FORMING HARTFORD UNION HIGH SCHOOL'S WELDING CURRICULUM TO MEET LOCAL INDUSTRIES' NEEDS

By

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ABSTRACT

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FORMING HARTFORD UNION HIGH SCHOOL'S WELDING CURRICULUM
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TO MEET LOCAL INDUSTRIES' NEEDS

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At the time of this study, Hartford Union High School's welding curriculum was directed toward the articulation agreements it had with area technical schools. Not many students were taking advantage of these agreements, instead they were signing up for the high school's welding internship program. The welding curriculum had not been revised to prepare students for the specific skills local industry requires of them. The researcher used a survey to measure the student's input, and an interview to measure the factory internship supervisor's input. These two sources of information gave the researcher a good idea if the current curriculum needed to be revised to better prepare students for their internship.

After reviewing both sets of data, the researcher concludes that the existing welding curriculum is for the most part meeting the needs of local industry. There are

just a few areas that the former students and factory internship supervisors have pointed out that need to be tweaked to make the school-to-work transition smoother. In the classroom the welding instructor needs to spend more time on how to use and read a dial caliper, how to conduct safety inspections of equipment, and how to prevent arc flash. The high school internship supervisor needs to inform future internship students that no horseplay is allowed on the shop floor, how crucial it is for them to take responsibility for their quality of work, and that communication with internship supervisors is important. Lastly, because of the eight period rotational schedule the high school uses, the high school internship supervisor needs to inform the factory internship supervisor exactly when the internship students are going to show up for work every week.

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Chapter I

RESEARCH PROBLEM AND OBJECTIVES

Introduction to the study

Welding is essential to the expansion and productivity of our industries (Miller, p. 1). It is a very popular method of joining metal, plastic and numerous other materials together to form products. Such products include airplanes, space equipment, high-rise buildings, bridges, ships, and cars. The American Welding Society (AWS, 1969) has identified 88 different welding and cutting processes, from state of the art laser welding and cutting to the very basic gas welding and cutting. It would be virtually impossible for anyone to learn how to do every process. Each welding industry specializes in just a few of the different welding processes, which makes each industry unique from the next in the type of welding processes and materials used. This makes it difficult to find qualified employees.

To find employees, many industries look toward technical colleges. Technical colleges train their students in a wide variety of welding processes, making the students more employable at many different industries. Unfortunately, there are not enough technical college students to go around, so companies are forced to train internally.

Local companies in Hartford, Wisconsin, do train internally. They feel this is the quickest and least expensive way to get good employees. Helgesen, a job shop in Hartford, is growing rapidly and cannot find enough qualified employees (Broker,

1997). This has them looking toward what is happening in the local high school's welding program.

The Hartford Union High School's welding program has had an Internship program in place for the last four years. This allows the students to work in the local industries for the last three hours of the school day. During this time, the students earn money and high school credits toward graduation. The industries are very interested in the internship program, because it gives these students a head start to real life production, and reduces the amount of time the industry must spend training students if they decide to continue working there after graduation. However, at this time, the welding curriculum is directed toward students entering technical colleges.

Hartford Union High School's welding curriculum is based on welding coupons together, testing them, and throwing them away. If students make a bad weldment, they simple cut two more pieces of metal and try again. They do this until they make a weldment that passes. Welding coupons together is a great way to learn how to weld, but is a long way from production welding in local Hartford industries.

The curriculum is shaped this way because the high school has an articulation agreement with Moraine Park Technical College and Milwaukee Area Technical College. An articulation agreement is a contract that allows high school students to earn vocational college credit by completing specific tasks during their high school classes. This agreement is a great opportunity for the students, but to this point not many students have taken advantage of it. Approximately three out of the 100 students that finish the program every year attend technical colleges. Instead, most of

the students (approximately 30) are choosing to go directly to work in the local industries.

Statement of the Problem

Research is needed to find the relationship between Hartford Union High School's welding curriculum and the needs of local industry. This study is needed to improve the quality of welding instruction given to Hartford High School students and to improve the quality of employees available for local industry. This research has never been conducted for the community of Hartford, Wisconsin.

Purpose of the Study

The purpose of this study is to revise Hartford Union High School's welding curriculum to better meet the needs of local industry. To better educate Hartford Union High School students in the area of welding, information on the welding processes and techniques used by local industries will be adapted to the welding curriculum. This will make these students more employable and should smooth their transitions from school to work. This information will also improve the caliber of employee the local industry has to select from.

Objectives

To revise the Hartford Union High School's welding curriculum the following objectives were addressed. This research determined if the students had:

1. Adequate entry-level layout skills that are needed to meet local industries' needs.
2. Adequate entry-level safety skills that are needed to meet local industries' needs.
3. Adequate entry-level welding techniques that are needed to meet local industries' needs.
4. Adequate entry-level weldment evaluation skills that are needed to meet local industries' needs.
5. Valuable internship experiences.

Rationale for the study

The Hartford Union High School's welding curriculum needs to be revised. At this time, it is directed toward the articulation agreements with area technical colleges. Not many students are taking advantage of these agreements, instead they are signing up for high school's Internship program. The welding curriculum has not been revised to prepare the student for the specific skills local industry requires of them. With this revision, the school and industry will be linked, which will ease the school to work transition for the students.

Limitations of the study

Some limitations do exist in this study. The researcher notes the following limitations.

- The research only pertains to the local industries of Hartford, Wisconsin, that employ Hartford Union High School's welding internship students.
- The research only pertains to the Hartford Union High School's welding curriculum.
- The research was based on data collected in 1998 - 1999.

Definition of terms

ANSI:	American National Standards Institute is a nonprofit corporation that publishes National Standards in cooperation with technical and engineering societies, trade associations, and government agencies.
Articulation agreement:	A written understanding between a secondary school district and a post-secondary educational institution identifying which credits earned by secondary students are eligible to be counted toward the course requirements for specific post-secondary level program and/or course identified by the post-secondary institution.
American Welding Society:	American Welding Society is a nonprofit society organized and found for the purpose of advancing the art and science of welding. The AWS publishes codes and standards concerning all phases of welding and The Welding Journal.
Brazing:	Group of welding processes in which metal is joined by heating the filler metal at temperatures greater than 840 degrees Fahrenheit, but less than melting point of the base metal.
Coupon:	A small piece of metal used to practice weldments on.
Dial Caliper:	Versatile measuring instrument capable of taking inside, outside, depth, and step measurements.
Entry Level Welder:	An individual who possesses a prerequisite amount of knowledge, attitude, skills, and habits required to perform routine, predictable, repetitive, procedural zed tasks involving motor skills and a limited theoretical knowledge while working under close supervision.
Ferrous metals:	Any metal with iron as a major alloying element.
Gas Metal Arc:	Welding process with a shielded gas arc between a continuous wire electrode and the weld metal. Also known as MIG welding.

Gas welding:	A welding process that uses oxygen combined with a fuel to sustain a flame that generates the heat necessary for welding.
Gas Tungsten Arc:	Welding process in which shielding gas protects the arc between a tungsten electrode and the weld area. Also known as TIG welding.
Heat treatment:	Heat treating is used to soften metal and relieve internal stresses (annealing), harden metal, and temper metal (to toughen certain parts).
Inert gas arc welding:	Welding process that use a gas that does not readily combine with other elements.
Internship program:	A program that allows students to work in local companies to gain hands on experiences during the school day.
Job shop:	An agency that supplies technical personnel or a plant that performs a specific function in a manufacturing process, usually on short-term contracts.
Machining:	Shaping material to the desired shape or contour by using a sharp bit composed by harder metal than the part being machined.
Metallurgy:	The study of the effects of heat on the chemical, physical, and mechanical properties of metals.
Metal surfacing:	Applying filler metal which has similar characteristics to the base metal.
Porosity:	Cavity or cavities in the weld metal or weld interface caused by trapped gas.
Shielded Metal Arc:	Arc welding process in which the arc is shielded by the decomposition of the electrode covering. Also known at Stick welding.

Welders certification:	A certification that validates that the welder can perform methods and practices including all joints welding procedures involved in the production of a weldment.
Welding:	The joining of material by means of melting or fusing their adjoining surfaces.

Chapter II

REVIEW OF LITERATURE

In this review of literature the researcher needs to investigate the key areas of the research to be conducted. The purpose of this study is to revise Hartford Union High School's welding curriculum to better meet the needs of local industry. To better educate Hartford Union High School students in the area of welding, information on the welding processes and techniques used by local industries will be used to modify the welding curriculum. This will make these students more employable and should smooth their transitions from school to work. This information will also improve the caliber of employee local industry has to select from. The researcher will review background information on the city of Hartford, the local industries of Hartford, the Hartford Union High School in general, the Hartford Union High School's welding classes, the articulation agreements with area tech schools, and other literature that could be important to know for the outcome of this research.

The city of Hartford is a small town located in southeastern Wisconsin. It is located in southwestern Washington County and eastern Dodge County. It is about thirty-two miles from downtown Milwaukee. Hartford has a population of 9,303 according to the 1997 U.S. Census.

Hartford is a growing industrial city too. It has total civilian labor force of 67,363. Of that total labor force, 65,263 are employed and 2,100 are unemployed.

The break down of the employed labor force is given in Table 1. More than one-third of the labor force is in manufacturing. The next highest is services with 17.9%.

Table 1

Washington County Employment Labor and Wages: 1998

Industry By Employment	Number of Persons Employed	Percent Of Persons Employed
Agriculture, Forestry, and Fishing:	747	1.6
Construction:	2,481	5.4
Manufacturing:	15,857	34.3
Transportation and Public Utilities:	1,915	4.1
Wholesale Trade:	2,249	4.9
Retail Trade:	7,814	16.9
Finance, Insurance, Real Estate:	1,977	4.3
Services:	8,281	17.9
Public Administration:	4,826	10.5

Table 1 Continued

Unknown Industrial Division:	37	0.1
Total	46,184	100

(HADC, 1998)

The break down of median hourly wages for some of the above occupations is in Table 2. Production jobs have the third highest average wage at $13.48.

Table 2

Washington County Median Hourly Wage For Selected Occupations: 1998

Managerial and Administrative:	$22.28
Sales Occupations:	$15.65
Clerical and Administrative Support Occupations:	$11.21
Service Occupations:	$9.42
Production, Construction, Operating, Maintenance and Material Handling Occupations:	$13.48

(HADC, 1998)

About 50 industrial firms are located in the city of Hartford, engaged in many diversified areas of manufacturing. Hartford's industries are located in three industrial parks and various other industrial areas along State Highway 60 covering about 900 acres. Of the twelve major employers, eight of them incorporate welding into their main product.

The Hartford Union High School is one of ten union high school districts in Wisconsin. The high school is a 9^{th} - 12^{th} grade facility and the district covers about 225 square miles. A five-person school board, 120 professional staff, and 80 support staff members run the high school. The high school enrolls about 1650 students that come from as many as seventeen kindergarten through eighth grade schools. The high school's mission statement is:

> The Hartford Union High School District:
>
> - A dynamic team of students, staff, administration, and school board, sharing a responsibility with our families and diverse communities.
> - Is committed to a comprehensive educational program that ensures all of our students will graduate prepared to succeed in a rapidly changing world. (HUHS Home Page (On-line), 1996)

The Technology Department is composed of ten full-time instructors. This Technology Department is currently the second largest in the state of Wisconsin. These instructors offer a great variety of class. There are thirty-four different classes

that include Auto, Carpentry, Drafting, Graphics, Machine Shop, and Welding. The mission statement of this department is:

> Technology Education is the study of the way people apply knowledge and scientific principles in the use of various tools and materials to solve problems and meet human needs. It is our mission with supportive businesses and industries to prepare all students to adapt and function in an ever-changing technological society, develop employability skills and provide the transition from school to ultimate gainful employment. (HUHS Home Page (On-line), 1996)

The welding program is composed of about 150 students and one instructor. There are four levels of welding. They include Welding 1, Welding 2, Metal Fabrication, and Welding Internship.

Welding 1 is a class that a student could take to explore the art of welding. If a student wants to be eligible for the welding internship he or she needs to take and pass both Welding 1 and Welding 2. If a student wants to gain employment as a welder he/she should take all four classes.

Welding 1 is a half credit, one hour, one semester class offered only to 10^{th} - 12^{th} graders. The course description is:

> Students become involved in the study of welding positioning, heavy plate steel welding, brazing, and cutting. Inert gas arc welding

as applied to mild steel and blueprint symbols as related to welding are also studied.

1) The student will be able to apply various welding processes to join ferrous metals.
2) The student will be able to interpret welding symbols used on blueprint.

* Prerequisite: None (HUHS Home Page (On-line), 1996)

Welding 2 is a half credit, one hour, one semester class offered only to 10th - 12th graders. The course description is:

The students will expand their knowledge and increase their skills in the areas of Shielded Metal Arc, Gas Tungsten Arc, and Gas Metal Arc welding of mild steel, stainless steel, and aluminum in various positions. Metallurgy, heat treatment, welder certification, and metal surfacing are also studied.

1) The student will be able to satisfactorily join aluminum and stainless steel weldments using Gas Tungsten Arc equipment.
2) The student will be able to satisfactorily join mild steel weldments using Shielded Metal Arc and Gas Metal Arc equipment. Many of the activities common to the sheet metal industries are studied including layout, fabrication, assembly, and fastening techniques.

3) The student will study and be able to apply layout techniques, various types of hand tools, machines and fastening methods to complete required and elected projects.

- Prerequisite: Successful completion of Welding 1

(HUHS Home Page (On-line), 1996)

Metal Fabrication is a one credit, two hour, one semester class offered only to 11th - 12th graders. The course description is:

> Metal Fabrication is a class that deals with the cutting, bending, welding, and assembling of sheet metal and structural steel in producing a finished product. Students will build a project from start to finish using fabrication techniques and metal joining processes. Students can design their own projects or select from blueprints available. Students will develop a bill of materials for their project and pay for the materials.
>
> Prerequisite: Successful completion of Welding 1 and Welding 2
>
> (HUHS Home Page (On-line), 1996)

Welding Internship is an up to two credits, three hour, one school year long class offered only to 12th graders. The course description is:

> Students work in local industry during early release or after school (an average of 15 hours) with opportunities of extended hours.

> Students earn at least minimum wage and commit to one school year of employment. Supervision and evaluation is shared by the instructor and employer. Attendance rules of the employer may not necessarily follow those of the school. Recommendation of the instructor and application to the employer is required. Placement is decided through the interview process of the employer.
>
> Prerequisite: Successful completion of Welding 1 and Welding 2
>
> (HUHS Home Page (On-line), 1996)

Hartford High School also has an articulation agreement available for their students involved in the welding program. Moraine Park Technical College and Milwaukee Area Technical College have both made similar agreements with Hartford Union High School. The articulation agreement reads like this:

> Students completing Hartford Union High School Metal Fabrication class and its prerequisites may be given credit for Welding Practice 1 and Welding Practice 2 upon acceptance into the MATC's and MPTC's Welding Technology Program. Students must be enrolled at MATC's or MPTC's no later than two years after completion of their last Hartford Union High School welding course. June 1997 graduates of the Hartford Union High School are the first potential beneficiaries. (MATC, 1996)

The researcher then looked for studies and article that would relate to this study. The researcher could not find any previous research done on training welding students for local industries. However, the researcher found a study related in the construction field.

Steve Olson completed a thesis on "Preparing Qualified Young Construction Workers" for the National Louis University. Olson's statement of the problem was "Are students coming out of high school construction programs with skill they need to be successful in the construction field?" (Olson, 1998, p. 3). Although this research was done in a different field, the data collection is what the researcher was interested in. Olson collected his data by talking with or interviewing area contractors and surveying past students who completed his upper level class. His research was going to be used to develop a better upper level class. His conclusion stated that it would be almost impossible to develop an upper level class that would meet the expectations of all area contractors and every type of student. He admitted that he had a good start, but will have to keep the communication highways open with both the area contractors and past students to keep this upper level class polished.

The researcher did find several magazine articles related to his research. The article "Teen Welders: The Key To Our Future" (1997) laid out a lot of key information for this research and the researcher found several articles to support the information in this article. The first point that the article "Teen Welders: The Key To Our Future" makes is that there is a serious shortage of qualified welders available for

industry. While technical schools are turning out large numbers of qualified welders there is still not enough to go around.

Next the article "Teen Welders: The Key To Our Future" along with the article "AWS Entry Level Welder Program Makes S.E.N.S.E."(1995) pointed out that the AWS had the foresight to see that the future of welding depends upon its youth. The AWS has developed a welding curriculum for high school programs to follow if they wish entitled "Entry Level Welder".

> For schools looking to increase the hiring rate of their students, Robert Reeve (AWS Director of Education) explained, it makes sense to consider adopting this national skill standard. The emphasis, he added, is on education that produces employable graduates. By employable I mean a student who has shown a certain level of competency in the right skills. (Woodward, 1995, p.49)

The Entry Level Welder Program was developed from input provided by industry, educators, and government under strict ANSI rules. The whole idea by the AWS is to help industries and instructors produce more entry level welders.

Another factor for students to get proper education is industries' communication with instructors. The article "Teen Welders: The Key To Our Future" make this point very strong. "How can welding instructors be expected to supply industry with qualified entry-level welders if they are not given information about what is needed"(Williams, 1997, p.62). The article told a story about a student

who went to apply for a job at a local industry. The student passed his welding test easily and was hired. Then the student was placed at a welding station with parts and a blueprint and was told to let them know when he was finished. He was lost and never completed one part. The student was quickly removed and demoted to another department. Sadly, the student's confidence was ruined because he had no idea what would be expected of him at this job and was not prepared. Instructors and employers need to communicate to make the school to work transition easier for students. If this transition is not smooth many students will never have the courage to enter industry to apply for a job.

The last thing that the researcher was interested in was how to train students for welding in a factory. Most training facilities train welders by welding coupons together, while many articles the researcher found said that students really learn best when making projects.

The article "Welder Training with a Reggae Beat"(1997) commented about two men developing a welding training center in the Caribbean. The article mainly focused on the developing of this training center. The researcher did take special note on how they planned on doing the practice training. They trained the students by welding coupons together, visually inspecting them, and throwing them away. Coupon welding is also the basis of the Entry Level Welder Program that the researcher discussed earlier.

The articles "The Screaming Eagle Soars and So Do These Metals Students" (1997), "Students Take a Step into the Real World with Bridge Project" (1998), and

"Training Winners for Industry" (1999) focused on the students making projects that they really dreamed of making. In all cases, the instructors said it was a great experience for the students and them. The students gained great problem solving skills and the welding program gained popularity. All of these students took pride in their welding skills and will make good employees for the welding industry.

This literature review was very helpful in this research. Because there is such a shortage of welders in the Hartford area, it is very important that the researcher really opens the line of communication with the local welding industry. The researcher would hate to have students have a bad experience because the researcher did not properly prepare them for their future job.

Chapter III

METHODS AND PROCEDURES

Introduction

Research is needed to improve the quality of welding instruction given to Hartford Union High School students and to improve the quality of employees available for local industry. This research will determine if the students currently have adequate entry-level layout skills, safety skills, welding techniques, and weldment evaluation skills that are needed to meet local industry needs. In addition, it will determine if the students had a valuable internship experience.

The methods and procedures used in this study are explained in this chapter under the headings of "Research Design", "Sample Selection", "Instrumentation", and "Research Schedule".

Research Design

A descriptive research design was used, based on an interview and a survey. The interview was designed for the local industry internship supervisors. This allowed the researcher to meet one-on-one with each of the five internship supervisors to gain very detailed information on how well the students were prepared to meet the local industries' needs. It also allowed the researcher to clarify the answers to the interview questions, which were based on the objectives.

The survey was designed for the internship students. Because there were thirty internship students in various locations to get information from, the survey

allowed the researcher to ask questions of each one of the students without making the process too time-consuming for the students or the researcher. The questions were developed from the objectives. Each objective had at least two questions in the survey. This allowed the students more opportunity to comment about their internship experience and how well they thought they were prepared for the transition from school to work. It also gave the researcher a variety of data for each of the objectives.

Sample Selection

The participants in the interviews were local industry supervisors involved in the internship program who had overseen two or more internship students from 1994 to 1999. There were five supervisors who met these criteria. Because of the small size of the population, a 100% sample size was used.

The participants in the surveys were former students who were involved in the internship program from 1994 to 1999. In order for students to be involved in the welding internship program, they had to be of senior status and have completed the Welding I and Welding II courses offered by Hartford Union High School. The population for the surveys was thirty. Because of the small size of the population, a 100% sample size was used.

Instrumentation

The data from the interviews covered the various welding skills the industry supervisors thought an internship student needed to enter the internship program and how well they met the needs of the industry. The topics discussed during the supervisor's interview included: years that the supervisor had been involved in the internship program; the number of students they supervised; their concerns with the students' safety habits on the job; the adequacy of students' welding skills; their concerns with the students' workmanship; the overall work habits of the students; the positives of the internship program; and any suggestions to improve it.

The data from the survey covered the various welding skills the internship students' thought they needed to enter the internship program. The questions that were asked on the internship students' surveys included: the students' layout skills, safety skills, welding techniques, and weldment evaluation; and their over all experience and enjoyment of the internship program.

The sources of the data for the interviews were the local industry supervisors involved in the internship program that had supervised two or more internship students from 1994 to 1999. The sources of the data for the surveys were the students involved in the internship program from 1994 to 1999.

To collect the data for the interviews, the researcher contacted the local industry supervisors involved in the internship program and asked if they would participate in the research. If the supervisor agreed, a date and time was set up for the interview. At that time, they were given a copy of the interview questions to review

and a human research subject consent form to ensure them that their participation was voluntary. During the interviews, the researcher took notes and asked the supervisor for permission to tape record the interview. The supervisors were ensured that no names would be revealed and that all the notes from the interview would be destroyed at the completion of the research.

To collect the data for the surveys, the researcher got a class list of past and present internship students and asked them to fill out the survey. For the past internship students, the surveys were mailed to them to fill out and return in an envelope. For the present internship students, the surveys were handed out during class time, and one of the students was asked to collect the surveys in an envelope at the end of class to ensure confidentiality. All surveys had a human research subject consent form attached that ensured their participation was voluntary. Also, no identifiers were used on the surveys or the envelopes.

The data from the interviews was evaluated by listening to the tapes and finding common answers to each of the interview questions. A computer-analyzed program at the University of Wisconsin - Stout evaluated the data from the surveys. The interviews and surveys were crosschecked to identify where they were in agreement.

To justify the validity and reliability of the interview and survey, they were checked over by five teachers involved in internship programs, the administrator directly in charge of the internship students, two factory supervisors who dealt with internship students, and seven students involved in the internship program. After

their review and recommendations, the questions were considered valid and reliable to generate the responses necessary for the research.

The interview and survey were then sent to the thesis paper advisor for approval, and then to the Graduate College for approval of the research topic and protection of human subjects.

The interviews and surveys allowed the researcher to collect the data necessary to find the relationship between Hartford Union High School's welding curriculum and the needs of the local industry. They helped the researcher to improve the welding curriculum and the quality of welding instruction given to Hartford Union High School students. That, in turn, will help improve the quality of employees available to the local industries. The questions on the interview and survey were directly aligned with the researcher's objectives of adequate entry-level layout skills, safety skills, welding techniques, and weldment evaluation skills that are needed to meet local industries needs; and the internship students' over-all experience and enjoyment of the internship program.

There are a few limitations involved in this study that the reader should be aware of. The research only pertains to the local industries of Hartford, Wisconsin, that employ Hartford Union High School’s Co-op students in welding. Also, the research only pertains to the Hartford Union High School’s welding curriculum. Last, the research only pertains to the 1998-1999 time period.

Data Analysis

The surveys were sent to the University of Wisconsin-Stout to be analyzed by a computer program. The data was separated into three different areas. The first analysis printout tabulated the answers to each survey question from all of the respondents. The second printout tabulated the answers to each survey question according to the year each respondent interned (survey question 21). The third printout tabulated the answers to each survey question according to their current use of welding (survey question 22).

The researcher analyzed the interviews. The comments on the tapes and the researches notes were aligned with the appropriate objectives.

Research Schedule

The data for the interview was collected between June 14, 1999, and June 30, 1999. The data for the survey was collected between June 1, 1999, and June 30, 1999.

From July 1, 1999, through July 9, 1999, the interviews were analyzed by the researcher according to the objectives. The surveys were sent to the University of Wisconsin - Stout to be evaluated by a computer analyzed program, July 15, 1999. The analysis of the surveys was returned, July 29, 1999. From July 30, 1999 to August 10, 1999, the computer printouts were analyzed by the researcher according to the objectives. From October 28, 1999 to November 1, 1999, the researcher also compared the answers to the interviews with the answers to the survey.

Chapter IV

RESULTS AND DISCUSSION

A descriptive research design was used, based on an interview and a survey. The interview was designed for the local industry internship supervisors. This allowed the researcher to meet one on one with each of the five internship supervisors to gain very detailed information on how well the students were prepared to meet the local industries' needs. It also allowed the researcher to clarify the answers to the interview questions, which were based on the objectives.

The survey was designed for former internship students. Because there were thirty former internship students in various locations to get information from, the survey allowed the researcher to ask questions to each one of the students without making the process too time consuming for the students or the researcher. The questions were developed from the objectives. Each objective had at least two questions in the survey. This allowed the students more opportunity to comment about their internship experience and how well they thought they were prepared for the transition from school to work. It also gave the researcher a variety of answers to each of the objectives.

The researcher according to the objectives analyzed the interviews. The notes and recordings from the interviews were reviewed and put into a table. This was done to see if the answers were similar and to see if the supervisors thought the current curriculum was meeting the needs of the local industry.

Twenty-eight out of thirty surveys were returned to the researcher. The surveys were then sent to the University of Wisconsin - Stout to be evaluated by a computer program. The surveys were evaluated in three areas: data for all responses, data for those currently using welding skills, and data based on the year the students interned. The data based on the year the student interned has been omitted from the rest of the research report because of the small numbers of students in some years and the fact that there did not appear to be any important differences in the response patterns from the other two areas.

The researcher analyzed the computer printouts according to the objectives and the results are explained in this chapter by each objective under the headings of "Current Use of Welding Skills", "Adequate Entry-Level Layout Skills", "Adequate Entry-Level Safety Skills", "Adequate Entry-Level Welding Techniques", "Adequate Entry-Level Weldment Evaluation Skills", and "Valuable Internship Experiences".

Current Use of Welding Skills

The following table (Table 3) illustrates how former students were using their welding skills at the time of the survey. The students were asked to circle all the responses that applied for their current use of welding skills (See Appendix 1 for a copy of the student survey). There were forty replies from twenty-eight former students to this question. Twenty-seven of the twenty-eight still use their welding skills in some shape or form and one former student said that he did not use his

welding skills. Twenty-one of twenty-eight former students used welding in a full time or a summer job at the time of the survey.

Table 3

Graduates' Use of Welding Skills

Use of welding skills at the time of the survey.	Number of students	%
Uses welding for an occupation	13	46
Uses welding for a summer job	8	29
Uses welding for a hobby	9	32
Uses welding occasionally	9	32
Don't use welding	1	4
Total N = 28	40	

The rest of this report will use the responses from the former students who said they used welding for an occupation. These former students have the most current knowledge in the field of welding.

Adequate Entry-Level Layout Skills

The following table (Table 4) displays results for objective one by summarizing the interview comments made by the internship supervisors. Overall, the internship supervisors were satisfied with the entry-level layout skills the

internship students possessed. Blueprint reading skills are not needed at the internship level for 4 out of the 5 local industries, but are helpful for future employment at those industries.

Table 4

Supervisors' Perceptions of Students' Entry-Level Layout Skills

Local Industries	Comments
A	Overall, the students are good and I would say they have improved over the last two years. The students don't read blueprints at the internship level, but if they become future employees the will need that skill.
B	They have good basics and adapt easily to our style.
C	The students have good blueprint reading skill and that is a very important part of their job.
D	The students do a pretty good job. Blue print reading is not that important at this level, because every part to be welded goes into a jig or fixture and that makes blueprint reading unnecessary.
E	Most of the students read a blueprint better then they can read a tape measure. The students should be able to read a dial caliper, which most cannot do.

At industry C blueprint reading skill is very import at the internship level and their past students have done a good job reading them. Industry E would like more time spent training students how to use and read a dial caliper.

Table 5 displays results for objective one by presenting the data from the former internship student survey. The former students were not completely satisfied with the entry-level layout skills they possessed entering the internship. The former internship students agree that they had adequate measuring skills and agree they could produce parts within tolerances specified by the blueprints during their internship experience. They were less certain that they had adequate blueprint reading skills.

Table 5

Graduates' Perceptions of Their Entry-Level Layout Skills

		Overall			Currently Welds		
No.	Item	M	SD	n	M	SD	n
3	I had adequate measuring skills	4.68	.67	28	4.85	.38	13
4	I had adequate blueprint reading skills	3.75	1.21	28	3.62	1.26	13
5	I could produce parts within tolerances specified by the blueprints	4.14	1.04	28	4.08	1.12	13

1 = Strongly Disagree 2 = Disagree 3 = Undecided 4 = Agree 5 = Strongly Agree

There were six comments made by former students regarding blueprint reading. Six out of six suggested that we should have spent more time on blueprint reading skills.

Adequate Entry-Level Safety Skills

Table 6 displays results for objective two by summarizing the comments made by the internship supervisors during the interview. Overall, the internship supervisors were satisfied with the entry-level safety skills the internship students possessed.

Table 6

Supervisors' Perceptions of Students' Entry-Level Safety Skills

Local Industries	Comments
A	Welding safety habits are good overall, but a few students are throwing things at other students and that is dangerous in a factory atmosphere.
B	No problems out of the ordinary.
C	The students have great safety habits. The students have even pointed out unsafe equipment and/or practices to the supervisor.
D	Overall welding and personal safety is excellent. We have had a few incidents with arc flash, but only when welding aluminum.
E	Our factory supervisors teach the needed safety skill to the students, so we have very few safety concerns.

Five out of five industries said that students are entering their internship experience with adequate entry-level safety skills. There was mention of a few isolated safety issues. Industry D had a few incidents with arc flash and industry A had some students throwing things at each other during their internship time. On a positive side industry C said that past students have pointed out overlooked safety issues to them.

Former students' perceptions of their safety skills are summarized in Table 7. The former internship students were not quite satisfied with the entry-level safety skills they possessed entering the internship. The former internship students agree that they had adequate personal safety skills, but are not as confident they could perform all safety inspections of equipment during their internship experience. There was one comment stating that local industries do not put up with horseplay.

Table 7

Graduates' Perceptions of Their Entry-Level Safety Skills

		Overall			Currently Welds		
No.	Item	M	SD	n	M	SD	n
1	I had adequate personal safety skills	4.5	.64	28	4.54	.66	13
2	I could perform all safety inspections of equipment	3.89	.99	28	3.85	1.07	13

1 = Strongly Disagree 2 = Disagree 3 = Undecided 4 = Agree 5 = Strongly Agree

Adequate Entry-Level Welding Techniques

The following table (Table 8) displays results for objective three by summarizing the comments made by the internship supervisors during the interview. Overall, the internship supervisors were satisfied with the entry-level welding techniques the internship students possessed. Five out of five supervisors agreed that the former internship students have adequate entry-level welding techniques. Every industry welds different materials and has different techniques they incorporate. All supervisors made mention that they would like the students trained for their style of welding.

Table 8

Supervisors' Perceptions of Students' Entry-Level Welding Techniques

Local Industries	Comments
A	The students have good basics. Something that our job requires is to welding in small tight areas where the gun doesn't fit easily and the welders vision are sometimes obstructed. Most students really struggle with that, because they are use to welding coupons together.
B	The students have good general basic skills. We have run into a few students that use a pulling gun technique and we prefer the pushing gun technique. That is the only welding technique concern we have.

Table 8 Continued

C	The students we have had are very good welders. Our product is made out of thin sheet metal, so we expect small weld size. After a few days of practice they adjusted well and were ready for production.
D	The students have generally good welding techniques. Most of the students can make the transition from MIG welding steel to MIG welding aluminum. Since most of our products are made out of aluminum any thing you can do to help that transition would be great.
E	The students are just entry level, that is all. No one can learn how to weld in a classroom. They need at least two years of factory experience to be considered a welder. We will teach them what we want.

Former students' perceptions of their entry level welding skills are summarized in Table 9. The former students were satisfied with the entry-level welding techniques they possessed entering the internship. They gave the highest ratings to their ability to operate all hand tools followed by their welding and cutting skills. There were ten comments made related to this objective. There were no glaring similarities in these comments. The comments were all based on different jobs the students were placed in during their internship experience.

Table 9

Graduates' Perceptions of Their Entry-Level Welding Techniques

		Overall			Currently Welds		
No.	Item	M	SD	n	M	SD	n
6	I could identify all the different types of metals I used	4.21	.83	28	4.15	.80	13
7	I could perform all the different welding and cutting processes	4.54	.58	28	4.46	.66	13
8	I could setup and operate all the welding and cutting machines	4.50	.69	28	4.54	.52	13
9	I had adequate welding and cutting skills	4.61	.50	28	4.54	.52	13
10	I could weld and cut in all positions required	4.54	.51	28	4.54	.52	13
13	I could use their jigs and fixtures easily	4.50	.75	28	4.46	.78	13
14	I could operate all the hand tools	4.68	.61	28	4.62	.65	13

1 = Strongly Disagree 2 = Disagree 3 = Undecided 4 = Agree 5 = Strongly Agree

Adequate Entry-Level Weldment Evaluation Skills

The following table (Table 10) summarizes the comments made by the internship supervisors concerning students' weldment evaluation skills. Overall, the internship supervisors were not quite satisfied with the entry-level weldment evaluation skills the internship students possessed. Three out of the five supervisors said that their former internship students had adequate entry-level weldment evaluation skills. Industry A and industry D have had problems with past internship students taking responsibility for their quality of work. Industry A is concerned with post weld cleanup and industry D is concerned with the student balance between quality and quantity.

Table 10

Supervisors' Perceptions of Students' Entry-Level Weldment Evaluation Skills

Local Industries	Comments
A	The students need to improve on cleaning the welds after welding. We have had problem with splatter, burn though, and whiskers on the parts made by the intern students. These defect really are exposed after the part is painted.

Table 10 Continued

B	We have had very few problems and when we brought their attention to it the problem for the most part it was taken care of.
C	The students were very good. No problems
D	The students need to learn the balance between quality and quantity. Some students are very picky and some students will over look any problems. The students also need to understand that every piece needs to be accounted for. Some students throw defective pieces away and don't account for them, so we are left short in later steps of production. That is a big problem.
E	They do as good as we expect beginning welders to do. They are very good at asking questions if the have trouble.

Overall, the former internship students were satisfied with the entry-level welding evaluation skills they possessed entering the internship (see Table 11). There was only one comment related to this objective. The comment stated that students need to know how to properly take care of porosity.

Table 11

Graduates' Perceptions of Their Entry-Level Welding Evaluation Skills

		Overall			Currently Welds		
No.	Item	M	SD	n	M	SD	n
11	I could identify all the welding defects	4.25	.89	28	4.31	.95	13
12	I could fix all the welding defects that I identified and/or created	4.29	1.01	28	4.15	1.14	13

1 = Strongly Disagree 2 = Disagree 3 = Undecided 4 = Agree 5 = Strongly Agree

Valuable Internship Experiences

The following table (Table 12) displays results for objective five by summarizing the comments made by the internship supervisors during the interviews. Overall, the internship supervisors were very satisfied with the internship experience. Five out of five supervisors said the internship is a great experience for the students and them. Three out of five supervisors said they did struggle with the high school eight period rotational schedule, because they did not know when a student was going to show up for work.

Table 12

Supervisors' Perceptions of a Valuable Internship Experience

Local Industries	Comments
A	The internship helps the student and us. Over all a good experience, but we have had a few students get lazy at the end of the school year. The students need to understand this is a job not just a school class. They need to finish strong. We also have a hard time with the high school class schedule. We need a way to know when they are showing up to work.
B	The internship program is an excellent opportunity for high school students. They get credits toward graduation, decent pay, and a real life experience. If they aren't interested in college or tech school, they also got their foot in the door for a full time job come summer. It is a win win for the students and us.
C	The internship program is great for students and great financially for us.
D	The internship program is a great way for us to add to our work force. I think it should be required of all students to show them what the real work is like. We do struggle with the eight period rotational schedule used by the high school, because we don't always know when the students are going to show up.

Table 12 Continued

E	The internship program is a good real life experience for the student and helps us get good quality employees. We do find the eight period schedule use by the high school confusing.

Former internship students were for the most part satisfied with their internship experiences (Table 13). Former students agreed that they had a valuable internship experience. The only areas in which they were not as sure were if the factory supervisor helped them get the most out of my internship experience and if they were reasonably paid for the work they did. The overall group and the group that currently welds had somewhat equal concerns about their supervisor helping them get the most out of their internship experience, but the group that currently welds were least favorable on the pay they received as an internship student.

Table 13

Graduates' Perceptions of a Valuable Internship Experience

		Overall			Currently Welds		
No.	Item	M	SD	n	M	SD	n
15	Over all, I was well prepared for my internship experience	4.46	.79	28	4.23	.93	13

Table 13 Continued

16	I was reasonably paid for the work I did	4.04	1.10	28	3.62	1.12	13
17	I had enough time to get from school to work	4.32	.86	28	4.15	1.07	13
18	My factory supervisor helped me get the most out of my internship experience	3.79	.88	28	3.69	.95	13
19	My high school supervisor helped me get the most out of my internship experience	4.32	.77	28	4.38	.77	13
20	Over all, I enjoyed my internship experience	4.39	.69	28	4.38	.77	13

1 = Strongly Disagree 2 = Disagree 3 = Undecided 4 = Agree 5 = Strongly Agree

Summary

After reviewing both sets of data, the researcher concludes for the most part that the existing welding curriculum is meeting the needs of local industry. There are just a few areas that the students and supervisors have pointed out that need work to make the school-to-work transition smoother.

The supervisors struggled somewhat with students taking responsibility for their work, students getting arc flash, and students throwing things at each other.

Also, they had a hard time with the eight period rotational schedule the high school uses.

The students struggled somewhat with performing safety inspections of equipment, the pay rate of the internship, and working with the on-the-job supervisors.

The welding curriculum needs to be tweaked a little, but most of the concerns are exclusive to each industry and need to be addressed to the students who seek internships or employment at that specific industry. As previously acknowledged in the literature review it is very important to keep the communication highways open with the welding instructor and industry supervisors. That way students will not be lost in this very challenging school to work transition.

Chapter V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this study is to revise Hartford Union High School's welding curriculum to better meet the needs of local industry. To better educate Hartford Union High School students in the area of welding, information on the welding processes and techniques used by local industries will be used to revise the welding curriculum. This will make these students more employable and should smooth their transitions from school to work. This information will also improve the caliber of employee the local industry has to select from.

In this chapter the results of the study are grouped together to make it easy for the reader understand the research without reading the entire paper. This chapter has the following sections: Summary, Conclusions, and Recommendations.

Summary

To summarize the study, the researcher will review the problem, methods and procedures, and major findings.

Restatement of the Problem

Research is needed to find the relationship between Hartford Union High School's welding curriculum and the needs of local industry. This study is needed to improve the quality of welding instruction given to Hartford High School students

and to improve the quality of employees available for local industry. This research has never been conducted for the community of Hartford, Wisconsin.

Methods and Procedures

A descriptive research design was used, based on an interview and a survey. The interview was designed for the local industry internship supervisors. This allowed the researcher to meet one on one with each of the five internship supervisors to gain very detailed information on how well the students were prepared to meet the local industries' needs. It also allowed the researcher to clarify the answers to the interview questions, which were based on the objectives.

The survey was designed for the former internship students. Because there were thirty former internship students in various locations, the survey allowed the researcher to present questions to each one without making the process too time consuming for the former students or the researcher. The questions were developed from the objectives. Each objective had at least two questions in the survey. This allowed the former students more opportunity to comment about their internship experience and how well they thought they were prepared for the transition from school to work. It also gave the researcher a variety of answers to each of the objectives.

The interviews were analyzed by the researcher according to the objectives. The notes and recordings from the interviews were reviewed and put into a table.

This was done to see if the answers were similar and to see if the supervisors thought the current curriculum was meeting the needs of local industry.

Twenty-eight out of thirty surveys were returned to the researcher. The surveys were then sent to the University of Wisconsin - Stout to be summarized by a computer program. The surveys were evaluated in three areas; data for all responses, data for those currently using welding skills, and data based on the year the students interned. The data based on the year the student interned has been omitted from the research report because of small numbers of students in some years and the fact that there did not appear to be any important differences in the response patterns from the other two areas. The researcher analyzed the computer printouts according to the objectives. The printout data was put into tables by objectives to see where the answers were similar, and to see if the internship students thought the current curriculum was meeting the needs of the local industries.

Major Findings

After reviewing both sets of data, the current welding curriculum appears to be working fairly well. There are just a few areas that the former students and supervisors have pointed out that need to be reviewed. The former welding students are continuing to use their welding skills after their internship experience. Twenty-seven out of the twenty-eight former students still use their welding skills in some shape or form and twenty-one were welding in a full time or a summer job at the time of the survey.

In general the internship supervisors were satisfied with the entry-level layout skills the internship students possessed. One industry would like more classroom time spent on how to use and read a dial caliper. The former internship students were not quite satisfied with the entry-level layout skills they possessed entering the internship. The former internship students agreed that they had adequate measuring skills and ability to produce parts within tolerances specified by the blueprints during their internship experience. They were not as certain if they had adequate blueprint reading skills.

The supervisors indicated the students have good overall safety skills. They reported just a few isolated problems including arc flash and students throwing things at each other. The former internship students were not quite satisfied with the entry-level safety skills they possessed entering the internship. The former internship students agree that they had adequate personal safety skills, but are not as certain if they could perform all safety inspections of equipment during their internship experience.

The internship supervisors were satisfied with the entry-level welding techniques the internship students possessed. Every industry welds different materials and has different techniques they incorporate. They all made mention that they would like the students train for their style of welding. The former internship students were satisfied with the entry-level welding techniques they possessed entering the internship. They gave the highest ratings to their ability to operate all hand tools followed by their welding and cutting skills.

The internship supervisors were not quite satisfied with the entry-level weldment evaluation skills the internship students possessed. Two of the industries have had problems with past internship students taking responsibility for their quality of work. The former internship students were satisfied with the entry-level weldment evaluation skills they possessed entering the internship.

The internship supervisors were very satisfied with the internship experience. Three out of five supervisors said they did struggle with the high school eight period rotational schedule. The former internship students were satisfied with their internship experience. The only areas that they were not as certain on were if the factory supervisor helped them get the most out of my internship experience and if they were reasonably paid for the work they did.

Conclusions

After reviewing both sets of data, the researcher concludes that the existing welding curriculum is for the most part meeting the needs of local industry. There are just a few areas that the former students and internship supervisors have pointed out that need work to make the school-to-work transition smoother. The researcher will present the conclusions by the five objectives of this research.

Objective one asked if the internship students had adequate entry-level layout skills that match local industries' needs. The researcher concludes that this objective was for the most part met. One industry would like more classroom time spent on how to use and read a dial caliper and the former internship students want more

blueprint reading skills, but four out of five internship supervisors said they do not have to read blueprints at the internship level and the one internship supervisor that does require blueprint reading skill said his students have been doing a great job. The researcher concludes that the current Welding 1 and Welding 2 blueprint reading curriculum is fine and suggest adding more advanced blueprint reading to the curriculum in the most advanced welding class (Metal Fabrication). The researcher would also recommend spending a little more time teaching students how to use and read a dial caliper.

The purpose of objective two was to determine if the students had adequate entry-level safety skills that are needed to meet local industries' needs. The factory supervisors agree for the most part that the students have good personal safety skills, but the former internship students feel they need a little work in the area of safety inspections of equipment. The researcher determined there is a need for the welding instructor to spend more time on safety inspections of equipment and how to prevent arc flash. The instructor should also reinforce that industry will not put up with horseplay.

Objective three asked if the students have adequate entry-level welding techniques that are needed to meet local industries' needs. All of the internship supervisors were satisfied with the welding techniques the internship students possessed and the ratings for all the question for this objective on the survey were above the agree range from former internship students. The researcher concludes that the current curriculum provides adequate entry-level welding skills.

The data for objective four determined if the students have adequate entry-level weldment evaluation skills. The former students and internship supervisors did not agree on this objective. The former internship students and three out of five industry supervisors agreed that this objective is being met, but two of the industry supervisors have had problems with past interns taking responsibility for their quality of work. The researcher suggests that the welding instructor should emphasize to students how important it is to take responsibility for their quality of work during their internship.

The purpose of objective five was to determine if the students' internship experiences are valuable. The former students and internship supervisors mostly agreed on this objective. The internship supervisors were very satisfied with the internship experience for the most part. Their only concern is the eight period rotational schedule that the high school uses. The internship supervisors do not always know when the students are going to show up for work. The only two concerns the former students had were if the factory supervisor helped them get the most out of their internship experience and if they were reasonably paid for the work they did. The researcher agrees that the eight period rotational schedule is causing confusion. The high school supervisor should contact the internship supervisors to find out how to best remedy this problem (weekly calendar, E-mail, etc.). The high school supervisor should also highly recommend to his internship students that if they are having problems with their internship supervisor that the student immediately tell him so that he can resolve the issue before it gets out of hand. Lastly, the pay rate for

welding internships varies with employers and the high school supervisor should pass the former internship students concerns with the pay rate along to the employers. The high school supervisor should also point out to the future internship students that the internship is a learning experience and they are not going to be paid the same rate as a full-time employee.

Recommendations

The researcher will outline recommendations for this study and future studies related to this one. The researcher will use the headings of "Recommendations Related to This Study" and "Recommendation for Future Study".

Recommendations Related to This Study

After reviewing both sets of data, the researcher concludes that the existing welding curriculum is for the most part meeting the needs of local industry. There are just a few areas that the former students and internship supervisors have pointed out that need work to make the school-to-work transition smoother. The researcher would recommend more class and lab time reinforcing:

1. How to use and read a dial caliper
2. How to conduct safety inspections of equipment
3. How to preventing arc flash.
4. No horseplay is allowed on the shop floor.
5. It is important to take responsibility for their quality of work.

6. That communication with internship supervisors is important.

The researcher feels that these concerns need to be strongly reinforced in class so that future internship students do not make the same mistakes.

The former internship students recommended that future welding students should spend more time on blueprint reading skills. Since most of the internship supervisors do not require blueprint reading skills for internship students the researcher recommends placing more emphasis on blueprint reading in the most advanced welding class (Metal Fabrication).

The industry supervisors were concerned with the eight period rotational schedule used by the high school. The researcher suggest that the high school internship supervisor needs to create a weekly calendar or E-mail that spells out when the student will show up for work that week. That way the students and supervisors will be on the same page everyday.

As previously acknowledged in the literature review it is very important to keep the communication highways open between the welding instructor and industry supervisors. That way students will not be lost in this very challenging school-to-work transition.

Recommendations for Further Study

The researcher has recommendations for further study in this area. During this research the former internship students wished they had better blueprint reading skill, but for the most part blueprint reading skills are not needed at the internship

level. Research would be beneficial to find out why these former students wanted more blueprint reading skills and what level of blueprint reading skills do they desire?

The researcher also thinks that research should be done in the area of communications skills and mathematical skills needed to meet local industries' needs. The researcher wants to make the internship transition even smoother for the internship student and feels communication skills and mathematical skill are crucial to this transition. The English, Math, and Welding teachers should all be aware of the skills local industry requires of their employees.

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Appendix A

Interview Questions

TO: Welding Internship Supervisors
FROM: Corey McCauley, Welding Instructor
RE: Interview on Hartford Union High School's Internship Program
DATE: April 20, 1999

Dear Welding Internship Supervisors,

I am conducting an interview of the Hartford Union High School's welding internship supervisors. The findings of this study will be the basis for the completion of my Plan B Thesis at UW-Stout.

Enclosed you will find a questions regarding the development of the Hartford Union High School's Welding Curriculum to meet local industries' needs. I will be contacting you to set up a time for the interview. This interview is intended to gather information on your experiences in the Hartford Union High School's Internship program.

Please look over this interview and make notes. It should only take a few minutes of your time. All your answers will be kept anonymous and confidential.

Your input will be greatly appreciated.

Sincerely,

Corey McCauley

FORMING HARTFORD UNION HIGH SCHOOL'S WELDING CURRICULUM TO MEET LOCAL INDUSTRIES' NEEDS

(Welding Internship Supervisor Interview)

1. How many years have you been involved in the Hartford Union High School's Internship program and during that time how many students have you supervised?

2. Are there any concerns you have with the internship students' safety habits? If yes, what in particular?

3. Are the students entering the workplace with adequate entry level skills? (ex. blueprint reading, welding, cutting, quality control, etc.) If not, what in particular?

4. Are there any concerns you have with the internship students' workmanship? If yes, what in particular?

5. How are the internship students' overall work habits? (ex. promptness, attendance, responsibility, relationships with co-workers, etc.)

6. Are there any other issues that you have a concern with?

7. What do you like most about the internship program?

8. Do you have any suggestions for improvements for the internship program?

Appendix B

Student Survey

TO: Welding Internship Students
FROM: Corey McCauley, Welding Instructor
RE: Survey on Hartford Union High School's Internship Program
DATE: April 20,1999

Dear Welding Internship Students,

I am conducting a survey of the Hartford Union High School's welding internship students. The findings of this study will be the basis for the completion of my Plan B Thesis at UW-Stout.

Enclosed you will find a survey regarding the development of the Hartford Union High School's Welding Curriculum to meet local industries' needs. I have also enclosed an envelope to return the survey. This survey is intended to gather information on your experiences in the Hartford Union High School's Internship program.

Please fill out this survey and return it to me by June 14, 1999. It should only take a few minutes of your time. All your answers will be kept anonymous and confidential.

Your input and timely response will be greatly appreciated.

Sincerely,

Corey McCauley

FORMING HARTFORD UNION HIGH SCHOOL'S WELDING
CURRICULUM TO MEET LOCAL INDUSTRIES' NEEDS
(Welding Internship Student Survey)

Directions: Base your responses to this survey on your experience in the Hartford Union High School Internship program. There are no right or wrong responses. Use the following Responses:

1=SD=Strongly Disagree
2=D=Disagree
3=U=Undecided
4=A=Agree
5=SA=Strongly Agree

WHEN I ENTERED YOUR INTERNSHIP EXPERIENCE …	Responses SD 1	D 2	U 3	A 4	SA 5
1. I had adequate personal safety skills……	1	2	3	4	5
2. I could perform all safety inspections of equipment……...	1	2	3	4	5
3. I had adequate measuring skills……..	1	2	3	4	5
4. I had adequate blueprint reading skills……	1	2	3	4	5
5. I could produce parts within tolerances specified by the blueprints……..	1	2	3	4	5
6. I could identify all the different types of metals I used……...	1	2	3	4	5
7. I could perform all the different welding and cutting processes……..	1	2	3	4	5
8. I could setup and operate all the welding and cutting machines……..	1	2	3	4	5
9. I had adequate welding and cutting skills……	1	2	3	4	5

	SD	D	U	A	SA
10. I could weld and cut in all positions required……..	1	2	3	4	5
11. I could identify all the welding defects……..	1	2	3	4	5
12. I could fix all the welding defects that I identified and/or created……..	1	2	3	4	5
13. I could use their jigs and fixtures easily…….	1	2	3	4	5
14. I could operate all the hand tools…….…...	1	2	3	4	5
15. Over all, I was well prepared for my internship experience……..	1	2	3	4	5
16. I was reasonably paid for the work I did……...	1	2	3	4	5
17. I had enough time to get from school to work……	1	2	3	4	5
18. My factory supervisor helped me get the most out of my internship experience…….	1	2	3	4	5
19. My high school supervisor helped me get the most out of my internship experience……...	1	2	3	4	5
20. Over all, I enjoyed my internship experience……	1	2	3	4	5

21. What year did you Internship? *(circle all that apply)*

1. 1994 – 95
2. 1995 - 96
3. 1996 - 97
4. 1997 - 98
5. 1998 - 99

22. How are you using your welding skills today? *(circle all that apply)*

    1. Use welding for an occupation
    2. Use welding for a summer job
    3. Use welding for a hobby
    4. Use welding occasionally
    5. Don't use welding

23. How could the welding program be improved to better prepare future students for their internship experience? *(add a piece of paper if needed)*

Thank you for your input,
Corey McCauley