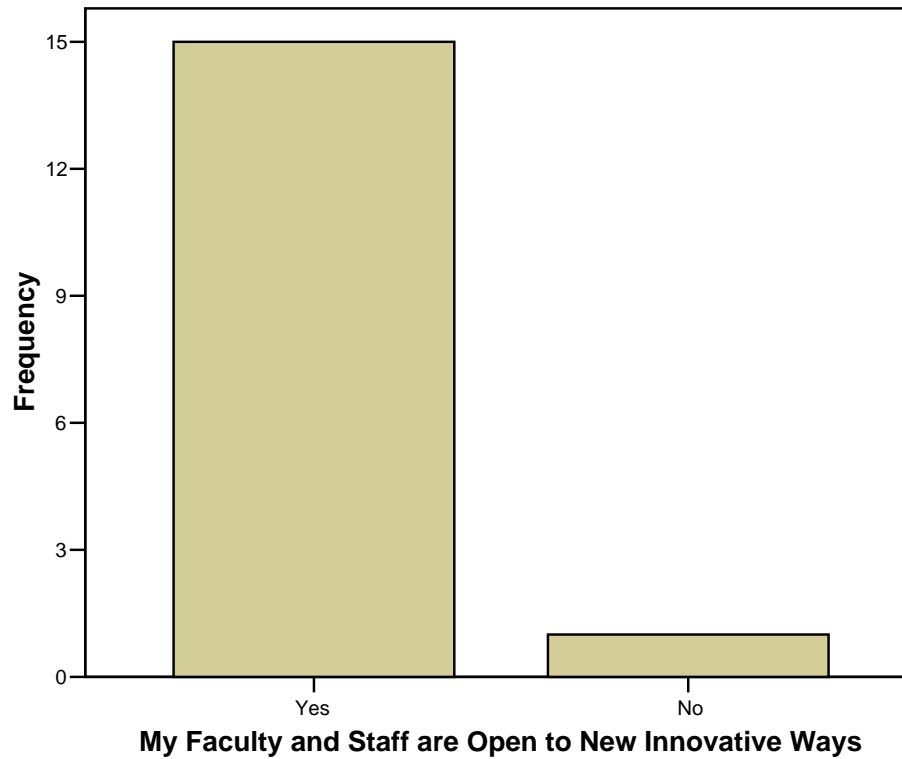


Administrator Survey



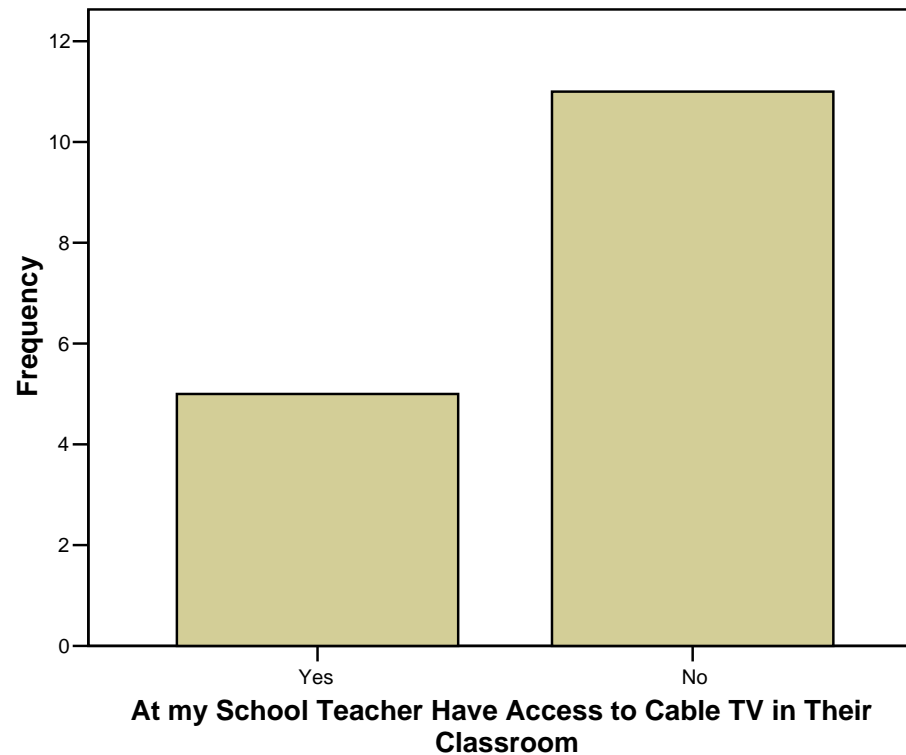
Administrator Survey

My Faculty and Staff are Open to New Innovative Ways

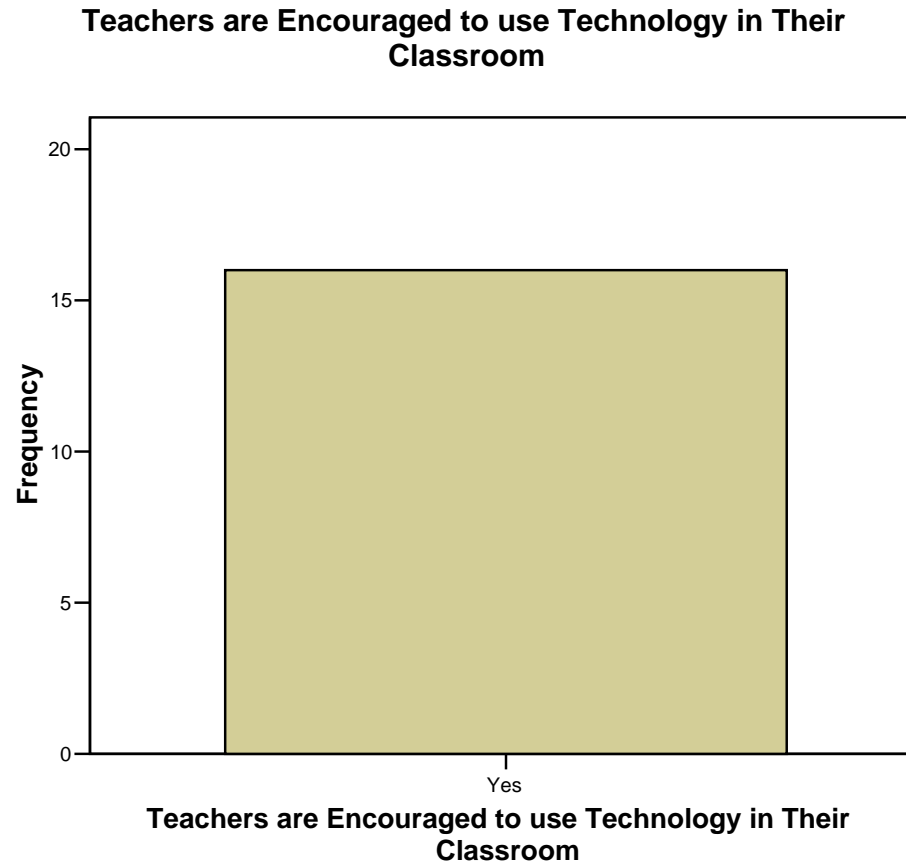


Administrator Survey

At my School Teacher Have Access to Cable TV in Their Classroom

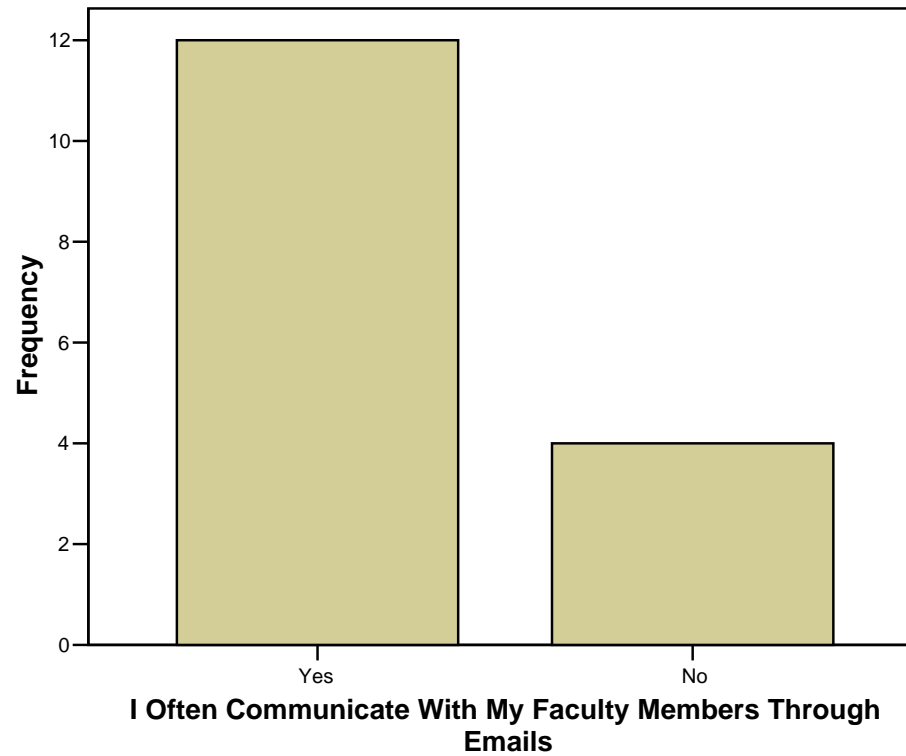


Administrator Survey



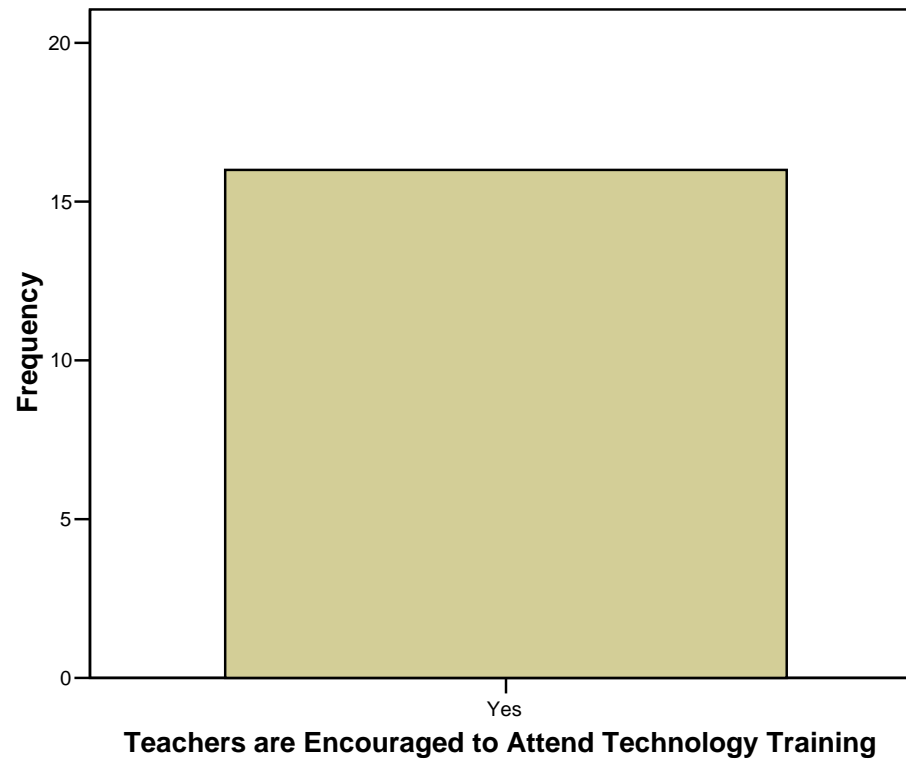
Administrator Survey

I Often Communicate With My Faculty Members Through Emails



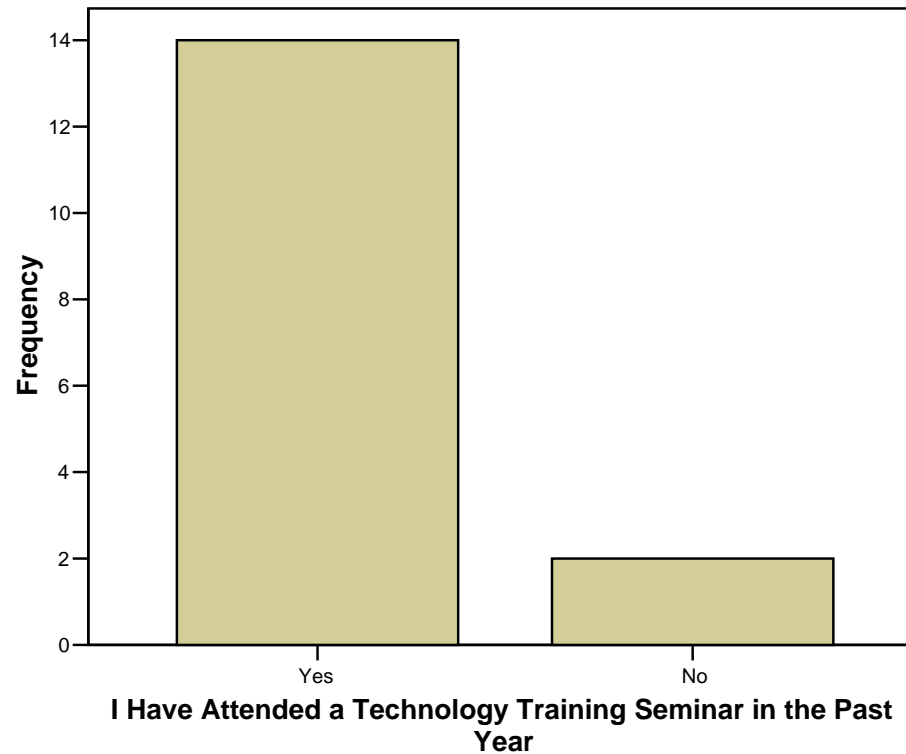
Administrator Survey

Teachers are Encouraged to Attend Technology Training



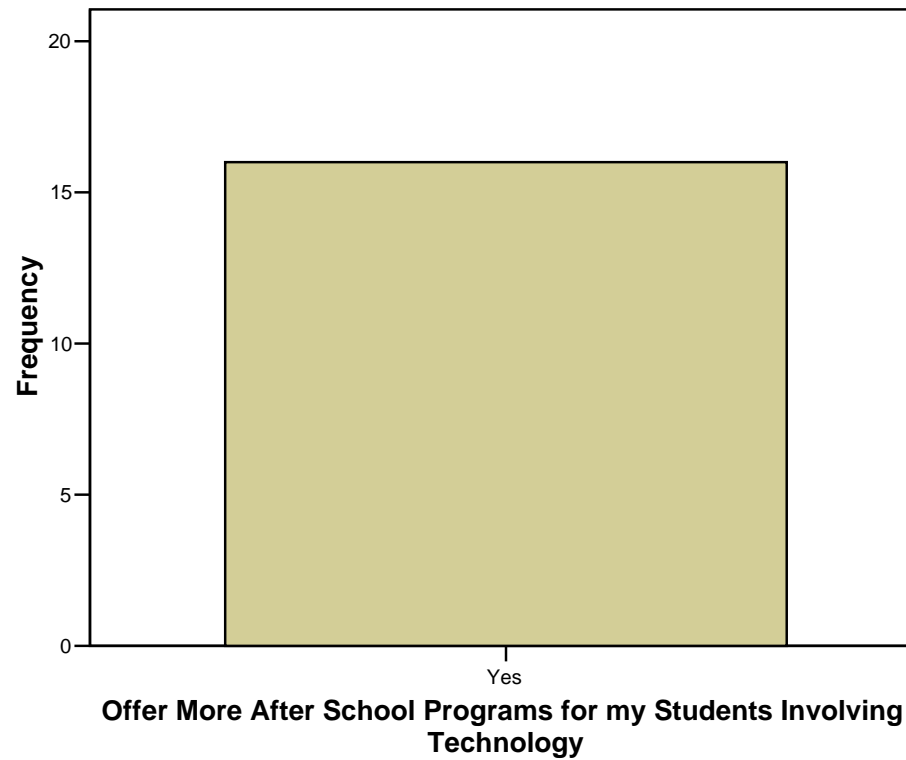
Administrator Survey

I Have Attended a Technology Training Seminar in the Past Year



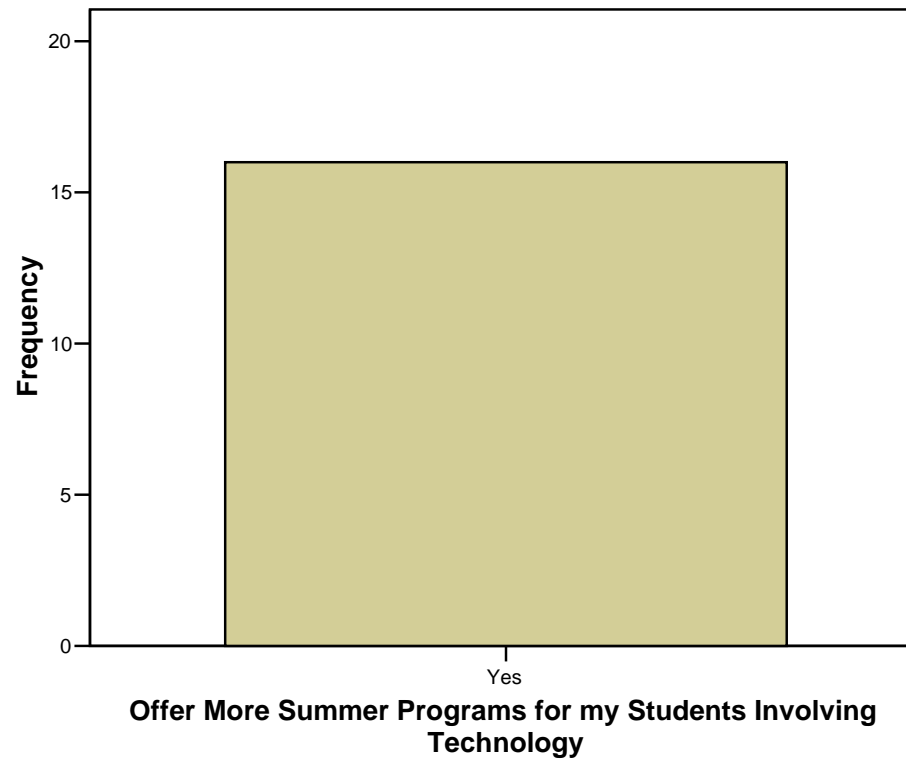
Administrator Survey

Offer More After School Programs for my Students Involving Technology



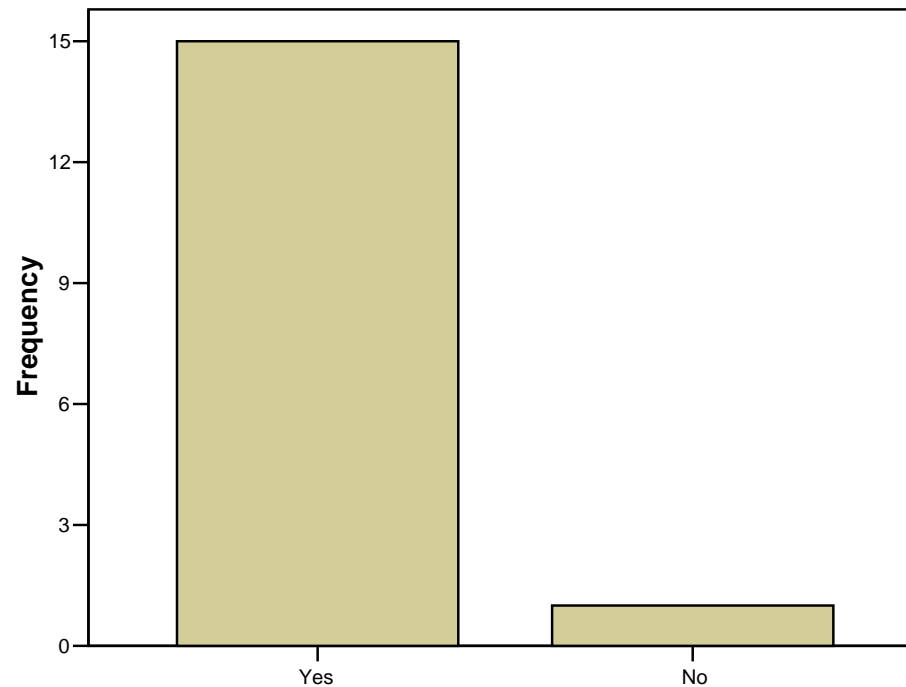
Administrator Survey

Offer More Summer Programs for my Students Involving Technology



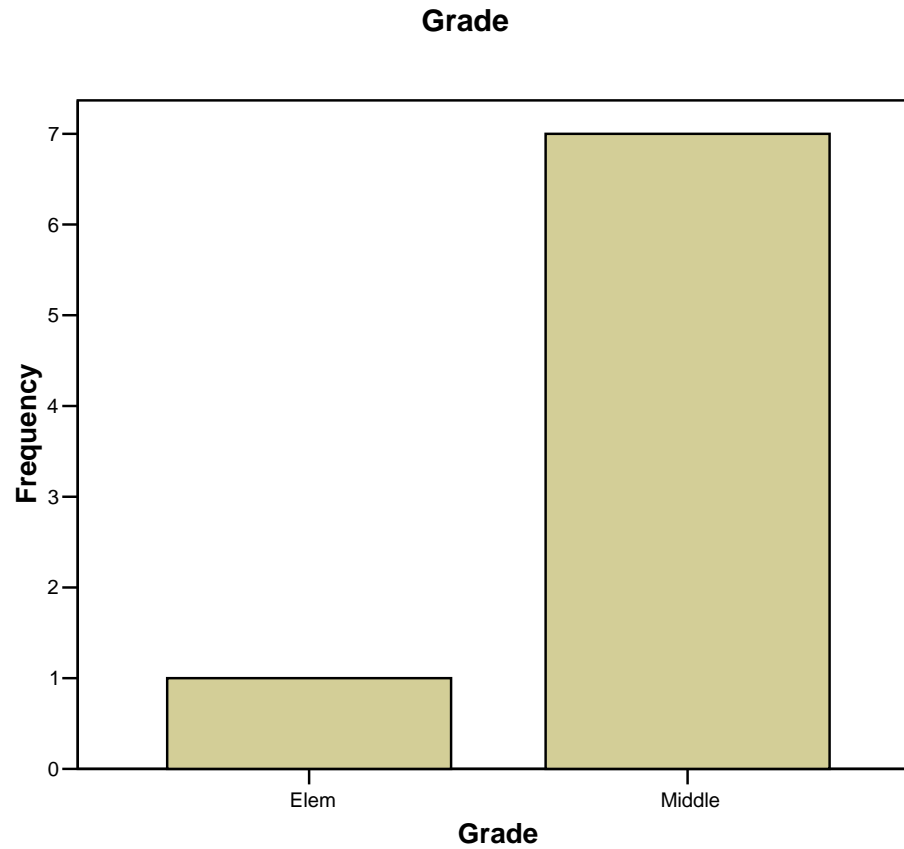
Administrator Survey

Offer More After School and Saturday Faculty Development Programs on Effective Use of Technology in the Classroom

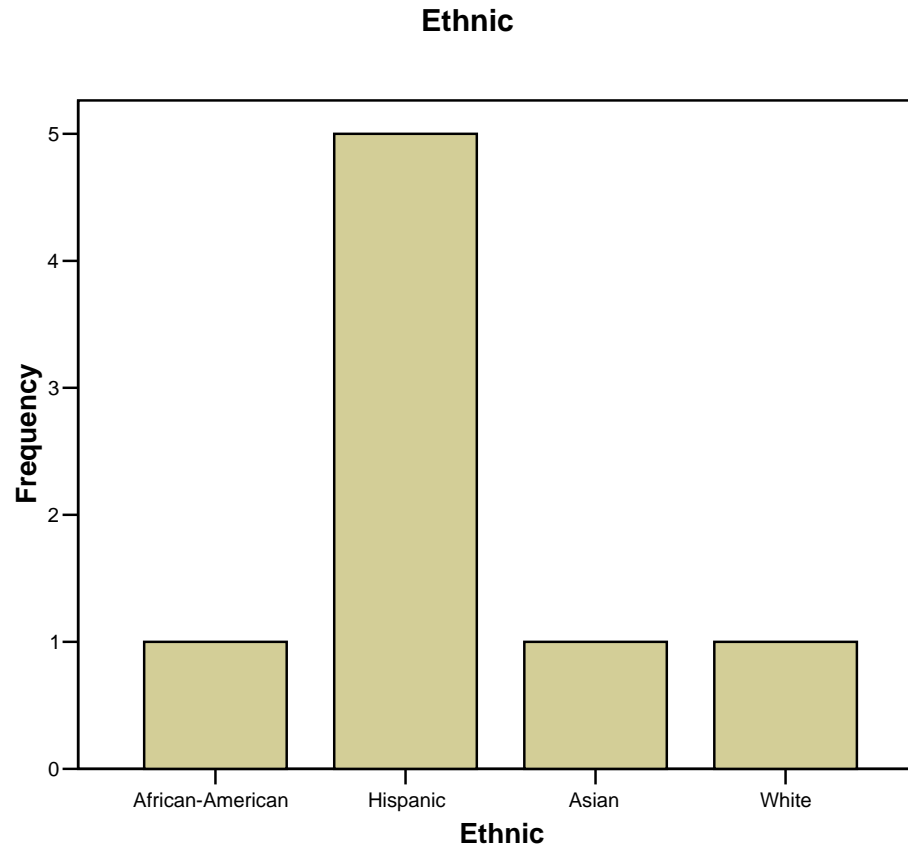


Offer More After School and Saturday Faculty Development Programs on Effective Use of Technology in the Classroom

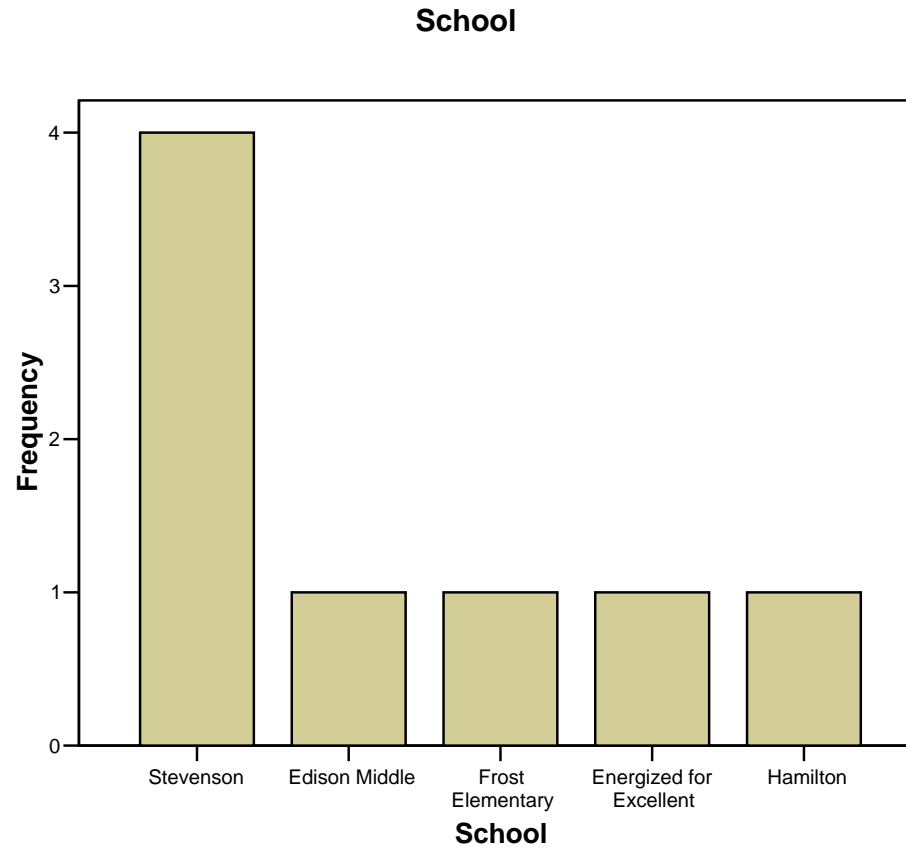
Parent Survey



Parent Survey

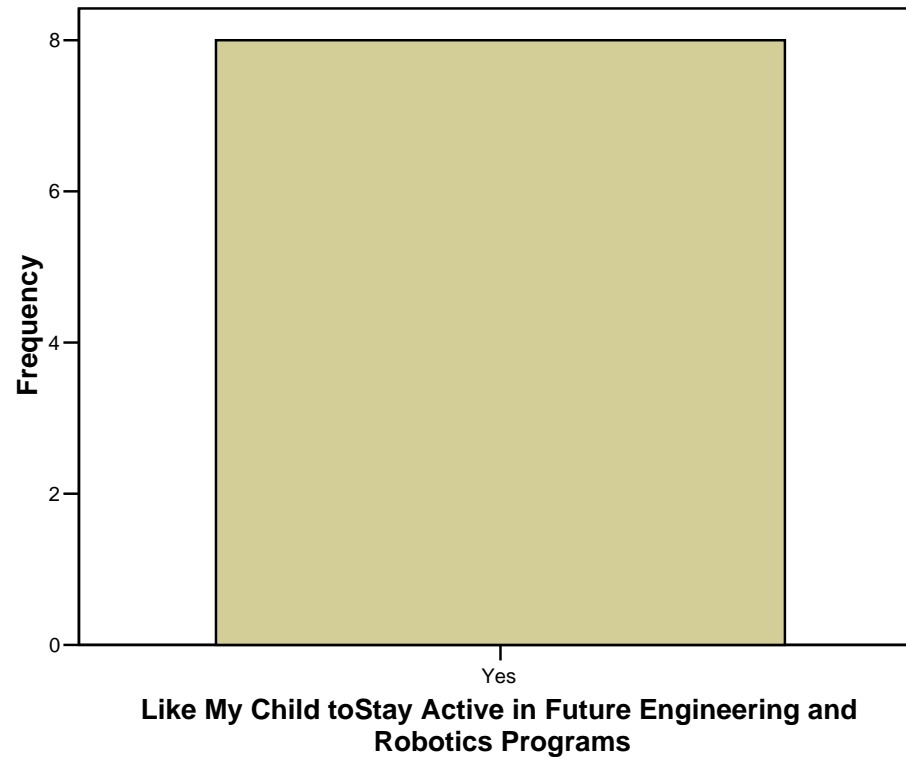


Parent Survey



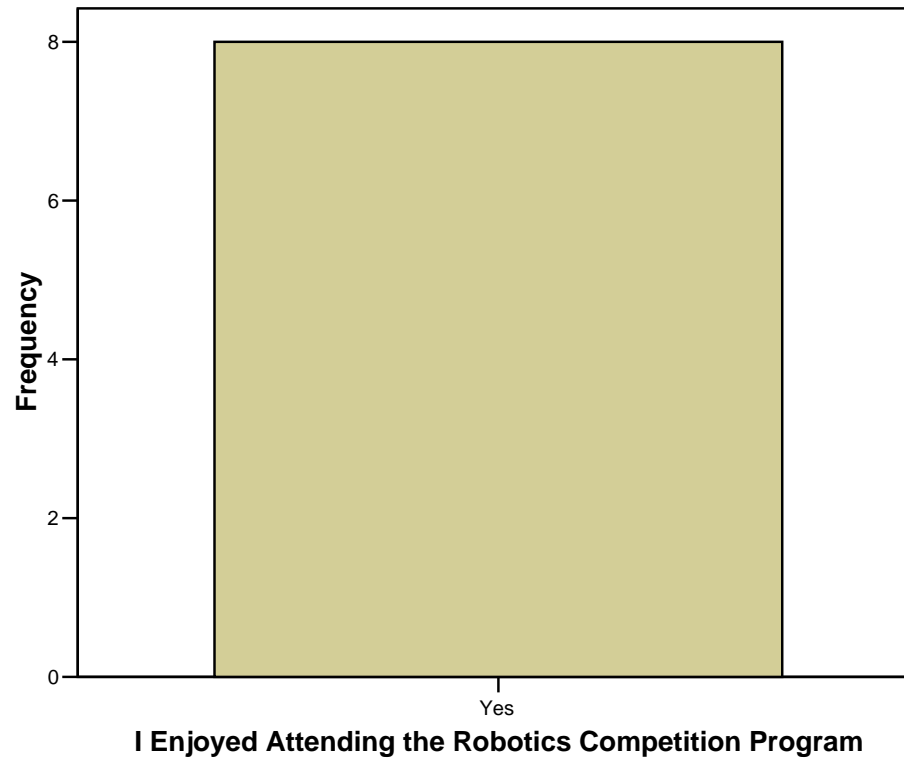
Parent Survey

Like My Child to Stay Active in Future Engineering and Robotics Programs



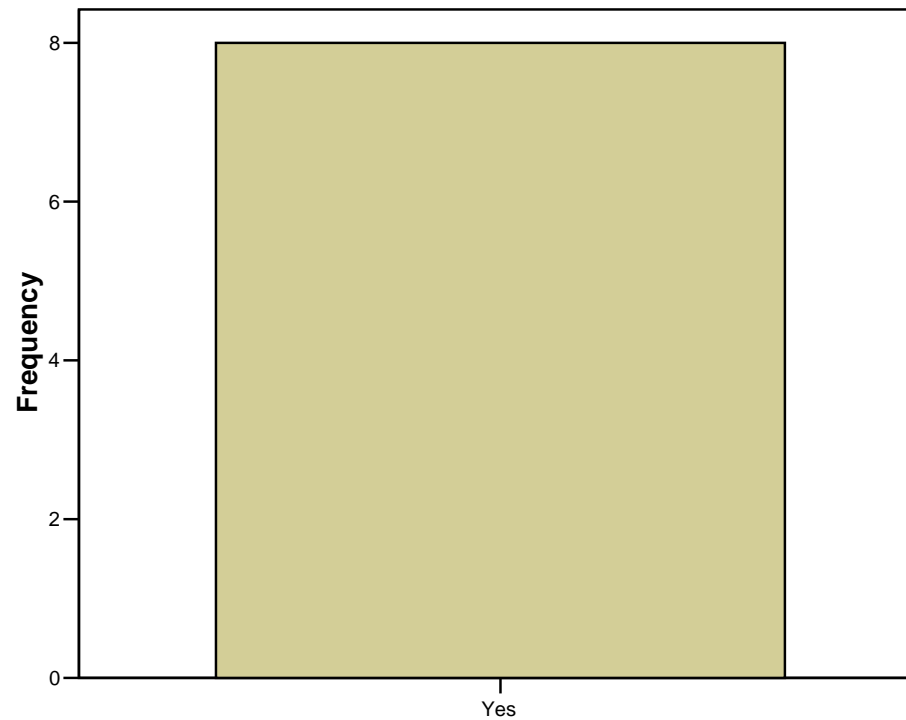
Parent Survey

I Enjoyed Attending the Robotics Competition Program



Parent Survey

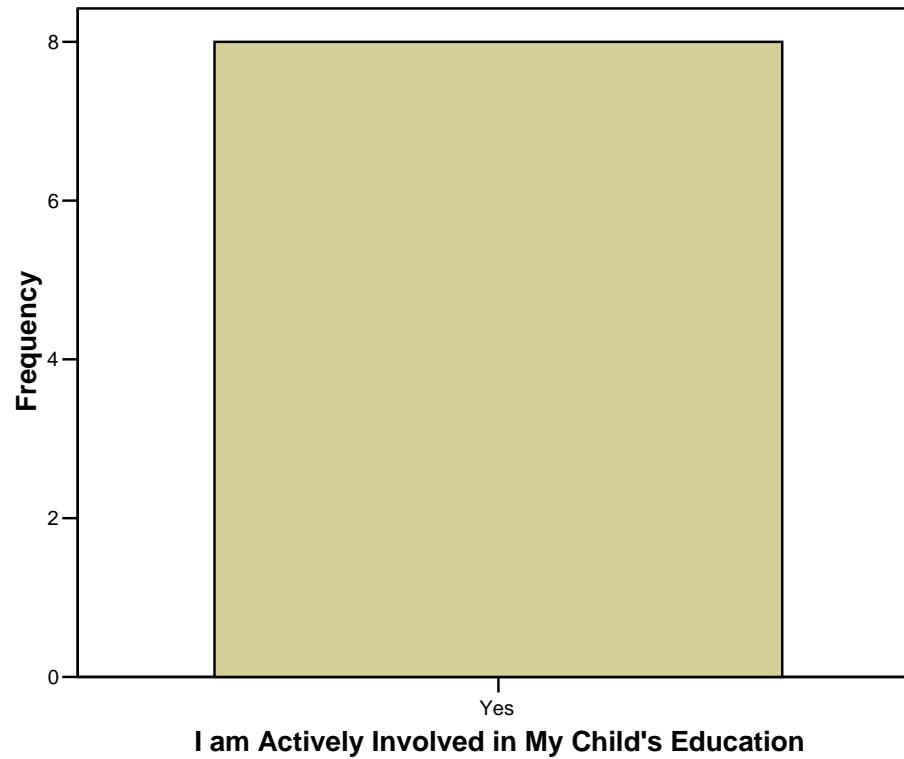
The Program Will Help My Child do Better in Math and Science



The Program Will Help My Child do Better in Math and Science

Parent Survey

I am Actively Involved in My Child's Education



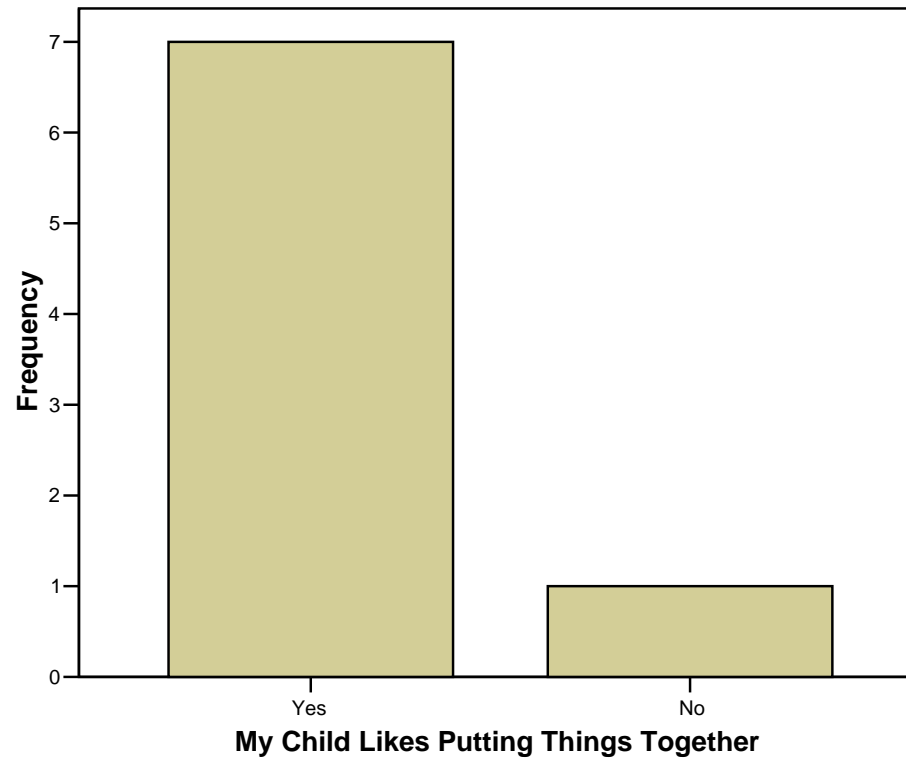
Parent Survey

I Often sit down with my Child to Help Them Plan His/Her Educational Career

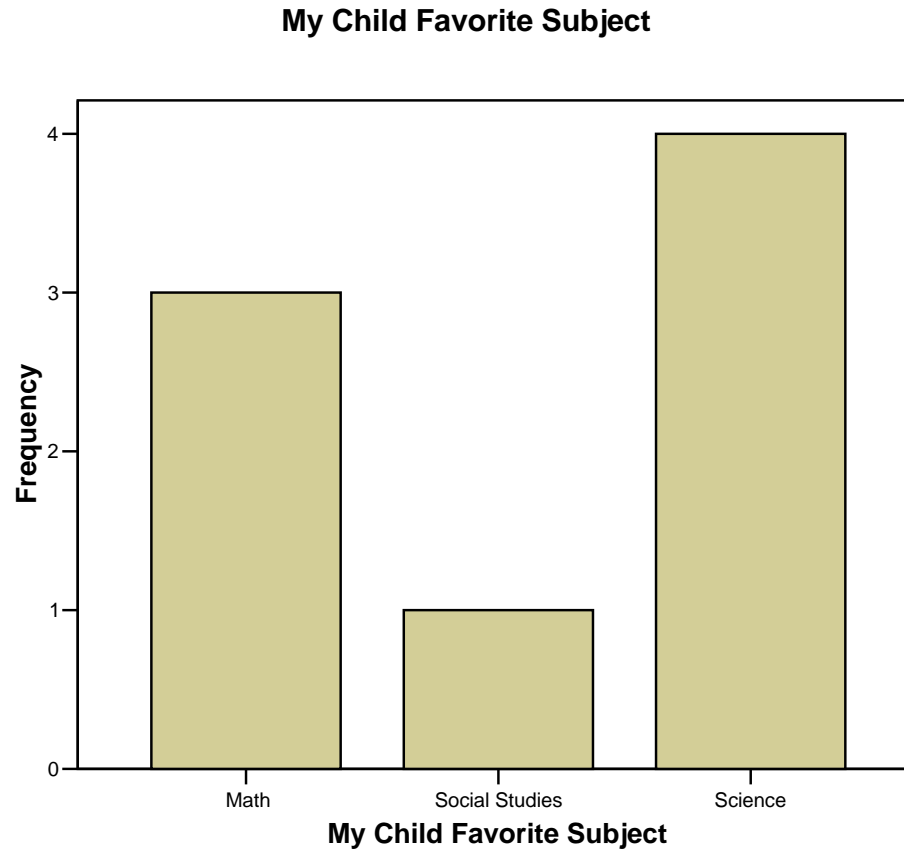


Parent Survey

My Child Likes Putting Things Together

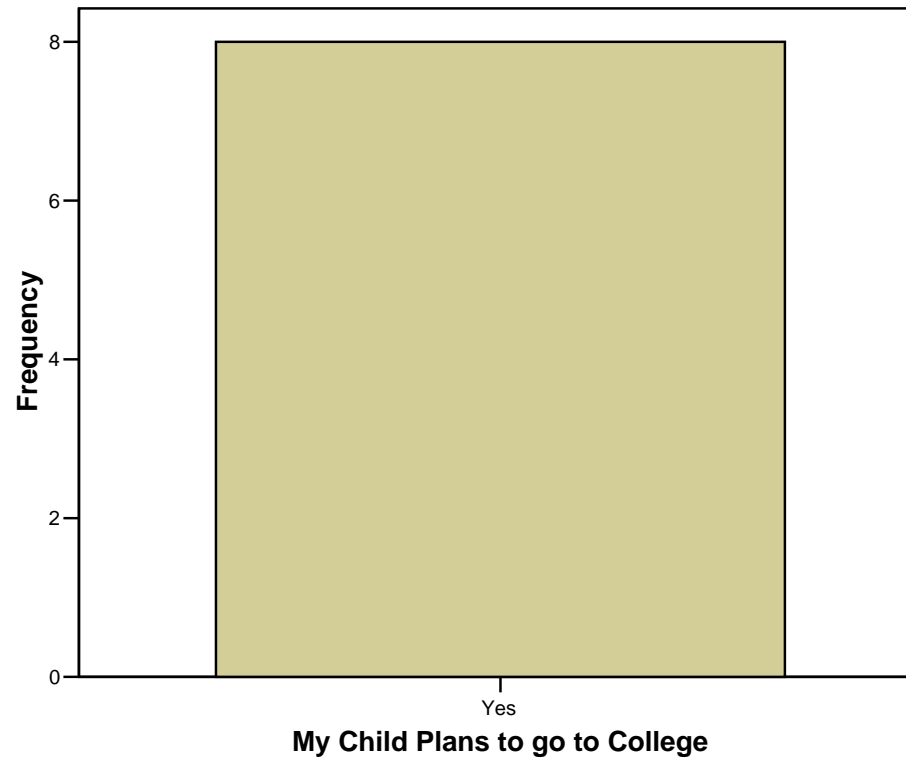


Parent Survey



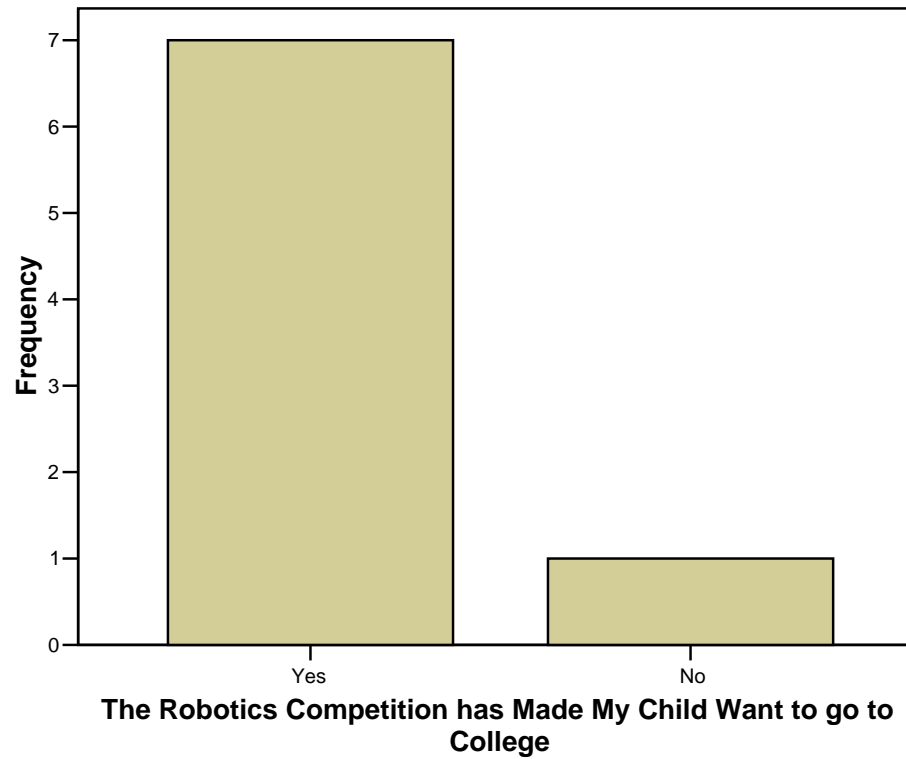
Parent Survey

My Child Plans to go to College



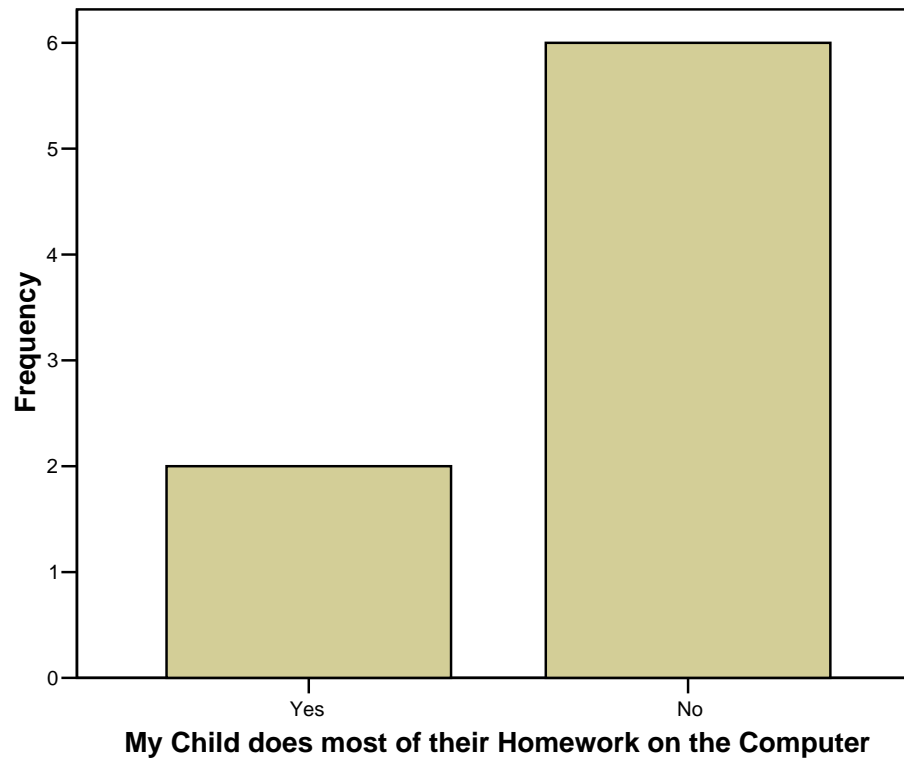
Parent Survey

The Robotics Competition has Made My Child Want to go to College



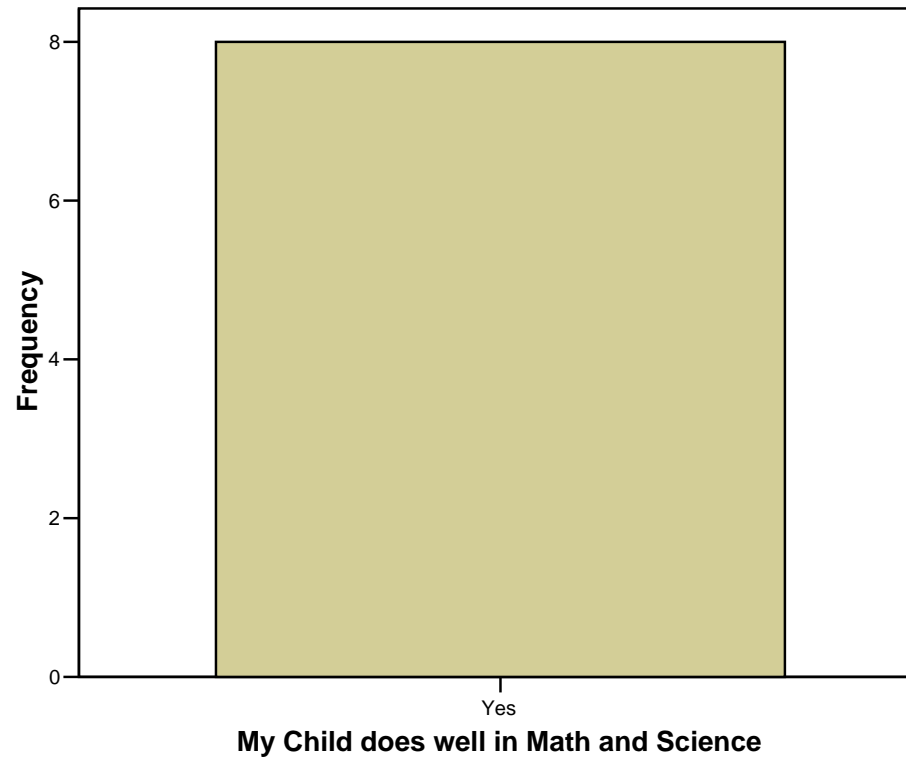
Parent Survey

My Child does most of their Homework on the Computer



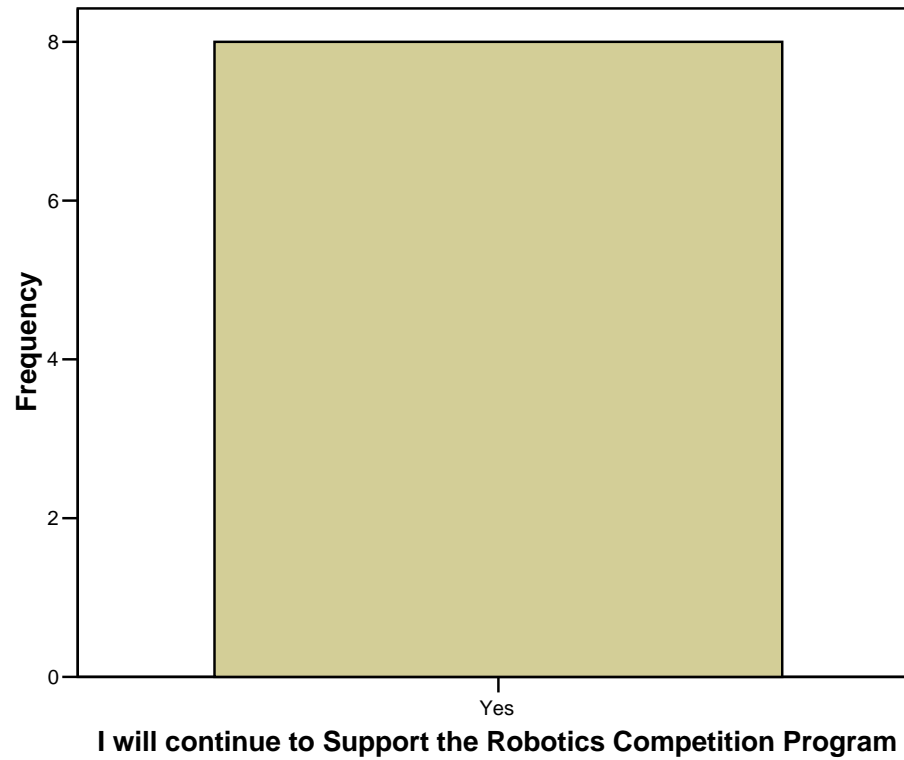
Parent Survey

My Child does well in Math and Science



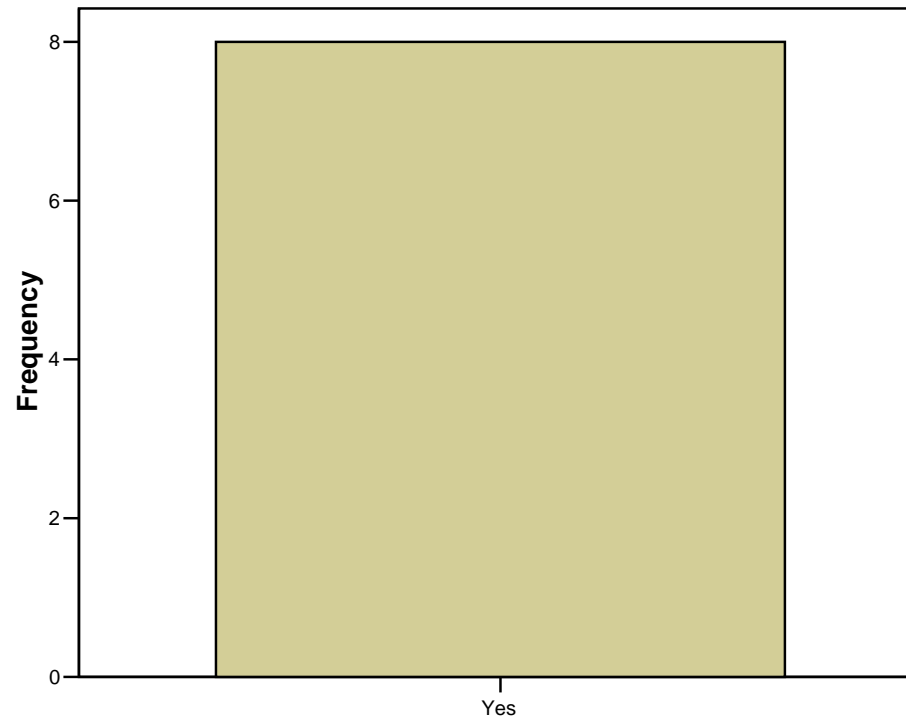
Parent Survey

I will continue to Support the Robotics Competition Program



Parent Survey

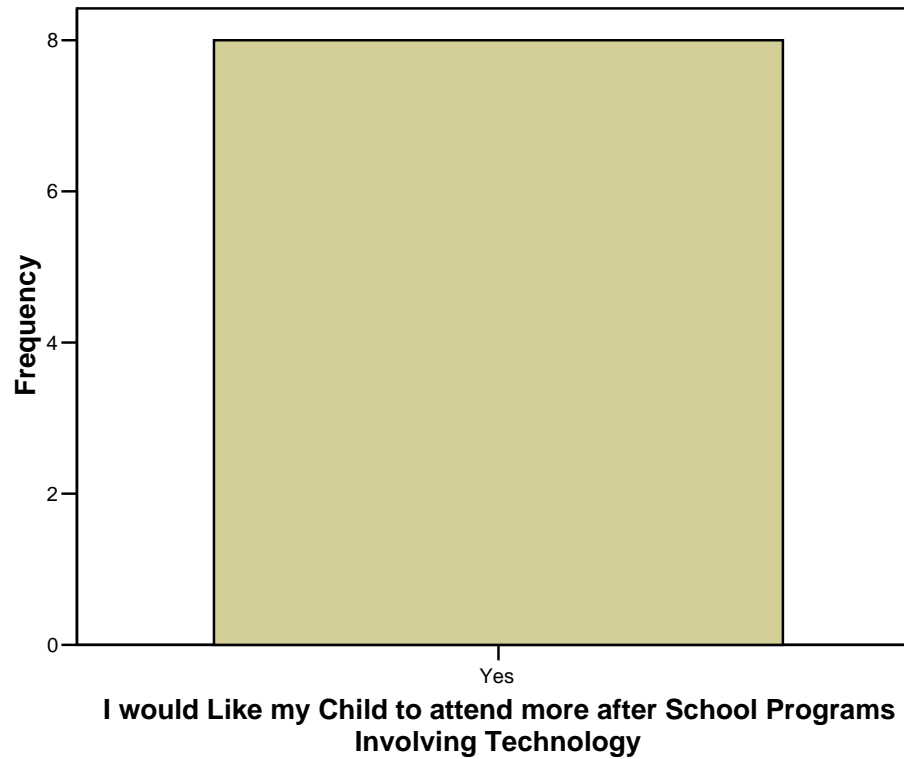
I would Like my Child to Receive more Training in Robotics



I would Like my Child to Receive more Training in Robotics

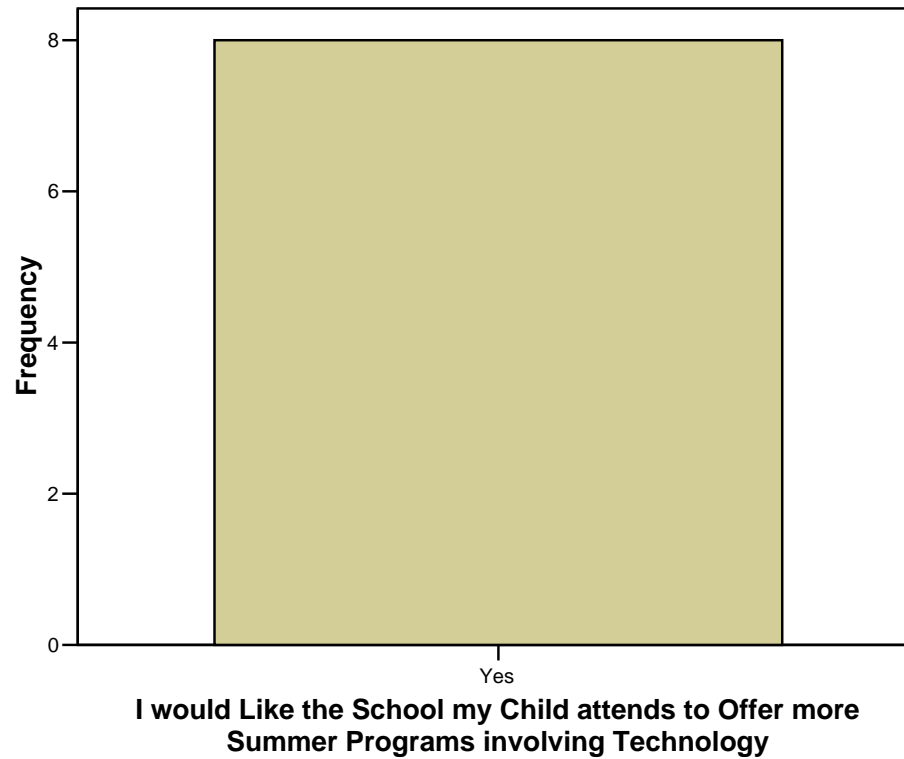
Parent Survey

**I would Like my Child to attend more after School Programs
Involving Technology**

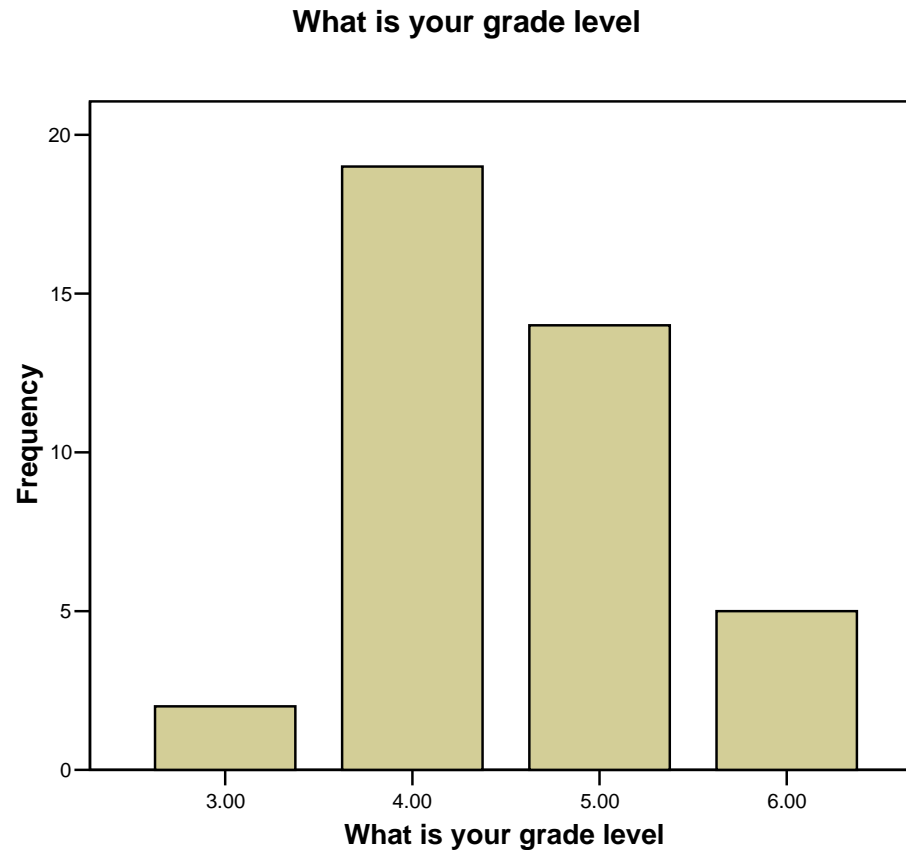


Parent Survey

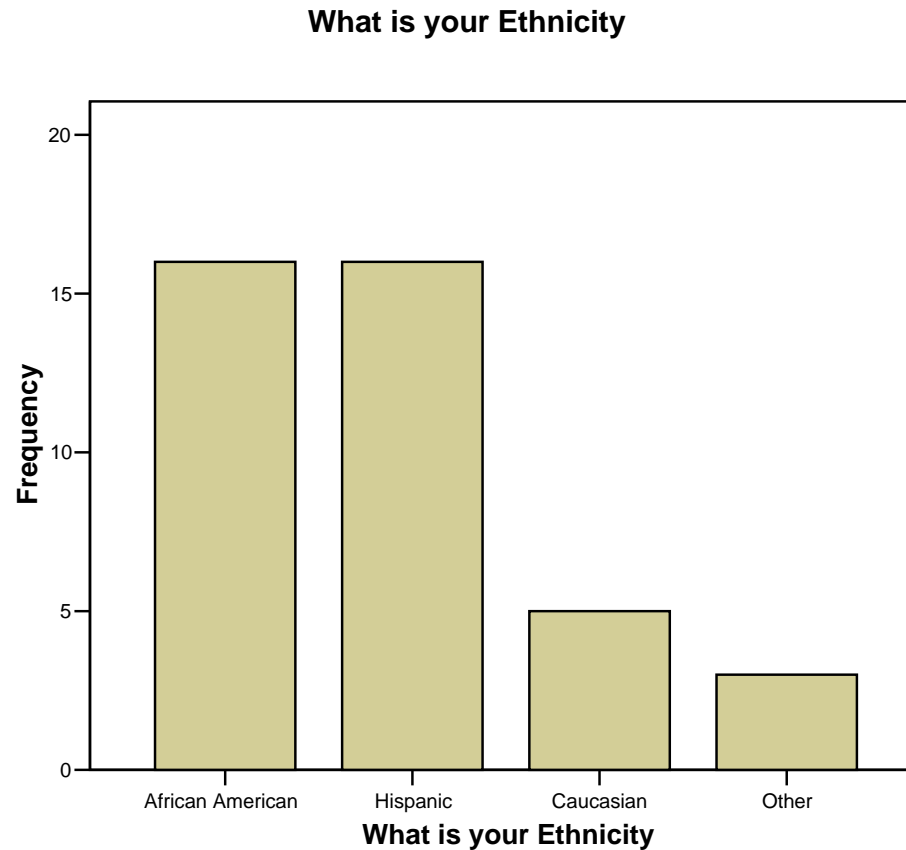
**I would Like the School my Child attends to Offer more
Summer Programs involving Technology**



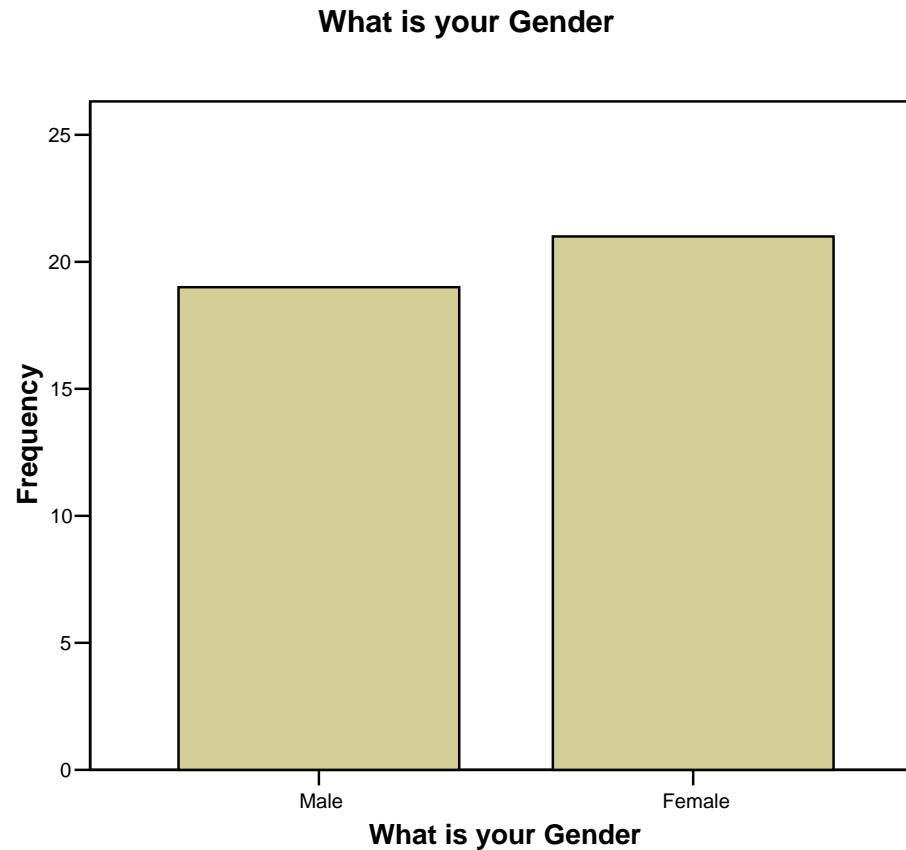
Student Survey (Elem)



Student Survey (Elem)

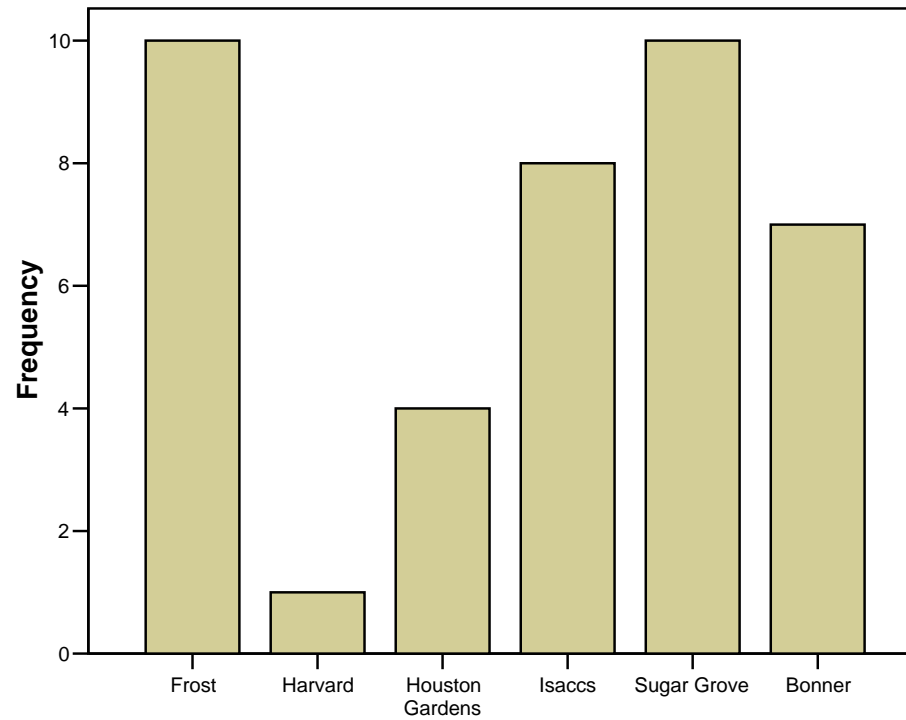


Student Survey (Elem)



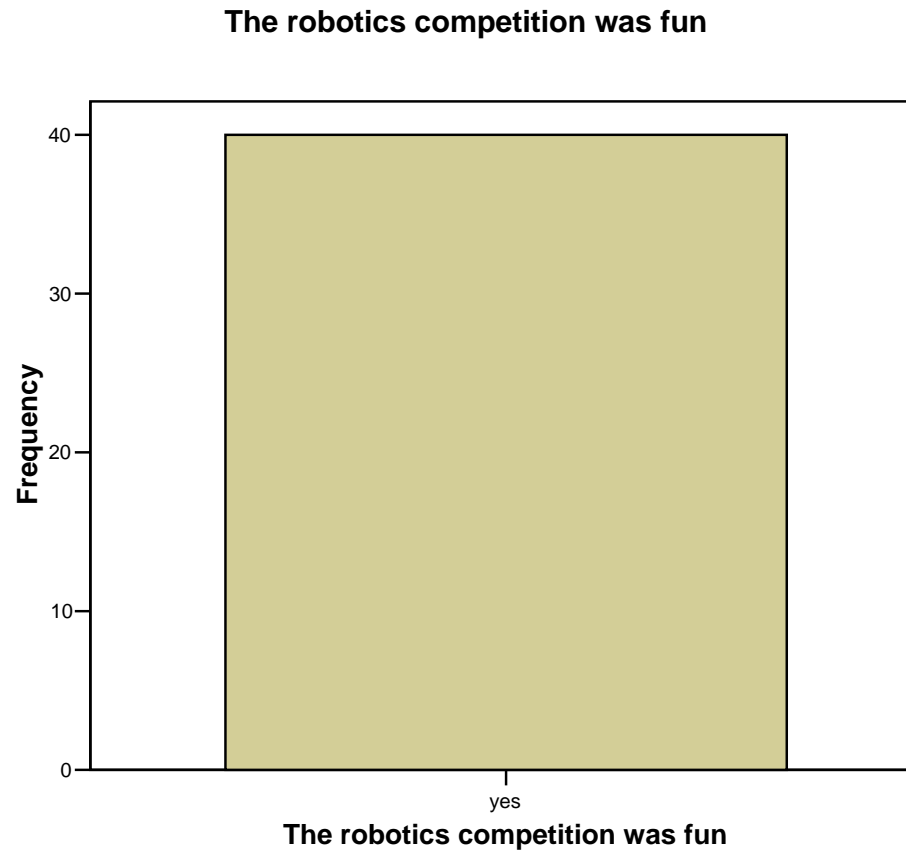
Student Survey (Elem)

What is the name of your School

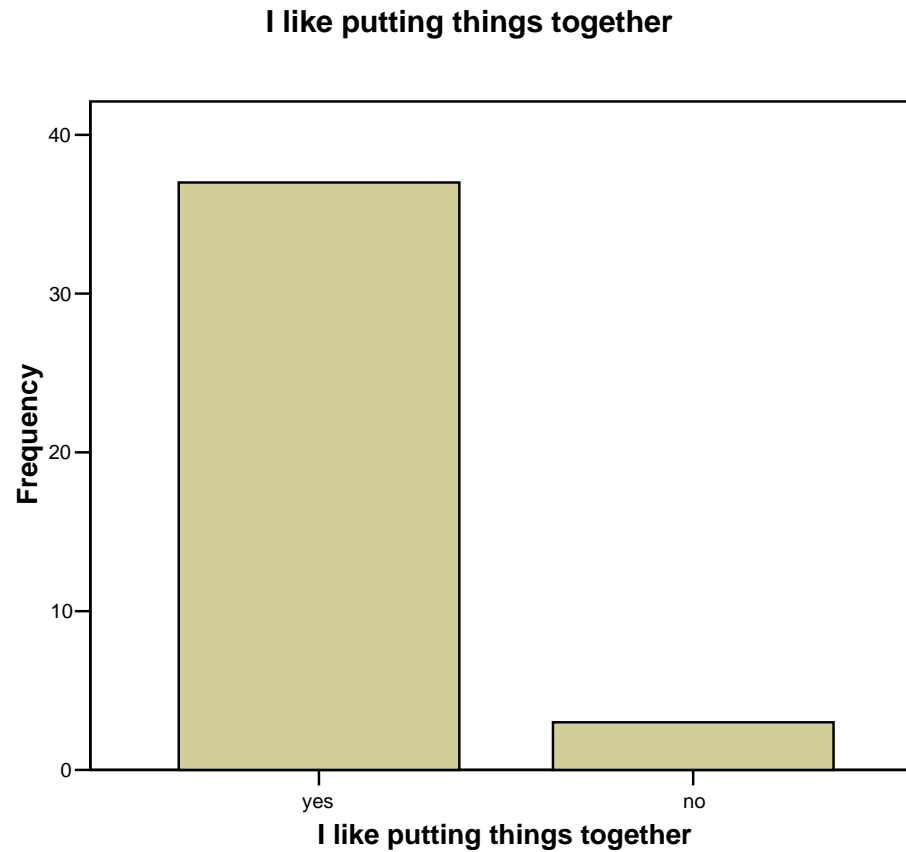


What is the name of your School

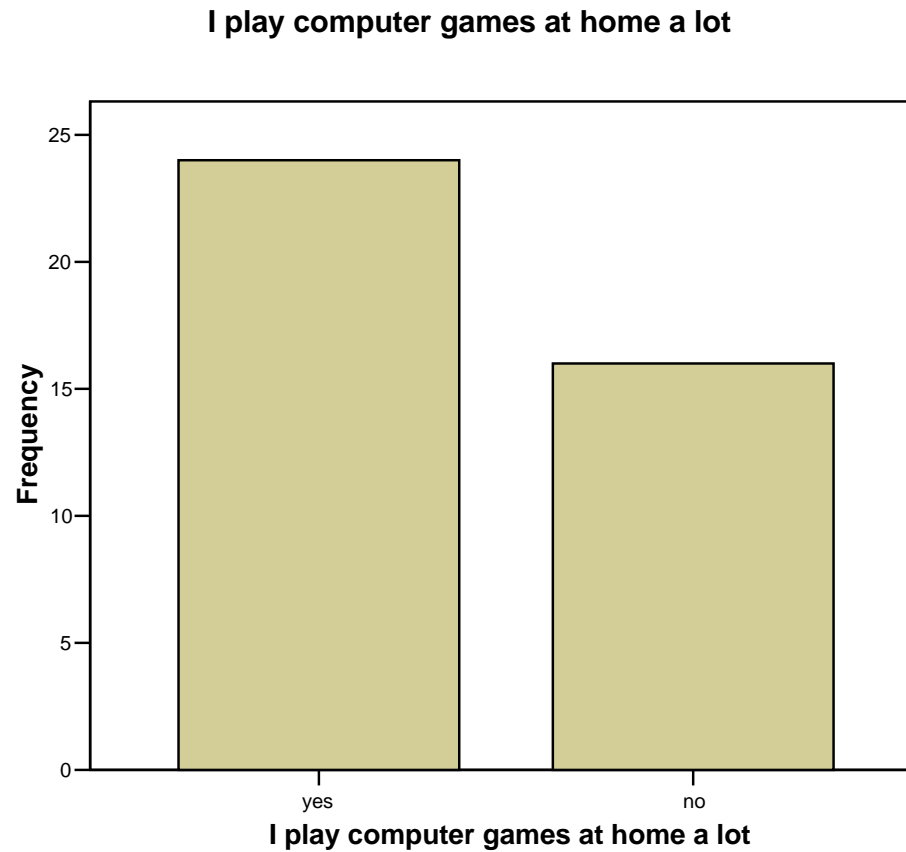
Student Survey (Elem)



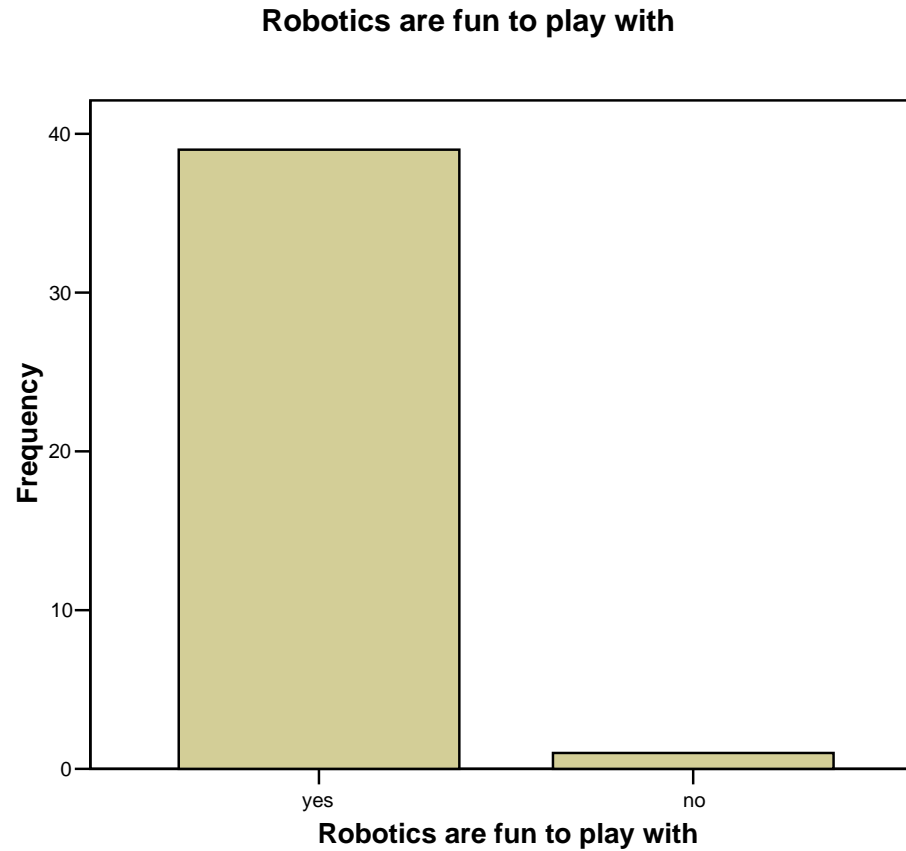
Student Survey (Elem)



Student Survey (Elem)

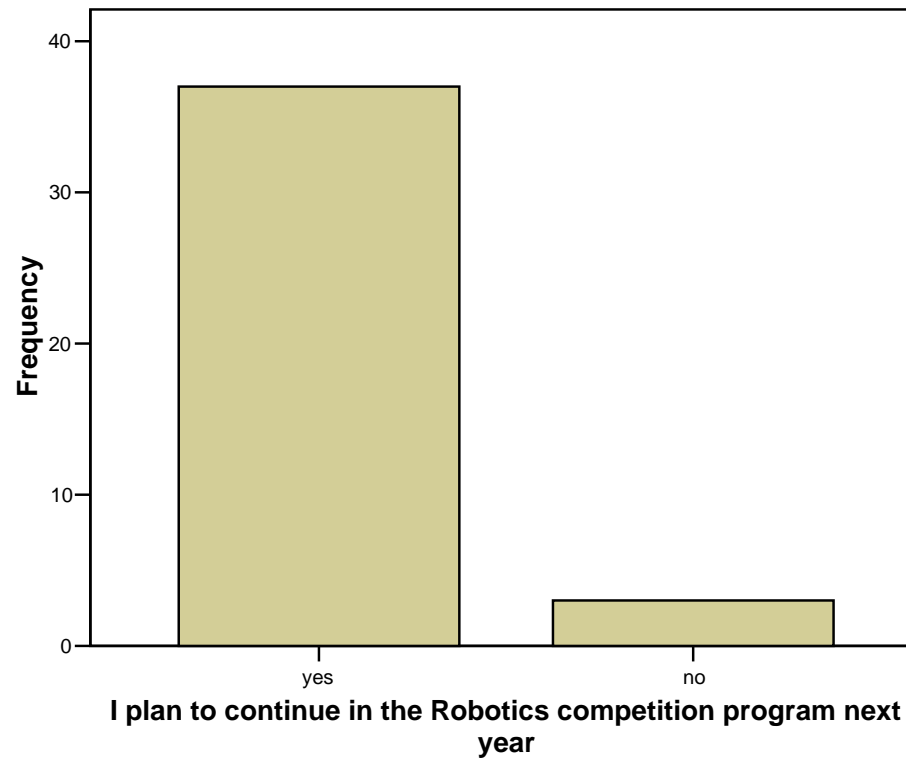


Student Survey (Elem)

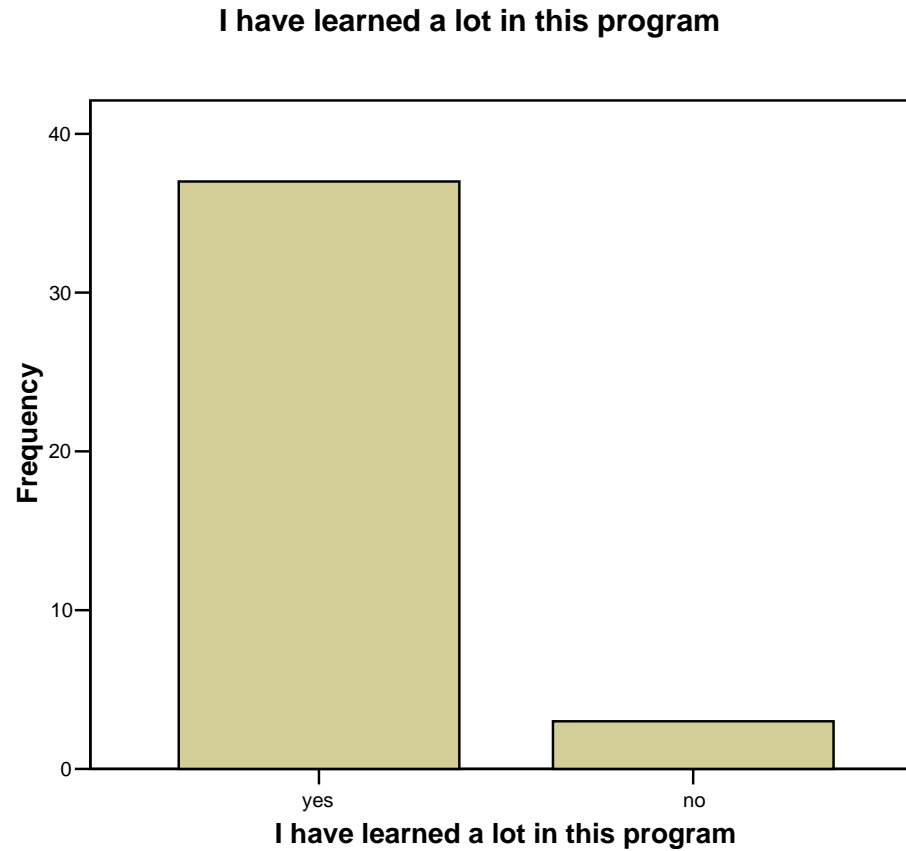


Student Survey (Elem)

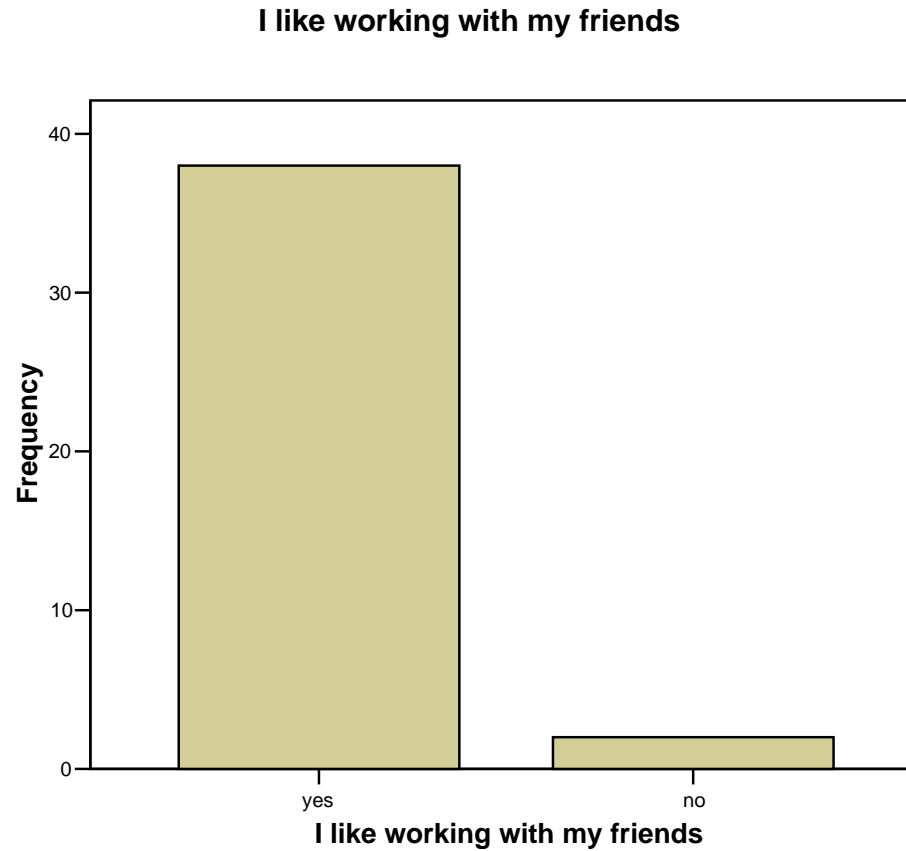
I plan to continue in the Robotics competition program next year



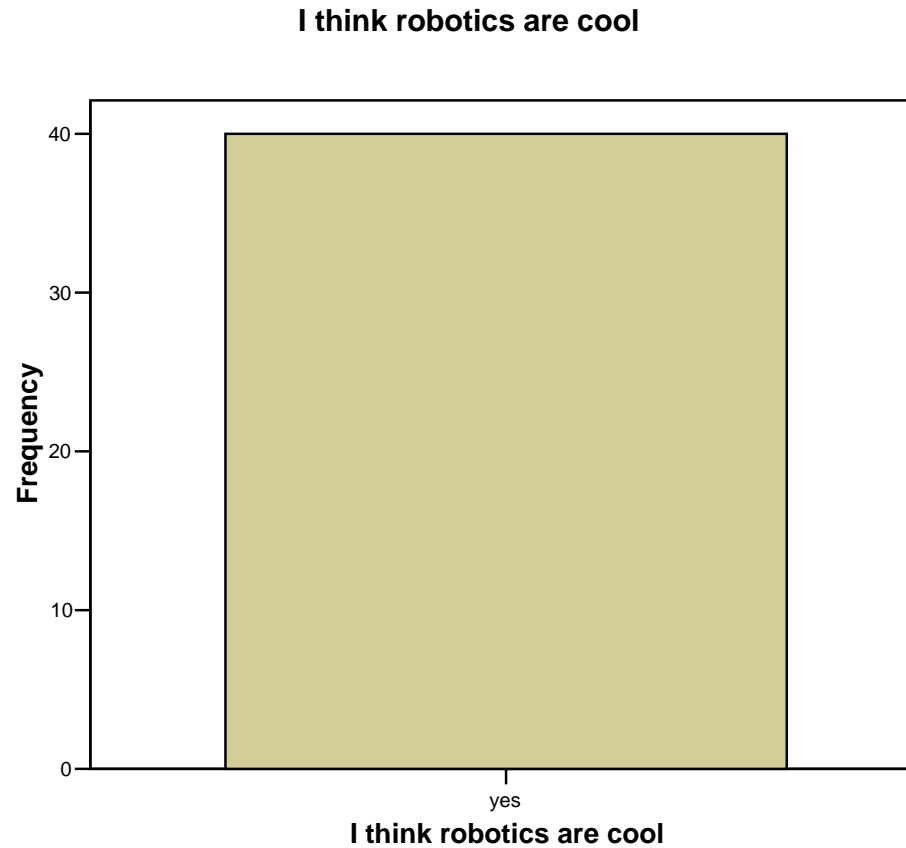
Student Survey (Elem)



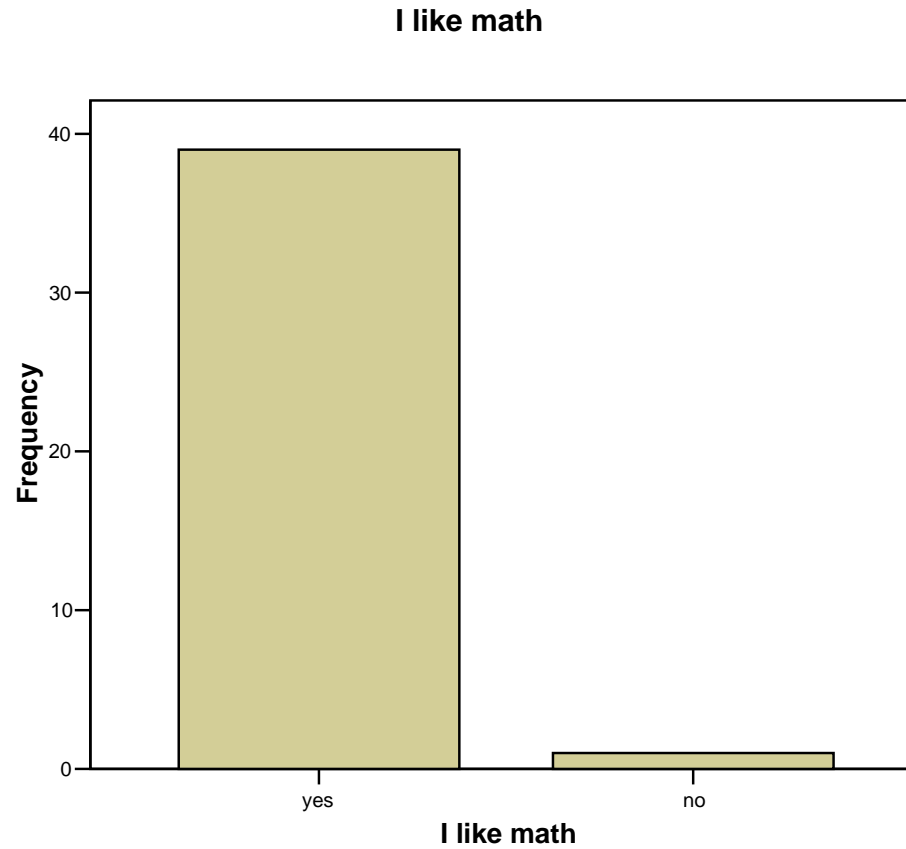
Student Survey (Elem)



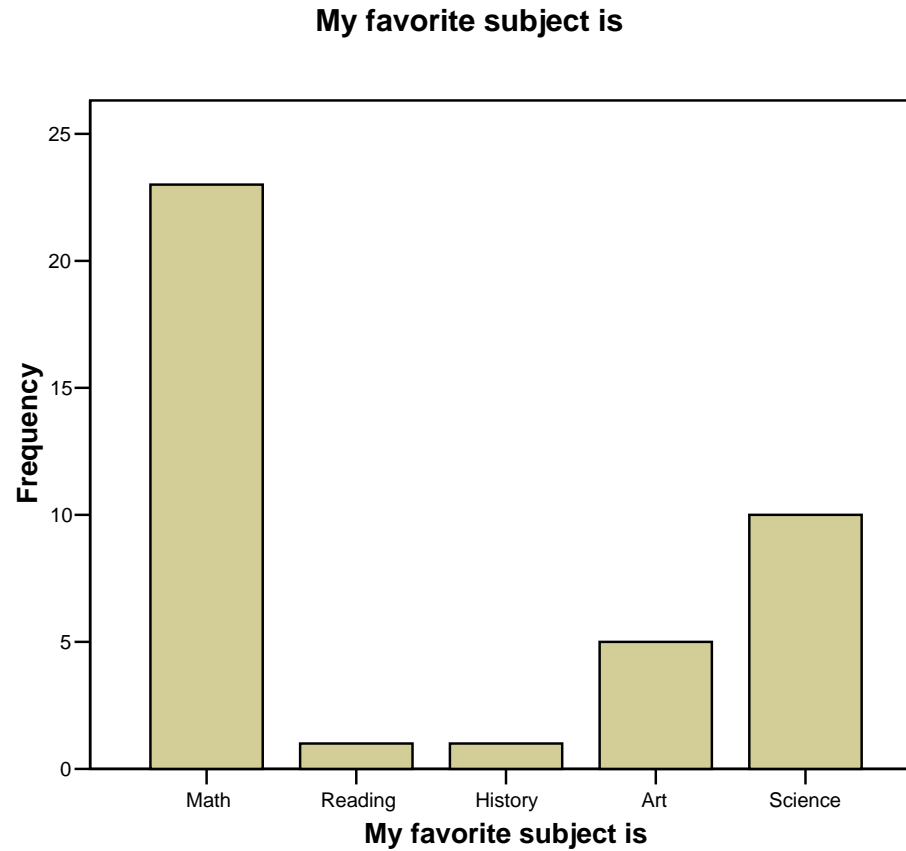
Student Survey (Elem)



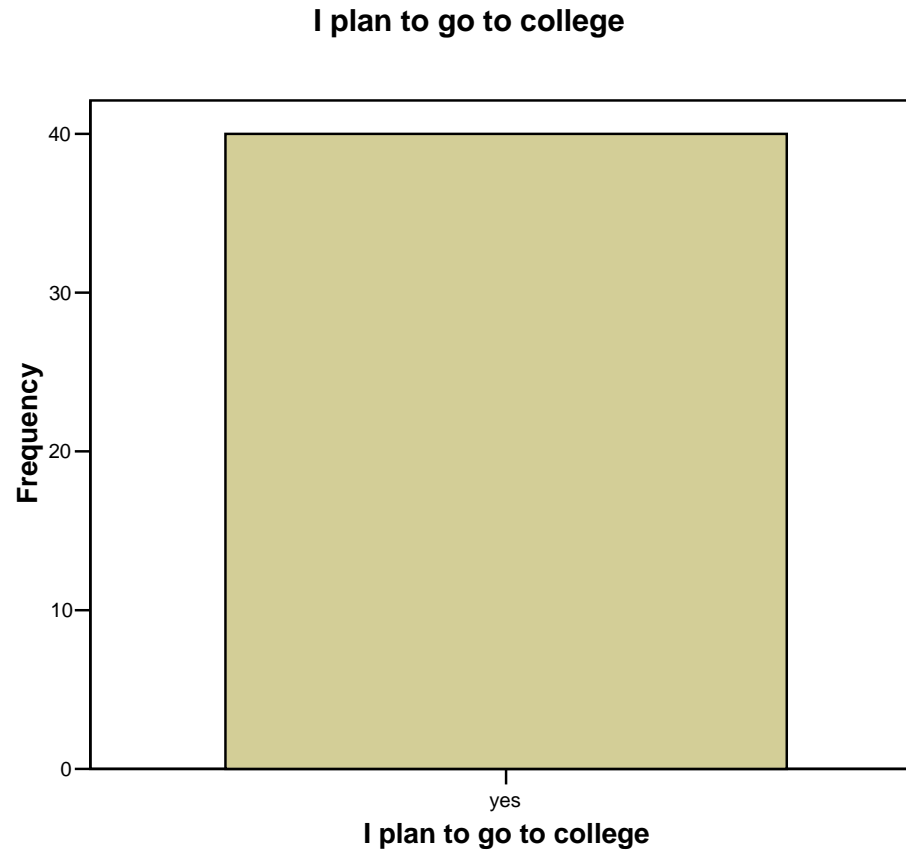
Student Survey (Elem)



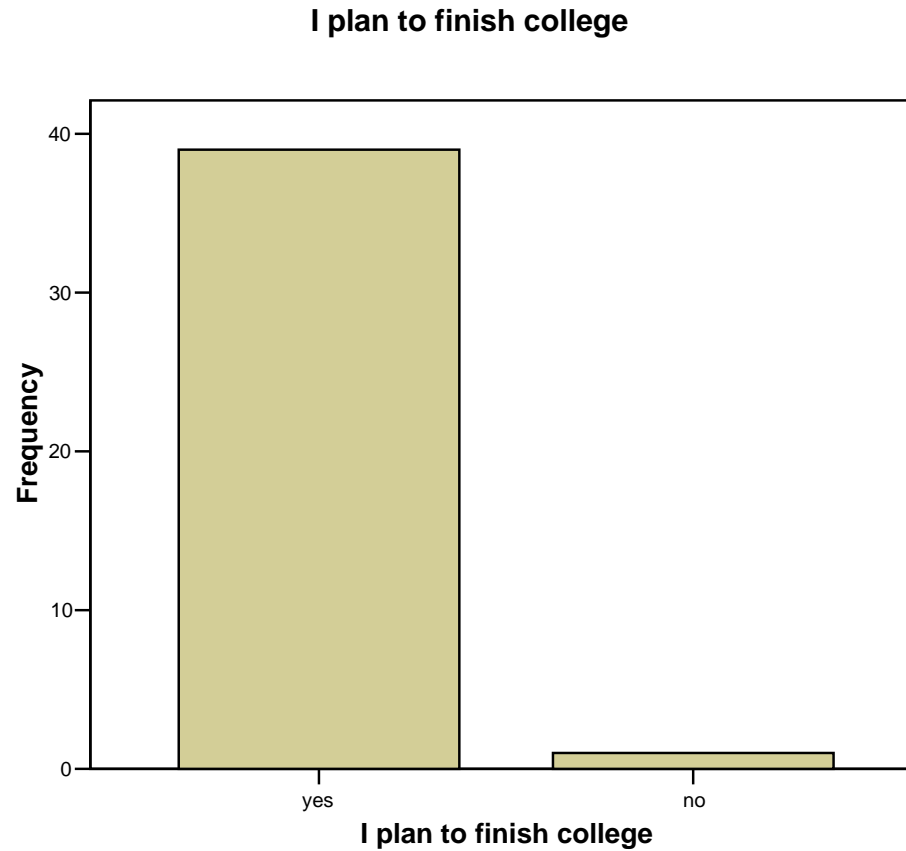
Student Survey (Elem)



Student Survey (Elem)

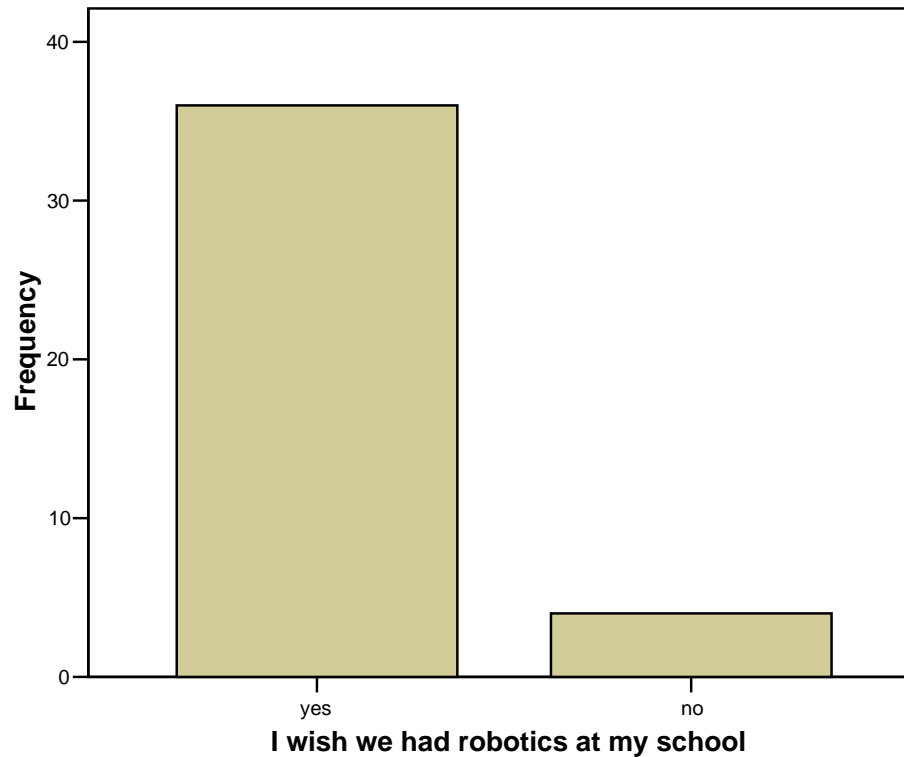


Student Survey (Elem)



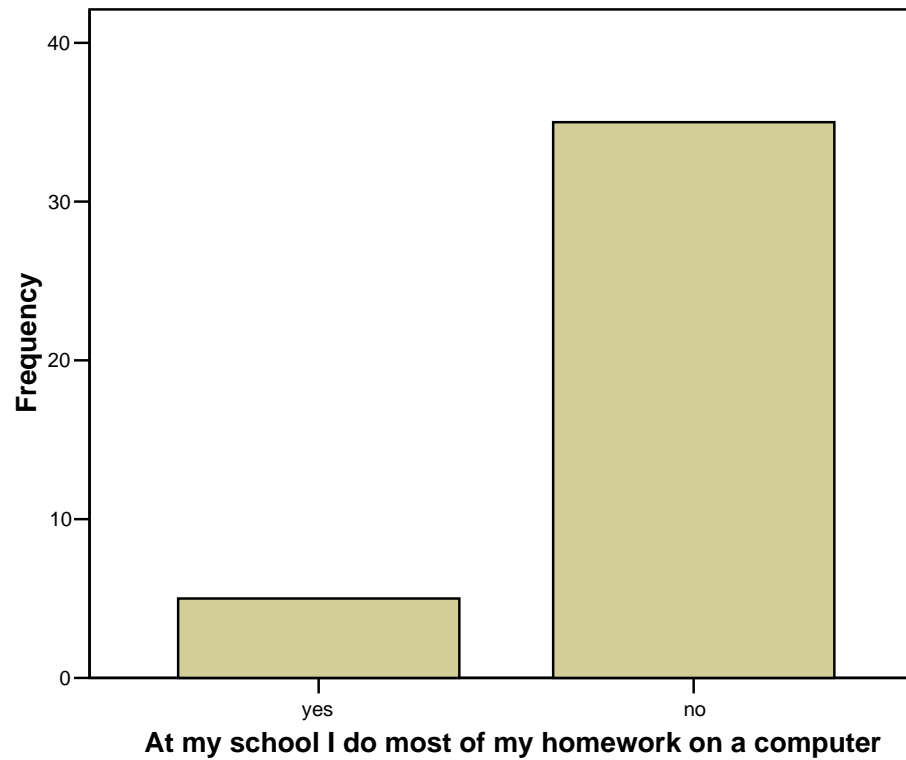
Student Survey (Elem)

I wish we had robotics at my school



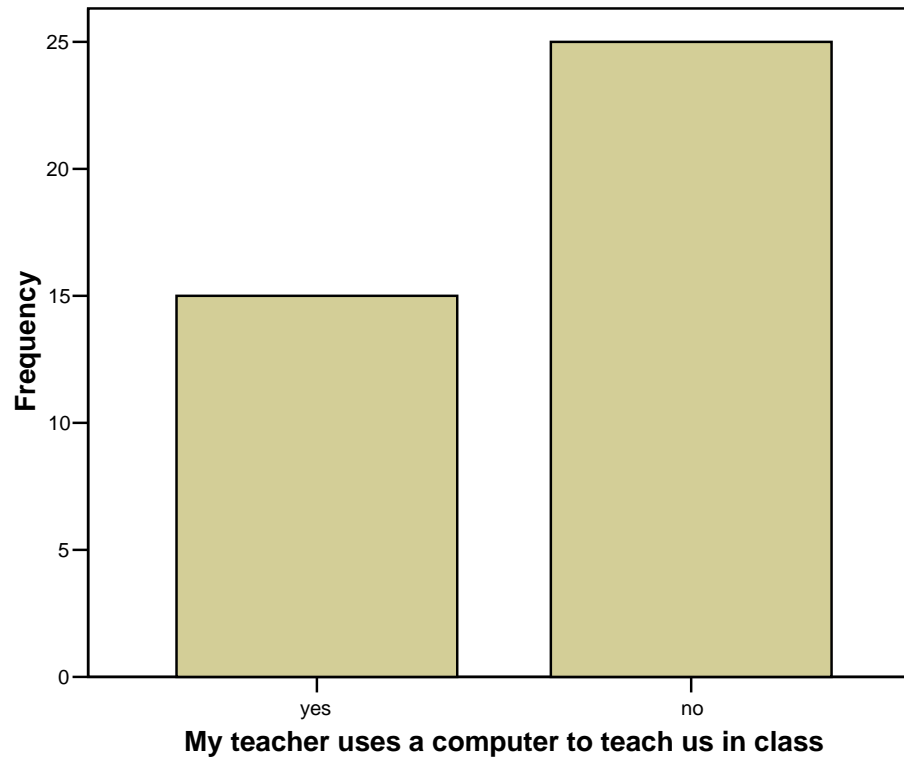
Student Survey (Elem)

At my school I do most of my homework on a computer



Student Survey (Elem)

My teacher uses a computer to teach us in class



Student Survey (Elem)

