

A Study Comparing Seventh- and Eighth-Grade Wittenberg and Birnamwood
Middle School Students' Perceptions of High School Math and Science Credits
Needed for Admissions to Postsecondary Education

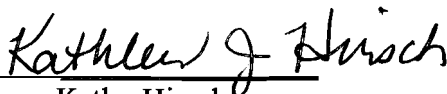
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Jill Lewis

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Kathy Hirsch

The Graduate School
University of Wisconsin-Stout

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**The Graduate School
University of Wisconsin-Stout
Menomonie, WI**

Author: Lewis, Jill M.

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ABSTRACT

Not all high schools require math and science classes that meet college admission requirements. The result is students who are not adequately prepared to attend college and lack knowledge for 21st century careers that are requiring more advanced math and science skills. Until higher mandates exist, it will be important to teach youth the link between high school courses, postsecondary education, and careers. The Educational Talent Search (ETS) program in the Wittenberg-Birnamwood school district examined how effective this approach was by comparing 7th-grade students who had little exposure to career awareness to 8th-grade students who had completed a career awareness curriculum. Results indicated that significantly more 8th grade students realized the need to take more math and science classes. In addition, females were more aware of the need for more additional math and science courses and, overall, students were more aware of

needing additional math than the need for additional science. The researcher recommends that ETS continue with the program at the 8th-grade level and expand into greater depths at the high school levels to keep students on track for taking the essential math and science credits needed to succeed in postsecondary education and careers.

The Graduate School
University of Wisconsin Stout
Menomonie, WI
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Chapter I: Introduction

A coach readily prepares players by having them exercise to reach top physical form and by showing the team strategic play options so the team has optimal opportunities to win games. Educators, like coaches, should be preparing students to reach top mental form by having students select courses that will prepare them for life after secondary education.

Not all Wisconsin high schools are implementing strategies to prepare students for postsecondary education and careers. Wisconsin math and science mandates for high school graduation requirements are rapidly falling behind those of other states. In Wisconsin Governor Jim Doyle's 2005 State of the State Address, he commented,

Wisconsin - unlike most other states - requires only two years of math and science in high school. In fact, we're in the bottom 13 states in math and science requirements. Our high school requirements are not even high enough to meet the basic standards for incoming freshmen at the University of Wisconsin. The world has changed, and so has the job market. It is time our schools changed with them. ("Governor Doyle's," 2005, para. 38).

When students are given options of selecting less rigorous core math and science classes, they may not realize the correlation between taking minimum credits and the limitations imposed on their options for continuing into postsecondary education and future careers. Students who attend high schools that require three to four math or science credits to graduate ultimately have a large advantage in postsecondary career options. Conversely, those high schools that require only two credits of math and science may be limiting students' postsecondary options and career choices. Students may not realize

early enough in their high school years that they need more rigorous courses in math and science to plan for postsecondary options.

The Wittenberg-Birnamwood School District is one example of a Wisconsin high school that requires the minimum state mandates of math and science for graduation requirements. According to the Wittenberg-Birnamwood Handbook (2006), students need two credits of science (general science and biology) and two credits of math (General Math, Algebra IA and Algebra IB, Algebra I, Algebra II, Algebra IIB, or Consumer Math) to graduate from high school. This means that a Wittenberg-Birnamwood high school senior can fall short by two credits of math and one credit of science to meet most postsecondary education enrollment requirements. Completing two science credits and basic Algebra I inadequately prepares Wittenberg-Birnamwood students for some types of future postsecondary education and careers. Students who do not make postsecondary education decisions until later in their junior or senior year may be limited from furthering their education if they have not selected appropriate math and science courses.

According to President Bush's Executive Summary, over 60% of new jobs in the 21st century will require postsecondary education, yet only one-third of America's workforce will obtain the additional schooling needed for these jobs (The White House, 2004a). Both blue and white collar jobs are now requiring employees to be skilled in math and science (Jones, 2006). Wittenberg-Birnamwood students need additional core math and science credits if they are going to pursue postsecondary education options and compete in the future job market.

Since 1996 the Wittenberg-Birnamwood school district had been involved with the University of Wisconsin-Stout's federally funded TRiO Educational Talent Search

(ETS) program. ETS was developed specifically for 5th- to 12th-grade students in high population areas of first generation and low-income schools to increase enrollment into postsecondary education. Over the last eleven years, the ETS program has tailored its services to meet the needs of the Wittenberg-Birnamwood school district. Recently, a career awareness curriculum program was designed for eighth-grade students to increase knowledge of the need for postsecondary education.

Using ETS' career awareness curriculum to increase the knowledge of Wittenberg and Birnamwood's eighth-grade students could be one way to facilitate students' plans for taking additional high school math and science. Increasing student enrollment in more math and science courses may better prepare them for postsecondary education and help them consider more career choices.

Statement of the Problem

Wisconsin high schools do not mandate necessary core credits in math and science to adequately prepare students for postsecondary education and career options. The Wittenberg-Birnamwood school district is one high school requiring only two credits of math and two credits of science to graduate. Students from Wittenberg Middle School and Birnamwood Middle School may be unaware of career options and the minimum requirements of math and science to attend postsecondary education in Wisconsin.

Purpose of the Study

The purpose of this research is to determine if the ETS program is effectively increasing Wittenberg and Birnamwood eighth-grade students' knowledge, awareness, plans and reasoning for future selection of math and science high school courses than what is currently required to meet Wittenberg-Birnamwood High School graduation

standards. Additionally, this research will compare the difference between seventh- and eighth-grade students from Wittenberg and Birnamwood schools in their knowledge of the need for additional high school math and science courses to pursue postsecondary education. In February 2007, a survey will be given to Wittenberg and Birnamwood seventh-grade students who had little or no exposure to career and awareness courses delivered by the ETS program. The same survey will be given to Wittenberg and Birnamwood eighth-grade students who received the career awareness courses delivered by the ETS program. The survey will be compared and analyzed to determine if students understood and plan to take additional core math and science courses in high school based on their increased knowledge of postsecondary education and career options.

Objectives of the Study

The objectives of this study are:

1. To determine the perceptions of Wittenberg's and Birnamwood's seventh- and eighth-grade students for the amount of high school math and science courses needed for postsecondary education.
2. To determine the percentage of students with career plans that will require postsecondary education.
3. To compare Wittenberg and Birnamwood seventh- and eighth-grade students' knowledge for additional math and science courses for enrollment in postsecondary education.
4. To determine if the ETS program is effectively increasing eighth-grade Wittenberg and Birnamwood students' awareness of the need for selecting more math and science courses than the amount currently mandated by the

Wittenberg-Birnamwood school district to meet the graduation requirements.

5. To determine the reasons seventh- and eighth-grade Wittenberg and Birnamwood students are choosing to take more high school math and science credits than what is required for meeting the Wittenberg-Birnamwood high school requirements.
6. To determine how much career education has increased the knowledge of Wittenberg and Birnamwood's eighth-grade students compared to seventh-grade students who have not yet been taught the various career education tools.
7. To compare perceptions between boys and girls.

Definition of Terms

The following definitions of terms aid the reader to understand the specific meaning of words used in this research plan.

Career awareness tools. Career awareness tools are the curriculum developed and software programs used by ETS to teach students about the matches of their interests to careers and the various skill and education levels needed to obtain those particular careers.

College core preparation courses. These are the math, science, English, and social studies credits required to be completed by a high school student before they can apply to a Wisconsin University (Higher Education Location Program, 2006).

Core curriculum state mandates. Mandates of core curriculum state high school graduation standards as of September 1, 1988 until the present are termed by Wisconsin Department of Public Instruction (2005) as the following:

A board may not grant a high school diploma to any pupil unless the pupil has: (a) Earned a minimum of 12.5 credits in grades 9 to 12 as follows: Four credits of English. Three credits of social studies. Two credits of mathematics which incorporate instruction in the properties, processes, and symbols of arithmetic and elements of Algebra, geometry, and statistics. Two credits of science which incorporate instruction in the biological sciences and physical sciences. One and a half credits of physical education. (p. 1)

Disadvantaged youth. A disadvantaged student is one who is either considered low-income or a potential first-generation college student (U.S. Department of Education, 2007).

Educational Talent Search (ETS). ETS identifies “qualified youths with potential for postsecondary education, encourage[s] them to complete secondary school and to enroll in postsecondary education programs” (U.S. Department of Education, 2007, para. 1).

First-generation college student. “A first-generation college student is one whose parents or guardians did not receive a baccalaureate degree” (U.S. Department of Education, 2002, p. 6).

Graduation requirements. Courses required by a high school student to complete before receiving his/her high school diploma (Wittenberg-Birnamwood School District, 2006).

Low-income participant. “A low-income participant is one whose family’s taxable income was less than 150% of the federal poverty level amount. The U.S. Department of Commerce, Bureau of the Census, sets guidelines to determine the definition of poverty level” (U.S. Department of Education, 2002, p. 6).

Trends in International Mathematics and Science Study (TIMSS). According to the U.S. Department of Education (2006), “TIMSS provides reliable and timely data on the mathematics and science achievement of U.S. students compared to that of students in other countries. TIMSS data has been collected in 1995, 1999, and 2003” (para. 1).

Assumptions of the Study

There are four assumptions of this study:

1. Students will give honest perceptions about their plans for taking additional math and science courses.
2. Seventh-grade students are naïve in their knowledge about core curriculum requirements for postsecondary education.
3. Students have the learning aptitude and ability to take higher level math and science courses.
4. The career assessment tools used are valid and updated in their information about needed core math and science credits for postsecondary education and career options.

Limitations of the Study

Limitations of this study include:

1. The survey instrument used for this research does not have reliability or validity statistical information.

2. Students' opinions about math and science core curriculum needs for postsecondary enrollment are influenced by their peers, parents, teachers, and guidance counselor.
3. Students may be influenced by peer pressure to state they are going to take more math and science credits when it is not their intention.
4. The researcher is well known to the students which may cause students to answer the survey in a manner they think the researcher wants to read.
5. The study is limited to only Wittenberg and Birnamwood students.

Chapter II: Literature Review

This chapter includes discussion of the impact in differing math and science requirements between schools at the national level and the variation of those requirements within the state of Wisconsin. This chapter will then concentrate on the impact of low math and science core requirements for postsecondary education and future careers as well as the aspects of future jobs' financial and security outlooks. It will conclude with the importance of using career assessment tools to increase awareness and selection of more math and science credits and the role of the ETS program.

National Impact

America is in a quiet crisis because too many high schools are not demanding enough essential math and science skills to adequately prepare students for life (Jones, 2006). Laura Tomaka (2006), senior program manager for the Council of State Governments Midwestern Office, stated "Research shows students' skill level of math and science in the fourth grade are among the highest ranking at an international level" (p. 1). However, by the time these students reach their senior year of high school, they rank almost at the very bottom in both math and science. Many researchers attribute the lower skill levels of math and science abilities to the lack of rigor in school curricula and waning student interest.

Not all high schools have math and science deficiencies due to lacking rigor in math and science curriculum graduation requirements (Jones, 2006). Nationally, math and science standard credits for high school graduation range from two to four credits. Only eight states mandate college prerequisites be completed through all four core course subjects of English, social studies, math, and science. The remaining states vary between

two to three credits of science and math. Math becomes a further concern because in many high schools, students can take a lesser math or take basic Algebra over two years. This earns them the two credits needed for graduation, but only one of three qualifying credits toward college math prerequisites.

Students need to balance the value of a high school diploma in terms of postsecondary education so career options can become a reality for all. Research conducted by the U.S. Department of Education plainly shows that the single biggest predictor of college success is the quality and intensity of a student's high school courses (Barth, 2004). Math scores have shown significant relationships between high school courses and college success. High school students who complete math higher than Algebra II are twice as likely to enter and earn a college degree, than those students who take lower level math courses (Adelman, 1999). Research from the Trends in International Math and Science Survey found that 83% of students who took math credits beyond Algebra I and geometry and nearly 89% of students who took chemistry went on to college, compared to only 36% of those students who did not take additional math and science credits (U.S. Department of Education, 2006).

In the last decade, there has been an increase of enrollment in college core preparation math and science courses, but the increase is far from being evenly distributed between states' high school requirements (Barth, 2004). While some states require their high schools to take education to a college preparation level, there are many more not getting their students to a college readiness level. "Ultimately we must prepare all young people for success because it is the right thing to do. Despite decades of effort, our country has been unable to conquer the inequities that divide us as Americans"

(Barth, 2004, p. 17). When schools are allowed to graduate students with one basic math and two science credits, the unbalance for students is not just in education, but in an entire future. To help ensure students are suitably prepared, states can make certain that the high school curriculum has universally rigorous standards and that these standards align with college and work expectations (National Governor's Association, 2005).

As the U.S. Department of Education addresses the issue of increasing math and science at the national level, individual states, like Wisconsin, need to consider what steps they must take to reduce individual school district's discrepancies of math and science requirements (Achieve, 2006). By increasing Wisconsin's state protocol of requiring college readiness math and science credits for graduation, schools will offer a more level playing field of their students' potential and futures.

Wisconsin Impact

In 2002, Wisconsin ranked second in the nation (along with North Dakota and Illinois) for the percent of students graduating from high school (Achieve, 2006). While this is a ranking to be proud of, it does not accurately reflect college or career readiness due to the low standards of math and science courses required by most Wisconsin school districts. Currently, Wisconsin mandates that schools require only two credits of science (physical and biology) and two credits of math (general, basic, pre-algebra, Algebra, I, II, or III, geometry, calculus, or trigonometry; Wisconsin Department of Public Instruction, 2005). Institute for Policy researchers Greene and Winters (2005) wrote, "While everyone would rather the graduation rate be a full 100%, most would be willing to call an 85% graduation rate tolerable. Unfortunately, this statistic does not square with reality" (p. 4). The frightening truth is that while students in Wisconsin are adequately

obtaining their diplomas, the worthiness of that document can be significantly devalued if the student has not elected to take enough math and science courses (Dounay, 2006b).

A further look at state comparisons shows that while Wisconsin high schools are graduating almost 85% of its seniors, it ranks near the bottom in its pre-college core curriculum math and science requirements. Philip McDade (2006), a school board member and research writer for the Wisconsin Policy Research Institute, was asked to examine learning gaps among high school students in Wisconsin. In his report to Wisconsin Policy Research, McDade stated that

State statistics from 2003-2004 show that less than a third of the state's districts with high schools required their students to take more than two years of credits in mathematics; barely a fifth of them required their students to take more than two years of science. (p. 18)

Wisconsin Policy Research Institute President, James Miller, is also concerned about the impact of having lower state mandates for math and science. Miller states, "Wisconsin now requires 1.5 years of physical education, but only 2 years of math and science. We suspect that this is probably not the best policy to be internationally competitive in the twenty-first century" (McDade, 2006, p. ii). Increasing the state mandates of math and science curriculum would be one way to close the achievement gaps between Wisconsin's higher and lower tiered school districts.

There are a number of schools that do not go above the minimum state mandate. This data is shown in Table 1 which details the breakdown of credits for graduation requirements in math and science credits based on the 379 high schools in Wisconsin (Wisconsin Department of Public Instruction, 2004).

Table 1

Wisconsin's High School Graduation Requirements for Math and Science

Wisconsin High							
School Course	2.0 credits		2.5 credits		3.0+ credits		
Requirements	Frequency	%	Frequency	%	Frequency	%	
Math	276	73%	10/379	3%	93/379	24%	
Science	302	80%	09/379	2%	68/379	18%	

Table 1 shows that 76% of the high schools in Wisconsin are not mandating the three credits of math required for admission to any of the University Wisconsin Colleges.

Additionally, over 80% of the Wisconsin high schools are not mandating the three credits of science that is also required to meet admissions. Should high school students decide not to take math or science beyond their high school requirements, the majority of Wisconsin's graduates would not be able to gain entrance to the state colleges.

Furthermore, students electing not to pursue additional math and science become limited in which programs they are eligible to take at technical colleges.

Wisconsin is not adequately preparing all its high school students to attend Wisconsin colleges. Currently, all Wisconsin colleges require a minimum of three credits in math (counting only Algebra 1 and above as a credit) and three credits in science for college entrance (Higher Education Location Program, 2006). Many technical schools are also requiring three math and science credits for a large majority of their health and technical programs (U. S. Department of Education, 2000). Only 34% of Wisconsin high school graduates require the actual high school credits to enter a four year college degree.

This figure is relatively low when 85% of students are graduating from high school (Achieve, 2006). It is alarming that over 50% of Wisconsin high school students are graduating without enough math and science credits to even attend their own state college. While there are numerous reasons that students choose not to pursue postsecondary education, having poor college preparation courses should not be one of those contributing factors (Barth, 2004).

Since 1988, Wisconsin high school mandates for math and science credits have not changed and, unlike many other states, there are no clear directives, programs, or plans in place to make the necessary changes for increasing math and science courses. Colleges and the workforce have seen significant increases in the need for higher math and science skill levels in both the blue and white collar level jobs (Achieve, 2006). If Wisconsin plans to compete in the ever evolving technology of education and careers, they will need to increase college readiness in their high schools' requirements of math and science.

Careers and Postsecondary Education Impact

It is becoming imperative that the application of math and science disciplines be used to solve real-world problems, and the comprehension to use technology as a tool is at the foundation of our economic future as a nation and as an individual's personal opportunities (U.S. Department of Education, 1998). In 1995, the Trends in International Mathematics and Science Study found that thousands of applicants were being turned down for factory jobs because they lacked the necessary high school math and science skills to keep up with the advanced technological changes in many of today's manufacturing and industrial businesses. Additionally, Crosby and Moncarz (2006)

projected in Occupational Outlook Quarterly that high school graduates looking for jobs from 2004-2014 will probably need training beyond a high school diploma, particularly if they want a job with high pay. This is partially due to the largest job growth being in technology and health field areas.

Careers demanding employees to have comprehensive math and science skills are at an all time high (The White House, 2004b). The U.S. Department of Education (1998) commented on the Trends in International Mathematics and Science Study,

In our knowledge-based economy, demands for skills in mathematics, science, and technology are continually increasing. Many jobs that once called for little background in mathematics, science, and technology in manufacturing, the service industry, and other areas now require higher-level skills -- people who can read technical manuals, handle a spreadsheet, and solve complex problems.

Already, businesses are facing worker shortages that are affecting their growth in key sectors like information technology. Manufacturers surveyed believe that 40 percent of all 17-year-olds lack the mathematics skills to hold down a production job in manufacturing. (p. 1)

The changes in workforce due to the technological boom mean that workers will need even sharper skills in math and science. Businesses are desperate for skilled workers to fill many available positions, but they struggle to find qualified employees due to the poor math, science, and technological abilities of many high school graduates (Barth, 2004). Barth states that almost half of all the economic growth in the United States will result directly from research in science and technology. America's current education system is not requiring or producing the intellectual capital necessary to secure future

generations of scientists and engineers (Achieve, 2006). Major concerns are arising in the education system as foreign countries like China and India continue to advance in their abilities to move technologically forward. If America can not provide employees for jobs that demand higher math and science skills, they will be replaced. The result could cost Americans their edge in the world, financially, competitively, and in security (Jones, 2006). The world rapidly continues to advance in technology globally, nationally and statewide. This rapid technical advancement requires updating of skills and knowledge in the math and science aptitudes of America's high school students.

Financial and Job Security

There are substantial payoffs in the current job market for those with more years of education (Barth, 2004). According to Postsecondary Education Opportunity (2006), the 2004 average yearly wage for those holding only a high school diploma was \$31,075. People holding an associate degree averaged \$38,597 per year. Those holding a bachelor's degree averaged \$50,394 per year. "Simply, the more you know, the more you earn" (Barth, 2004, p. 18). Students who do not have enough math and science courses can not go on for schooling, thus, they will find it increasing difficult to obtain adequately paying jobs to provide them with personal financial security.

Unemployment rates are also correlated to the amount of education. In 2005, the population with only a high school diploma had a 4.7% unemployment rate, those with an associate degree had a 3.3% unemployment rate and those with a four-year degree found a 2.6% unemployment rate (Postsecondary Education Opportunity, 2006). Higher levels of education provide increased job security. Jennifer Dounay (2006a), project manager for Education Commission of the State wrote, "A growing number of studies are

suggesting that all students need to complete some postsecondary education - be it technical certification, an associate's degree, a bachelor's degree or beyond - to be prepared for the majority of jobs of the 21st century" (para. 1).

The gap between levels of education, finances, and job security will continue to grow as technology increases. Higher math and skill requirements are found not only at the top of the career ladder but also at bottom (Barth, 2004). If school systems were more effective in producing kids with bachelor's degrees in science and math, more of them would be competitive for the best paying high tech jobs. Taking the postsecondary math and science requirements in high school will have a direct impact on the future job security of students. State policy makers are becoming aware of the future workforces that will need a completed college degree, thus implanting college readiness will need to continue as a common practice for all states (Dounay, 2006a). Until the graduation requirements of math and science are raised for all students, creating awareness through educating students must become a priority. One way to get students aware of the impact and need for further education is through the use of career assessment tools.

Usefulness of Career Assessment and Awareness Tools

Most students expect they will go on for postsecondary education but the fact remains that many do not know what kind of preparation it will take. While 80% of high school students expect to complete a college education, less than a third will actually make it (Dounay, 2006a). Career assessment helps to inform students of the high school courses needed to meet college expectations. There are numerous kinds and types of career assessment tools available. While the career assessment approach may vary, the thought behind using career assessment is to educate a person about matches between

their interests and the many existing occupations. Planning for Life project director, Carol Dahir states: "Career planning establishes a focus for achievement and helps middle-level students identify the strategies and tasks necessary to achieve their goals" (2001, para. 3). The sooner students link their goals to career pathways, the more motivated they will become in choosing appropriate high school courses. Creating a career plan through assessments and education will serve as a guide for students in their academic preparation and the education and/or training that will be needed during and after high school. As students gain understanding of the preparation needed for specific careers, they may begin to consider the role that postsecondary education and training could play in their futures.

Creating awareness of middle school students for the needs of additional high school math and science credits is also crucial to the success of students in obtaining postsecondary education. In his article "Career Linking," University of Wisconsin-Milwaukee professor, Nadya Fouad, wrote, "One major concern is that by the time students reach high school, decisions have already been made regarding math and science preparation, decisions that are difficult for students to remediate" (1995, para. 10). Several issues must be addressed at the middle school level to increase the likelihood of influencing career aspirations effectively. If awareness is not created by ninth grade, it could be too late for students to change their attitude and aptitudes of their math and science skills. Awareness through self-concept, career perception choices, and appropriate core courses must begin early to effectively influence career aspirations. To encourage students to make informed decisions, middle schools must introduce career

awareness, such as the concept that success in most careers requires education and training.

Role of Educational Talent Search (ETS) Program

Research shows high school students' career decisions and exploration of career alternatives generally tends to be restricted within the boundaries imposed by socioeconomic status, parents' educational and occupational attainment, cultural background and the limited experiences of students' families and friends (Career Institute for Education and Workforce Development, 2002). The ETS program was developed to help with some of these issues by concentrating on individuals and school districts with a high percentage of disadvantaged youth. ETS is a federally funded TRiO program that helps participants coming from low-income and/or first-generation families who have the ability to succeed in higher education (U.S. Department of Education, 2007). By providing projects and services such as career exploration; information on postsecondary education; and counseling on academic, financial and college admissions, the ETS program helps youth realize their abilities and find the ways to access education beyond high school.

ETS helps disadvantaged students become their own advocates in obtaining postsecondary education. Many students in the ETS program are first generation youth which means the majority of them come from families that have little or no parental experiences with collegiate environments (U.S. Department of Education, 2007). The fact that only one in three students complete a college degree is partially attributed to the troubling gap between educational aspirations and what families need to do to achieve those expectations. While it is often the parental intent and belief that their child needs to

and will go on for college, parents that have not obtained a degree themselves have a much higher frequency of children that do not enter postsecondary education (Dounay, 2006c). Simply put, parents and students that lack the experiences often lack the knowledge of what needs to be done at the secondary levels of schooling to obtain postsecondary education. One way ETS helps students obtain this goal is to ensure they are aware of the selected courses needed at the high school levels for gaining postsecondary education.

Starting early with the middle school levels and adequately addressing the career development for students in disadvantaged environments is another way the ETS program is working to build academic performance, facilitate high school completion, and encourage postsecondary education (U.S. Department of Education, 2002). This service becomes especially important if the school district being served by the ETS program falls short in its graduation requirements for meeting many college entrance requirements. By educating students through the use of career tools and awareness, the ETS program helps youth facilitate better preparation through course selection at the high school level.

Chapter III: Methodology

Subject Selection and Description

Subjects were selected using the cluster method selection process. They were selected from the seventh and eighth grade middle schools of the Wittenberg-Birnamwood school district. Both male and female participants were asked to participate. There were 112 students in the seventh-grade level and 118 students in the eighth-grade level. These numbers of students allowed for an ample pool of participants. Subjects selected for the survey were from two different schools and two grade levels in the Wittenberg-Birnamwood school district. Of the 112 seventh-grade students, 84 students participated in the survey, 45 from Birnamwood Middle school and 39 from Wittenberg Middle school. Of the 118 eighth-grade students, 72 students participated in the survey, 38 from Birnamwood Middle School and 34 from Wittenberg Middle School.

The subjects were selected because of the school district's current low standard requirements in math and science core curriculum college preparation. The school was also chosen because of its high population of first-generation and low-income families. In addition, this school district was chosen because it has been involved with the ETS program for the past 18 years.

Instrumentation

The one page paper survey of 10 questions was created specifically for this research project, therefore, no measures of validity and reliability were documented. The data collected was nominal using multiple choice, yes/no, true/false, and one fill in the blank question. A copy of the finalized survey is located in Appendix E. The survey was

approved by University of Wisconsin Stout's Institutional Review Board on February 15, 2006.

Data Collection Procedures

Middle school principals, seventh- and eighth-grade teachers, guidance counselors, and the administrative staff from Wittenberg and Birnamwood were contacted by letter and phone to seek approval for implementation of the survey during class time. A copy of the consent form, survey and a detailed letter explaining the research was sent to each of the participating schools and signed approval was received from the superintendent and principals of Wittenberg and Birnamwood Middle Schools (see Appendix A).

A letter explaining the survey was given to all middle school teachers to help ensure cooperation and to minimize teachers giving students answers to survey questions (see Appendix B).

The cluster sample of seventh- and eighth-grade students were minors, therefore a consent form was sent home requesting parental permission to do the survey (see Appendix C). Students were verbally instructed to return consent forms to their homeroom and/or science teachers. Parents also had the option of mailing back the consent form through an attached envelope. A checklist of the names of students who had returned signed consent forms was kept by the teachers giving the survey.

Specific directions for administration of the survey were given to the teachers to facilitate common dispersion of the survey (see Appendix D). Student surveys (see Appendix E) were completed during class for those students who had returned the parental consent form. The option of either free reading or doing a word search puzzle

was given to those students who chose not to participate in the survey. Surveys were color coded to differentiate between grade levels, gender and schools. On March 1, 2007, students were given 10 minutes to complete the survey during class time. The survey was collected by the teacher and mailed back in preaddressed envelopes provided by the researcher.

Data Analysis

The Statistical Program for the Social Sciences (SPSS), version 12.0, was used for data analysis. All appropriate descriptive statistics of frequencies and percentages were run and used to interpret the data. The interpretation of the data was descriptive in nature, comparing the percentages and frequencies and range of scores once the independent variable of the career assessment and course selection tools were administered. Mode central tendencies were used to interpret the nominal and ordinal data. Descriptive statistics, frequencies, Pearson correlations, and t-tests were run.

Limitations

One limitation of the sample population was that only Wittenberg-Birnamwood students participated in the research. Another limitation was that participants knew the researcher and could provide responses that they thought the researcher wanted. An additional limitation was that students may guess at answers instead of acknowledging what they really know about the need for math and science credits for postsecondary education and jobs. Limitations were also present because the instrument used had no measures of validity or reliability. Also, the study will not be able follow up on the participants to validate students' intentions of taking additional science and math during their high school years.

Chapter IV: Results

Introduction

This chapter documents the demographic information, item analyses, major study findings, and correlations of significant levels between the survey variables as they relate to the research objectives.

Demographic Information

The participants in this survey were minors thus parental consent forms were sent home with 230 potential seventh- and eighth-grade students from the Wittenberg and Birnamwood Middle Schools. Of the 230 consent forms, 156 (68%) were returned. There were no incomplete surveys; therefore, all 156 surveys were usable.

The first survey question asked about gender. According to the responses, there were 73 (47%) male students and 83 (53%) female students. Wittenberg Middle School had 73 (47%) responding participants and Birnamwood Middle School had 83 (53%) responding participants. There were 84 (54%) students from the seventh grade and 72 (46%) from the eighth grade.

Item Analysis

The second survey question asked if taking two years of math from Wittenberg-Birnamwood High School was enough to attend Wisconsin colleges. Ninety (58%) knew the correct answer was false while 64 (42%) answered "true" incorrectly or were unsure of the correct answer.

The next question asked if taking two years of science from Wittenberg-Birnamwood high school was enough to attend Wisconsin colleges. Seventy-nine (51%)

knew the correct answer was false while 77 (49%) answered “true” incorrectly or were unsure of the correct answer.

The fourth question of the survey asked if participants plan to take more than the required two years of math. There were 113 (72%) students planning to take more than two years of math, while 43 (28%) were unsure or did not plan to take math beyond the high school requirements.

The fifth question asked the reasoning for taking more math from the 113 students who responded yes to question four (multiple choices could be selected). Of the 113 students who responded yes, 43 (38%) marked they liked math, 44 (39%) marked being good at math, 80 (71%) selected taking more because they needed it to attend college.

Question survey number six asked to find out if students plan to take more than the required two years of science. Of the 156 participants, 151 chose to answer this question. There were 87 (58%) students that checked yes, indicating that they plan to take more than two years of science and 64 (42%) checked they were unsure or not planning to take more science than what was required.

The seventh survey question asked the 87 students for the reasons they were planning to take more science (multiple choices could be selected). Forty-four (51%) plan to take it because they like it, 27 (31%) plan to take more science because they are good at it, and 52 (60%) are planning to take more science because they will need it to go on for college.

Question eight on the survey was given to determine where students are finding out their information regarding the amount of math and science classes they need to get

into college (multiple choices could be selected). The results were tabulated based on 154 of 156 participants that responded and appear in Table 2.

Table 2

Resources for Determining Math and Science Classes Needed for College

Source	Frequency	Percent
Stout Lady	93	60
Teacher/Counselors	36	23
Family	37	24
Not sure	21	14
Never told	25	16

The ninth question on the survey asked students if learning about careers has helped them understand the need for education after high school. Due to the high percentage (94%) of students that responded yes, this question will not be used for analysis as it was misleading and therefore has no discernable impact to this research.

The final question was a fill in the blank asking students about their career or job choice interests. The data was then broken down by yes, no, or not sure and tabulated based on the need for postsecondary education to obtain that particular career choice. Of the 156 participants, 154 filled in their choice and the results were as follows: Careers requiring postsecondary education were at 106 (69%), 41 (27%) show interest in careers that do not require postsecondary education and 7 (4%) were not sure of their career choice.

Research Objectives

The overall purpose of this research was to determine if the ETS program was effectively increasing eighth-grade Wittenberg and Birnamwood students' knowledge, awareness and plans for taking enough high school math and science credits for future postsecondary education enrollment. Students in seventh grade who had not yet been taught the ETS career awareness were compared to the eighth-grade students who had received the career awareness tools. Comparison and relevant significance of the data is discussed below with each of the research objectives.

Research Objective One. The first research objective was to compare the perceptions of Wittenberg's and Birnamwood's seventh and eighth-grade students for the amount of high school math and science courses needed for postsecondary education. Questions two and three dealt with this objective as it relates to grade levels. The results indicated that 33 (37%) seventh graders and 57 (63%) eighth graders perceived the correct answer to be false, knowing that they needed more math to attend Wisconsin colleges. For student knowledge about the need for more science to attend Wisconsin colleges, 26 (33%) seventh graders and 53 (67%) eighth graders answered the question correctly. According to the Chi-Square tests, significant differences were determined between the seventh- and eighth-grade perceptions ($\chi^2 = 31.28$, $p < .001$ for math and $\chi^2 = 31.75$, $p < .001$ for science). Twenty-six percent more eighth graders than seventh graders knew the correct answer for how much math was needed to enter Wisconsin colleges. For science, 34% more eighth-grade students knew how much science was needed to gain entrance to Wisconsin colleges.

Research Objective Two. The second objective was to determine the percent of students with career plans that will require postsecondary education. Survey question 10 relates to this question. Table 3 compares these items.

Table 3

Career Plans Needing Postsecondary Education

Student Response	Yes		No		Unsure	
	Number	Percent	Number	Percent	Number	Percent
<i>Careers Needing</i>						
Postsecondary	106	69%	41	27%	7	4%

Research Objectives Three, Four and Five. These objectives will be discussed together because they share significance with survey items four, five-C, six and seven-C as it relates to grade level and choice of taking additional math and science for purpose of college admission. Objective three was to compare Wittenberg and Birnamwood seventh- and eighth-grade students' knowledge for additional math and science courses for postsecondary education enrollment. Objective four was to determine if the ETS program has been effective in increasing eighth-grade students' awareness to select more math and science courses than the amount currently mandated by Wittenberg-Birnamwood school district. Objective five was to determine the reasons seventh- and eighth-grade students are planning to take more high school math and science credits than what is required for graduation from Wittenberg-Birnamwood High School. The relationship of these survey questions is displayed in Table 4 followed by a discussion of the significant levels.

Table 4

Students' Plans to Take More High School Math and Science

Grade Level	Plans to take more high school math		Taking high school math for college		Plans to take more high school science		Taking high school science for college	
	N	%	N	%	N	%	N	%
Seventh Grade	54	64%	26	48%	37	46%	10	27%
Eighth Grade	59	82%	54	92%	50	70%	42	84%

There were significant differences found between grade levels with these results at both the .01 and .05 levels for the Chi-Square tests. According to these findings, 20% more eighth graders will be taking additional math ($t = 7.6, p < .05$). Also, there will be 24% more eighth graders taking additional science over the current seventh-grade class ($t = 9.35, p < .01$). Additional significance was found between the grade levels regarding their reasons for taking additional math and science. In comparing seventh-grade responses to those of the eighth graders, the results found that eighth-grade students were almost twice as likely ($t = 25.659, p < .001$) to take additional math and three times more likely ($t = 28.705, p < .001$) to take science for reasons of gaining college entrance. Based on these results, it seems as if ETS' programming is increasing the awareness of eighth-grade students to take more math and science credits at the high school level.

Research Objective Six. The sixth objective is to determine where and how much career education tools have increased the knowledge of Wittenberg's and Birnamwood's

eighth-grade students to take additional math and science credits for college entrance compared to seventh-grade students who have not yet been taught the various career education tools. Survey item eight dealt with this objective (multiple choices could be selected). Table 5 shows the choices based on grade levels, followed by a summation of the significant results.

Table 5

Knowledge Source for Careers and Math and Science Credit Needed for College

Entrance

Grade Level	7 th	7 th	8 th	8 th
Source	Frequency	Percentage	Frequency	Percentage
ETS/Stout Lady	29	35%	64	90%
Teachers/Counsel	14	17%	22	31%
Family Members	18	22%	19	27%
Not Sure	17	21%	4	6%
Not Yet Learned	25	30%	0	0%

The data analysis results indicated that ETS' career tools has been a significant factor in raising awareness of the need for additional math and science for eighth-grade students ($t = 48.746, p < .001$). Almost all eighth graders (90%) attributed the ETS program as their source for knowing about college math and science classes. Additionally, there was not a single eighth-grade student that marked they had no knowledge of the amount of math and science needed for college entrance, while 30% of the seventh-grade students marked

they had yet to receive information regarding the link of math and science classes ($t = 7.164, p < .01$).

Research Objective Seven: To compare the different perceptions between boys and girls. Questions one, two, and three dealt with this objective as it relates to gender perception on math and science amounts needed to attend Wisconsin colleges. The results indicated that 90 (58%) students from seventh and eighth grade knew that taking two years of math was not enough to attend Wisconsin colleges. Of the 90 students who knew more math is required, 53 (59%) were females and 37 (41%) were males. In comparing science requirement perceptions, 79 (51%) from both seventh and eighth grade knew that taking two years of science was not enough to attend Wisconsin colleges. Of the 79 who knew more science is required, 46 (55%) were females and 33 (45%) were males. Statistical significance of difference between genders found for knowledge of taking additional math to gain college entrance was not found. However, there was significance found between genders in knowledge of taking additional science to attend Wisconsin colleges. Based on Chi-Square results, females had significantly more correct perceptions than males ($t = 7.29, p < .05$).

Chapter V: Discussion, Conclusions, and Recommendations

Introduction

In this chapter, the research will be summarized, conclusions will be discussed, and further recommendations related to this study will be made.

Summary

The purpose of this research was to analyze if the ETS Program was effectively increasing Wittenberg and Birnamwood eighth-grade students' knowledge, awareness, and plans for taking more math and science high school courses to meet college entrance requirements and career areas of interest. After a review of literature, a survey was developed and given to Wittenberg and Birnamwood seventh- and eighth grade students. The purpose of the instrument was to compare the differences between seventh-grade students who had not yet received the ETS career awareness tools to the eighth-grade students who had gone through the ETS career awareness tools.

Discussion

Unlike many other states, Wisconsin does not mandate high schools to require the same amount of math and science credits needed for college entrance into its state universities. This discrepancy decreases a student's chances of going on for postsecondary education should he or she choose to take the minimum graduation requirements allowed by most Wisconsin high schools. The problem is likely to become a further area of concern as the careers and jobs of the future continue to escalate in the fields of technology, which require more math and science skills. Until math and science credit state mandates increase to meet postsecondary education entrance requirements, tools need to be implemented early to raise student awareness for selecting more rigorous

math and science classes. The problem of lower math and science graduation expectations is that students can decide after their sophomore year to not take additional math and science without realizing this decision will cost them the option of being eligible to attend Wisconsin colleges as well as many technical programs. By educating students in eighth grade about the careers needing postsecondary education and the requirements to enter postsecondary education, the hope is that they will make better and more informed decisions about their course selection in high school. The ETS program seems to be increasing these student perceptions through the career awareness tools at the eighth-grade level.

This study supports the idea that students who are likely to take more high school math and science credits are aware of the need for additional credits for college entrance and link that with the necessity of additional education for career purposes.

Conclusions

Based on the survey responses, more students knew they needed additional math than realized they needed additional science credits to meet the entrance requirements for Wisconsin colleges. This may be a contributing factor to the course selection plans of why more students are planning to take beyond two years of math than those planning to take more than two years of science. It is important to note that while almost two thirds of the students were planning to take more math, only a little more than half were planning to take more science. Reasoning for taking the additional math and science showed that while some are taking it for purposes of going onto college, a vast majority are planning to take more because they like or are good at the subjects of math and science. A concern is that should students start to feel inadequate or dislike these topics,

they may chose not to take the additional high school courses needed for securing the options of attending postsecondary education.

Both seventh- and eighth-grade females were more aware than males of the credit amounts needed for both math and science credits. Additionally, at both grade levels, females had more intentions of taking additional math and science at the high school level. The implication of this factor is noteworthy as the ratio of males to females entering postsecondary education continues to see about 10% fewer males entering postsecondary education.

Results indicate that the ETS program is having an effect on increasing the perceptions of need for more math and science classes through the career awareness tools. Almost two-thirds more eighth graders knew to take additional math and science compared to 37% of the control group (the seventh graders). While these results help validate the importance of teaching career and postsecondary awareness, it remains alarming that students have the option of taking minimal math and science credits that could impede their ability to go on for postsecondary education. The fact that a high school diploma does not carry the same opportunity for all students seems unbalanced. It is unsettling that a high school diploma from Wittenberg-Birnamwood does not carry the same opportunity as a high school diploma from another school that requires its students to graduate with the same requirements needed to meet college admission.

Knowledge is power and by raising insights through useful tools, the information on what it takes to have better postsecondary and greater career options seems to have impacted students' perceptions. Eighth graders were twice as likely as seventh graders to take more high school math for purposes of attending college. That reasoning also

applied to science as eighth graders were three times more likely than seventh graders to choose taking additional science for gaining college entrance. These findings indicate that learning about careers and postsecondary education has almost doubled the awareness of what students need to take at the high school level in math and science.

When asked what careers or jobs they were interested in, almost 70% of the students selected jobs that needed postsecondary education. These numbers become of relevant interest when compared to the survey questions by grade level and their intentions for taking additional math and science credits. Of the 59 seventh graders selecting careers that need postsecondary education, there are only 26 planning to take more than two years of math and only 10 planning to take more than two years of science for gaining college entrance. Of the 47 eighth-grade students selecting career interests needing postsecondary education, 100% plan to take additional math and 42 plan to take additional science for the reasoning of possibility going onto college. These numbers indicate that the eighth-grade students are making the selection of taking more math and science based on learning about the need of postsecondary education for the possible pursuit of their career interest.

Recommendations

This research is but a stepping stone for looking into the problems and discrepancies caused by the gaps of Wisconsin high schools that require only the state's minimal math and science credits for graduation compared to schools that match their graduation requirements to college admission. Comparing student percentages entering postsecondary education from Wisconsin schools that match college requirements to those schools, like Wittenberg-Birnamwood, that require the bare minimum would be

very insightful. Taking the research even further by following an extended national research would also be interesting as there are many states that mandate their high schools to have matching high school graduation and college admission requirements.

It would be insightful if this study could be done over a longer period of time to follow these eighth-grade students through their senior year to track the following:

- How many students actually follow through with their intent of taking additional high school math and science courses?
- How many students take enough math and science to meet postsecondary enrollment?
- Is there an increase of students enrolling in additional high school math and science courses compared to previous grades that did not have the ETS career awareness?
- Is there an increase of these students enrolling in postsecondary education compared to previous grades that did not have the ETS career awareness?
- How many students succeed in their first year of postsecondary education?
- How do students involved in the ETS future course selection plans compare with other schools?

Given the opportunity to do this study over, this researcher would change the group surveyed by using only the eighth-grade class. The research would be more conclusive if the same group of students could be compared through a pre-post survey given before and after the ETS career awareness is completed. It would also be relevant to conduct this survey between two different school districts of similar high school graduation standards and socioeconomic status.

In discussing the research within the Wittenberg-Birnamwood school district, this researcher was surprised at the amount of adults who were unaware of the gap between Wittenberg-Birnamwood's high school graduation requirements and those needed for attending postsecondary education. Further research could be done with teachers, administration, and parents to determine their knowledge about postsecondary education requirements.

The information obtained from this study is useful for students, teachers, counselors, school administrators, parents, ETS programs, and Wisconsin governances involved with education as it all pertains to the future of our children which is ultimately linked to the future for all. Ultimately, this research has shown that the sooner students realize the link between career and college requirements and their high school math and science selection, the more informed decisions they will make and the better chances they will have to strategize their choices for ultimate options in their post high school years.

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Appendix A: Letter to School Officials Seeking Research Permission

February 16, 2007

Mr. David Bardo
Wittenberg-Birnamwood District Office
400 W. Grand Avenue
Wittenberg, WI 54414

Dear Mr. Bardo:

In completing research for my master's thesis, I would like to survey 7th and 8th grade students from Wittenberg and Birnamwood Middle Schools. The survey has 10 questions. First a consent form will be sent home asking parental permission. Second, the survey will be given only to those students that return a signed consent form. Thirdly, the survey is voluntary, confidential, and should take no more than 5 minutes to complete.

I am seeking your signed permission and approval for two activities. First, to have Wittenberg and Birnamwood Middle School 7th and 8th grade students participate in this research during classroom time. Second, I would like your permission to request 7th and 8th grade teachers to distribute and collect the surveys.

There will be no costs to the schools for conducting this survey and research. My hope is that the research will provide the Educational Talent Search program insight on its effectiveness in raising student awareness for taking additional high school math and science courses. In addition, I hope the survey will provide Wittenberg-Birnamwood School District with insight on the knowledge, perception and plans of middle school students regarding the need for taking additional high school math and science courses for students to be eligible for postsecondary education.

I sincerely thank you for allowing me to conduct this research that will benefit the Wittenberg-Birnamwood School District, the Educational Talent Search Program, and most importantly, the student. I will provide each of the schools the research results.

For your convenience, I have attached an example of the parent my form and survey to be given.

School District Consent:

Jill Lewis has my permission to conduct her research at Wittenberg and Birnamwood Middle Schools. I understand Ms. Lewis has received approval from The University of Wisconsin-Stout Institutional Review Board for the Protection of Human Subjects in Research.

Signed _____ Date _____

Mr. David Bardo
Wittenberg-Birnamwood Superintendent

Appendix B: Research Explanation Letter to Teachers

February 22, 2007

Dear Wittenberg-Birnamwood District Administration and Educators:

This is to inform and ask for cooperation in completing my research master's degree topic. My topic is Wittenberg and Birnamwood 7th and 8th students' perceptions of high school math and science credits to attend postsecondary education and the effectiveness of the career tools delivered by the Educational Talent Search program.

After receiving verbal and written permission from the Superintendent, Wittenberg Principal, and Birnamwood Principal, I will be conducting a brief survey asking students about their plans and perceptions of high school math and science requirements. The survey will be given to 7th and 8th grade students at Wittenberg and Birnamwood during class time. The survey is completely voluntary and confidential. It should take no more than 5 minutes to complete. Only students' who have returned signed parent consent forms will be allowed to take the survey.

I am seeking your cooperation by asking that if a student asks, you do NOT provide answers to any of the survey questions. The purpose of the survey is to determine the students' perceptions, knowledge, and plans in selecting high school math and science courses. Getting just students answers, will make the research more accurate about what the student's know and the effectiveness level of the Educational Talent Search Program.

Once the research is completed, I will provide the Wittenberg-Birnamwood school district with a copy of the survey results and research paper. If you are interested in receiving a personal copy of the results once the study is complete, you may contact me at the address, phone number or email listed below.

The University of Wisconsin-Stout Institutional Review Board for the Protection of Human Subjects in Research has approved this study. If you have any questions or concerns about this study, please contact me at the address, phone number, or email listed below. Kathy Hirsch, my research advisor, is also available for consultation at (715) 232-5010. If you have questions regarding any treatment of the participants in this study, please contact Sue Foxwell, UW-Stout Human Protections Administrator, 152 Voc Rehab Building, Menomonie, WI, 54751, phone: (715) 232-2477.

Thank you for your support and cooperation,

Jill Lewis aka ("The Stout Lady")

Appendix C: Consent Letter to Parents

Dear Parent or Guardian:

As part of my master's thesis requirement, I am conducting research at Wittenberg and Birnamwood Middle schools regarding the perceptions of 7th and 8th grade students' math and science future course selection at the high school. Also, I would like to see how effective the career tools of the Educational Talent Search (Stout Lady) are for promoting college awareness.

Your child's school has this opportunity to take part in my survey of asking about high school math and science course requirements perceptions. I am asking you for permission to let your child be included in this survey.

Because your student is a minor, **parental consent** is mandatory before they can do this. **Only children with this signed consent form will be given this survey.** Students that do not return a consent form or chose not to participate will be given the choice of free reading time or a career word search to do while participating students are completing the survey. The survey consists of 10 questions and will take no longer than 5 minutes to complete.

There is virtually no risk to your child in taking this survey. All responses are completely confidential and voluntary. The results may benefit your child as well as future students.

Questions or concerns about your child's participation in the research should be addressed first to the researcher (Jill Lewis at 715-232-1253) or research advisor (Kathy Hirsch at 715-232-5010) and second to Susan Foxwell, Human Protections Administrator, UW-Stout Institutional Review Board for the Protection of Human Subjects in Research, 152 Voc Rehab Building, UW-Stout, Menomonie, WI 54751, phone (715) 232-2477.

Please sign the attached form saying you have agree to have your child participate. Have your student return it to their science teacher by **March 1, 2007**.

I, _____ (print your name) agree to have my child,
_____, in the Wittenberg-Birnamwood Middle School
survey.

Parent /Guardian Signature _____ **Date** _____

Thank you for taking the time to read through this consent.

If you are interested in receiving a copy of the research, you may contact me at the address, phone number, or email listed below.

Thank you,

Jill Lewis
13 Harvey Hall
UW-Stout
Menomonie, WI 54751
715-505-1439 lewisji@uwstout.edu

Appendix D: Instructions for Teachers Giving Survey

Dear Teachers: Thank you for administering this survey during class time. I have enclosed copies of a career word search as an option for students to do that do not have a signed consent form or for those students who chose not to take the survey. I have listed the students in your class that are eligible to take the survey based on the return of the parent consent form. Please only give the survey to those students that are checked off. Even if a student has a consent form turned in, they still have the choice of participating in the survey.

Please read the following directions before handing out the survey to those students who are checked off on your consent return list:

"This survey is being done for research to better understand what students know about high school math and science courses. Taking this survey is voluntary and confidential, please **DO NOT** put your name on the survey. There will be no affect on your grades if you choose to complete or not complete the survey. Answer the questions as best you can. If you do not know an answer, check unsure. Jill Lewis (the Stout Lady) thanks you for taking the time to complete this survey."

Once the surveys are completed and handed in, please place in the pre-addressed envelope and mail out as soon as possible. I sincerely thank you for taking the time to administer these surveys.

Sincerely,

Jill Lewis (the Stout Lady)

Appendix E: Math and Science Course Need Survey

This research has been approved by the UW-Stout IRB as required by the Code of Federal Regulations Title 45 Part 46.

By answering this survey, I am agreeing to take part as a volunteer. I know that completing or not completing this survey will not affect my grades. It is my choice to participate or not participate.

HIGH SCHOOL MATH AND SCIENCE COURSE SURVEY

Directions: If you do not know an answer, that is okay, check Not sure.

1. I am a: Female Male

2. Taking 2 years of **math** to graduate from Wittenberg-Birnamwood high school is enough math for me to attend any Wisconsin college. **(Check only one)**
 True False Not sure

3. Taking 2 years of **science** to graduate from Wittenberg-Birnamwood high school is enough science for me to attend any Wisconsin college. **(Check only one)**
 True False Not sure

4. In high school, will you take more than the required 2 years of math? **(Check only one)**
 Yes (go to question 5)
 No (go to question 6)
 Not sure (go to question 6)

5. Why would you take more **math**? **(Check all that apply)**
 I like math
 I am good at math
 I need more than 2 years of math to attend college

6. In high school, will you take more than the required 2 years of science? **(Check only one)**
 Yes (go to question 7)
 No (go to question 8)
 Not sure (go to question 8)

7. Why would you take more **science**? **(Check all that apply)**
 I like science
 I am good at science
 I need more than 2 years of science to attend college

8. How did you find out about the math and science classes you need to get into college? **(Check all that apply)**
 Stout Lady (Educational Talent Search)
 Teachers/Counselors
 Family members
 Not Sure
 No one has ever told me

9. Learning about careers has helped me understand if I need education after high school?

(Check only one)

Yes

No

I have not learned much about careers

10. What career or job are you interested in? _____
(Do not worry about spelling)