

2006-813: INTRODUCTION TO SCIENCE AND TECHNOLOGY CAREERS AND LEADERSHIP WORKSHOPS FOR WOMEN AND GIRLS

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Introduction to Science and Technology Careers and Leadership Workshops for Women and Girls

Two workshops were developed for women and girls to foster an interest in career development, higher education, and careers in science and technology. The workshops were funded by a grant from the Decatur County Community Foundation. Participants in the girls' workshop were from the local area junior high school classes. Women from the community at large will attend the women's workshops. Workshop attendees participated on a voluntarily basis.

One of the goals of the workshops was to help women and girls develop self-confidence, self awareness, and establish habits that would encourage them to pursue their goals or career objectives. This was achieved by using engaging exercises that taught the participants leadership skills, risk taking approaches, goal setting techniques, and assertiveness methods. The workshop participants were also introduced to careers in science, technology, and engineering by presenting "Engineers Can Do Anything" and facilitating a discussion about the DVD afterwards. The workshop participants then listened to several professional women share their career experiences. The workshops also provided participants with a list of avenues for achieving their career objectives or goals, such as a list of potential businesses, a list of local area technical colleges and universities, or a list of local career centers.

Another goal of the workshops was to have the participants establish a mentoring relationship with professional people from the community or older students. The mentors and workshop participants discussed and planned career objectives and goals, developed a Microsoft power point presentation on their career objectives or future goals, and presented their ideas to the group. At the end of each workshop, participants were asked to evaluate the workshop and provide feedback to the authors.

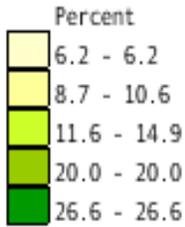
Introduction and Background

Table 1 shows educational and workforce statistics for Decatur County Indiana ^{1, 2, 3}. Decatur County ranks eleventh in the state of Indiana in terms of manufacturing jobs in 2004. Those jobs account for 33.3 percent of the jobs in 2003. It is the home of two high-tech manufacturers.

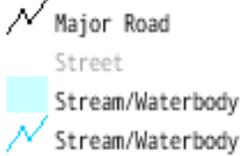
Table 1. Workforce Statistics for Decatur County Indiana.

Population Characteristics	Decatur	Percent	Indiana	Rank of County for entire State
Population 25 years and over, 2004 estimate	24,970	.4% of state	6,237,569	62 nd
High School diploma or higher, 2000 census	7,573	79.1% of county	82.1%	69 th
Bachelor's degree or higher, 2000 census	1,829	11.5% of county	19.4%	58 th
In labor force (population age 16 and over), 2004	12,566	70.1% of county	63.9%	62 nd
Persons going on to higher ed.	221	.5 % of state	59,655	59 th
Median household income, 2003	\$42,959	99.2% of state	\$43,323	35 th

Data Classes



Features



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The map of Decatur County in Figure 1 shows the percent of residents who have completed a bachelor's degree or higher. The county's educational level is about 50% of the national average. The area in dark green abuts northern Ripley County, a prosperous area hosting the corporate headquarters of a hospital, a furniture company, and casket manufacturer.

The Learning to Lead girls' workshops were held during the fall 2005 semester and the *Women's* workshops will be completed by July 2006. The girls' workshops targeted those school communities with the lowest college participation rates in workshop advertisements. A partnership with Greensburg Middle School of Decatur County identified junior high students who could benefit from career mentoring. In cooperation with the science teacher, a series of career sessions was held in two eighth-grade classrooms. Since the authors were not able to separate out the girls in the classroom, the entire class participated in these workshops.

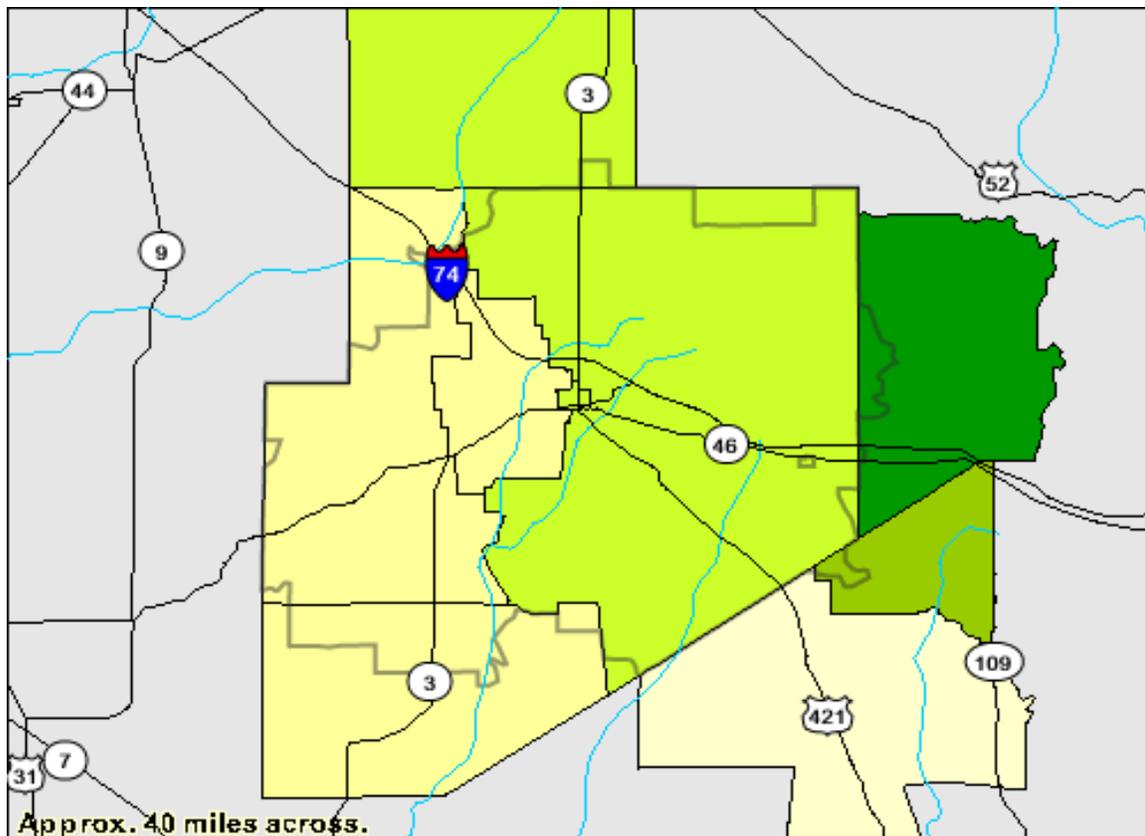


Figure 1. Map of Decatur County showing percent of residents with completed Bachelor's degrees.

Project Activities

Project activities were chosen to build students' self awareness and to increase awareness of occupational tasks involved in a variety of jobs. Table 2 shows a complete list of the workshop activities. An interest inventory, learning style inventory, and temperament profile were used to begin the self-awareness segment of the project.

Goal-setting activities were also used. To help with career choice, students considered what they wanted from work as well as their interests and abilities. They thought about how important it was to have a career that pays well. Students were asked if they wanted a job with many responsibilities. Students prioritized their goals.

Students searched the availability of openings in Indiana for their desired career. They also looked at salary information for their desired careers. These salaries were used to calculate the feasibility of buying an automobile.

Table 2. List of Workshop Activities

Career Activities	Resource location	Description
Bureau of Labor Statistics	www.bls.gov/k12/	Exploring Career Information has good descriptions of job requirements and educational requirements. It also has current salary and wage for various occupations. Links to the Occupational Outlook Handbook are available. Teacher's guide is available.
Keirsev Temperament Sorter Please Understand Me	www.keirsev.com	Links between temperament and career choices. Keirsev attempts to examine what the four intelligence types can do well under varying circumstances.
Learn More Resource Center -- Merkle Style Preference Inventory Career Interest Checklist Career Clusters Job descriptions	www.learnmoreindiana.org	Resources for middle school through adult. The Merkle Style Preference Inventory is limited to Indiana residents, but other materials are for all to use. Indiana specific information: <ul style="list-style-type: none"> • Pay information • Job demand statistics
Buying a Car	http://42explore.com/buyingcar.htm	Students had to use the annual salary of their favorite occupational choice to plan a budget. Students selected either a truck or car for purchase.

U Buy A Car	www.mcli.dist.maricopa.edu/pbl/ubuystudent/index.html	Students calculated the cost of their automobile choices to see if they could afford to buy a vehicle.
Engineering K-12 Center	http://www.engineeringk12.org/	Engineering Go for It! Engineering Options.
Engineering Education Service Center	http://www.engineeringedu.com/	Engineers Can Do Anything! DVD Women in Engineering Posters The motivational and informational DVD was used at the beginning of the sessions. The posters contributed provided positive images of women engineers. Resources for students, parents, teachers.
U.S. Department of Energy	http://www.doe.gov/forstudent/sandkids.htm http://www.doe.gov/foreducators.htm	Energy activities for students and teachers. Science fair project help and ideas.

In order to provide feedback to the authors, the students were asked several questions about their career choices and about the workshop. The survey questions in Table 3 show how the workshop project was assessed.

Table 3. Workshop Project Evaluation

Please help us improve our career sessions.
1. What is your age?
2. What are the three career choices that you made in class?
3. Do you think that this class/workshop helped to change your opinion about career choices?
4. If yes, in what way?
5. Do you think you might consider a career in science, engineering, or engineering technology?
6. Do you think you have a better understanding of what engineers do?
7. List three things you learned in this class.
8. What was your favorite activity?
9. What did you like least?
10. Would you like to work with a mentor to help guide you to your career choice? If yes, please give your name.

In Figures 2 and 3, each student was allowed to make three career choices. All of the female students made three choices. Not all of the male students made three choices.

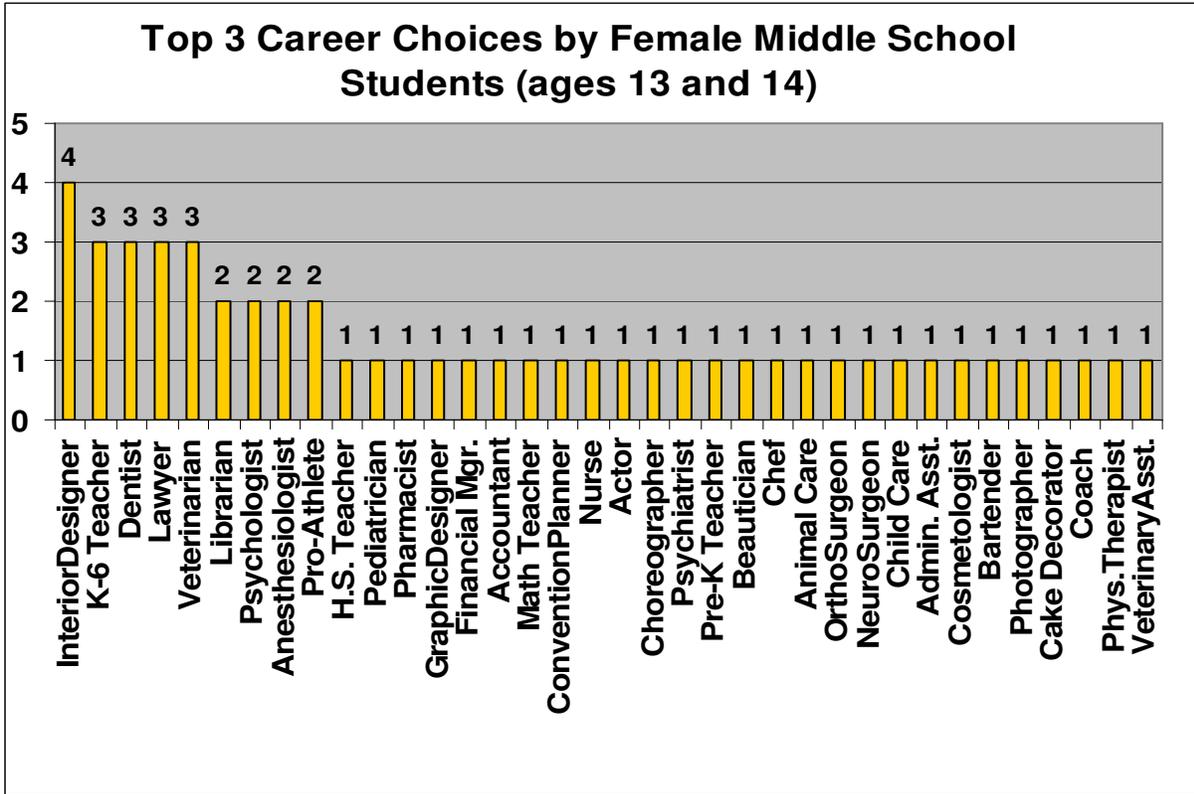


Figure 2. Top 3 career choices by female middle school students (ages 13 and 14).

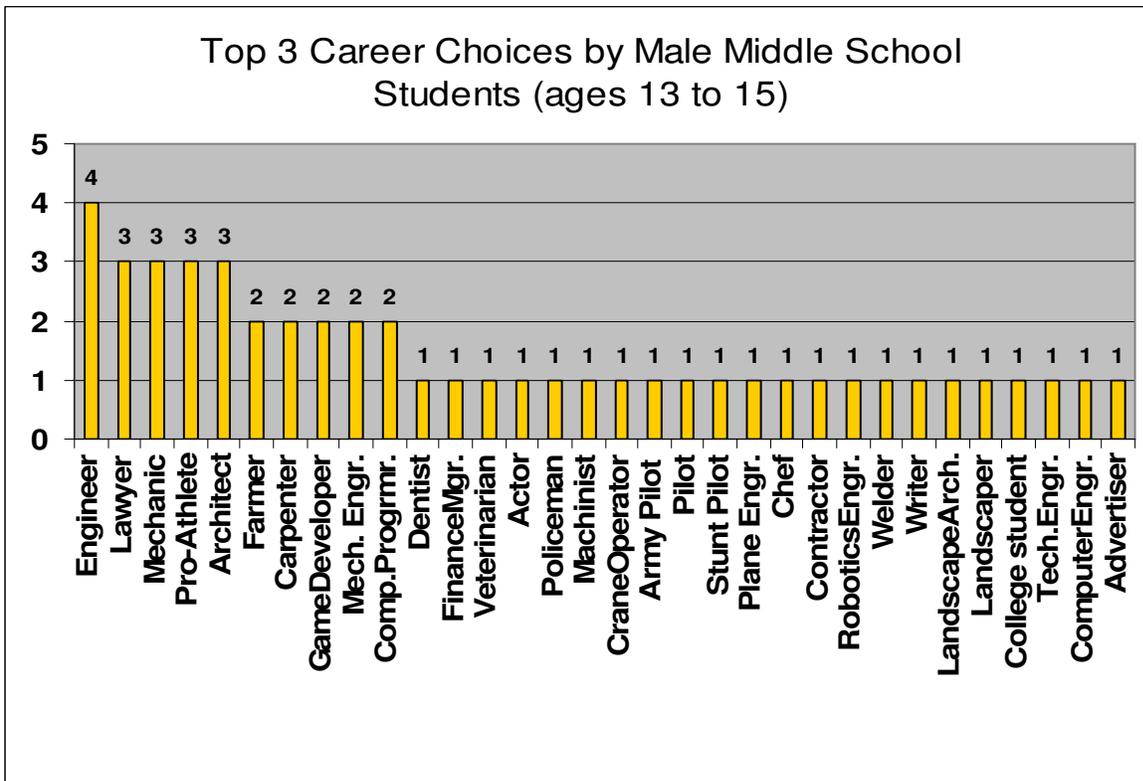


Figure 3. Top 3 career choices by male middle school students (ages 13 to 15).

Figures 4 and 5 show the Middle School Students' Responses to survey Questions 3 and 4 "Do you think that this class/workshop helped to change your opinion about career choices? If yes, in what way?"

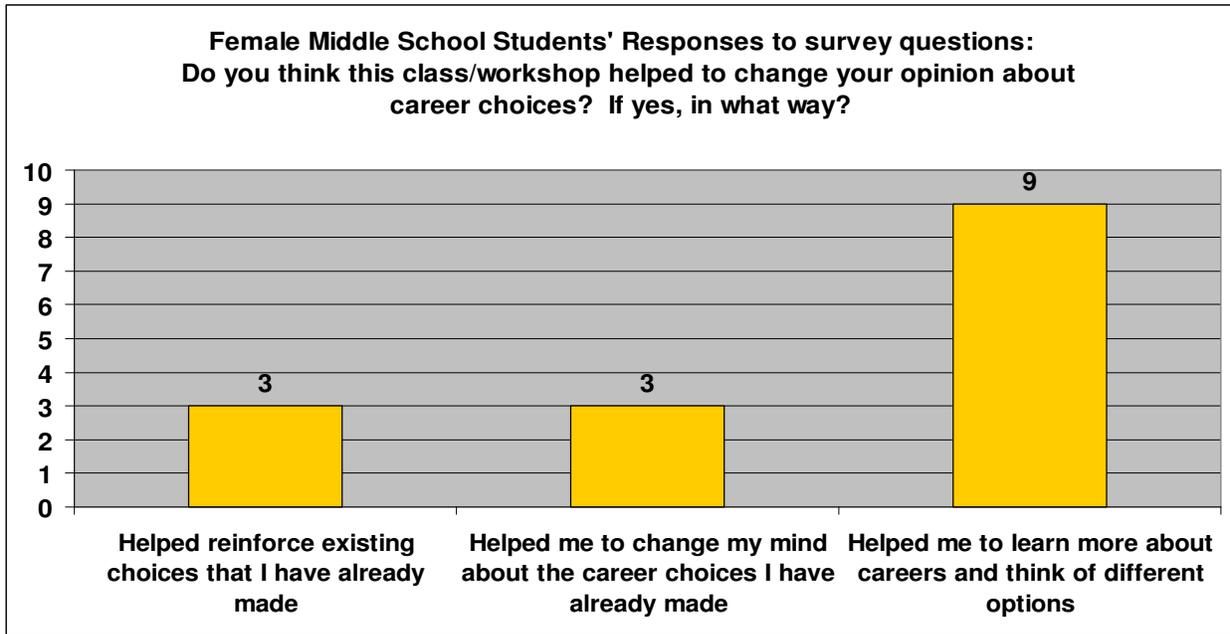


Figure 4. Female middle school students' responses to survey questions 3 and 4: "Do you think this class/workshop helped to change your opinion about career choices? If yes, in what way?"

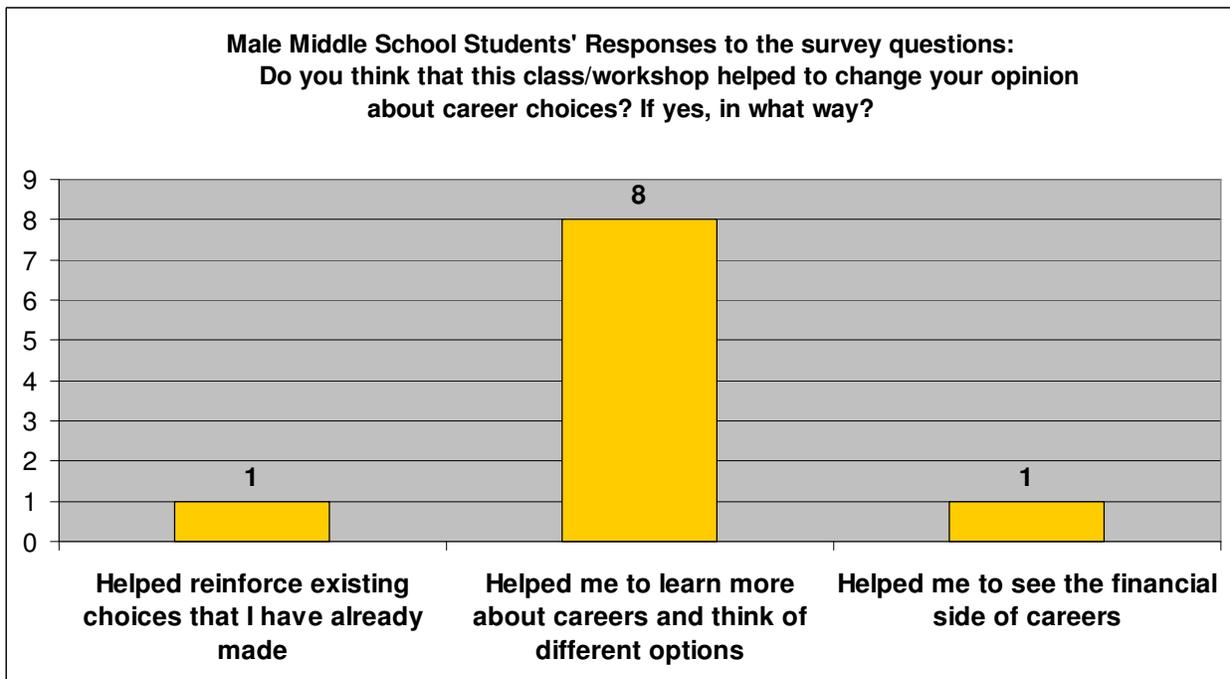


Figure 5. Male middle school students' responses to survey questions 3 and 4: "Do you think this class/workshop helped to change your opinion about career choices? If yes, in what way?"

In Figures 6 and 7, students responded to the yes/no survey questions. For Question 5: “Do you think you might consider a career in science, engineering, or engineering technology?”, only 5 of the girls answered yes, whereas 12 of the boys answered yes. Most students answered yes to Question 6: “Do you have a better understanding of what engineers do?” For Question 10: “Would you like to work with a mentor to help guide you to your career choice?”, only 3 of the girls wanted a mentor and 4 of the boys wanted a mentor. All of the students that wanted a mentor have been provided with a mentor. The mentors are professionals in the community that have volunteered to participate in the workshop. The mentors have been matched with the students according to the field of study that the student has chosen.

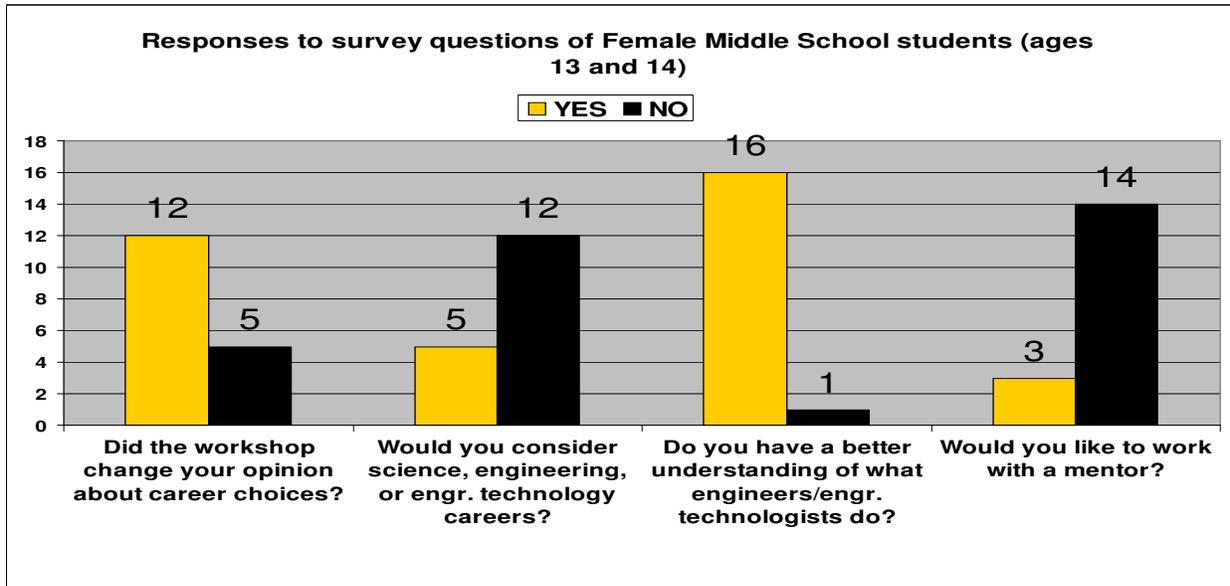


Figure 6. Responses to survey questions of female middle school students (ages 13 and 14).

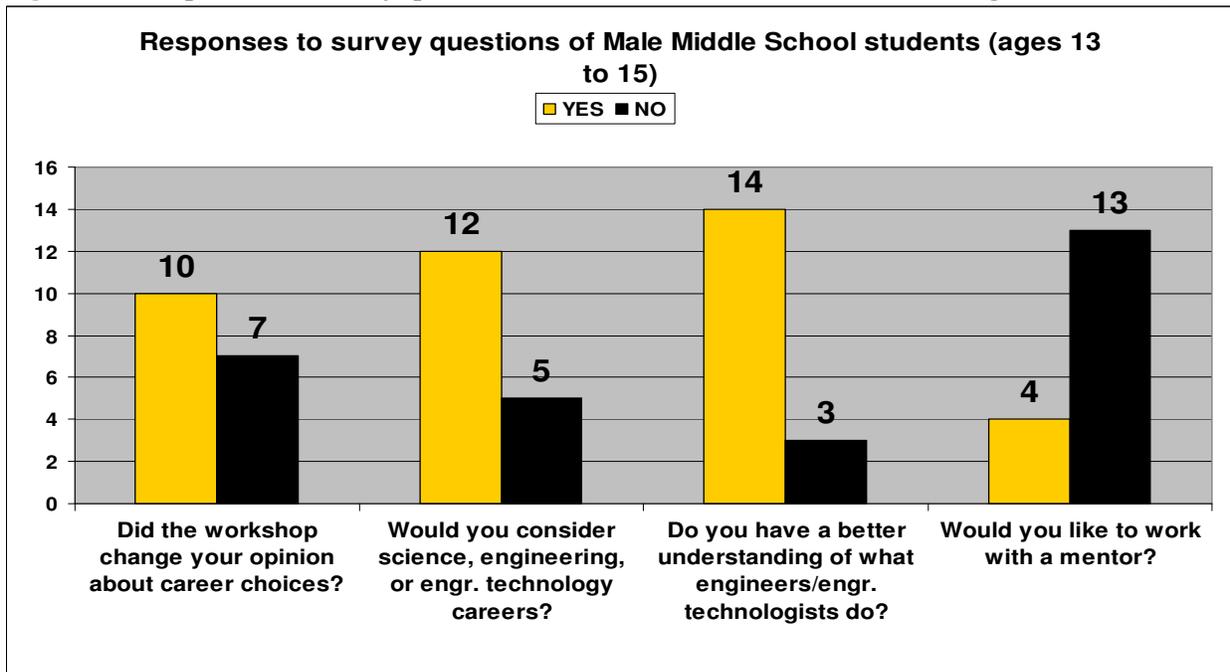


Figure 7. Responses to survey questions of male middle school students (ages 13 to 15).

As shown in Table 4, the Indiana Department of Workforce Development categorizes jobs according to specified Career Clusters ⁴. In Figure 8, the career choices made by middle school females are shown by their Indiana Career Clusters. Figure 9 shows the career choices made by middle school males according to their Indiana Career Clusters.

Table 4. Indiana Department of Workforce Development Career Clusters:

Agriculture, Food and Natural Resources	Manufacturing and Processing
Art, A/V Technology and Communications	Marketing, Sales and Promotion
Building and Construction	Mechanical Repair and Precision Crafts
Business, Management and Finance	Personal and Commercial Services
Education and Training	Science, Engineering and Information Technology
Health Services	Transportation, Distribution, Logistics
Law, Public Safety and Security	Social and Recreation Services

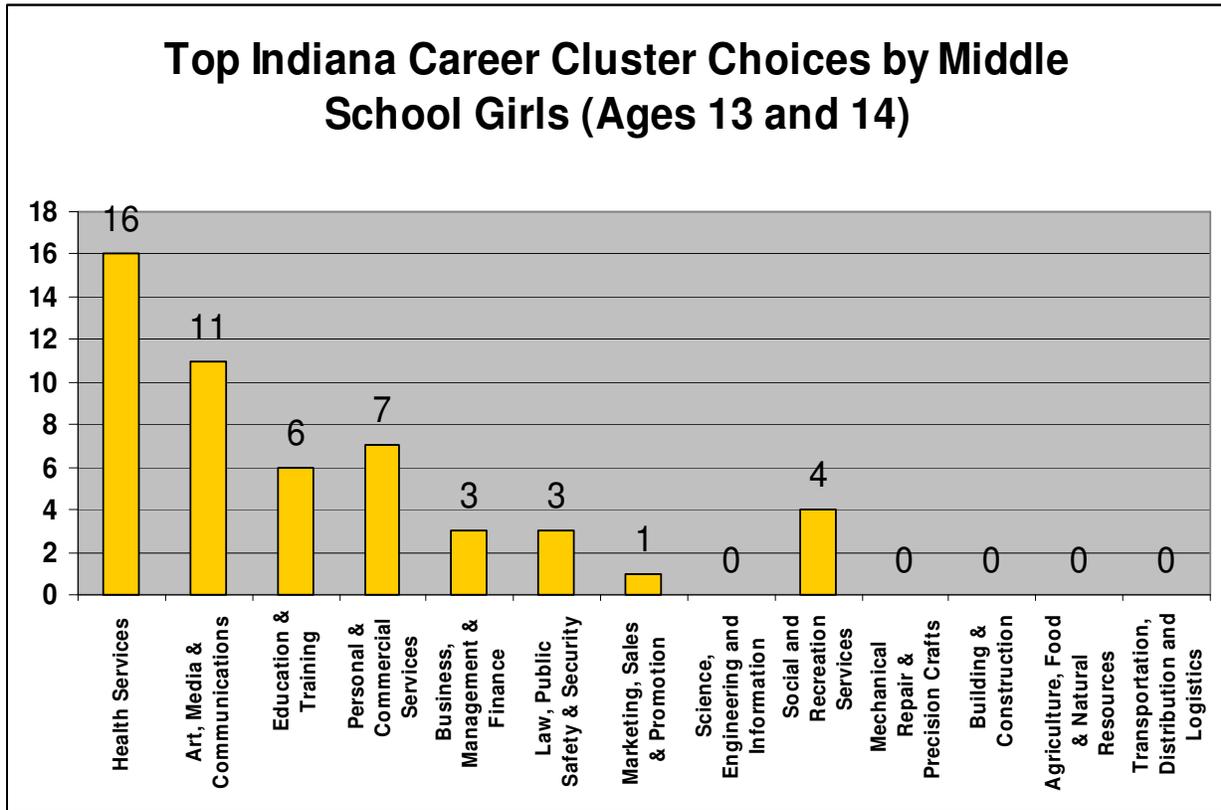


Figure 8. Top Indiana career cluster choices made by female middle school students (ages 13 and 14).

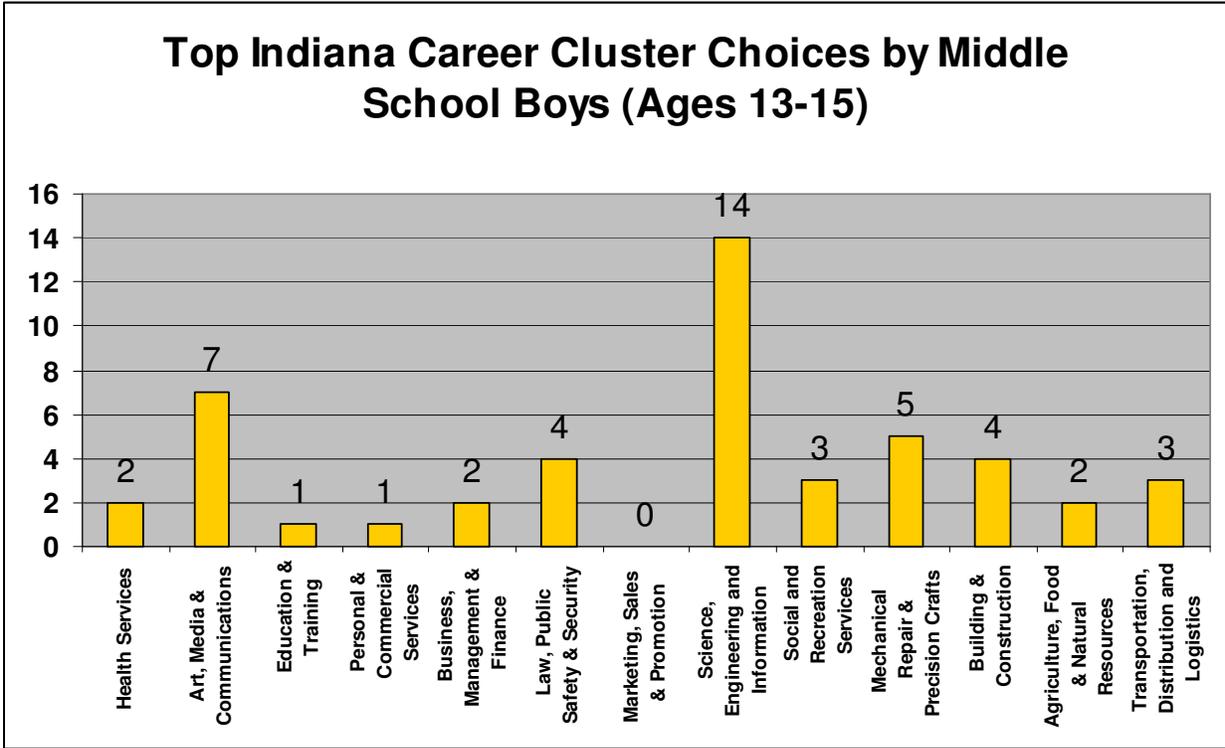


Figure 9. Top Indiana career cluster choices made by male middle school students (ages 13-15).

In Figures 10 and 11, survey statement 7: “List 3 things you learned in this class (workshop)”, the most popular answer for both boys and girls was: “I learned about different careers”.

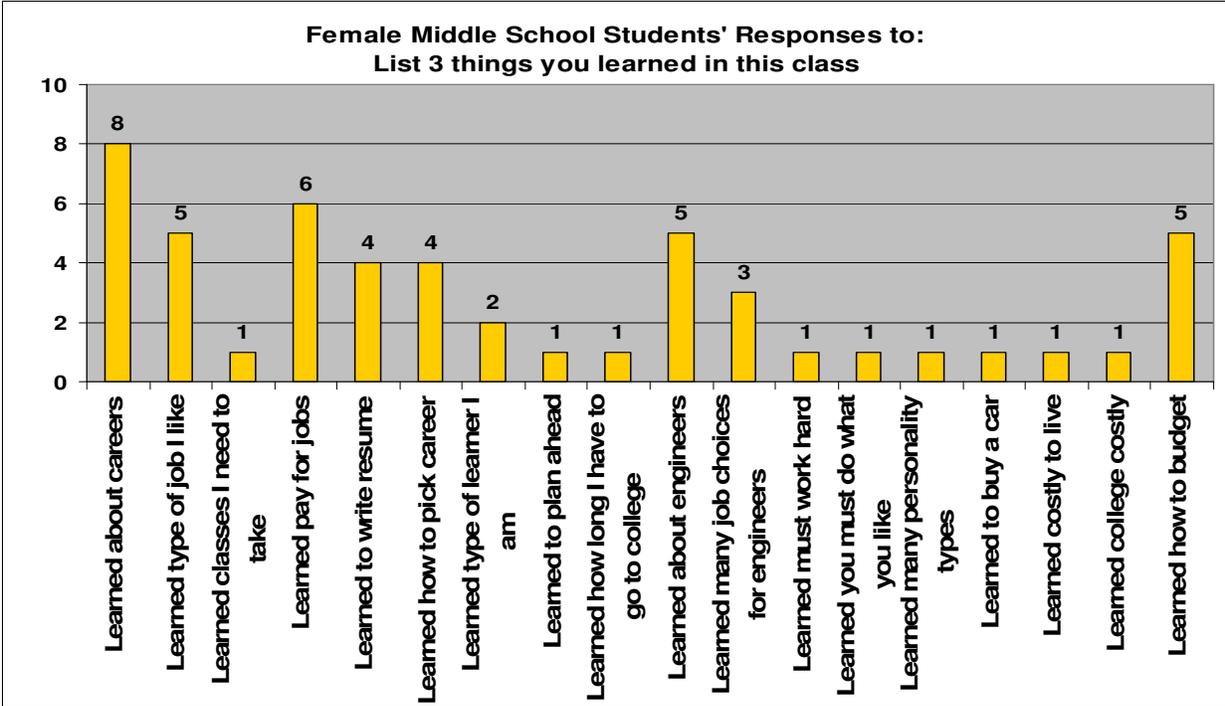


Figure 10. Female middle school students’ responses to: “List 3 things you learned in the class (workshop)”.

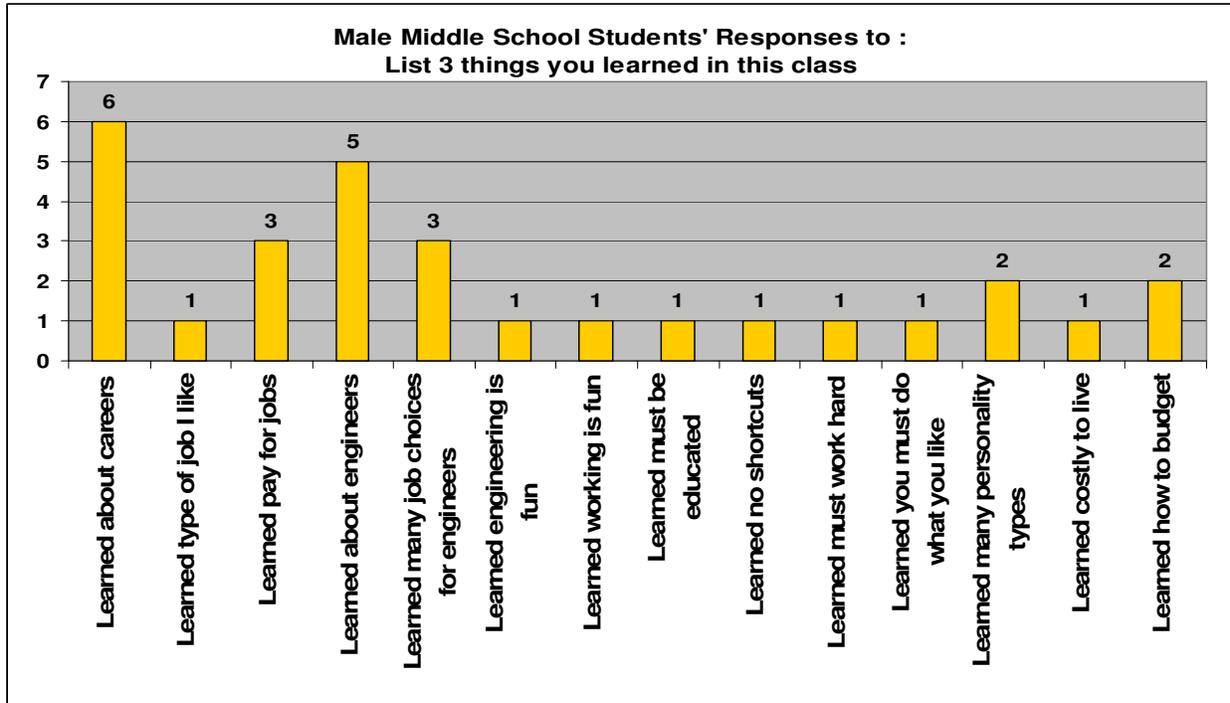


Figure 11. Male middle school students’ responses to: “List 3 things you learned in the class (workshop)”.

Figures 12 and 13 show the responses for both girls and boys to the question: “What was your favorite activity in the workshop?”

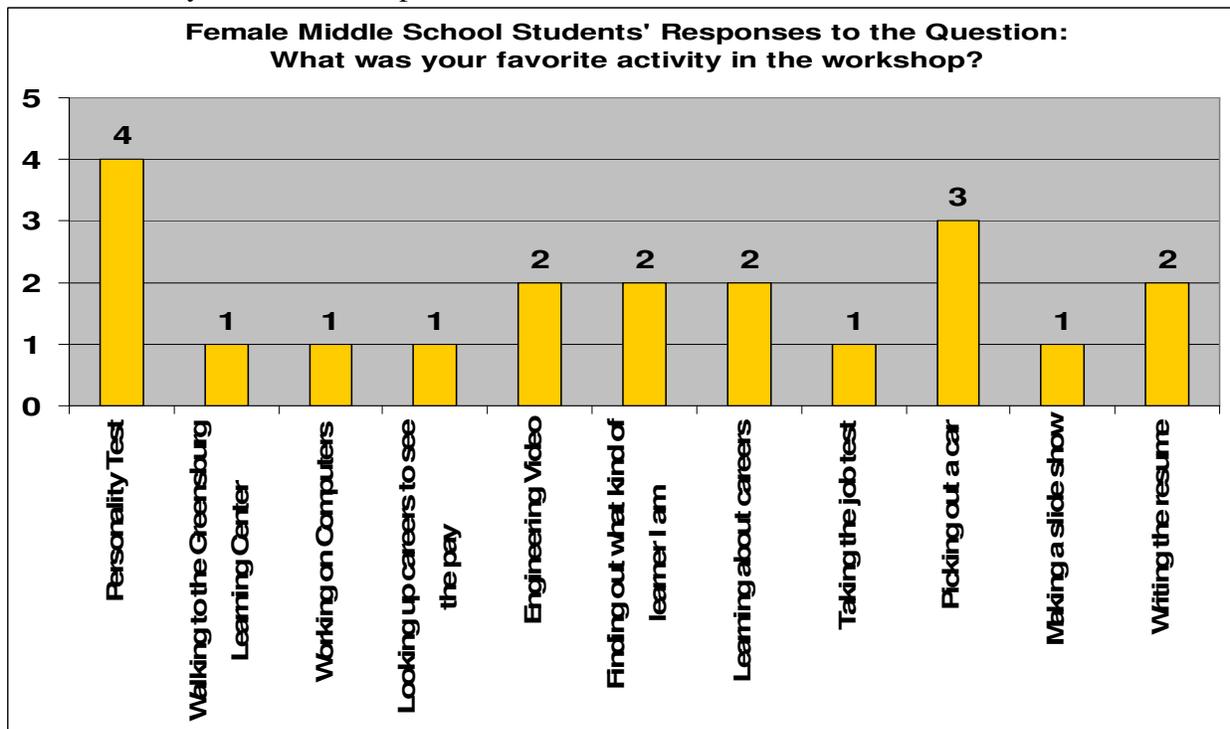


Figure 12. Female middle school students’ response to question 8, “What was your favorite activity in the workshop?”

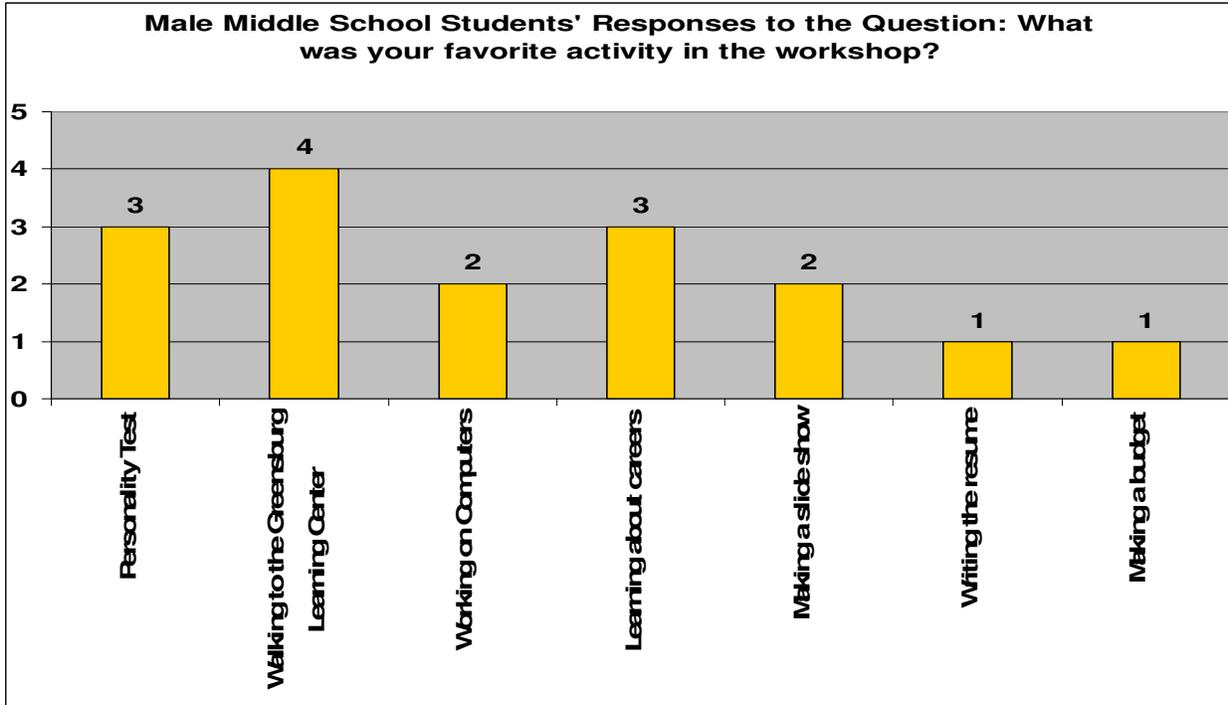


Figure 13. Male middle school students’ response to question 8, “What was your favorite activity in the workshop?”

Finally Figures 14 and 15 show the female and male responses to question 9, “What did you like the least (in the workshop)?”

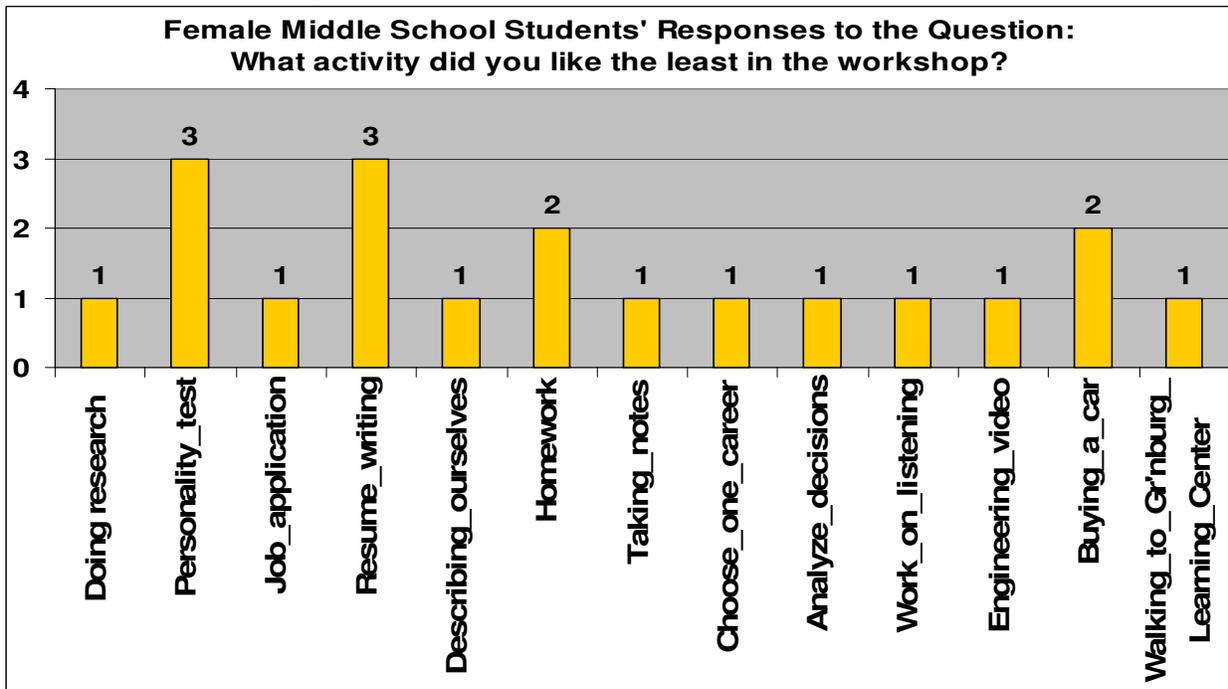


Figure 14. Female middle school students’ responses to the question: “What activity did you like the least (in the workshop)?”

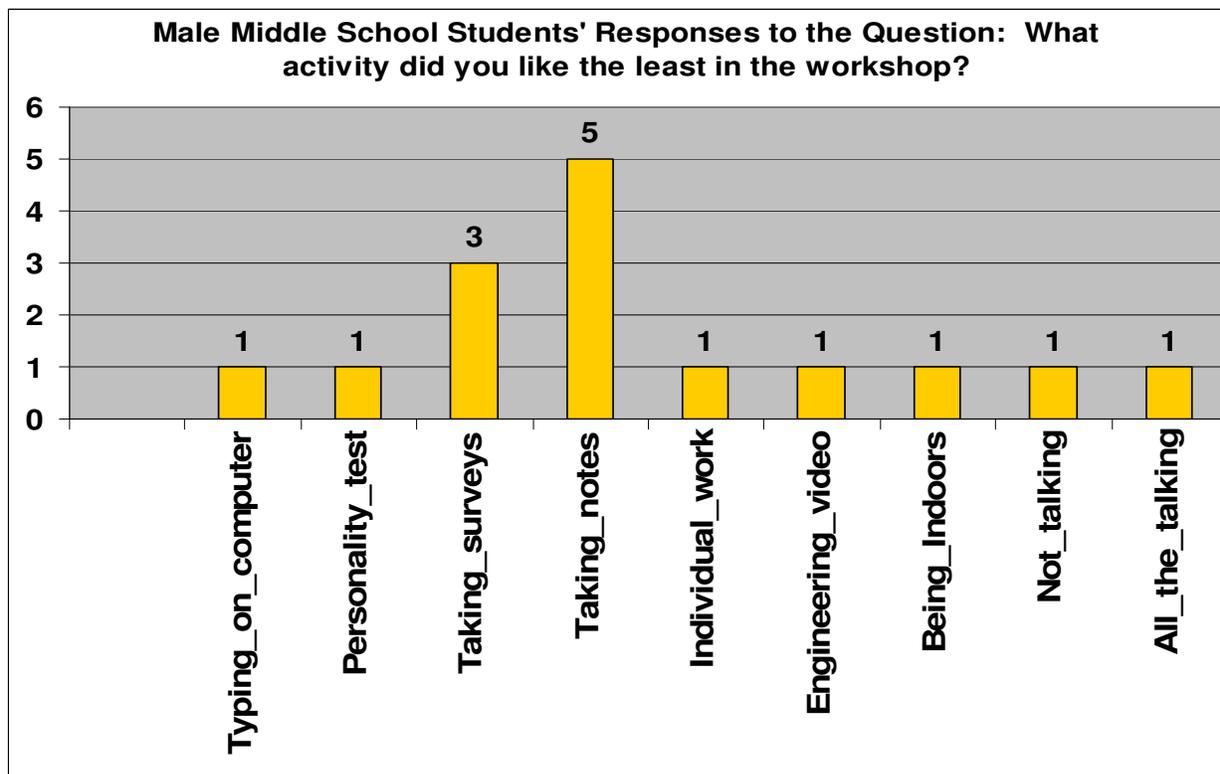


Figure 15. Male middle school students’ responses to the question: “What activity did you like the least (in the workshop)?”

Observations

It was observed that many of the workshop participants had already made career choices prior to the workshop. It appears that for many of these students, the career choices have been made much earlier than middle school. There were several girls that had previous mentoring relationships with health care professionals in the community or in their families, thereby leading to a higher number of career choices in health care. Some of the boys also had previously established mentoring relationships and therefore they were directed to more traditional male career choices. It was also observed that parents’ attitudes had a great affect on career choices for both boys and girls. From the responses to the survey questions and after talking to the girls, it is believed that the girls did not explicitly choose engineering, science, or technology most likely because of their unfamiliarity with these fields, parental influence, and socialization.

Influencing Career Choices

A study 15 years ago identified support from parents as the most important element in career aspirations. Grades in sixth grade, parental expectations, parent educational attainment, and motivation had moderately strong indirect effects on eighth-grade achievements. The National Science Foundation study *Longitudinal Study of American Youth* found parents’ positive attitudes toward science and technology in the students’ eighth grade year was a major influence in the choice of careers in these areas^{5,6}.

Women majoring in science said that they were not influenced by teachers or counselors in making career plans ⁷. If parents are the primary influence in their children's career choices, then we also need to be working with the parents in Decatur County. A strong manufacturing presence from foreign-owned firms has been positive because these companies value higher education and will pay for it.

Changing community values has been a lengthy process. Several companies in the community have closed, leaving long-standing employees without the skills to seek a different kind of employment. As the county is influenced by global companies and outsiders who are moving into the community, these attitudes are gradually changing workforce values.

Parents sometimes express the fear that once their child goes on to higher education, she will not return to her hometown. To some extent their fears are warranted. About three-fourths of young, single, and college-educated adults reported moving between 1995 and 2000 ⁸. Indiana had an out migration of 14,344 young, single, and college-educated persons in this period, while it experienced a net growth in overall population of 21,625.

Conclusion and Recommendations

In conclusion, the workshop had raised several questions for the authors:

- 1.) If we want to recruit more female students into engineering, science, and technology, then shouldn't we have more parental involvement in this effort?
- 2.) If we want to recruit more students into the fields of engineering, science, and technology, shouldn't we start introducing the students to these careers at an earlier age?
- 3.) If we are really interested in improving engineering, science, and technology education, then shouldn't we establish classes in the elementary school curriculum that would develop these skills?

For future workshops, the following recommendations are made:

- 1.) To increase the number of workshop participants in order to collect statistical data
- 2.) To have more in depth assessment in order to better understand the issues
- 3.) To have parental education in the fields of engineering, science, and technology and to discuss parental concerns about out migration after college
- 4.) To have parental participation in part of the workshops in order to support the students
- 5.) To have a workshop that targets younger students (ages 9-12)

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Appendix

Goals Lead the Way

Successful people often set goals to help them get what they want out of life. There is no right way or wrong way to set goals, but these strategies have worked in the past for others.

1. Make a list of your values. Decide what's most important to you, and set goals to include and enhance those. If you have a hobby that is very important to you, make sure you include time for it in your goal.
2. Visualize your success. Create a clear image in your mind of where you'd like to be when you achieve your goal. If you set a goal of graduating from college, imagine what it'll be like when you receive your diploma. You can even start thinking about who you'll invite! This will help keep you focused on your goal.
3. Write down the things you want. This will help you decide what's most important to you, and will help them seem more real to you. Make sure some of those things can be gained in the near future.
4. Create a top three. After you've listed the things you want, decide on three things you'd like to achieve in your life. You can also do this for goals in other time frames—this year, within the next five years and so on. This will help you prioritize your goals.
5. Ask yourself tough questions. Instead of wishing for your goals to come true, ask yourself how you'll accomplish them and what you can do to follow through. Don't be afraid to recognize your limitations. If you have difficulty studying when the television is on, study somewhere without one.
6. Focus on one project at a time. You'll accomplish more if you devote more energy to each individual project, instead of spreading it out over several at once.
7. What's your ideal scenario? Imagine you're being interviewed for a newspaper or magazine article after you've accomplished your number-one goal. What publication is it? What would you tell the reporter? How would the headline read?

Goals should be specific. Don't just say you want to improve your math scores. Say, "I want to achieve a score of 85 on the next test. I want to raise my grade by one letter grade in the next 9 weeks." This is like focusing on the game each week, but with an eye on the post season.

Nov. 21, 2005. Goals lead the way to success. The Cincinnati Enquirer. D,8.

PRIORITIZE YOUR GOALS

Name _____



To help you choose a career, consider what you want from your work as well as your interests and abilities. Do you want a career where you earn lots of money? Do you want to have many responsibilities? The exercise below will help you discover what is most important to you in a career.

Read the 10 items that follow. Write a 1 next to the career goal that is most important to you. Then use numbers 2 through 10 to rank the remaining goals.

___ EARNINGS

how much the career pays

___ SERVICE

how much you help others

___ PRESTIGE

how much people respect your work

___ GEOGRAPHY

how important it is to live in a particular place

___ INDEPENDENCE

how much you are your own boss

___ SECURITY

how much the career promises long-term, stable employment.

___ RESPONSIBILITY

how much people depend on you

___ TEAMWORK

how much you will work as a member of a group

___ ENVIRONMENT

where most of the job will take place (outdoors, indoors, or both)

___ VARIETY

how much the job will have you doing different kinds of tasks