Does Changing the Name of Technology Education to

Technology and Engineering Increase

the Program's Prestige?

by

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A Research Paper
Submitted in Partial Fulfillment of the
Requirements for the
Master of Science Degree
in

Industrial/Technology Education

Approved: 2 Semester Credits

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May, 2007

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Title: ***Does Changing the Name of Technology Education to Technology and Engineering Increase the Program's Prestige?***

Graduate Degree/ Major: MS Industrial/Technology Education

Research Adviser: **Brian McAlister, Ph.D.**

Month/Year: **May 2007**

Number of Pages: **50**

Style Manual Used: **American Psychological Association, 5th edition**

ABSTRACT

This study surveyed middle school parents about their perception of prestige for six different names for the middle school subject technology education: pre-engineering, technology and engineering, technology education, vocational education, industrial technology, and shop. The study asked parents to rate 10 occupations for their level of prestige that have been ranked as part of a national poll and 13 middle school subjects for their level of prestige. Technology education names such as pre-engineering and technology and engineering had the highest perception of prestige. Names with shop or industrial in the name had the lowest perception of prestige. Science, math and reading had the highest perception of prestige for all the school subjects.

Parents with basic education levels ranked the prestige of technology education much higher than parents with advanced education levels. School districts contemplating changing the name of their technology education program to one that includes "engineering" should consider the education background of their parents when making

such a decision. Districts with low education levels of parents might not see an increase in prestige in changing the name to pre-engineering or technology and engineering. Districts with parents of advanced education levels might see an increase in the program's prestige by changing the name to pre-engineering or technology and engineering.

Acknowledgments

I would like to thank my wife Brenda Fujikawa for her patience and endless support as I spent many long weekends away from the family working on this thesis. I would also like to thank Dr. Brian McAlister for his advice and guidance through the writing process.

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Chapter I: Introduction

Technology education is a kindergarten through 12th grade (K-12) subject area that attempts to teach students to be technologically literate. "Technological literacy is the ability to use, manage, and understand technologies" (Technology for all Americans Project, 1996, p. 6).

The defining feature of technology education's curriculum is its use and reliance on hands-on, experiential learning (Pearson & Young, 2002; Snyder, 2004). A few common activities, but not representative of all curricula, that a casual observer of classrooms across the United States might see students working on include mousetrap cars, CO_2 racecars, and/or electrical vehicles (Beven & Raudebaugh, 2004).

Technology education has been a school subject in the United States for about 100 years (Snyder, 2004). During the last century, technology education's curriculum, like the curriculum for all K-12 subjects, has been steadily revised to keep pace with changes in society and scientific research. One aspect that has changed dramatically over the last century is the name that hangs over the classroom/laboratory door. Snyder lists 13 names that have been used in the United States for schools teaching what would today be called technology education, including mechanical schools, polytechnics, schools of industry, mechanics institutes, manual laboratory academies, technical institutes, working men's schools, manual training schools, industrial arts and vocational schools. None of the names lasted longer than 50 years before being replaced by a newer and "improved" name. In contrast, the use of the terms mathematics and reading have been in use for over 400 years (Oxford University Press, 1961).

There is general agreement that the history of what is termed modern day technology education can trace its roots through the following three broad movements: manual training, manual arts and industrial arts (Snyder, 2004). Each of these disciplines struggled with what to call itself as the world changed. Technology education has been the modern name for the school subject since 1985, when the American Industrial Arts Association changed its name to the International Technology Education Association (ITEA; Benenson & Piggott, 2002). However, even with all the work of the standards movement and 20 years of K-12 education using the term technology education in place of industrial arts, the average person equates the word technology with computers and electronics (Pearson & Young, 2002; Pearson, 2004).

There is a movement to change the name once again and incorporate the word "engineering" into the title (Pearson, 2004). Recently Lewis (2004) wrote "In the long march from manual training the subject which we today call technology education has always had to contend with the question of its legitimacy as valid school knowledge" (p. 1). The change in terminology to include engineering may have to do with the prestige associated with the term engineer. Harris Interactive (2006) has taken a poll since 1977 asking U. S. adults to rank various professions for their level of prestige. Engineers' prestige ranking has varied from 3rd to 9th over the last 27 years. In 2005 they ranked 9th place with a 34% "very great prestige" ranking (¶ 9).

Statement of the Problem

There is a general assumption within technology education that changing the subject name "technology education" to "technology and engineering" will result in an increase in prestige for the program. There is little research to confirm or deny this assumption.

Implications of changing the name of technology education have interest at the state and local level. This study was undertaken to inform technology education teachers in the state of Wisconsin and teachers and administrators at the local school district about the community's perceptions of technology education vs. technology and engineering. This study asked parents of middle school students at a suburban middle school in the Midwest to rank the prestige of various names for technology education.

Research Questions

1. Did the ranking of occupation prestige by parents in this study differ from the ranking of occupation prestige by US adults as listed in Harris Interactive Poll #69?
2. Was there a statistically significant difference between the prestige ranking of middle school subjects by parent's education level?
3. How did parents rank the prestige of potential, past, and current technology education subject names?
4. Was there a statistically significant difference between a parent's education level and the ranking of their perception of prestige for the potential, past, and current technology education subject names?

Assumptions and Limitations

The study did not define the terms used on the survey questionnaire. Some respondents may have had different views of the terms used, for example, technology, prestige, technology education, and engineer. It was important for this study that parents rated the occupations and school subjects based on their perceptions of the terms at the time of the survey. It is assumed that some parents will have extensive experience with the engineering profession while others could possibly equate engineer with the operator of a railroad locomotive. The study was interested in the value attached to the subject names regardless of how parents came to their opinion.

The population of the study was limited to parents who attended the school's back-to-school registration day and filled out a survey. Due to the traditionally high levels of parent participation, there was no attempt to follow up with parents who did not show up at the registration day. There is a possibility that some demographic group that does not attend school registrations or who choose to not fill out the survey at registration day may have been missed. Therefore the results of the study may not be generalizable to the whole school parent population.

The researcher who is the Technology Education Teacher at the school personally handed out the surveys to parents at the back-to-school registration. Parent's knowledge of the teacher may have influenced how they responded on the survey. There was no attempt to determine if the Technology Education Teacher handing out the survey increased or decreased parent perception of prestige for Technology Education.

The census data used for the demographic data on the sample was taken from the U.S. Census area that most closely matches the boundaries of the school district. It is not a complete match (U.S. Census Bureau, 2000).

Chapter II: Literature Review

The History of Technology Education in the United States

The earliest type of formal training in technical skills was based on the apprenticeship system that dates back a millennium (Snyder, 2004). Students agreed to work with a master craftsman for seven years in exchange for learning the secrets of the trade. At the completion of their apprenticeship, the young person would be admitted to a local craft guild as a journeyman. After several years of moving around from village to village as a journeyman he could choose to produce a "masterpiece" (Lewis, 2005). The student was only granted the name of master craftsman after his piece of work was judged to be a masterpiece.

The earliest state sponsored technical education was started in 1879 by Calvin Woodward at the St. Louis Manual Training School of Washington University (Friese, 1926). Calvin Woodward's "manual training," as it was termed at the time, had three broad goals: "...to keep boys in school, 'provide vocational skills,' and 'develop leisure-time interest'" (Gerbracht & Babcock, 1969, as cited in Foster, 1996, p. 7). Students in manual training schools at the simplest level were to learn the correct use of tools. The emphasis was on hands-on work and learning how to use the tools of the shop. Part of the reason for the creation of manual training schools was the breakdown of the apprenticeship system in the United States and the beginning of industrialization. People worried about how to keep young boys in school. The hands-on nature of the work was seen as a way to train factory workers and to keep boys actively engaged in schooling by letting them get out of their seats and move (Woodward, 1887).

"Manual training" was slowly replaced at the beginning of the 20th century with "manual arts" (Foster, 1996). For many years, the two names were used side by side. Manual arts gradually evolved into a philosophy geared towards the general education population. The use of vocational tools was emphasized less in manual arts than it was in manual training. In manual arts, more emphasis was put on the creation of individual projects and less emphasis was put on learning the details of tool use.

With the passage of the federal 1917 Smith-Hughes Vocational Act (Foster, 1995) a new term was introduced for technology education. The Smith-Hughes Vocational Act provided federal funding for vocational programs in public schools. The law "... stipulated in detail the vocational character of the courses to be taught" (Helton, 2005 ¶ 1). Industrial arts was the general education name that eventually replaced "manual arts" (Snyder, 2004).

When reading varied histories of technology education it became clear that there was not a linear path from manual training to manual arts to industrial arts with an offshoot of vocational education (Foster, 1995; Friese, 1926; Snyder, 2004). Snyder tried to help clear up the confusion between the three methods of teaching technology education at the beginning of the century: manual arts, manual training, and vocational arts. He said, "The emphasis of all these programs was on 'learning by doing,' but the focus of the content was always based in, or on, technology. Technology education evolved from, but is not limited to, this strong tradition of hands-on learning" (p. 23).

Each of the early technology education disciplines, manual training, manual arts in the early part of the century and industrial arts near the end, struggled with what to call itself as the world changed around them. Calvin Woodward wrestled with this over 100 years ago when he wrote about the possibility that the subject name "manual training" would some day change:

> The word "manual" must, for the present, be the best word to distinguish that peculiar system of liberal education which recognizes the manual as well as the intellectual.... When the manual elements which are essential to liberal education are universally accepted and incorporated into American schools, the word "manual" may very properly be dropped. (Lewis, 2004, p. 21)

The most dramatic and documented change in the history of technology education occurred in 1985, when the American Industrial Arts Association changed its name to the International Technology Education Association (ITEA) (Benenson & Piggott 2002, ¶ 2). Benenson and Piggott wrote that even this change has been fraught with uncertainty and confusion about what exactly technology education should teach and emphasize.

The standards movement has tried to clear up some of the confusion for teachers and parents about what should be taught in the technology education classroom. The State of Wisconsin published its standards in 1998 (Department of Public Instruction, 1998). The Wisconsin standards list four broad categories of performance standards: nature of technology, systems, human ingenuity, and the impact of technology. In 2000, ITEA published the national technology education standards (ITEA, 2000). ITEA's national standards lists 20 different standards for technology education and groups them into five areas: nature of technology, technology and society, design, abilities for a technological world and the designed world.

Over the course of technology education's history, much work has been done to establish a solid curriculum foundation that is clear and easy to explain to the general public. Despite all this work, there is still a perception that much more has to be done. Two quotes written 109 years apart illustrate the point. Calvin Woodward (1887) wrote:

> Nothing is clearer than that our present system of education is inadequate.... We want a fuller knowledge and a greater familiarity with the material world by which we are surrounded, through the medium of which we act for and upon each other and for our own physical well-being. A knowledge of material things and material instrumentalities can be gained only by close and systematic observation and study, and is in itself a liberal education. (p. 263)

Similar concerns were addressed in the Technology For All Americans report in 1996:

> ...it is about invigorating the entire educational system with high interest, student-focused content and methods. It is about developing a measure of technological literacy within each graduate so that every American can understand the nature of technology, appropriately use technological devices and processes, and participate in society's decisions on technological issues. (p. 1)

The Movement To Add An Engineering Component To Technology Education

There is a recent movement within the field of technology education to move away from blue-collar industrial arts activities towards white-collar/academic-based engineering processes (Lewis, 2004). There is a debate among teachers and schools as to whether this is the correct new path for technology education to follow.

An early report in the move towards engineering in technology education is the Technology For All Americans Project's 1996 report, *Technology For All Americans: A Rationale and Structure for the Study of Technology*. The report argued for all students to be technologically literate and it laid the groundwork for the national standards that were to follow in 2000. The report barely mentions engineering, but where it does, it foreshadows what was to come. The authors wrote:

> There are strong philosophical connections between technology, engineering, and architecture.... These professions need to work with technology educators to develop alliances for infusing engineering and architectural concepts at these levels. The alliances will provide a mechanism for greater appreciation and understanding of engineering, architecture, and technology. (p. 29)

The movement to increase the emphasis of engineering in the technology education curriculum received a second big push from the National Science Foundation when it funded the grants that paid for creating the ITEA standards document (ITEA, 2000). William Wulf, president of the National Academy of Engineering, wrote the introduction to the national standards. The National Academy of Engineering's National Research Council sponsored a report published in 2002 titled *Technically Speaking: Why All Americans Need to Know More About Technology*. They argued that a technically literate person needs to understand engineering design. They also argued for teaching engineering design in the nation's technology education classrooms (Pearson & Young, 2002). "An especially important area of knowledge is the engineering design process, of starting with a set of criteria and constraints and working toward a solution—a device, say, or a process—that meets those conditions" (p. 13).

Lewis (2004) gave three reasons for the shift towards pre-engineering. One is that there is a need for more engineers in the United States. In addition, technology education programs are elective in high school and can be eliminated from school budgets with relative ease. Lastly, the standards movement has squeezed schools to look at every program for ways to increase test scores. If a program is not seen as adding to the school's test score it is vulnerable to elimination.

In 2006 the National Science Board (2006) released a letter to the science community comparing the progress that pre-college students have made since the 1983 Education American for the 21st Century report. The news was not good:

> In the intervening years, we have failed to raise the achievement of U.S. students commensurate with the goal articulated by that commission – that U.S. pre-college achievement should be 'best in the world by 1995'-- and many other countries have surpassed us. (p. 1)

They go on to say

> The Nation is now well into the 21st century and not since the Soviet union's launch of the *Sputnick* satellite -- 47 years ago -- has the need to improve science and mathematics education in America been as clear and as urgent as it is today. (p. 1)

Many schools across the United States have adopted a pre-engineering curriculum to replace or augment the technology education curriculum (Lewis, 2004). In an editorial, Pearson (2004) summed up the recent moves by technology education and engineering to work together: "Science education validates itself through science, and mathematics education through the work of mathematicians. Why not technology education through engineering?" (p. 68).

The Movement from Technology Education to Technology and Engineering

There is a movement to change the name once again (after 22 years as technology education) and incorporate the word "engineering" into the title (Pearson, 2004). Despite all the work of the standards movement and 22 years of K-12 education using the term technology education in place of vocational arts, the average person still thinks technology is mostly about computers (Pearson & Young, 2002; Pearson, 2004).

Many researchers have noted the negative perception of technology education held by the general public (Pearson 2004; Rogers & Rogers, 2005; Daugherty & Wicklein, 1993) For example, Pearson (2004) noted that "Most outside the profession, including many engineers, still see technology education through the lens of 'shop class,' a term almost always used pejoratively" (Pearson, 2004, p. 68). Thirteen years ago Daugherty and Wicklein (1993) studied the perceptions of technology education, math, and science teachers and they wrote

> The technology education discipline has a definite need to alter the image it projects in order to improve the overall perception of what technology education is, what it hopes to accomplish, and how it fits within the general education curriculum. (p. 41)

One recent solution to this misunderstanding is to add pre-engineering to the technology education curriculum. Rogers and Rogers (2005) summed up this recent trend when they wrote

> The general public often refers to the field as "shop class". Or technology education is misunderstood as computer technology, or information technology. However almost everyone understands the word "engineering" and recognizes what engineers do.... Pre-engineering provides a way to give technology education legitimacy and life in these grades by providing ways to discuss with any teacher, administrator, student, or parent why and what the program teaches. (p. 90)

The shift towards emphasizing engineering in technology education has also shown up in the name of three states' technology education departments. Massachusetts, Utah and Wisconsin have all added "engineering" in the official name of the subject (Lewis, 2004). In 2004, the Department of Public Instruction for the state of Wisconsin changed the name of its technology education department to technology and engineering.

How are Scientists and Engineers Perceived by the General Public?

The perceptions of the prestige level of scientists and engineers have been measured since 1977 as part of a Harris Interactive Poll. Scientist has been in first or second place since the beginning and in 2005 it tied with fireman as having the most prestige; 56% of the adults surveyed said scientists had "very great prestige. Engineers' prestige ranking has varied from 3rd to 9th over the course of the survey. Table 1 lists the ranking from the 2005 Harris Interactive Poll #69 (2006) with the percentage of the adults that ranked each occupation as having "very great prestige."

In contrast to scientists, the engineering profession has "...been engaged in a campaign for public recognition" (Pearson, 2004, p. 67). They "...have met countless times, founded hundreds of public outreach efforts, all with the goal of improving the public image of engineering" (p. 67). According to the Harris Poll number 69 (2006), over the last 27 years the prestige level of scientists has declined from 66% in 1977 to 56% in 2005. The prestige level of engineers has not changed from its level in 1977: 34%.

Table 1

Ranking of 22 Occupations by the Percentage of the US Adult Population That Feel the Occupation has "Very Great Prestige"

Rank	Occupation	Very great prestige: %
1	Fireman	56
2	Scientist	56
3	Doctor	54
4	Nurse	50
5	Military Officer	49
6	Teacher	47
7	Police Officer	40
8	Priest/Minister/clergyman	36
9	Engineer	34
10	Architect	27
11	Member of Congress	26
12	Athlete	23
13	Lawyer	18
14	Entertainer	18
15	Actor	16
16	Business executive	15
17	Banker	15
18	Union Leader	15
19	Journalist	14
20	Accountant	13
21	Real estate agent/broker	9
22	Stockbroker	8

Source: Harris Interactive, 2006, ¶ 10

Chapter III: Introduction

Selection and Description of Population

The population for this study was parents of middle school students (grades six, seven and eight) at a middle-class suburban school in south central Wisconsin who attended the school's back-to-school registration on August 24, 2006. According to the school's principal, approximately 95% of parents attend the registration. There are approximately 450 students enrolled at the school. No sample of the population was taken; each family was asked to fill out one survey. If a family had more than one student enrolled in the middle school they did not fill out a second or third survey. Each family decided who was responsible for filling out the survey if more than one parent attended.

According to the U.S. Census Bureau (2000a), the population that matches the school district boundaries the closest for this study is 97% white. Ninety seven percent of the population has a high school diploma and 36% have a bachelor's degree or higher. The median family income in 1999 income was $71,218; a small percentage (1.2%) of families live below the poverty level.

Instrumentation

This study had four sections of survey questions that it asked parents to answer. See Appendix A for a copy of the instrument. The first section asked parents to check the box next to the highest level of education that they completed. This question is modified from an education question used on the 2000 U.S. census (2000b). The 2000 U.S. census question had 16 different levels of education from which a parent could choose, ranging from no schooling to post Ph.D. For this survey, the seven education levels below high school graduate were all condensed into one, leaving 8 education levels. The census question was chosen so that education levels of the survey participants can be directly compared with census data from 2000.

The second group of questions was based on a Harris Interactive poll that has been given every fall since 1977. Permission to use the question's wording is given in Appendix B. The questions were most recently used for Harris poll #69 (2006) in September of 2005. The questions in the Harris poll are given over the telephone whereas the questions in this study were part of a written survey. The Harris Interactive poll asked U.S. adults over the age of 18 to rank 22 occupations and rate them on a four point scale from "very great prestige" all the way down to "hardly any prestige at all." For the purpose of this study the 10 occupations rated as having the most prestige by U. S. adults as listed in the Harris Interactive (2006) poll were chosen for use. Parents ranked each occupation on the same four-point scale used in the Harris poll.

The third set of questions asked parents to rate the level of prestige for 13 middle school subjects. The subjects used were courses offered in the 2005-2006 school year at the middle school at which the researcher works. The question was modified slightly from the second set of questions. The words "school subjects" were used in place of the word "occupation." Parents were to rank the level of prestige of each school subject on the same four-point scale used by the Harris Interactive poll.

The last series of questions asked parents to rate the level of prestige for names of possible new subject areas. The study listed six names for technology education: the current name used at the researcher's school (technology education), two names from the recent past (industrial arts, industrial technology), a colloquial term still used in casual conversation (shop) and two names that have been proposed that incorporate engineering into the name (pre-engineering, technology and engineering). The question was modified slightly from the third set of questions. The word "potential" was inserted in front of "school subject."

Research Questions

1. Did the ranking of occupation prestige by parents in this study differ from the ranking of occupation prestige by US adults as listed in Harris Interactive poll #69?

2. Was there a statistically significant difference between the prestige ranking of middle school subjects by parent's education level?

3. How did parents rank the prestige of potential, past, and current technology education subject names?

4. Was there a statistically significant difference between a parent's education level and the ranking of their perception of prestige for the potential, past, and current technology education subject names?

Data Collection Procedures

The data was collected at a back-to-school registration. There were a series of tables that parents and students stopped at as part of the registration process. The researcher, who is the technology education teacher at the school, sat at a table to hand out the surveys. The surveys were completed at a different table and given to a research assistant sitting near the end of the line. The research assistant offered each parent who turned in a survey a choice of a piece of candy or a pencil.

Data Analysis

The data was analyzed by collecting the responses from each parent. The percentage of parents who considered each occupation as having very great prestige was calculated. In addition, the mean and standard deviation was calculated for each school subject for both the advanced and basic education groups. A Z-Test was used to compare the differences between the ranking of occupation prestige by US adults as listed in the Harris poll and parents in the survey. An Independent Samples Test was used to compare the perception of prestige of the school subject names between parents with basic and advanced education levels.

Chapter IV: Results

One hundred and forty one surveys were collected that were filled out correctly with parental education levels and rankings of the different occupations and school subjects. The survey data was then entered into a spreadsheet for analysis. As mentioned in chapter three, there were four research questions to be answered with survey results. The four questions will be answered in turn.

Ranking of Occupations

Results indicated that six out of the 10 occupation rankings were different between the two surveys. To examine the differences between the two groups, a statistical Z-test was done comparing the Harris Interactive poll results in relation to the survey results from middle school parents. See Appendix C for a more detailed analysis of the formula and the raw data. Six out of the ten occupations had a Z-Value above the 95% confidence interval (see Table 2) and five out of the ten had a Z-Value above the 99% confidence interval. The two groups therefore cannot be used to make accurate predictions about the other. The ranking by prestige for engineer was not significantly different between the two groups.

If the two groups are compared based on rank order the three occupations with the highest perception of prestige were the same for both groups. The Harris poll US adult population ranked fireman first, scientist second and doctor third. The middle school parent population ranked doctor first, scientist second and fireman third. The ranking of engineer in the Harris Poll was at 9th place and in the parent survey engineer was in 5th place. The percentage of parents in the school survey and the Harris poll who rated engineers, as having very great prestige was very close: 34% for US adults and 37% for middle school parents.

Table 2

Comparison of Harris Interactive Poll Data And Parent Survey Data

Occupation	Percentage Ranking From Harris Poll Data "Very Great Prestige"	Percentage Ranking From Parent Survey "Very Great Prestige"	Z-Test of significant differences
Nurse	50	27	**-5.29**
Doctor	54	76	**4.96**
Fireman	56	39	**-3.76**
Military Officer	49	36	**-2.91**
Scientist	56	46	**-2.32**
Teacher	47	37	**-2.23**
Police Officer	40	34	-1.42
Architect	27	24	-0.74
Engineer	34	37	0.69
Priest/minister/ clergyman	36	34	-0.56

A "Z" value of plus/minus 1.960 is needed to be significant at the 0.05 level.

A "Z" value of plus/minus 2.576 in needed to be significant at the 0.01 level.

Education Level and Parent Perception of Subject Prestige

The survey asked parents to rank the prestige of current middle school subjects. This was analyzed by calculating the mean of the scores given by parents ranging from hardly any prestige to some prestige to considerable prestige and, finally, to very great prestige. Very great prestige was scored as a 4, considerable prestige as a 3, some prestige as 2, and hardly any prestige as a 1. The higher the mean score, the higher the prestige parents had for the subject area.

Math, science, and reading were at the top of the ranking and technology education was sixth place on the list. See Table 3.

Table 3

Ranking of School Subjects Based On Mean Score for Prestige

	Mean Scores for all Parents Sorted by Mean Score				
Rank	Subjects	Mean	Std. Dev.	Missing	N valid
1	Math	3.55	0.592	2	140
2	Science	3.54	0.627	1	141
3	Reading	3.47	0.681	0	142
4	Social studies	3.23	0.738	0	142
5	Language arts	3.15	0.748	2	140
6	Technology education	2.96	0.829	0	142
7	Foreign language	2.92	0.747	1	141
8	Health	2.7	0.838	4	138
9	Art	2.61	0.703	0	142
10	Band	2.61	0.673	0	142
11	Family and Consumer ed.	2.56	0.863	0	142
12	Physical education	2.56	0.789	2	140
13	Choir	2.43	0.647	1	141

Parents were asked what their highest level of education attainment was. Nearly half (48%) of the parents had at least a bachelor degree. This is higher than the Wisconsin adult population. The 2005 US census reports that 24.6% of the citizens 25 years and older in Wisconsin have a bachelor degree or higher (US Census Bureau, 2006). The survey asked parents to mark their level of education into one of eight levels based on the highest level of education that they attained. The results included three parents with some high school but no diploma, 14 high school graduates, 28 parents with one or more years of college but no degree, and 28 parents with an associate degree or technical certification. The largest education group was parents with bachelor degrees at 49. Fifteen parents had a master's degree and three had a professional degree such as doctor.

The number of parents at each of the eight census levels was small. To increase reliability of the data for statistical tests, education levels were grouped to increase the sample size. The researcher grouped the eight education levels into two levels for all the calculations used in this survey. The first group, called hereafter the "basic education" group consisted of all parents with an education level from some high school up to and containing an associate or technical degree. This basic education group contained 73 parents. The next group hereafter called the "advanced education" group contained parents with at least a bachelor degree; this group contained 67 parents (see Table 4).

Table 4

Grouping of Parents By Education Level

Education Grouping for Study	Education Level from Survey	Number in Each Level	Total in Group	Percent of total Population
Basic Education Group: Up to Associate or Vocational Degree	Some HS or less	3		
	HS Grad	14		
	Some college	28	73	52
	Associate	28		
Advanced Education Group: Bachelor degree or above	Bachelor	49		
	Masters	15		
	Professional	3	67	48
	Doctoral	0		
Totals		140	140	100%

Ranking of Middle School Subject's Prestige by Parent Education Level

To compare the differences between the two education groups and their perception of prestige for each school subject, an Independent Samples Test was calculated. To determine if there was approximately equal variance between the two education groups, a Levene's test for equality significance was computed. For a significant difference in variance between the two education groups, the test for significance must be less than .05. No school subject had a Levene's Test for Equality significance under .05, therefore the two groups can be considered as having approximately equal variance. Then a t-test for equality means was computed for the two education levels and the mean for prestige for all school subjects. Only four subjects had a significant difference below .05: physical education, family and consumer education, health, and technology education. See Table 5 and 6 for the comparison of the mean scores by parent education level. See Appendix D for tables of Independent Samples Test.

Table 5

Basic Education Level Ranking of Subject Prestige

Subjects	Mean	N Valid	Std. Dev.	Std. Error Mean
Science	3.56	72	0.669	0.079
Math	3.53	72	0.604	0.071
Reading	3.45	73	0.688	0.081
Social studies	3.27	73	0.75	0.088
Language arts	3.21	72	0.768	0.091
Technology education	3.11	73	0.859	0.101
Foreign language	2.94	72	0.785	0.093
Health	2.86	71	0.85	0.101
Family and consumer ed.	2.74	73	0.866	0.101
Physical education	2.68	73	0.78	0.091
Art	2.68	73	0.724	0.085
Band	2.63	73	0.677	0.079
Choir	2.46	72	0.627	0.074

Table 6

Advanced Education Level Ranking of Subject Prestige

Subjects	Mean	N Valid	Std. Deviation	Std. Error Mean
Math	3.59	66	0.554	0.068
Science	3.55	67	0.558	0.068
Reading	3.51	67	0.66	0.081
Social studies	3.19	67	0.723	0.088
Language arts	3.11	66	0.726	0.089
Foreign language	2.93	67	0.703	0.086
Technology education	2.82	67	0.777	0.095
Band	2.6	67	0.677	0.079
Art	2.55	67	0.681	0.083
Health	2.52	65	0.793	0.098
Choir	2.42	67	0.678	0.083
Physical education	2.42	65	0.788	0.098
Family and consumer ed.	2.36	67	0.811	0.099

The results imply that there is a 95% probability that the difference in the four subject's prestige score is due to the education level of the parents. With the exception of the four subjects mentioned above, the other nine school subjects did not differ in the percent of perception in a statistically significant way. Education level of parents does not seem to be a reliable predictor of perception of prestige except for: physical education, family and consumer education, health, and technology education which were all ranked as having higher prestige by basic education parents.

Parents with the basic level of education ranked Technology Education at a statistically significant higher level than parents with advanced education. Basic education parents gave technology education a mean score of 3.11 and advanced education level parents gave technology education a mean score of 2.82, see Table 7 for mean scores based on education level of parents that are significantly different at a .05 level.

Table 7

Ranking of School Subject Prestige: Basic Education Level Compared to Advanced Education Level

	Basic Education Level Mean Prestige	Advanced Education Level Mean Prestige
Technology education	3.11	2.82
Health	2.86	2.52
Family and consumer ed.	2.74	2.36
Physical education	2.68	2.42

Prestige of Names For Technology Education: Past Present And Future

Research question three looked at how parents perceived the prestige of different names that have been used for technology education programs in the past, at the present, and a few that are possible future names for the subject. The mean scores were calculated in the same way as for the 13 school subjects mentioned above. Very great prestige was scored as a 4, considerable prestige as a 3, some prestige as 2, and hardly any prestige as a 1. The higher the mean score, the higher the prestige parents had for the technology education name. Names with engineering in them had the highest mean, for example pre-engineering had a mean of 3.18. In the middle were names with technology and industrial in them they ranged from a mean of 2.59 to 3.12. The name shop had the lowest mean score at 2.44 (see Table 8).

Table 8

Ranking of Technology Education Names

Subjects	Mean	Std. Deviation	Missing	N valid
Pre-Engineering	3.18	0.722	2	140
Technology and Engineering	3.12	0.77	1	141
Technology Education	2.96	0.829	0	142
Industrial Technology	2.81	0.746	1	141
Industrial Arts	2.59	0.699	2	140
Shop	2.44	0.732	2	140

Ranking of Prestige For Technology Education Names by Parent Education Levels

To compare the differences between the two education groups and their perception of prestige for each technology education name, an Independent Samples Test was performed. To determine if there was approximately equal variance between the two education groups, a Levene's test for equality significance was computed. For there to be a significant difference in variance between the two groups the test for significance must be less than .05. No technology education name had a Levene's test for equality significance under .05, therefore the two groups can be considered as having approximately equal variance. Then a t-test for equality means was computed for the two education levels and the mean for prestige for all technology education names. Only one name had had a significant difference below .05: technology education. See Appendix D for tables of Independent Samples Test. As noted in Table 9 and 10 below, parents with a basic education level ranked the name of technology education as having higher prestige than parents with an advanced level of education. Basic education level parents gave technology education a mean prestige score of 3.11 compared to 2.82 given by advanced education level parents. Therefore, with the exception of technology education, the difference in prestige between basic and advanced education groups for the other technology education names did not differ in a statistically significant way.

The range in mean scores for the top three technology education names as rated by basic education parents was small at .05, ranging from 3.11 for technology education to 3.16 for pre-engineering. The range for the same three technology education names for advanced education parents was larger at .42, ranging from 2.82 for technology education to 3.24 for pre-engineering.

Table 9

Ranking of Technology Education Names by Basic Education Parents

Names	Mean Ranking	N Valid	Std. Deviation	Std. Error Mean
Pre-engineering	3.14	72	0.737	0.087
Technology and engineering	3.16	73	0.782	0.092
Technology education	3.11	73	0.859	0.101
Industrial technology	2.82	73	0.752	0.088
Industrial arts	2.64	73	0.695	0.081
Shop	2.54	72	0.786	0.093

Table 10

Ranking of Technology Education Names by Advanced Education Parents

Names	Mean Ranking	N Valid	Std. Deviation	Std. Error Mean
Pre-engineering	3.24	66	0.703	0.087
Technology and engineering	3.09	66	0.759	0.093
Technology education	2.82	67	0.777	0.095
Industrial technology	2.8	66	0.749	0.092
Industrial arts	2.52	65	0.709	0.088
Shop	2.33	66	0.664	0.082

Chapter V: Discussion

Summary

Technology education has changed its name many times in the last 100 years and some school districts are changing the name of technology education to include the term engineering. This researcher surveyed middle school parents to see if the name of the school subject made a difference in parents' perception of prestige for the subject.

This study began by studying the results of a national telephone poll taken by Harris Interactive in 2005. The poll asked US adults to rank the prestige of a group of occupations based on their perception of the prestige of the occupation. The poll, in similar form, has been given every year in the United States since 1977. The researcher thought it would be interesting to survey parents at his middle school in regard to their perceptions of the prestige of the same list of occupations as the Harris Interactive poll. The hypothesis was that if there was not a statistically significant difference between the scores for very great prestige on the national Harris Interactive poll and the middle school parent survey, then the results of the rest of the survey might be of greater interest to technology education teachers and administrators outside of the researcher's school district. Six out of 10 occupations were statistically significantly different between the two surveys. The occupation of engineering was scored nearly the same by both survey groups.

Parents have strong opinions about what types of school subjects they value. The core subjects of math, science and language arts had the highest rankings of prestige by both education groups. Social studies, language arts, technology education, and foreign language were in the next tier of subjects for prestige ranking. The lowest scores of prestige were for health, family and consumer education, physical education, art, band, and choir.

When the education level of parents is taken into consideration, parents with an education level up to an associate degree, rated technology education, health, physical education and family and consumer education as having higher levels of prestige than parents with at least a bachelor degree. The other nine school subjects did not differ in a statistically significant way between the two education groups.

In regard to technology education names, parents have a higher perception of prestige for programs that include the term engineering: for example pre-engineering and technology and engineering were the two top ranked potential names for technology. Older technology education names such as shop and vocational education had the lowest scores of perception of prestige. In the middle at third and fourth place were technology education, the current subject name at the researcher's middle school, and industrial technology.

The education level of parents in regard to their perception of levels of prestige shows that parents of basic and advanced education groups only disagree in a statistically significant way on the name of technology education. Parents with a basic education level rated the subject technology education as having more prestige than parents with advanced education levels. Names that included engineering were ranked the highest by both education groups.

Conclusion

The title of this paper asked if changing the name from technology education to technology and engineering increases the program's prestige. The short answer is yes. Both education levels of parents ranked pre-engineering and technology and engineering as having more prestige than any other technology education name on the survey. Any school that changes the name of its technology education program to pre-engineering or technology and engineering may see an increase in parental perception of prestige for the school subject.

Programs that are located in areas where parent education levels are basic may not need to change the name of the program from technology education because technology education's level of prestige is very close to the level of prestige for pre-engineering and technology and engineering. In districts where parent education levels are advanced, changing the name from technology education to pre-engineering or technology and engineering might raise the program's prestige, based on the results from this survey.

Another way to look at the data is by the age of the technology education name and the prestige given to the name. Generally the older the technology education name the lower the level of prestige reported. The newest proposed names such as pre-engineering and technology and engineering had the highest perception of prestige and names such as industrial arts and industrial technology had the lowest perceptions of prestige. The colloquial term "shop" had the lowest perception of prestige among all the names studied.

One thing that all technology education teachers can do, regardless of what the name is on the classroom door, is to work on adding as much value to their classroom prestige as possible. One way to do this is to let administration and parents know that engineering design is already part of the ITEA technology education standards even if the name technology education does not mention engineering. Another way to raise the perception of prestige is for teachers to inform parents and administrators when their students work on a technology education project that incorporates some part of the highest rated school subjects: math, science and reading. Any time teachers have a lesson that highlights one of these areas they need to let parents and administrators know what they have done. Teachers who do this will then be linking their program with a subject that has very high prestige from parents of all education levels.

Technology teachers will also want to be careful about the words they use in casual conversations with parents, students, and administrators. Talking about a program by using the name "shop" over and over again will not lead to an increase in the program's prestige. Parents do not see "shop" as a subject of high prestige. It is important to banish "shop" from the vocabulary if technology education teachers are interested in being respected. Teachers need to tell parents that in technology education, their children design things, solve problems, think creatively, work on pre-engineering activities, and solve problems using math and science concepts.

Recommendations

The researcher was surprised at the statistically significant difference in perception of prestige for technology education, health, physical education and family and consumer education between basic and advanced education parents. A follow-up study to determine why the basic education group ranked these subjects higher than the advanced education group would be interesting. To determine if the type of name currently being taught in a technology education classroom has an affect on the perceptions of parents, the researcher recommends that a similar study be undertaken at a school district that has changed their name from technology education to pre-engineering or technology and engineering.

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Appendix A: Survey Instrument

Parental Perceptions of Prestige of Occupations And School Subjects

You have been asked to fill out this **anonymous** survey. The survey is the basis for this researcher's master's thesis in Technology Education. In addition, it will inform teachers and teacher educators in regard to parental perceptions of school subjects, selected occupations and names for potential classes.

Please take a few minutes to fill out the survey. When you are finished there is a box at the end of the line with a research assistant sitting next to it. Please deposit your survey into the box. When you drop in the survey, you may pick up a piece of candy or pencil as my thank you for completing the survey.

The following information is used for demographic purposes and is considered confidential.
What is the highest degree or level of school you have completed? Mark one box. If currently enrolled, mark the previous grade or highest degree received.

	Some high school (or less)
	High school graduate or the equivalent, (for example: GED)
	One or more years of college, no degree
	Associate degree (for example: AA, AS)
	Bachelor's degree (for example: BA, AB, BS)
	Master's degree (for example: MA, MS, MEng, Med, MSW, MBA)
	Professional degree (for example: MD, DDS, DVM, LLB, JD)
	Doctoral degree (for example: PhD, EdD)

Directions:
Listed below are a number of different occupations. For each, check the box indicating if you feel it is an occupation of very great prestige, considerable prestige, some prestige, or hardly any prestige at all.

	Very great prestige	Considerable prestige	Some prestige	Hardly any prestige at all
1. Architect				
2. Doctor				
3. Engineer				
4. Fireman				
5. Military Officer				
6. Nurse				
7. Police Officer				
8. Priest/Minister/Clergyman				
9. Scientist				
10. Teacher				

Listed below are a number of different school subjects. For each, check the box indicating if you feel it is a school subject of very great prestige, considerable prestige, some prestige, or hardly any prestige at all.

	Very great prestige	Considerable prestige	Some prestige	Hardly any prestige at all
11. Art				
12. Band				
13. Choir				
14. Family & Consumer Education				
15. Foreign Language				
16. Health				
17. Language Arts				
18. Math				
19. Physical Education				
20. Reading				
21. Science				
22. Social Studies				
23. Technology Education				

Listed below are a number of potential school subjects. For each, check the box indicating if you feel it is a school subject of very great prestige, considerable prestige, some prestige, or hardly any prestige at all.

	Very great prestige	Considerable prestige	Some prestige	Hardly any prestige at all
24. Industrial Arts				
25. Industrial Technology				
26. Pre-Engineering				
27. Shop				
28. Technology & Engineering				

Thank you for completing the survey. When you are finished there is a box at the end of the line with a research assistant sitting next to it. Please deposit your survey into the box. When you drop in the survey, you may pick up a piece of candy or pencil as my thank you for completing the survey.

Appendix B: Permission to Use Harris Interactive Poll Question As Part of Study

Email Correspondence:

Alan,

It is fine if you want to use the study question. Please just be sure to include when showing the results the complete methodologies used for each.

As a general source:
The Harris Poll was conducted by telephone within the United States by Harris Interactive between August 9 and 16, 2005.
and you can use the link to our complete release, if you will be posting anything online:
http://www.harrisinteractive.com/harris_poll/index.asp?PID=599

(please be sure to provide the following methodology, especially when making comparisons to your study–and strongly recommend that you provide the full disclosures for your own study)

Methodology

The Harris Poll® was conducted by telephone within the United States between August 9 and 16, 2005 among a nationwide cross section of 1,217 adults (aged 18 and over). Figures for age, sex, race, education, number of adults, number of voice/telephone lines in the household, region and size of place were weighted where necessary to align them with their actual proportions in the population.

In theory, with a probability sample of this size, one can say with 95 percent certainty that the overall results have a sampling error of plus or minus 3 percentage points of what they would be if the entire U.S. adult population had been polled with complete accuracy. Unfortunately, there are several other possible sources of error in all polls or surveys that are probably more serious than theoretical calculations of sampling error. They include refusals to be interviewed (nonresponse), question wording and question order, interviewer bias, weighting by demographic control data and screening (e.g., for likely voters). It is impossible to quantify the errors that may result from these factors. This online sample is not a probability sample.

These statements conform to the principles of disclosure of the National Council on Public Polls.

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Please let me know if you have any further questions.

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Appendix C: Z-Test of Statistical Differences: Prestige of Occupations, Harris Poll compared to Parents Surveyed.

From Fundamental Statistics in psychology and education pg. 186. by J.P. Guilford, Fourth edition.1965, McGraw-Hill Book Company New York

Terms:
N1 = number of items answered for that question, all parents surveyed
p1 = percentage of very high prestige all parents surveyed
n1 = the number of items marked as very high prestige all parents surveyed

N2 = number of items answered for that question, US adults from Harris Poll
p2 = percentage of very high prestige US adults from Harris Poll
n2 = the number of items marked as very high prestige US adults from Harris Poll

p (expected) = (n1 + n2) / (N1 + N2)
q (expected) = 1 - p (expected)

The formula is: $Z = (p^{1} - p^{2)} \div (\surd((pe * qe) * ((N_1 + N_2) \div (N_1 * N_2)))$.

You need a "Z" value of plus/minus 1.960 to be significant at the 0.05 level.

You need a "Z" value of plus/minus 2.576 to be significant at the 0.01 level.

You need a "Z" value of plus/minus 3.291 to be significant at the 0.001 level.

Education Group	Terms	Architect	Doctor	Engineer	Fireman
Basic Education	N1	141	141	141	140
	p1	.241	.759	.369	.393
	n1	34	107	52	55
Advanced Education	N2	1217	1217	1217	1217
	p2	.27	.54	.34	.56
	n2	329	657	414	682
	p (expected)	.2673	.5625	.3431	.5431
	q (expected)	.7326	.4374	.6568	.4568
Real Z		**-.74**	**4.96**	**.69**	**-3.76**

Education Group	Terms	Military Officer	Nurse	Police Officer	Priest/minister/ clergyman
Basic Education	N1	139	140	139	140
	p1	.36	.264	.338	.336
	n1	50	37	47	47
Advanced Education	N2	1217	1217	1217	1217
	p2	.49	.5	.4	.36
	n2	596	609	487	438
	p (expected)	.4764	.4760	.3938	.3574
	q (expected)	.5235	.5239	.6061	.6425
Real Z		**-2.91**	**-5.29**	**-1.42**	**-.56**

Education Group	Terms	Scientist	Teacher
Basic Education	N1	140	140
	p1	.457	.371
	n1	64	52
Advanced Education	N2	1217	1217
	p2	.56	.47
	n2	682	572
	p (expected)	.5497	.4598
	q (expected)	.4502	.5401
Real Z		**-2.32**	**-2.23**

Appendix D: Independent Samples Test. Comparing education level of parents.

Items that are significant at a .05 level are in bold under column "Sig. (2-tailed)".

Subject		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Diff.	Std. Error Diff.	95% Confidence Interval of the Difference Lower	Upper
Art	Equal Variances assumed	0.819	0.367	0.101	136	0.92	0.015	0.148	-0.278	0.308
	Equal Variances not assumed			0.101	135.792	0.92	0.015	0.148	-0.277	0.307
Band	Equal Variances assumed	0.007	0.963	0.289	138	0.773	0.033	0.114	-0.193	0.259
	Equal Variances not assumed			0.289	137.032	0.773	0.033	0.114	-0.193	0.259
Choir	Equal Variances assumed	0.336	0.563	0.365	137	0.715	0.04	0.111	-0.178	0.259
	Equal Variances not assumed			0.364	133.974	0.716	0.04	0.111	-0.179	0.26
Family and Consumer ed.	Equal Variances assumed	0.501	0.48	2.683	138	**0.008**	0.382	0.142	0.1	0.663
	Equal Variances not assumed			2.691	137.944	0.008	0.382	0.142	0.101	0.662
Foreign Language	Equal Variances assumed	0.876	0.351	0.15	137	0.881	0.019	0.127	-0.232	0.27
	Equal Variances not assumed			0.151	136.804	0.88	0.019	0.126	-0.231	0.269

Subject		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Health	Equal Variances assumed	0.032	0.858	2.378	134	**0.019**	0.336	0.141	0.057	0.616
	Equal Variances not assumed			2.386	133.952	0.018	0.336	0.141	0.057	0.615
Language Arts	Equal Variances assumed	2.562	0.112	0.802	136	0.424	0.102	0.128	-0.15	0.354
	Equal Variances not assumed			0.804	135.866	0.423	0.102	0.127	-0.149	0.354
Math	Equal Variances assumed	1.218	0.272	-0.638	136	0.525	-0.063	0.099	-0.259	0.133
	Equal Variances not assumed			-0.64	136	0.523	-0.063	0.099	-0.258	0.132
Physical Education	Equal Variances assumed	0.029	0.865	2.017	136	**0.046**	0.27	0.134	0.005	0.534
	Equal Variances not assumed			2.015	133.797	0.046	0.27	0.134	0.005	0.534
Reading	Equal Variances assumed	0.65	0.421	-0.485	138	0.628	-0.055	0.114	-0.281	0.17
	Equal Variances not assumed			-0.486	137.724	0.628	-0.055	0.114	-0.281	0.17
Science	Equal Variances assumed	1.671	0.198	0.032	137	0.975	0.003	0.105	-0.204	0.211
	Equal Variances not assumed			0.032	135.432	0.975	0.003	0.104	-0.203	0.209

Subject		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Social Studies	Equal Variances assumed	1.419	0.236	0.641	138	0.523	0.08	0.125	-0.167	0.327
	Equal Variances not assumed			0.642	137.667	0.522	0.08	0.125	-0.166	0.326
Technology Education	Equal Variances assumed	1.609	0.207	2.079	138	**0.039**	0.289	0.139	0.014	0.563
	Equal Variances not assumed			2.088	137.974	0.039	0.289	0.138	0.015	0.562
Industrial Arts	Equal Variances assumed	0.126	0.723	1.009	136	0.315	0.121	0.12	-0.116	0.357
	Equal Variances not assumed			1.008	133.455	0.315	0.121	0.12	-0.116	0.358
Industrial Technology	Equal Variances assumed	0.052	0.82	0.148	137	0.882	0.019	0.127	-0.233	0.271
	Equal Variances not assumed			0.148	135.707	0.882	0.019	0.127	-0.233	0.271
Pre-Engineering	Equal Variances assumed	0	0.987	-0.842	136	0.401	-0.104	0.123	-0.347	0.14
	Equal Variances not assumed			-0.844	135.785	0.4	-0.104	0.123	-0.346	0.139

Subject		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Shop	Equal Variances assumed	3.42	0.067	1.674	136	0.096	0.208	0.124	-0.038	0.454
	Equal Variances not assumed			1.686	135.125	0.094	0.208	0.124	-0.036	0.453
Technology and Engineering	Equal Variances assumed	0.631	0.428	0.561	137	0.576	0.073	0.131	-0.186	0.333
	Equal Variances not assumed			0.562	136.296	0.575	0.073	0.131	-0.185	0.332