PERCEIVED IMPORTANCE STUDENTS HAVE OF TECHNOLOGICAL
LITERACY, TECHNICAL SKILLS AND THE AREAS OF
INSTRUCTION THAT BEST PROVIDE THE
INFORMATION AND SKILLS NEEDED
TO LIVE IN THE TWENTY-FIRST
CENTRY

By

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ABSTRACT

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Survey of perceived importance students have of technological literacy, technical skills_
(Title)

and the areas of instruction that best provide the information and skills need to live in the

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     The purpose of this study was to assess the perceived importance students have of

technological literacy, technical skills and the areas of instruction that best provide the

information and skills need to live in the twenty-first century.

     The research shows that the majority of students (82 percent) believe they have

the technological literacy and skills that will be needed for the twenty first century.

Students also believe that those with technological literacy will be better prepared to use

and understand twenty-first century technology. The research also shows that almost 75

percent of the students believe they will need to know more about technological literacy

and skills. 53 % indicated that more training and technical experiences would be needed

to better understand twenty-first century technology. Students who have taken college

prep courses or who have not taken vocational courses did not consider knowing and understanding technological literacy and skills as important. Research shows students considered the ability to operate computers and their programs as the most important technological literacy and skill needed. Students also perceive that continues education in technology literacy and skills as the least important after graduating from high school. Research shows the three most important programs that best deliver the technological literacy and skills to be Math, Science, and Technology Education. When students were asked about Technology Education, 68 percent considered technology education important and 43 percent indicated that it should be a required course.

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Chapter I

Introduction of Topic

Year after year students return to the classroom in both secondary and post secondary institutions. Students, parents of students, or society as a whole believe that by doing so they will learn and through learning they will have the tools necessary to become successful citizens, employee's and leaders of the of the and Twenty-first century. Koffel (1994) stated that, "A person learns those things he/she perceives as maintaining or enhancing him/her self" (p.5). This kind of thought is traceable from the inception of the human race to where we are today. As one culture perfected new skills, languages, philosophies and ideals, other cultures deemed these new developments valuable and endeavored to learn them.

As technological advances continue to change the world we live in, it is imperative that societies focus on technological education in order to maintain and advance the society's technological understanding. Rapidly changing technology has caused growing concern that many people are failing to accept the use of, or use new technology to its fullest potential. For example, the most common pieces of technology in the homes of most people are the VCR and TV. Many people own this equipment, but are unable to use some of its most simple features, such as setting the time, programming start and stop recording, or programming channel settings.

Starkweather, ITEA (1999), best states the importance of technology to everyone.

"Technology is like water. It is dynamic and can take on any shape. It can be

beautiful or ugly. It can be something that is calm or can be volatile. It gives you

many advantages, but can cause disaster. It can be harnessed or run unabated. We can relate it to work or recreation. It creates various moods from happiness to sadness. It is everywhere and can be linked to anything in our lives. Our opinion relates to how it is used or affects us. But one thing is for certain about both technology and water, we cannot do without them and people will never get their fill of them." (p.1)

Advances in technology has been so fast that Dare (1996) stated: "Employees will need to have all of the basic skills now highly valued in sciences, math, and language arts plus sophisticated skills in the areas of electronics, computer use, technology adaptation, critical thinking, team building, and decision making" (p. 2).

In addition to this, a review of literature showed that there is great concern for the lack of technological literacy among students and citizens alike around the world. Hayden (1991) stated " technology affects every person on this planet, it is growing exponentially, and is becoming increasingly complicated"(p.1).

As we start the twenty-first century research showed that all workers need a solid foundation in traditional skills, but the high performance workplaces require technological literacy (SCANS Report, 1990). The lack of technological literacy is becoming increasingly apparent, as companies are unable to fill technical positions. The lack of technological literacy caused Former State Governor, Tommy Thompson to assign a task force to study the problem. The Task Force (1999) concluded that "Wisconsin must make a commitment to revolutionize the way we prepare all our students and citizens for the future and we must meet this challenge head on"(p. 8). To

address this need, the task force and educational professionals identified Technology

Education as one of the major vehicles in which technical skills, literacy, and problem

solving can be delivered to students, and therefore, should be required of all students.

<u>Statement of the Problem</u>

As a result of rapidly advancing reliance on technology by society, today's high

school graduates face a dramatically increase in the need for technical skills and

technological literacy. Research showed that it was important that students exiting from

school have technological skills to fill highly technological jobs in the twenty-first

century.

<u>Purpose of the Study</u>

The purpose of this study was to measure the level of perceived importance

students have of technological literacy, technical skills, and the areas of instruction that

best provide the technical literacy needed to live and work in the twenty-first century.

<u>Research Objectives</u>

The objectives of this study were:

1. Determine to what extent students understand the importance of technical skills and

technological literacy in the twenty-first century.

2. Determine the level of importance that students place on understanding the

technological world in which they will work and live in.

3. Determine what level of technological literacy students' think is necessary and what

technical skills are needed for the twenty-first century.

4. Determine which high school programs students believe best deliver the needed

technical skills and technological literacy.

5. Determine the perceived importance of Technology Education in presenting technical information that students require.

Significance of the Study

Recent studies suggested that students who are graduating from school do not have the necessary knowledge about today's employment opportunities, nor the technical skills to do these jobs. It was stated that Wisconsin businesses typically have 110,000 unfilled job openings, a significant portion of which are high-wage technical positions (Wisconsin Task Force on Technical Education). These studies are leading the education profession to think about the relevance of courses offered to students and whether adjustments can be made to improve their relevance to the technical world of work. The significance of this study was to assess if students share the same belief of noted specialist in the technological field about the importance of technical literacy and skills required to live in the twenty-first century. This information could then provide Technology Educators insights on what changes or improvements need to be addressed to meet needs of students as well as help prepare students for the twenty-first century. The focus of this study will be High School Seniors at New Richmond High School.

Limitations of the Study

The following are limitations of this study

1. Findings of this study are limited to the New Richmond High School.

2. Students surveyed will be second semester seniors who will be graduating.

3. Not all students who completed the survey will have completed or taken course work in Technology Education. Although they may not have taken course work at the high school, what they know of and their perceived importance of Technology Education and the education of technological literacy is valuable data.

4. Because of the limitations in number 3, It was assumed that not all students knew the definition of technological literacy and therefore a definition was provided in the survey.

Definitions of terms

The following section defines terms used throughout this study:

1. Technological Literacy –

    "The ability to effectively use, manage and understand technology. This includes understanding the nature of technology, being able to assess a given technology and its potential impacts and potential, and being able to forecast future technologies and their role in our society". (Task Force On Technical Training, 1999)

2. SCANS – The Secretary's Commission on Achieving Necessary Skills.

3. Technical Education – A hands on design and problem solving based program of studies that leads to technological literacy.

4. Technology – The generation of knowledge and processes to develop systems that solve problems and extend human capabilities (Technology for All Americans, 1996)

Chapter II

Review of Literature

<u>Introduction</u>

We are two years into the new millennium, whether society is ready for it or not. We live

in a time when technological advances are in constant change, in fact, so much of a

change that technological capacity is expected to double every three to six years (Lauda,

1994). As the need for consumer knowledge becomes more complex, so too does

technology become more sophisticated. As workers struggle to cope with the

technological changes in their occupations, consumers struggle to cope with the effects of

technology in their homes and lives. As technology encompasses our lives, the separation

of the haves from the have-nots is becoming bigger. The haves are those who are able

and/or have the interest to keep up with technological trends. The have-nots are those

who cannot afford, don't have the time, or the interest to maintain technological literacy.

Wright (1994) stated the "have-nots, long for a return of a simpler way of life and thus

fall farther behind" (p.25).

An individual's life is affected daily by technology no matter what corner of the

world they live in. Alarm clocks wake people each day to the smell of coffee brewing in a

programmable coffeepot. Technology in homes we live in is so sophisticated, that lights

turn on and off when people are/are not in a room. Computer systems monitor and make

decisions on every aspect of the home, even when the residents are not home. Phones,

TV's, VCR's, satellite dish systems and cooking appliances require programming and a

great deal of technical knowledge to use appropriately and effectively. At work

technology effects workers in every way, just as it does at home. Even the simple task of making french-fries at McDonalds is now performed by robots. Wright (1994), paraphrased from Burke, (1979) that "never have so many people understood so little about so much"(p.25). Lauda (1994) quoted Former United States Secretary of Education Richard W. Riley "that nearly half the American adults are at risk in today's technological society" (p.45). The amount of knowledge required to cope with technology is bewildering. Lauda (1994) stated "Today's high school seniors are introduced to more information in one year than their great-grandparents were in a lifetime" (p.48). Society has entered a time when the current generation cannot comprehend, cope with, or direct the new technology.

A democratic free society is best known for its efficiency when citizens are well educated, understand the roles of major institutions, and have the ability to change rapidly with technological demands. In 1951 the American society had a 90-95 percent rate of literacy and a working class that was second to none in the world. Other countries lacked high literacy among workers and invested capital into manufacturing facilities. In 1988, America's literacy rate was down to 80 percent allowing other countries to surpass the U.S. There is some evidence that people, not machines, are the driving force behind economic growth (Nussbaum, 1988).

As we look around local neighborhoods, new business building complexes are continually being built to keep pace with technological changes and world competition. Federal, state, and local governments have invested billions of dollars in incentives designed to encourage companies to increase spending on plants and capital equipment.

This can be good thing, however some evidence indicated by Nussbaum (1888) stated that "failing to invest in people, is already haunting the business community"(p.102). Millions of technical jobs go unfilled each year (Bernstein 1988). During 1999, 110,000 jobs in Wisconsin alone went unfilled. Significant portions of those are high paying technical positions (Task Force On Technical Training, 1999). This number of unfilled technical positions is expected to increase due to several things:

1. Forty percent of the current technical work force is expected to retire by the year 2005.

2. Many sectors of the economy are growing, and new jobs will require technical skills.

3. Positions have shifted from being twenty percent skilled in the 1950's to being sixty percent plus skilled in the 1990's, and this number is expected to increase.

(Task Force On Technical Training, 1999)

Failing as a society to educate and prepare our youth to fill these technical positions may cause severe shortages that could stifle United States innovation, productivity, and competitiveness in world markets as well rob as youth of potential rewarding careers.

<u>Next Generation Job Skills</u>

Workers in the twenty-first century must be better educated and more flexible to enter into the work force. Employers want to hire people who are honest, reliable, literate, who are able to reason, communicate, make decisions and who are life long learners. Employers are receiving applications for vacant positions. In fact, some get hundreds, but

those applying do not have the technical skills required and/or the technological knowledge base that allows them to be trained in a timely matter. Clearly workers who are proficient in technology have a greater advantage in the current workplace. Workers entering the workforce will need or show evidence of past growth in essential skills like reading, writing, math, effective listening, oral communication skills, adaptability, creative thinking, problem solving, personal management, self-esteem and initiative, interpersonal skills, ability to work in teams, leadership effectiveness, understanding of technology, and technological skills.

Technological Literacy and Technical skills

If people are the driving force behind economic growth, it should be apparent that success of economic growth relies on a societies ability to learn required technical skills, and to understand and apply technological changes. Ginsburg and Elmore (1998) Stated "Workers who know relatively little about technology, who carry with them negative attitudes and anxieties toward computers, who have a difficult time learning to use technology or upgrading existing technology skills may find themselves on the lower end of a professional hierarchy"(p.1). The American Dream is to live the good life, and no American wants to be on the lower end of the economic status.

One major problem with addressing America's literacy problem is defining technological literacy. What must the average person know about technology to be considered literate? What is the body of core knowledge required in today's changing society? Little agreement exists as to what technological literacy means and how much knowledge an individual should have (Hayden, 1991). Jenkins (1997) stated that

"technological literacy is a slogan, not a prescription for action" and that "technological literacy is essentially concerned with an understanding of, and sympathy towards technological capability" (p.2). Hayden (1991) stated "technological literacy is having the knowledge and ability to select, properly apply, then monitor and evaluate appropriate technology given the context" (p.30). Jennings (1988) stated that "technological literacy is the ability to communicate using the symbols and language of contemporary life, to solve problems using the modern tools of science and technology, to learn how to learn as a way of acquiring new skills and knowledge, and adapt to a continuously changing world created by the rapidly advancing technologies"(p.2). Another definition developed by the Wisconsin Task force on Technical Education (1999) described it as "the ability to effectively use, manage, and understand technology. This includes understanding the nature of technology, being able to assess a given technology and its potential impacts and potential, and being able to forecast future technologies and their role in our society" p.35).

A review of these definitions identified some key words that give a straightforward, outline of what technological literacy is needed by the future workforce. It is the ability to understand technology, to monitor, to evaluate, to solve, to effectively use, to forecast, and to be continuous learners. Whatever definitions are used to describe technological literacy, it is not just something nice to know about. It is a critical core competency that must be integrated into peoples' lives in order to communicate, learn and feel comfortable in the twenty-first century.

Call For the Reinvention of Education

      Our current systems served well in the past, but technological advances have left a large portion of the United States population without valuable skills and knowledge. Westrum (1991) summed it up when he stated "we have third generation machines, but first generation minds" (p.5). In the early 1900's we dominated world power, manufacturing production, and technological advances. Our dominance in world power through the 1980's slipped, allowing other countries, like Japan, to close this gap. According to some experts, one noticeable reason is the technical literacy rate of Japans work force; it stands at 95 percent. Japan took the knowledge they learned from America's quality legend Dr. Deming seriously, which was the more quality, including human resource quality built into a system, the more efficient it would be resulting in less cost in the long run. This allowed Japan's work force in the 1960's and 1970's to be more efficient, produce higher quality goods, and react quicker to technological advances (Nussbaum, 1988).

      Many studes have been completed in an attempt to overcome the deficiencies that currently plague the current and future work force. One of these, The Secretary's Commission on Achieving Necessary Skills (SCANS) report, commissioned in 1989, focused on what needed to be done to prepare America's workforce for new jobs, realities and challenges of the twenty-first century. They were asked to work with businesses and educators to identify what skills were needed and at what level of proficiency. Former Senator Bob Dole explained that in 1965 a car mechanic needed only to understand and interpret 5000 pages of the service manuals they used to repair

automobiles. In 1990, the number of pages jumped to 465,000. In 1965 being mechanically inclined was probably more important than being proficient in technically literate. Today, being mechanically proficient without being technically literate would probably not do much for a mechanic. This is just an example of what America faces in training and retraining its workforce to be proficient, skilled and technically literate.

In the end, the SCANS report called for a complete revamping of educational institutions. The general knowledge base that was acceptable in the past is not enough for students preparing to enter the technological workforce of tomorrow.   The SCANS committee outlined three basic foundations and five basic competencies that students should be able to perform as they enter the workforce and be considered technologically literate. They are:

Foundations

    1. Basic Skills

    2. Thinking Skills

    3. Personal Qualities

Competencies

    1. Resources: Identifies, organizes plans, and allocates resources

        A. Time

        B. Money

        C. Material and Facilities

        D. Human Resources

2. Interpersonal: Works with others

     A. Participates as member of a team

     B. Teach others new skills

     C. Exercises leadership

     D. Negotiates

     E. Workers with Diversity

3. Information: Acquires and uses information

     A. Acquires and evaluates information

     B. Organizes and maintains information

     C. Interprets and communicates information

     D. Uses computers to process information

4. Systems: Understands complex inter-relationships

     A. Understands systems

     B. Monitors and corrects performance

     C. Improves or designs systems

5. Technology: Works with a variety of technologies

     A. Selects technology

     B. Applies technology to a task

     C. Maintains and troubleshoots equipment. (SCANS, 1992).

Wisconsin's government responded by initiating its own study which was completed in 1999. The task force also was asked to identify how Wisconsin could better prepare the workforce for the twenty-first century. They identified that:

1. The current education systems typically focus on preparing and directing students to attend universities.

2. Twenty percent of the work force requires university training, leaving an astounding eighty percent unprepared.

3. The current educational system focuses on teaching subject verses skills, which leaves an 80 percent student populous with a lot of knowledge, but no ability to use it.

4. An awful lot of students enter into the world unprepared to compete in the global market of employment opportunities.

(Task Force On Technical Training, 1999).

The task force recommended they identify ten phases that all students should go through. The phases were called "The Life Work Continuum". Each phase would be introduced at specific times in a student's education through adulthood, with specific education competencies being met. This vision was hoped to link life, work and education to improve Wisconsin's work force.

Programs identified to better prepare students for the future include Youth Apprenticeship, Cooperative Education, School to Work, Job Shadowing, Tech Prep, 2+2, and subject integration. In many cases, students' preparing to enter one of these programs does so after having completed several Technology Education courses and was supervised by Technology Education instructors.

Technology Education programs exist at all levels Kindergarten through College and in all areas of the world. Most programs in Wisconsin are most prevalent at the

seventh grade through twelfth grade level. Originally known as Manual Arts and then Industrial Arts, with the responsibility of training students valuable manual labor work skills, it was now changed to Technology Education with a focus that should be on developing an understanding and use of technology.

 According to the Task Force On Technical Education (1999) The Wisconsin description of Technology Education is,

> "A hands on design and problem solving based program of studies that leads to technological literacy. It should enhance technical and higher order thinking skills and provide a means of applying knowledge form other disciplines and should culminate in high school with a broad understanding of the nature, impact, and potential of technology and an ability by students to create, mange and use technology to solve problem and create opportunities" (p.35).

Although there is no one course that can provide students with all that it is required in today's technological society, recommendations identifying Technology Education as one of the key contributors to providing technical literacy and technical skills that meet the SCANS and Wisconsin Task Force technological literacy education recommendations are becoming more prevalent. Therefore Technology Education should become a core course that is required of all students. (Task Force On Technical Education, 1999; ITEA; Yeager, 1998; Hayden, 1991; Waejten 1994).

Just as the field of education must meet identified standards that insure students graduate with specific competencies, so must Technology Education accept and meet standards that are accepted and applied by schools across the state. These competencies

must be of value to employers with high performance technical positions proving decent

wages and must develop a perception that Technology Education is a valuable subject

which provides knowledge that is valuable in all facets of life.

<u>Perceptions</u>

If Technology Education is to make the jump to the next level, perceptions of

students, administrators, counselors and parents must be changed. The lack of technology

knowledge in a society that is so dependent upon technology could develop a spiral of

human catastrophes that is unprecedented. Hayden (1991) concluded in his research that

there are widespread misunderstandings of what technology is.

Currently Technology Education currently is not perceived as an integral part of

education but as an add on consisting of vocational training, and learning skilled trades

for students who are problematic and who have been classified as not college material.

For parents, the American Dream is that their child graduate from high school, attends the

best college, and lives happy successful lives. Knowing a skilled trade is not part of what

some parents perceive as successful. Unfortunately research shows that 60 to 70 percent

of American youth fail at or never make it to college (Black, 1995). Teaching a skilled

trade should not be the focus in general Technology Education courses, but should teach

the following competencies as outlined by (Wright, 1994).

- Select appropriate technological products and services to meet personal and
  groups needs.

- Understand how technology is used in producing products and services.

- Effectively communicates technological information and ideas.

- Describe technology in a historical and evolving society context

- Apply problem solving, decision making, invention, and innovation in designing technological devices and systems.

- Appropriately select, operate, maintain, and dispose of technological devices.

- Assess the personal, social, economic, and environmental impacts of technology.

- Use appropriate personal and interpersonal skills in participating in the technological society as a citizen, consumer, and worker (p. 28-29).

Some schools in Iowa, Michigan, and New Jersey have made the change to meeting these competencies or similar ones. Following the changes, research was done to determine student perceptions of and the value of Technology Education. Courses identified by students as being most helpful by those in gaining employment were Mathematics, and courses in Vocational, Technical, and Technology Education. Other research shows that students indicated they believed no course had been helpful in gaining employment. Other findings of the research determined that students who had completed Technology Education courses also performed better in other courses while in school (Zuga, 1994). One study found that graduates had identified Technology Education as one of the most helpful courses for employment (Doty, 1991).

Summary

In a world where history provides evidence that the ability of human capital can determine a nation's economy, and that a society's success can lie within the knowledge and skills of its populace. Having an understanding and the ability to use technology as

well as being technologically literate, is the "currency of a culture" (Gladis, 1998) (pg.3).

If this is true society must continue to expand its technical knowledge base, keep up with

technological changes, restructure educational institutions instruct on the importance of

understanding technology and insure that we teach what we know to the whole society.

A source of providing these desired skills has been identified as Technology Education.

Unfortunately, there are mixed perceptions about the value of Technology Education in

the educational institution. The real value, then can be identified by the quality of the

programs within the community, and the changes that have been made educating students

to be technological literate, technically skilled and informed consumers of the twenty-

first century.

Chapter III

Methodology

The purpose of this study was to measure the level of perceived importance students have of technological literacy, technical skills, and the areas of instruction that best provide the technical literacy needed to live and work in the twenty-first century.

Population and sample

The population for this study consisted of New Richmond High School Seniors. Surveys were given to all students that were present in class and had reached the age of eighteen. The survey packet given to students contained the definitions of technological literacy and technical skills. The packet also described the intent of the study and stressed the confidentiality of each sample. Instrumentation

The purpose of this instrument (Appendix A) was to survey New Richmond High School students perceptions of the importance of technological literacy and technical skills needed in the twenty-first century and the importance that Technology Education plays in delivering this knowledge. The survey was developed by the researcher to assess student perceptions. The questions on the survey were intended to gather information to answer the research questions.

Data Collection Methods

The purpose of this instrument was to determine student perceptions and beliefs. The instrument was in the form of a questionnaire consisting of a lickart rating scale.

New Richmond High School students completed the questionnaire during the spring semester of 2002. Attached to the survey was a letter explaining the intent of the

survey.

Chapter IV

Results

The purpose of this study was to measure the level of perceived importance students place on technological literacy, technical skills, and the areas of instruction that best provide the technical literacy needed to live and work in the twenty-first century.

The survey was distributed to all New Richmond High School twelfth grade students taking the required twelfth grade English for graduation. A total of one hundred seventy eight surveys were distributed to English teachers of twelfth grade students. One hundred seven responses were returned (60 percent) and of those one hundred seven, seven (3 percent) were thrown out because they were not fully completed. After deducting those seven surveys a total of one hundred surveys remained (56 percent). A breakdown of students used for completing the research included fifty-five female students (55 percent) and forty-five male students (45 percent).

The survey was written to address five objectives. Questions 1 – 5 in the survey where general questions about the student. To better answer the objectives, this information was used to further sort questions by gender, those who had and had not taken college prep courses, those who had and had not completed vocational courses and student plans after high school. Questions 6,7,8, 9 and10 addressed research Objective One, what extent students understand the importance of technical skills and technological literacy in the twenty-first century. Questions 11,12,13, and 14 addressed research Objective Two, level of importance that students place on understanding the technological world, in which they will work and live in. Question 15 addressed research

Objective Three, level of technological literacy students think is necessary and what technical skills are needed for the twenty-first century. Questions 16, 17, and 18 addressed research Objective Four, high school programs students believe best deliver the needed technical skills and technological literacy. Questions 19 – 24 addressed research Objective Five, perceived importance of Technology Education in presenting technical information students require.

<u>Presentation of Results</u>

Some preliminary information was asked of students to identify the type of students who had completed the survey. This information is important in understanding the perceptions of students who have taken Vocational Education courses and those who have not. Only students who had reached the age of 18 at the time of the survey were asked to complete the survey. Therefore of the one hundred seventy eight twelfth grade students it was presumed that seventy-one students were not yet 18 or that they were 18 and older but had declined to complete the survey.

<u>Technical Skills and Technological Literacy</u>

The first research objective was to determine to what extent students understand the importance of technical skills and technological literacy in the twenty-first century. Four survey questions were used in attempting to answer this objective. Question 6 of the survey asked students how informed they considered themselves to be concerning technical advances and innovations in technology. According to the responses (Table 1), the majority, (72 percent) of students surveyed considered themselves informed about technical advances. Another ten percent considered they, were very informed.

Table 1

Individual

Response	Frequency		Percent
Very Informed	10		10
Male		7	15.5
Female		3	5.4
Informed	72		72
Male		31	68.8
Female		41	74.5
Not Informed	16		16
Male		7	15.5
Female		9	16.3
Need to be informed	2		2
Male		0	0
Female		2	3.6
Total	100		

Question 7 of the survey asked students to rate as a whole if they considered their classmates to be highly technological literate with technical advances and innovations in technology. According to the responses (Table 2), students rated fifty-nine percent of their classmates as being considered technological literate with thirty-one percent responding neutral about their classmates' technological literacy.

Table 2

Classmates

Response	Frequency Overall	Male	Female
Strongly Agree	3	1	2
Agree	59	27	32
Neutral	31	14	17
Disagree	6	3	3
Strongly Disagree	1	1	0
Total	100	45	55

Question 8 of the survey asked whether students with technological literacy and technical skills are better prepared to use technology in the twenty-first century. According to the responses (Table 3), eighty-four percent of males indicated at agree or strongly agree and females indicated eighty-seven percent. Comparatively males more frequently indicated that they strongly agreed with the statement and females more frequently indicated that they agreed that those with technological literacy and technical skills are better prepared to use technology in the twenty-first century.

Table 3

Use of Technology

Response	Frequency Overall	Male	Female
Strongly Agree	41	22	19
Agree	45	16	29
Neutral	8	4	4
Disagree	5	2	3
Strongly Disagree	1	1	0
Total	100	45	55

Question 9 of the survey asked about the importance of students being knowledgeable about advances and innovations in technology. The results shown in Table 4 indicate that males believed it is more important to be knowledgeable about advances and innovations in technology. On a scale of 1-5, males had a higher average of 4.355 as compared with females who had a 3.909 average. The information was also compared to students who had and had not taken college prep courses. Of those fifty students who had not taken college prep courses, fifty (100 percent) selected agree or strongly agree in the importance of having knowledge about advances and innovations in technology. Comparatively those fifty who had taken college prep courses only thirty-three (66 percent) indicated that they agree or strongly agree. Thirteen students (26 percent) indicated that they were neutral about question 9.

Table 4

Knowledge about Advances and Innovations in Technology

Response	Frequency Overall	Male	Female
Strongly Agree	33	23	10
Agree	50	17	33
Neutral	13	4	9
Disagree	3	0	2
Strongly Disagree	1	1	0
Total	100	45	55

Response	Students who had taken college prep courses	Students who had not taken college prep courses
Strongly Agree	9	24
Agree	24	26
Neutral	13	0
Disagree	3	0
Strongly Disagree	1	0
Total	50	50

Question 10 of the survey asked students to indicate their level of agreement as to whether students as a whole should be educated in general technological literacy and skills. The results shown in Table 5 indicate that males indicated a higher level of agreement (91.1 percent selected agree or strongly agree as compared to 65.9 percent of females) that all students should be educated in general technological literacy and skills. Question 10 was also compared to students who had and had not taken college prep courses. Of those fifty students who had not taken college prep courses, 45 students (90 percent) selected agree or strongly agree. Comparatively the fifty who had taken college prep courses only thirty-two (64 percent) indicated that they agree or strongly agree that all students should be educated in general technological literacy and skills.

Table 5

Students Educated in General Technological Literacy and Skills

Response	Frequency Overall	Male	Female
Strongly Agree	22	13	9
Agree	55	28	27
Neutral	17	3	14
Disagree	6	1	5
Strongly Disagree	0	0	0
Total	100	45	55

Response	Students who had taken college prep courses	Students who had not taken college prep courses
Strongly Agree	5	17
Agree	27	28
Neutral	13	4
Disagree	5	1
Strongly Disagree	0	0
Total	50	50

Understanding Technology

The second research objective was to determine the level of importance that students place on understanding the technological world in which they will work and live. Question 12, 13, and 14 asked students about their thoughts on the importance of having and the level of importance they place on having technological literacy. Results (Table 6), show seventy-three students (73 percent) responded as agreeing or strongly agreeing that students will need to have more technological literacy and skills in the twenty first century. A comparison of question 12 on the importance students have with technological literacy and skills (Table 6) to those students who have and have not taken vocational courses is shown in Table 7.

Question 13 asked students if they thought more intensive training and experiences would be needed in the twenty-first century. Only fifty three percent of students indicated they agreed or strongly agreed that technology would require more intense training. Question 14 asked students to respond to the statement, you place a high level of importance on learning and understanding technology in the world. The most frequent response was agree (50 percent) with twenty-five (25 percent) indicating neutral to the question (Table 8).

Table 6

More Technical Literacy in the Twenty-first Century

Response	Frequency Question 12	Frequency Question 13	Frequency Question 14
Strongly agree	20	9	16
Agree	53	44	50
Neutral	23	30	25
Disagree	3	16	7
Strongly Disagree	1	1	2
Total	100		

Table 7

Comparison of those who have and have not taken vocational Courses

Response	Have Taken Vocational Courses		Have Not Taken Vocational Courses	
	Question 12	Question 13	Question 12	Question 13
Strongly agree	16	8	4	1
Agree	41	34	12	10
Neutral	18	25	5	5
Disagree	2	11	1	5
Strongly Disagree	1	0	0	1

| Total | 78 | 78 | Total 22 | 22 |

A.) Question 12 agree or strongly agree have taken percentage…..   73.0 percent

B.) Question 12 agree or strongly agree have not taken percentage…..   72.7 percent

C.) Question 13 agree or strongly agree have taken percentage…..   53.8 percent

D.) Question 13 agree or strongly agree have not taken percentage…..   50.0 percent

Table 8

Students Place a High Level of Importance on Understanding Technology

Response	Have Taken Vocational Courses	Have Not Taken Vocational Courses
Strongly agree	12	1
Agree	40	10
Neutral	20	5
Disagree	1	5
Strongly Disagree	1	1
Total	78	22

Necessary Level of Technological Literacy

The third research objective was to determine what level of technological literacy students' think is necessary and what technical skills are needed for the twenty-first century. Question 15 asked students to rate the importance of specific technological literacy and skills (Table 9). According to the respondents the three most important are:

1.) Ability to operate computer programs

2.) Ability to adapt to changing technology

3.) Ability to use all features on home and personal appliances and entertainment systems

Of the students responding to ability to operate computer programs twenty six times males (57.7 percent) considered that as being most important, as compared to thirty-five females (63.6 percent). Responses of males and females ability to adapt to changing technology were also compared. Nineteen Males (42.2 percent) responded as that being most important in comparison of thirteen females (23.6 percent).

Table 9

Top Three Responses

Response	Frequency	Average
Operate standard computer	61	1.72
Ability to adapt to changing technology	32	2.07
Use all features on home and personal appliances and entertainment systems	32	2.27

Technical Literacy and Skills needed for the Twenty-first Century Overall

	Most important = 1		Least important = 5		
Response	1	2	3	4	5
Operate standard computer programs	61	20	11	2	6
Understand and follow technical manuals to use new technology	22	37	30	9	2
Use all features on home and personal appliances and entertainment systems	32	26	27	13	2
Ability to adapt to changing technology	32	41	18	6	3
Ability to use modern tools of science and technology	25	43	19	8	5
Maintain continuous education in technology and technical skills after high school	18	31	30	16	5

Program Delivers Technological Skills

The fourth research objective was to determine which high school programs students believe best deliver the needed technical skills and technological literacy. Eight high school courses were rated on a scale of 1 through 5, (1 being most important) as to their importance to the student (Table 10). The three highest rated courses based on frequency of responses and calculated averages according to the respondents:

1.) Math (2.10 average)

2.) Science (2.11 average)

3.) Technology Education (2.26 average)

Courses were then compared based on those student who have taken and have not taken college prep courses (Table 11). Based on a scale of 1 through 5, (1 being the most important) students who have taken college prep courses rated the following courses most important:

1.) Science (2.12 average)

2.) Math (2.14 average)

3.) English (2.28 average).

Students who have not taken college prep courses (Table 12) based on a scale of 1 through 5, (1 being the most important) rated the following courses in order as the three most important:

1.) Technology Education (2.02 average)

2.) Math (2.06 average)

3.) Science (2.10 average).

Table 10

Importance of High School Courses Providing Technology Literacy and Skills

Course	Frequency of Responses on Scale 1-5					Average response
	1	2	3	4	5	
Science	29	42	18	11	0	2.11
Math	36	35	16	9	4	2.10
English	36	21	27	9	7	2.30
Social Studies	10	19	45	18	8	2.95
Technology Ed.	30	32	22	14	2	2.26
Business Education	15	38	32	11	4	2.51
Agriculture	6	18	39	25	12	3.19
Family Consumer Education	5	26	34	24	11	3.10

Table 11

Importance of High School Courses Providing Technology Literacy and Skills for Those

Who Have Taken College Prep Courses

Course	Frequency of Responses on Scale 1-5					Average response
	1	2	3	4	5	
Science	13	23	9	5	0	2.12
Math	18	16	9	5	2	2.14
English	15	13	13	5	4	2.24
Social Studies	3	9	24	11	3	2.94
Technology Ed.	13	19	10	6	2	2.5
Business Education	4	23	17	4	2	2.56
Agriculture	3	8	25	11	3	3.26
Family Consumer Education	0	11	21	12	6	3.24

Table 12

Importance of High School Courses Providing Technology Literacy and Skills for Those

Who Have Not Taken College Prep Courses

Course	Frequency of Responses on Scale 1-5					Average response
	1	2	3	4	5	
Science	16	19	9	6	0	2.10
Math	18	19	7	4	2	2.06
English	21	8	14	4	3	2.32
Social Studies	7	10	21	7	5	2.96
Technology Ed.	17	15	12	8	0	2.02
Business Education	11	15	15	7	2	2.46
Agriculture	3	10	14	7	8	3.12
Family Consumer Education	5	15	13	12	5	2.96

Perceived Importance of Technology Education

The fifth research objective was to determine the perceived importance of Technology Education in presenting technical information that students require. Three questions were proposed. According to respondents' rating question 17, forty percent of the students agree and eight percent strongly agree that general education courses are important in preparing high school students. Thirty percent of the students responded neutral. According to respondents rating of question 18, forty-eight percent of the students agree and seven percent strongly agree that core course are important in preparing students for the twenty-first century. Thirty-four percent of the students responded neutral. According to respondents' rating of question 19, fifty-five percent of the students agree and thirteen percent strongly agree that Technology Education courses are important in preparing students for the twenty-first century. Thirty-three percent of students responded neutral. The results of question 19 were compared to question 20. Students were asked to respond to the statement "it is important to offer Technology Education at high school". According to respondents thirty-five percent of the students strongly agree and thirty-nine percent indicated that they agree to the statement. Comparisons were also made between students who have taken college prep courses and those who have not. (Table 13). Male respondents who indicated they have not taken college prep courses had the highest average 4.22 on a scale 1 through 5 (5 meaning they agreed the most) than any other group with or without college prep.

Table 13

Importance of Offering Technology Education

Respondents	Frequency of response					Average response
	SD	D	N	A	SA	
All Students	3	6	17	39	35	3.97
Males	1	1	8	17	18	4.11
Females	2	5	9	22	17	3.85

Students who had taken

College prep courses

Male	0	1	3	12	14	3.85
Females	1	5	9	26	36	3.86

Students who had not

Taken college prep courses

Male	1	1	7	15	31	4.22
Female	1	2	7	12	19	3.84

For question 22, seventeen percent strongly agree while fifty-two percent agree that Technology Education courses help students develop technology literacy and skills, and Technology Education courses help students make knowledgeable career decisions. The overall student responses resulted in a 3.815 average out of 5 with males indicating a higher response average at 3.94 out five and females indicating a 3.70 average out of five.

Question 23 asked students to indicate whether Technology Education should be a required part of general education to ensure that high school students graduate with technological literacy and skills needed in the twenty-first century. Results for responses for overall and male/female are shown in Table 14, for those who had taken college prep courses in Table 15, and anticipated plans after graduation Table 16.

Table 14

Should Technology Education be Required

Response	Frequency Overall	Male	Female
Strongly Agree	12	6	6
Agree	31	14	17
Neutral	30	15	15
Disagree	21	6	15
Strongly Disagree	6	4	2
Total	100	45	55
Frequent Response Average	3.22	3.26	3.18

Table 15

Should Technology Education be Required, College Prep

Response		Student with College prep	Students without College prep
Strongly Agree	12	6	6
Agree	31	11	20
Neutral	30	14	16
Disagree	21	16	5
Strongly Disagree	6	3	3
Total	100		
Average frequent response out of five	3.22	3.02	3.42

Table 16

Should Technology Education be Required, Career Plans

Response	4 year College	2 year College	Enter work Force	Undecided
Strongly Agree	10	2	0	0
Agree	15	8	2	6
Neutral	18	10	1	1
Disagree	14	5	0	2
Strongly Disagree	6	0	0	0
Total	63	25	3	9
Average frequent response out of five	3.14	3.28	3.66	3.44

The last question students were asked to rate was when comparing core courses offered at New Richmond High School, they perceived the value of Technology Education as equal to or more valuable in preparing them to be knowledgeable citizens of the twenty-first century. The three most frequent student responses were:

Agreed -   (38 percent)

Neutral -   (33 percent)

Strongly Agreed -   (12 percent)

Those who had and had not taken college prep courses (Table 17) and those who have or have not taken vocational courses (Table 18) were also evaluated by student responses. Students who have taken college prep courses, responded neutral most frequently (19 responses) while those who have not taken college prep courses responded most frequently agree (24 responses). Comparatively, the average frequent responses for those who have not taken college prep course was higher (3.58 average) than of those students who have taken (3.26 average).

Table 17

Perceived value of New Richmond High School Technology

Response	Overall	Student with College prep	Students without College prep
Strongly Agree	12	6	6
Agree	38	14	24
Neutral	33	19	14
Disagree	14	9	5
Strongly Disagree	3	2	1
Total	100		
Average frequent response out of five	3.42	3.26	3.58

Table 18

Perceived value of New Richmond High School Technology

Response	Overall	Student with Vocational Courses	Students without Vocational Courses
Strongly Agree	12	10	2
Agree	38	29	9
Neutral	33	27	6
Disagree	14	11	3
Strongly Disagree	3	2	1
Total	100		
Average frequent response out of five	3.42	3.43	3.38

Chapter V

Summary, Conclusions, Recommendations

<u>Summary</u>

The purpose of this study was to measure the level of perceived importance students place on technological literacy, technical skills, and the areas of instruction that best provide the technical literacy needed to live and work in the twenty-first century.

Existing literature was reviewed to determine if any previous investigations had been done concerning the perceptions that high school seniors have of technological literacy, technical skills and the best instructional area providing this information. It was discovered that many studies had been done by educators, professional leaders, and businesses representatives on what they perceived to be important, but no studies of students perceptions had been completed. Knowing students perceptions could help educators, professional leaders, and business representatives better understand the students and help them better prepare students for the twenty-first century.

A survey was developed under the supervision of the research advisor to gather information from New Richmond High School twelfth grade students. The survey contained twenty-three questions relating to five objectives and was distributed to all New Richmond High School Seniors twelfth grade students. A total of one hundred seventy eight surveys were distributed to English teachers of twelfth grade students along with a cover letter. One hundred seven responses were returned and of those one hundred seven, seven were thrown out because they were not fully completed. After deducting those seven surveys a total of one hundred surveys remained. The results were hand

tabulated by the researcher using Microsoft Excel.

Conclusions and Recommendations

The following conclusions and recommendations are based on the findings of this study and are used to answer the five research objectives of this study.

Technical Skills and Technological Literacy

The first research objective was to determine to what extent students understand the importance of technical skills and technological literacy in the twenty-first century.

The data showed more than three-quarters of the students (82 percent), considered themselves informed or very informed about technological literacy and skills. Of the remaining students who did not consider themselves informed, 16 percent stated that they were not informed. The data was also divided based on male/female responses to determine if one gender considered itself-more technologically literate. More males than females (4.4 percent more) indicated that they considered themselves more informed. When students where asked to rate their classmates on the same question, only 62 percent indicated that their classmates were informed on the importance of technological literacy and skills. Of the one hundred students, just over one quarter stated that they were neutral about their classmates technological knowledge and skills. This the data was also compared to determine if there was a difference between males and females. The results of the data showed that more males than females (1.9 percent more) considered their classmates more informed on technological literacy and skills.

When asked if students with technological literacy and skills were better prepared to use technology in the twenty-first century, 84 percent indicated they agreed or strongly

agreed that technological literacy and skills were important. Males had a slightly higher average of agreement than females, (4.3 compared to 3.9 out 5, 5 meaning strongly agree) with the statement. A comparison of students who have taken and have not taken college prep indicated a significant difference. One hundred percent of students who have not taken college prep courses indicated that it was important to be knowledgeable about advances and innovations in technology while only thirty-three percent of those who have taken college prep agree or strongly agree. On the statement that students should be educated in general technological literacy and skills, that seventy-seven percent indicated agree or strongly agree. The data also showed ninety percent of students who have not taken college prep courses agree or strongly agree with the statement compared to sixty-four percent of those who have taken college prep courses.

Based on the data it can be concluded that most students surveyed believed that they were informed about technological literacy and skills and that it is important to know for the twenty-first century. It can also be concluded that male students believe they want to be and believe they are more informed and knowledgeable about technological literacy and skills needed for the twenty-first century. Students who have not taken college prep courses place more value in understanding technological literacy and skills needed for the twenty-first century.

Based on the conclusions it is recommended:

1). Students who make up the small percentage of not informed about technological literacy and skills need further study to determine why.

2). Females need to be made more aware of the importance of obtaining technological

literacy and skills needed for the twenty first century.

3). New Richmond High School counselors and staff should encourage college prep students to take general technological literacy and skill courses to insure the student understands the importance that is placed on this knowledge for twenty-first century technology use.

Understanding Technology

The second objective was to determine the level of importance that students place on understanding the technological world in which they will work and live.

The data showed seventy-three students (73 percent) responded as agree or strongly agree that students will need to have more technological literacy and skills in the twenty first-century and fifty-three students (53 percent) agree or strongly agree that students will need more intensive training and experiences in the twenty-first century. A comparison was made of those students who have and have not taken vocational courses to compare whether or not vocational courses have an impact on a students' belief that more technological literacy and skills will be needed and that it will require far more intensive training. According to the survey, there was little difference between the responses of students who have taken vocational courses and those who have not. When responding to the statement, that they place a high level of importance on learning and understanding technology in the world, fifty-two students (66 percent) who have taken vocational courses responded as agree or strongly agree. Twenty-six students (33 percent) indicated that they were neutral or disagree with the statement. Of those who had not

taken vocational courses, 11 students (50 percent) indicated that they agreed or strongly agreed while the 11 other students were neutral or disagreed.

Based on this data it can be concluded that the majority of students realize they will need to know more about technological literacy and skills in the twenty-first century. However, only about half of the students believe the new knowledge about technological literacy and skills will require more intense training and experiences.

It can also be concluded that students who have taken vocational courses place a higher level of importance on learning technological literacy and skills than those who have not.

Based on the conclusions, it is recommended:

1). All students should be encouraged to take vocational courses to help increase awareness and knowledge of technological literacy and skills.

Necessary Level of Technological Literacy

The third research objective was to determine what level of technological literacy students think is necessary, and what technical skills are needed for the twenty-first century.

The data showed students believe the top three technological skill are ability to operate a computer and its standard programs, ability to adapt to changing technology, and ability to use all features on home and personal appliances and entertainment systems. Of the students responding to ability to operate computer programs, males responded twenty six times (57.7 percent) as that being most important in comparison of females who responded thirty-five times (63.6 percent. On the ability to adapt to changing technology. Males responded 19 times (42.2 percent) as that being most

important, while females responded 13 times (23.6 percent). The data also showed that both male and female students indicated maintaining continuous s education in technology and technical skills after high school as the least important of the given choices on the survey.

Based on this data, it can be concluded that students perceive the use of computers and the technology that uses computers to be the most important technical skill and knowledge needed in the twenty-first century. It can also be concluded that students perceive the knowledge and skills needed to adapt and use computer technology is received before they graduate from high school.

Based on the conclusions it is recommended:

1.) A variety of computer and computer related technology courses be created and available for New Richmond High School Students.

2.) Teachers devote instructional time to the importance of students continuing education in technological literacy and technical skills after they leave high school.

Program Delivers Technological Skills

The fourth research objective was to determine which high school programs students believe best deliver the needed and technological literacy and skills.

The data showed the three highest rated courses that deliver technological literacy and skills, based on frequency of response averages (on a scale of 1 through 5 with 1 being the most important) are Math (2.10), Science (2.11) and Technology Education (2.26). The data was then analyzed based on students who had or had not taken college prep courses. Students who have taken college prep courses rated Science (2.12) Math

(2.14) and English (2.28) as the three most important courses. In comparison students who have not taken college prep courses rated Technology Education (2.02), Math (2.06) and Science (2.10) as the three most important high school programs delivering the needed technological literacy and skills.

Based on this data it can be concluded that students perceive Math and Science and Technology Education as the most important programs in high school providing the needed and technological literacy and skills for the twenty-first century.

Based on the conclusions it is recommended:

1.) Technology Education should continue being offered at the high school level.

2.) Educational leaders, business representatives and educators should be informed about the most important programs delivering technological literacy and skills for the twenty-first century as perceived by twelfth grade high school students.

Perceived Importance of Technology Education

The fifth research objective was to determine the perceived importance of Technology Education in presenting technical information that students require.

The data showed students perceived general education courses (48 percent) and high school core courses (56 percent) to be about equal importance in preparing them for twenty-first century technological literacy and skills. About one third of the students indicated that they were neutral about one or both being important. When asked specifically about the importance of Technology Education, fifty-five percent of the students agree and thirteen percent strongly agree Technology Education courses were important, with seventy-four percent indicating that it was important to offer Technology

Education at the high school level to prepare students for the twenty-first century. When asked if Technology Education should be a required course at the high school level, almost one half (43 percent) of the students indicated that it should be. Another thirty percent responded neutral about requiring Technology Education at the high school level. More students who have not taken college prep courses (52 percent) believed Technology Education should be required than those who have taken college prep courses (34 percent) courses. The data also showed that eighty-eight percent of all students plan on entering a two or four year college after graduation. Of these eighty-eight percent, thirty five percent responded that they agreed or strongly agreed with twenty-eight percent responding neutral.

Based on the data it can be concluded that most students perceive Technology Education as an important part of high school education in preparing them for technological literacy and skills for the twenty-first century. It can also be concluded that while most students will be seeking higher education after they graduate high school many of these students believe technology education should be required.

Based on the conclusion it is recommended that:

1.) New Richmond High School considers requiring students to take Technology Education.

Recommendations for Future Studies

After completing the research, survey and analyzing the results new questions and thoughts formed about this research. After first reviewing the raw uncalculated results of the survey it was noticed that many students (more than 30% sometimes) had selected

neutral for their response on the survey. Although a neutral response could have indicated that they did not have enough information to appropriately respond it is possible that students selected neutral because it required little thought about the statement or that they didn't care. By eliminating the neutral choice would force students to think more about the statement and then select the best response either for or against. The results of a new survey may give a more accurate result. Therefore it is recommended that the following new studies be completed:

1.) A new study should be undertaken using the same survey with the elimination of neutral for a response to determine what effects it may have on the current survey results.

2.) A new study should be undertaken to determine the specific type of information and material that should be offered in a required Technology Education course.

3.) A study should be undertaken to determine what technological literacy and skills students perceive they will need more training in.

4.) A study should be undertaken to determine what perceived technological literacy and skills are learned in each program area.

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Technological Literacy and Technical Skills Survey

1. Male _____   Female _____

2. Age _____

3. During the last two years of high school you completed two or more college prep courses

   Yes _____
   No _____

4. During the last two years of high school you completed 2 or more courses in vocational education. (Technology Education, Business Education, Family Consumer Education, or Agriculture Education)

   Yes _____
   No _____

5. After high school graduation you intend to:

   a. attend a 4 year college
   b. attend a 2 year college
   c. enter the work force
   d. undecided

6. How informed do you consider yourself to be concerning technical advances and innovations in technology in the twenty-first century.

   a. very informed
   b. informed
   c. not informed
   e. need to be informed

After reading each statement review the rating scale and circle the letters which best describes your views or feelings about the statement.
SD = Strongly disagree   D = Disagree   N = Neutral   A = Agree   SA = Strongly agree

7. As a whole you consider your classmates   SD   D   N   A   SA
   to be highly technological literate with technical
   advances and innovations in technology.

8. Individuals with technological literacy   SD   D   N   A   SA

and technical skills are better prepared to
use technology in the twenty-first century.

9. It is important for students to be   SD   D   N   A   SA
    knowledgeable about advances and
    innovations in technology.

10. To cope with twenty-first century technology   SD   D   N   A   SA
    all students should be educated in general
    technological literacy and skills.

11. High school students lacking technological   SD   D   N   A   SA
    literacy and skills may be less financially
    successful as those with them.

12. High school graduates will need to have   SD   D   N   A   SA
    more technical literacy and skills in the
    twenty-first century than in the twentieth-century.

13. The technical skills and technological literacy   SD   D   N   A   SA
    required in the twenty-first century will require
    far more intensive training and experiences
    than did those of the twentieth century.

14. You place a high level of importance on   SD   D   N   A   SA
    learning and understanding technology in the
    world.

After reading each statement use the following rating scale and circle the number which
best describes your views or feelings about the statement.
               (1= most important and 5 = least important)

15. High school students are facing a high level of technological advances and need to
    demonstrate technical literacy and skills in the twenty-first century. Given this fact
    indicate the range of importance of each of the listed below

    - operate standard computer   1   2   3   4   5
      programs
    - understand and follow technical   1   2   3   4   5
      manuals to use new technology
    - use all features on home and personal 1   2   3   4   5
      appliances and entertainment systems
    - ability to adapt to changing technology 1   2   3   4   5
    - ability to use modern tools of science 1   2   3   4   5

and technology

- maintain continuous education in technology and technical skills after high school   1   2   3   4   5

After reading the statement use the following rating scale and circle the number which best describes your views or feelings about the statement.
(1 = most important and 5 = least important)

16. Research indicates that in the twenty-first century high school graduates will need

higher technological literacy and technical skills. Given this probability indicate the

range of importance of each of the disciplines listed below in preparing a student for

the twenty-first century with these skills.

Science	1	2	3	4	5
Math	1	2	3	4	5
English	1	2	3	4	5
Social Studies	1	2	3	4	5
Technology Education	1	2	3	4	5
Business Education	1	2	3	4	5
Agriculture	1	2	3	4	5
Family Consumer Education	1	2	3	4	5

After reading each statement review the rating scale and circle the letters which best describes your views or feelings about the statement.

SD = Strongly disagree   D = Disagree   N = neutral   A = Agree   SA = Strongly agree

17. General education courses prepare high school students with a wide range technological literacy and technical skills.   SD   D   N   A   SA

18. Core course needed to graduate are required to prepare students to be knowledgeable citizens of the twenty-first century

SD   D   N   A   SA

19. Technology Education courses prepare high school students with a wide range technological literacy and technical skills

SD   D   N   A   SA

20. It is important to offer Technology Education at high school.

SD   D   N   A   SA

21. Technology Education courses help students develop technological literacy and skills needed to make them smart consumers and employees in the twenty-first century.

SD   D   N   A   SA

22. Technical literacy and skills taught in Technology Education courses help prepare students to make knowledgeable career decisions for the twenty-first century.

SD   D   N   A   SA

23. Technology Education should be a required part of general education to ensure high school students graduate with technological literacy and skills needed in the twenty-first century.

SD   D   N   A   SA

24. When comparing core courses offered at New Richmond High school, you perceive the value of Technology Education as equal to or more valuable in preparing you to be a knowledgeable citizen of the twenty-first century.

SD   D   N   A   SA

<u>Survey Participation</u>

Dear New Richmond High School Student,

My name is Ken Bessac and I am conducting a survey of New Richmond High School Seniors. I am conducting research that examines the perceived importance student's place on learning technological literacy and technical skills needed in the twenty-first century. This research will also examine the courses students perceive most important in teaching this information and skills. Before completing the questionnaire, review the definitions attached to the survey.

Risks

There is little or no risk to you filling out this questionnaire. Your responses are completely confidential

Benefits

Although the results of this study may be of benefit to others in the future, there is no direct benefit to you by participating in this study.

Confidentiality of responses

Your answers are strictly confidential. Only the primary researcher or his/her designee will have access to the confidential raw data.

Right to withdraw or decline to participate

Your participation in this study is entirely voluntary. You may choose not to participate without any adverse consequences to you.

Your input and response is greatly appreciated!

Sincerely,

Ken Bessac