A FEASIBILITY STUDY FOR AN INDUSTRIAL ELECTRONICS MAINTENANCE CERTIFICATE AT WESTERN WISCONSIN TECHNICAL COLLEGE

by

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ABSTRACT

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A FEASIBILITY STUDY FOR AN INDUSTRIAL ELECTRONICS MAINTENANCE CERTIFICATE PROGRAM AT WESTERN WISCONSIN TECHNICAL COLLEGE
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This field problem studied the feasibility of an Industrial Electronics Maintenance Certificate Program at Western Wisconsin Technical College (WWTC). While manufacturing jobs continue to decrease across the nation as a whole, Wisconsin's manufacturing sector continues to grow, demanding additional skilled workers. This study sought to document the need for a series of courses that would supply training in the areas of electronics/electrical, mechanical and fluid power at an industrial level as opposed to associate degree college courses. The effort would address the skilled worker shortage in the district by providing much needed training to both incumbent workers and potential new employees in the industrial maintenance field. The information gathered by

the training needs survey was used to write a grant to obtain funding to support the effort.

The population for this study was defined as all manufacturing companies with 20 or more employees in the eight-county area of the WWTC district. Each manufacturing employer was contacted via telephone prior to distribution of the survey to verify applicability to the study and to determine the most appropriate company contact. These phone conversations yielded a total of 170 subjects that agreed to receive the survey and constituted the entire population of appropriate district employers. However, possible omissions may have existed in the database and therefore the 170 companies must be viewed as a significant sample of the population as opposed to its entirety.

One hundred and fifty-five replies were received out of the 170 mailed surveys for a response rate of 91.2%. Twenty-four of those replies indicated that the industrial maintenance activities at their company were performed by subcontractors and therefore were not applicable to the study. One hundred and twenty-nine completed surveys were returned. Input was received regarding topics for training as well as methodology and location preferences. The most requested topics included AC/DC fundamentals, AC motors and controls, and programmable logic controllers. These three topics were indicated as necessary by over 50% of the respondents. The most desired location for training was in La Crosse due to the overwhelming majority of businesses located in La Crosse County. The major methodology preferences were quite evenly split between one-day workshops, multi-day workshops, traditional lecture/lab courses and individualized open lab instruction. The next most popular choices were one-day and multi-day workshops on-site at the company. The highest demand for training outside the La Crosse area was in Tomah, followed by Mauston, Black River Falls, Viroqua, and

Independence.

Every respondent except one indicated a need for employee training on one or more of the topics listed in the survey. The data showed that between 420 and 661 incumbent workers in the district require this type of training over the next five years. In addition, almost 90% of the respondents indicated that they would hire an individual with the required industrial maintenance skill set regardless of whether they had completed a degree. The data showed that between 203 and 347 of these new employees would be required over the next five years. These two combined responses show a training need for between 623 and 1008 workers in the area of industrial electronics maintenance. These numbers provide substantial support for the program.

Information was also gathered regarding current training options and new employee recruitment activities. Over 20% of the respondents indicated that they were unable to obtain new employees with industrial maintenance skills. Finally, over 40 % of the respondents indicated that they would be willing to take time out of their already busy schedules to provide assistance regarding curriculum development and delivery planning. This is truly a testament to the extreme need for this training.

Acknowledgements

I would like to express my sincere appreciation to those individuals who provided assistance during the completion of this study. I would like to thank my associate dean, Alan Foster, and my dean, Ron Sellnau, for their guidance and support of this effort. I also want to show my appreciation to Cathy Welch and Lorrie Turner of the WWTC Industrial Division for their help with the distribution of the survey instrument along with Karen Gleason, dean of extended education, who graciously provided financial support for the mailing.

I am also indebted to Bill Brockmiller of the Western Region Division of Workforce Excellence for his assistance in obtaining the necessary employer database. My advisor, Joe Benkowski, who was an invaluable asset during the completion of this project and my entire master's program, also deserves a great deal of thanks. Lastly, I would like to thank my wife, Karen, and my two young boys, Jon and Josh, for putting up with me while I completed this study.

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INTRODUCTION

Introduction to the Field Problem

One of the biggest challenges identified by business today is to attract and retain employees with technical skills. At the pace of technology evolution, there is an inherent need to provide for continuous education for the employee. Partners in education, including business, trade and industry, in collaboration with educators, have identified the need for students to consider technical training. The Western Wisconsin Technical College (WWTC) Student Employment Services Office states that requests for WWTC's skilled graduates increased 65 percent from 1999 to 2000 (Drysdale, 2001).

Traditional models for technical education, though friendly for the full-time post secondary student, have not provided the opportunity for the incumbent worker to receive training. Considering the need to train the current employees and to provide for updating the recently educated, it appears to be more important than ever to deviate from the traditional model and to be able to offer on-time, industry specific training. Hough (1994) addresses the opportunities that community and technical colleges have to respond to key needs and expectations of the business sector. He suggests that colleges require a willingness to rethink and re-engineer traditional approaches to curriculum development and delivery methods. He also states that neither workers nor their employers can expend large blocks of the workday in classrooms on campus. Instead, they desire skills training and education providers to deliver a product tailored to their specific needs. Educational providers who are accountable for quality and effectiveness will secure the strongest position in the market (Hough, 1994).

Over the last five years, the electronics department at WWTC has transitioned from a standard instructor-centered lecture/lab approach to electronics training in an open lab individualized instruction environment. This methodology has provided great flexibility for students by offering an open-entry enrollment and lab hours that cover mornings, afternoons and evenings. Great strides have been made in revamping the associate degree and technical diploma curriculum in order to comply with this new methodology. The time has now come to concentrate on improving service to constituents that require industry specific, customized electronics training.

Introduction to Western Wisconsin Technical College

Western Wisconsin Technical College provides high quality and affordable educational opportunities that are designed to create a balance between the individual needs of students and the needs of business and industry. The college is committed to the success of students and to a philosophy of Continuous Improvement that emphasizes respect and dignity for everyone. The college exists to provide opportunities for people to be successful in achieving their goals to learn occupational skills, acquire additional skills, and enrich their personal lives. WWTC courses are designed to keep pace with technology in a rapidly changing global economy. The college maintains a comprehensive curriculum and provides support services in accordance with statutory mandates, consistent with community needs and college financial capabilities.

WWTC meets the needs of students in eleven counties in western Wisconsin. Over 18,000 students are served annually at campus locations that include Black River Falls, Independence, Mauston, Tomah, and Viroqua. The main campus is located in downtown La Crosse. WWTC offers 60 programs leading to associate degrees and

technical diplomas. Several short certificate programs are also offered. The program areas are divided into business, family and consumer sciences, human services, and industrial technologies. The electronics department is located in the industrial technologies division.

Background of the Problem

The electronics department at WWTC currently offers 3 two-year programs that provide training related to the area of Industrial Electronics Maintenance. These programs consist of an associate degree in electromechanical technology, an associate degree in electronics technology, and an electronics servicing technician technical diploma. These three programs incorporate essentially the same first year electronics curriculum that consists of six credits of AC/DC circuit fundamentals, six credits of electronic devices and four credits of digital circuits. These first-year courses are math intensive and are performed at the depth of study of associate degree courses.

The application courses that relate directly to industrial electronics maintenance are housed in the second year of the electromechanical technology program. Prerequisites to these courses include the entirety of the first year material mentioned above. Returning incumbent workers that wish to enroll in the second-year electromechanical courses are faced with a dilemma. It may have been several years since they received basic electronics training, if at all, and are therefore at a disadvantage when attempting these advanced courses that are written based on the student's possession of prerequisite knowledge. Unfortunately, the option of going through the entire first year curriculum as a refresher or precursor is truly not an option. First, most incumbent workers do not have the time to complete that amount of training. More importantly, they

may not possess the math aptitude necessary to succeed in courses delivered at this level. The result of this situation is that these students are allowed to attempt these courses without completing the prerequisites. While some of these students manage to struggle through the curriculum, a large number are overcome by their deficient prerequisite knowledge and either fail or drop the course.

Purpose of the Study

The desired result of this study was the substantiation of the need for a series of courses that would provide the necessary prerequisite first-year information in an accelerated format. This would allow returning incumbent workers or new students to complete this fundamental training in a short period of time through courses designed at an industrial-training level as opposed to the depth and math intensive nature of the current curriculum. The required math skills would be taught as part of the new courses and therefore eliminate the need for students to take general education math courses. This overcomes the potential problems of inappropriate general education math course content and inflexible course scheduling.

The information that was gathered in this study will be used to write a grant for funding of the certificate program. The grant is necessary since the WWTC budget could not support the instructional and equipment costs necessary to perform this training. It was surmised that if a grant could be obtained to fund the original equipment purchase and the first two years of development and instructional costs, the school would then be in a position to continue that funding of a successful effort.

Problem Statement

Is there a need for an Industrial Electronics Maintenance Certificate Program at Western Wisconsin Technical College?

Research Objectives

1. To determine whether the manufacturing firms served by WWTC would benefit from electronics/electrical specific training for incumbent industrial maintenance personnel.
2. To determine whether students who are not incumbent industrial maintenance workers would be employable with training in these focused industrial electronics maintenance skills.
3. To identify potential employees of manufacturing firms that would be willing to assist in curriculum development for the certificate program if the study substantiated the need.
4. To obtain substantial justification for an Industrial Electronics Maintenance Certificate Program at WWTC that will be required in order to write a grant to receive funding for two years of developmental, instructional and equipment costs of implementing the program.

Significance of the Problem

Current economic trends in educational institutions are forcing educators to perform their functions with fewer resources. Programmatic changes and additions at WWTC are driven by enrollments and the needs expressed directly by its industry client base. If changes are not made that reflect the rapidly changing skill competency requirements and specific needs of its employer base, the economic viability of WWTC is

in jeopardy. Accurate and timely data such as the information obtained by this research is important to focus the efforts of the school and its individual departments. Substantive justification of training needs allows educational institutions such as WWTC to apply for grants that provide funding that is critical to the development and delivery of these programs. Efforts such as these allow WWTC to ensure its viability while serving the economic development and workforce training needs of the business community it is committed to serve.

Limitations

Limitations of the study include the limited geographic region of the population. Only manufacturers in the eight-county district of WWTC were surveyed. Therefore, the survey data may not be interpreted as a representation of nationwide or global needs. The research was also limited only to needs relevant to industrial electronics maintenance and is therefore limited in its application to other types of industry training needs. Finally, efforts were made in the cover letter of the survey to solicit training needs based on a long-term outlook. However, economic conditions and employee layoffs at the time of the survey may have produced survey data that was skewed slightly by the current mindset of the survey respondents.

Definition of Terms

Throughout this study many terms have been used. The following list of definitions should be used to clarify the manner in which terms may have been used.

Open Lab. The electronics open lab is located on the third floor of the Kumm building at WWTC and occupies the entire north side of the floor. The term, *open* lab references the fact that lab facility is one large open area that allows unrestricted vision

and access to all areas of the lab. This term also indicates a high degree of access to the facility at various times and also signifies that a student can work on any course at any time. (http://learn.western.tec.wi.us/circuit)

Self- Paced Instruction. The current method of instructional material delivery includes an outline for each course unit that includes information regarding the necessary steps to complete the unit. These activities include reading assignments, instructional videos, practice problems, lab activities, and unit tests and can be completed at whatever pace that fits the schedule of the student. Most instructional materials are available to be printed off the electronics department server by each student, which reduces the clerical functions of the instructors and allows more time for true individualized instruction. (http://learn.western.tec.wi.us/circuit)

Individualized Instruction. There is not a more accurate way to describe this delivery methodology than *Individualized Instruction*. Since each student may be at a different point in a different course there is little opportunity to present information to groups of students. Although live topical seminars are held for students that prefer the lecture method of instruction, participation at these events is not mandatory. This results in the majority of instructor interaction taking place on the individual level. Practice problems and lab exercises must be reviewed and signed off by an instructor before a student can take a unit exam. Upon test completion, any wrong answer is reviewed individually with the student to insure understanding. Although a student in the open lab may originally feel insecure as compared to traditional delivery methods, the previous examples of individualized instruction quickly convince the student of the benefits of this methodology. (http://learn.western.tec.wi.us/circuit)

Open Entry/Open Exit. There are many other qualities of the open lab operation that may not seem clear to veterans of the traditional educational format. For example, each first-year electronics course in the open lab is broken down into one-credit increments. This means that students can sign up for as many courses/credits as they think they can successfully complete in a semester. The open entry/open exit system of the electronics lab allows students to start and finish courses at any time. This flexibility is the driving force behind the change in instructional delivery method. (http://learn.western.tec.wi.us/circuit)

WWTC. Western Wisconsin Technical College.

Incumbent Workers. Incumbent workers are identified as those who are currently employed and need additional training to maintain their current job, or those who seek additional training for promotional opportunity (Warford & Flynn, 2000).

Transitional Workers. The transitional workers are those that are moving from one career to another for a variety of reasons. They could be laid off from previous employment, returning to the job market after time out for family reasons, or upwardly mobile individuals seeking to improve their social and financial situation by switching jobs (Warford & Flynn, 2000).

Emerging Workers. The emerging workers are typically 22 years of age or less, and are preparing for their first full-time employment (Warford & Flynn, 2000).

Entrepreneurial Workers. The entrepreneurial workforce includes a significant number of people who operate or own small to medium-sized businesses (Warford & Flynn, 2000).

Chapter 2

Review of Literature

Introduction

Chapter 2 introduces several areas of research related to the feasibility of an Industrial Electronics Maintenance Certificate Program at Western Wisconsin Technical College. The first section discusses the skilled worker shortage on a national basis as well as the WWTC district in particular. The second section of the chapter addresses the options employers have for providing training to skilled workers. The chapter concludes with a discussion of the required skill set for an industrial electronics maintenance technician.

Skilled Worker Shortage

"Many communities across the nation are under stress. The number one economic threat to most communities is the lack of skilled and productive workers" (Ziess, 2000, p.47). Communities are faced with the challenge of attracting and retaining businesses and industries that provide high-wages to employees while most of those current and future employees need extensive education, training and re-training. Ziess (2000) adds:

> Every community is crying out for more skilled and productive workers, and businesses and trade associations are scrambling to develop dependable sources for providing new workers. Employers are equally concerned about keeping existing workers trained with the skills needed to be productive. (p.48)

Most baby boomers, now in their 40s and 50s, will be retiring around 2010. At the same time, birth rates are slowing, which means that there won't be enough workers to replace

retirees. In addition, expanding technology is producing new occupations that increase the pressure on workers to become even more highly skilled than their predecessors.

It's a continuous search process for the people we need," says Dave Buroker, human resources manager for CenturyTel's Midwest Region, headquartered in La Crosse, Wisconsin. Buroker hires electronics technicians from technical colleges for positions as installers, repairers, and support personnel for telecommunications equipment, electronic systems and computer networks (Drysdale, 2001). Although technical and community colleges are mobilizing to address the skilled worker shortage, it is obvious that current efforts are not keeping up with demand. Requests for WWTC's skilled graduates went up 65 percent last year as area employers face a shortage of skilled workers. The following graph depicts the steep rise in requests as opposed to a much slower rising number of graduates.

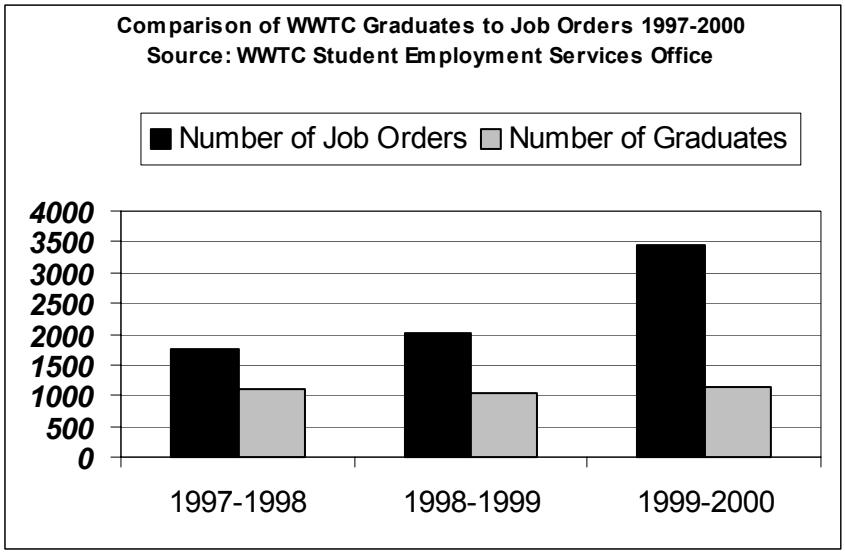


Figure 2.1

Swindle (1999) comments on another reason why the number of job orders far outpace the number of graduates:

> With unemployment at an all-time low, competition has heated up for the best-qualified workers. Technology has become pervasive across many industries, not just among high-tech companies. The skills required for many of these "smart jobs" have increased, and companies are finding it hard to fill jobs from the available pool of workers. While the technology workforce has continued to grow at a rapid pace, the numbers of young people choosing technical and science/engineering careers has declined. (p.16)

In Wisconsin, the skilled worker shortage is a function of actual numbers of workers in addition to a lack of necessary skills. Many Wisconsin employers are having difficulty filling job openings. In its January 2001 publication, Wisconsin Projections, the Wisconsin Department of Workforce Development (DWD) states that the gap between the number of jobs and the number of people in the labor force is widening. By 2008, about 3,295,820 non-farm jobs (including self-employment) are expected to exist. The 2008 labor force is projected to have 3,091,600 people. This indicates a difference of 204,220 between the number of non-farm jobs and the number of labor force participants.

The 2001 DWD report also states that manufacturing industries are expected to remain an important source of Wisconsin jobs between 1998 and 2008:

> Despite ongoing mergers, consolidations, and substitutions of machines for people, manufacturing is projected to add about 25,500 new jobs to grow to a total of 642,200 by 2008. Wisconsin's manufacturing growth is in contrast to a decline for the nation as a whole, which is expected to lose about 132,000 jobs during the 1998 to 2008 period. (p.6)

Besides the 25,500 new jobs, the Wisconsin manufacturing sector will have an additional

134,880 job openings available due to people permanently leaving the industry via retirement.

The seriousness of the skilled worker shortage is clearly summarized in a letter dated December 1, 1999, from then Governor of Wisconsin, Tommy G. Thompson, to WWTC President, Dr. Lee Rasch:

> As you well know, we are experiencing a shortage of skilled workers that shows no signs of improving. Projections show 40 percent of the state's current skilled workers have reached or will reach retirement age between 1995 and 2005. The year 2016 will present us with what in the business world is called an inflection point. In that year, for the first time, more Wisconsinites will turn 65 than turn 18, and the number of children born in our state will be less than the number of our citizens who pass away.

Skilled Worker Training Options

Many options exist today for people to obtain the skills necessary to succeed in today's high-tech industries. Employees that require this type of training can be divided into four basic groups. These four groups include the emerging worker, the transitional worker, the entrepreneur, and the incumbent worker. The emerging workers are typically 22 years of age or less, and are preparing for their first full-time employment. The transitional workers are those that are moving from one career to another for a variety of reasons. They could be laid off from previous employment, returning to the job market after time out for family reasons, or upwardly mobile individuals seeking to improve their social and financial situation by switching jobs. The entrepreneurial workforce includes a significant number of people who operate or own small to medium-sized businesses.

Lastly, incumbent workers are identified as those who are currently employed and need additional training to maintain their current job, or those who seek additional training for promotional opportunity (Warford & Flynn, 2000). Obviously, different types of training opportunities will be available based an individual's membership status in the four previously mentioned groups.

On-the-Job Training

In nearly all cases, on-the-job training (OJT) is an option for worker education. "On-the-job training is one of the most important components to learning in the workplace – yet it's often unplanned and ineffective" (Rothwell & Kazanas, 1990). OJT typically means training that occurs in the workplace rather than off the job. It is usually unplanned. Employees learn form experienced co-workers or supervisors while they work. Such learning occurs through observation and imitation of others and feedback about how the work is done. There are two distinct types of OJT. The first is a "sink or swim" approach where the "trainee" follows the "trainer" around in the hopes of learning what the trainer is doing.

> This is called unstructured OJT because is occurs haphazardly- the employee-trainer (a.k.a. expert) teaches the tasks as he or she remembers them. Because of time or other pressures, important steps may be forgotten or simply skipped. As an unstructured system, no criteria are established for the quality of training, nor are records of the training maintained (Levine, 1997, p.1).

When discussing unstructured OJT, Martin Broadwell states, "ninety-five percent of all training that's done on the job is so poorly done that the job suffers measurably" (Filipczak, 1993, p. 30).

The second category of on-the-job training is structured OJT, which is a planned and organized, one-on-one program designed to provide the employee with the knowledge and skills required to perform tasks entailed in the employee's job (Lawson, 1997). Rothwell & Kazanas (1997) define structured on-the-job training in the following manner:

> Planned on-the-job training occurs on the job and in real time. It is based on a job breakdown so that work requirements are systematically reviewed with newcomers (newly-hired workers or those who are new to a position or duty) based on effective principles of instruction rather than the logic of the subject matter or the convenience or availability of the trainer" (p. 76).

Barron (1997) states that OJT is making a comeback in the more structured version. "Overlooked in the past as manufacturers experimented with new training technologies, the world's oldest training technique is gaining newfound respect – thanks to structuring methods and other powerful updates. (p.14)

Skills Training Provided by Private Companies

There are many private companies that offer training in the area of Industrial Electronics Maintenance. The courses offered by these entities vary in depth and length. For example, Industrial Training Group (ITG), based in Michigan City, Indiana, offers a wide variety of training courses that range from Understanding and Implementing ISO 9000 to Basic Mathematics. These courses vary from 1 to 5 days and average in cost between $300-$400 per day. Meals and lodging are in addition to these charges. ITG lists four training centers located in Detroit, Indianapolis, Louisville and Columbus. Their web site, (http://www.itg.cc/, states that they will also bring these courses to the customer's

plant for a significantly increased charge.

Lewellyn Technology, (http://www.lewellyn.com), another Indiana-based firm, also offers training in industrial electronics related subjects. They offer hub-city based training like ITG at a rate of about $300-$400 per day. Again, transportation, lodging, and meals are an additional expense. Lewellyn will also bring their training to the customer's site for an increased cost. National Technology Transfer, (http://www.nttinc.com), based out of Englewood, Colorado, offers basically the same type of training as the two companies previously mentioned at comparable prices. An Internet search will provide a host of additional companies that provide the same type of offerings.

Manufacturing organizations also provide training opportunities for members. The International Maintenance Institute (IMI) (http://www.imionline.org) is an international organization with chapters in major industrial and metropolitan areas throughout the world. The chapters are an extension of the international and provide programs to meet the needs of members in the local area. Monthly meetings are scheduled to achieve a balance between social events and informative sessions that furnish members with the latest information and techniques in the maintenance field. IMI also provides training and certification in three levels of Certified Maintenance Technicians. Like the other private companies mentioned previously, training costs still range in the $300-$400 per day range with courses available in limited areas.

Technical Colleges as Providers of Workforce Development

Many people across the nation are under stress. Their primary concern is to lead safe, healthy, prosperous, and meaningful lives. Good jobs and careers are essential; yet

finding convenient training opportunities to get and keep good jobs is a real challenge. Ziess (2000) states:

> Community colleges across the nation are also under stress. Attempting to meet today's market demands with yesterday's model for education and training is like trying to navigate the Internet with a typewriter. (p. 48)

The time-honored notion that students are candidates for degrees conferred by faculty has shifted dramatically. Students have become consumers and faculty members are becoming facilitators of learning. Students (customers is more accurate) are becoming active learners in a new deregulated, open learning environment. The faculty driven monolithic university approach to knowledge and skills acquisition must yield to a consumer-driven, open learning delivery system (Duderstadt, 1999).

A recent study of community college student preferences by Baker (1998) indicates that the main reason people attend community and technical college is to gain occupational skills, not degrees. Ziess (2000) states that community colleges present the obvious solution to employer, citizen, and community concerns about getting and keeping skilled workers. However, Ziess adds that two formidable obstacles must be overcome before a viable solution can be developed. First, campus leaders must understand and embrace this new, more community-integrated role of the college, and secondly, community leaders must also understand and support this more market-driven role of the college. Swindle (1999) states that major advances have occurred on this front:

> Community and technical colleges across the country have become important allies of business, particularly for technology companies, in the "war for talent." Over the past decade, community colleges have shown that they can respond to

> industry needs by designing, staffing, and launching new training and educational programs. This responsiveness has led to many company-unique programs. This trend continues as industry moves more of the job-training roles to the colleges. Training that has been done in-house by companies for years is moving into well-equipped college labs and classrooms. (p.16)

However, for the manufacturing community, the strides made thus far are not enough. Eisen (1997) comments on the critical role the community and technical colleges play in workforce development for the manufacturing sector:

> Community colleges must realize that so much depends on them. Manufacturers need them, employees need them, and an economy increasingly dependent on a highly skilled workforce needs them. Connecting education to the workplace is a critical role for today's community colleges, which are in a position to be leaders in making the connection, particularly for U.S. manufacturers.

This sentiment regarding the significant role of the technical college is echoed in former Governor Tommy Thompson's letter of December 1, 1999 to WWTC president Dr. Lee Rasch where he writes, "Perhaps never in our history has the Wisconsin Technical College System (WTCS) been so important to the economic health and future of our state."

Technical and community colleges need to provide training opportunities for manufacturing firms that are strategic, customized, flexible, innovative and coordinated with options for on-site and campus delivery. Another key role to be played by the two-year colleges involves the promotion of the manufacturing business as a good place to work.

> Community colleges are in a unique position to influence public opinion on the value of manufacturing jobs. It is a continual uphill battle to sell manufacturing as a tomorrow job. Parents, teachers, and counselors pale at the idea of encouraging entry into factory jobs, no matter how high the pay and how clean the job (Eisen, 1997, pg. 22).

Eisen (1997) suggests that the National Association of Manufacturers' Manufacturing Institute should team with the two-year colleges to design a national awareness campaign to promote manufacturing as a rewarding career and the two-year college as a place to train for that career.

Skill Set for an Industrial Maintenance Technician

The skill set for an industrial maintenance technician covers a wide range of installation and repair activities. A DACUM performed by The Ohio State University for the occupation of Industrial Maintenance Technician states that tasks generally fall into three major categories – mechanical, electrical, or fluid power. The DACUM further breaks down these knowledge and skill areas into the equipment and components of Table 2.1 below.

Mechanical		**Electrical**		**Fluid Power**	
Bearings	Wear	Motors	Photo-optics	Cylinders	Pipes
Gears	Belts	Motor Drives	Marking Units	Pumps	Tubes
Shafts	Pulleys	Starters	Sensors	Hoses	Fittings
Bushings	Rollers	Controllers	Switches	Motors	Fuses
Couplings	Conveyor	PLCs	Servos	Solenoids	Gauges
Transmission	Boilers	Power	Fuses	Valves	Compressors
Clutches	Sprockets	Stepping	Conduit	Regulators	Switches
Breaks	Chains	Lighting	Wiring		

Table 2.1

Additional general knowledge and skills noted by the University of Ohio DACUM include:

- Problem-solving skills
- Hardware & Fasteners
- Analytical Skills
- Tensile Strength
- Computer Skills
- Time Management Skills
- Electrical Skills
- Communication Skills
- Welding Skills
- Fabrication Skills
- Mechanical Trades
- Machine Shop Skills
- Blueprint Reading
- Test Instrument Skills
- Measuring Instruments
- Basic Hand Tools
- Power Tools
- Maintenance Concepts
- National Electrical Code
- Math
- Facility/plan operation
- Non-destructive testing techniques
- Fluid Power Schematic Reading
- Electrical Schematic Reading
- Basic Physics (knowledge of forces)

Jobmaster's Guide to Competencies (1998) lists somewhat the same competencies for industrial maintenance personnel but breaks them up into the following categories:

- Basic Skills
- Hydraulics
- Pneumatics
- Precision Measuring
- Electrical Systems
- Mechanical Systems
- Industrial Pumps
- Process Control and Instrumentation

An additional source of information regarding the skill set for industrial maintenance workers is the Occupational Information Network (O*NET) website

developed for the U.S. Department of Labor. O*NET Online, is found at http://online.onetcenter.org. O*NET provides skill set data on several occupations closely related to industrial maintenance. One occupation related to industrial maintenance presented by O*NET is titled, "Maintenance and Repair Workers, General, occupation number 49-9042.00. O*NET defines the duties of this occupation as:

> Perform work involving the skills of two or more maintenance or craft occupations to keep machines, mechanical equipment, or the structure of an establishment in repair. Duties may involve pipe fitting, boiler making, insulating, welding, machining, carpentry, repairing electrical or mechanical equipment; installing; aligning; and balancing new equipment; and repairing buildings, floors, or stairs.

A second industrial maintenance related occupational title presented by O*NET is called, Electrical and Electronics Repairers, Commercial and Industrial Equipment – 49-2094.00. This occupational description concentrates more on the electrical portion of industrial maintenance and rates the knowledge and skills related to electronics as a higher requirement then a general maintenance worker. This requirement for knowledge of electronics more closely matches the needs of an Industrial Electronics Maintenance Technician, but the mechanical and fluid power skills required of a general maintenance technician are necessary as well. Therefore, a combination of the skill sets for both of these O*NET occupations would be included in the job description for this type of employee.

The skills and knowledge requirements offered by The University of Ohio DACUM, JobMaster Guide to Competencies, and the O*NET Occupational Information

Database were used as a foundation for the survey instrument that was developed as part of this study. The following chapter explains the development and utilization of the survey instrument.

Chapter 3

Research Methods

Introduction

This field problem studied the feasibility of an Industrial Electronics Maintenance Certificate Program at Western Wisconsin Technical College (WWTC). The study was completed by surveying the manufacturing employers in the eight-county area of the WWTC district. The purpose of this study was to obtain substantive justification of the need for a series of courses that could provide the necessary fundamental information in the industrial maintenance areas of electronics/electrical, mechanical, and fluid power. This curriculum would allow returning incumbent workers or new students to complete this fundamental training in a short period of time through courses designed at an industrial training level, as opposed to the depth and math intensive nature of the current associate degree curriculum. The required math skills would be taught as part of the new curriculum and eliminate the need for students to take additional math courses.

The information that was gathered during this study will be used to write a grant for funding of the certificate program. The grant is necessary since the current WWTC budget cannot support the instructional and equipment costs necessary to perform this training. It is surmised that if a grant can be obtained to fund the original equipment purchase and the first two years of development and instructional costs, then the school will be in a position to continue the funding of a successful effort. Chapter 3 includes information relevant to the population, the research design and the instrumentation involved in the study.

Research Design

The research design utilized in this study was quantitative in nature. The goal of the study was to provide substantive hard data as to the numbers of WWTC district employers that require industrial electronics maintenance related training for their employees. For this reason, a survey approach to the study was desired. In this manner, actual numbers of district employees that require the training could be documented. This data can subsequently be incorporated into a grant that will provide funding for the necessary training.

The survey was designed in such a way as to obtain information regarding the required topics for training as well as the most desired methodologies and locations. In addition, supplementary data regarding current hiring and training practices were also gathered. In each case, the need to document hard numbers for grant purposes led to the usage of quantitative research and the utilization of a survey instrument for data collection. The complete description of how the study was conducted is included in the following sections regarding population and instrumentation.

Population

The population for this study was defined as all manufacturing companies with 20 or more employees in the eight-county area of the WWTC district. A database of all district employers was obtained from the regional labor market analyst for the Western Wisconsin Region Division of Workforce Excellence. This database contained approximately 7,000 employers. Sorting the database by related Standard Industrial Classification Codes (SIC) and employer size reduced the number of companies that fit the guidelines of the study to 195. Each employer was contacted via telephone prior to

distribution of the survey in order to verify applicability to the study and to determine the most appropriate company contact. The study required in excess of 500 phone calls by the researcher over a period of six weeks. Making contact with the appropriate maintenance manager, training manager, production manager or plant manager was difficult since these people are rarely available to receive phone calls. It took fourteen calls to one company to reach the correct individual. Completion of the initial phone conversations yielded a total of 170 appropriate contacts that agreed to receive the survey and constituted the entire population of appropriate district employers. However, errors and omissions may have been present in the supplied database and therefore the 170 companies must be viewed as a significant sample of the population as opposed to its entirety.

Instrumentation

The research design utilized in this study included a survey instrument that gathered quantitative data. The design of the instrument was a multi-step process that began with several questions developed by the researcher believed to be of importance to the study. These questions were based on a short sample survey that was utilized previously by Fox Valley Technical College in Appleton, Wisconsin. The next step involved a brainstorming session with WWTC electronics department faculty and administrators to modify original questions and insert additional items. The third step involved introducing the survey questions to members of a focus group consisting of industry personnel familiar with the survey topic.

One of the key comments received centered on keeping the verbiage of both the survey questions and the cover letter to an absolute minimum. Therefore, the goal of the

instrument was to gather as much information as possible without exceeding a length that resulted in a high percentage of unreturned surveys. The survey questions were designed to provide input regarding the following four research objectives:

1. To determine whether the manufacturing firms served by WWTC would benefit from electronics/electrical specific training for incumbent industrial maintenance personnel.
2. To determine whether students who are not incumbent industrial maintenance workers would be employable with training in these focused industrial electronics maintenance skills.
3. To identify potential employees of manufacturing firms that would be willing to assist in curriculum development for the certificate program if the study substantiated the need.
4. To obtain substantial justification for an Industrial Electronics Maintenance Certificate Program at WWTC that will be required in order to write a grant to receive funding for two years of developmental, instructional and equipment costs of implementing the program.

In addition to the above research objectives, the survey instrument included features to provide information regarding the desired methodology and locations for the training. In addition, input was requested regarding the sources that district employers currently utilized for training of this nature. The final versions of the cover letter and the survey instrument are included in Appendix A.

Many revisions of the survey were developed based on faculty, administrative and focus group feedback. Several training topics were added to question one as the

instrument matured. In addition, question six was added in order to ascertain information regarding where employers currently find new employees with industrial maintenance skills. Question seven was also added to find out where employers are currently obtaining the necessary training for their incumbent workers.

The most effort, by far, was spent developing the format for question number two. Along with the need to document the topics for the required training, it was also important to document the desired methodologies and locations. After all, it is hardly worthwhile to collect data on needed training topics if the locations and methodologies employed make it unfeasible for the employers to utilize what is offered. It was therefore suggested that a method be developed to solicit this data. The first rendition of question number two directed the subject to mark an "X" in front of their most desired methodology/location combination. They were then directed to place a check mark in front of any and all additional choices that would be acceptable. Unfortunately, this method did not allow for any type of quantifiable rating of the other acceptable choices and was therefore modified to its final version.

The final version directed the subject to pick their top six methodology/location choices and rate them 1 – 6, with 1 being their most desired. This method allowed the choices to be assigned significant numerical values during database entry. The result was a question that gathers quantifiable data regarding the subjects top six choices as opposed to just their most desired methodology/location. This information was important since it is impossible to develop training in all desired methods and locations. With complete data from question two it was possible to determine the most desired choices and therefore fulfill the greatest need. Unfortunately, as chapter four will discuss, not all subjects read

or understood the directions for the question. This resulted in a small percentage of data that did not fit the requested format. The researcher's method for handling these anomalies will also be discussed in Chapter four.

One focus group suggestion included the development of an electronic version of the survey for email delivery. Although the electronic version worked well with the focus group, the time and energy spent in its development proved to be an unwise investment. Several problems occurred when implementing this venture with the general population of the study. First, issues arose related to software and email delivery system incompatibilities. Second, although many of the company contacts that requested the electronic version expressed comfort in dealing with email attachments, several of the emails were returned without the completed survey attached. This resulted in multiple follow-up contacts to collect the unsent attachments. Finally, it appeared that the email version of the survey in the contact's "In Box" was easier to ignore than a hard copy that was sent to their attention. Almost half of the surveys that were sent out electronically had to be resent in hard copy form due to the absence of a response. This response rate for the electronic version was much lower than the overall response rate for the entire population of the study.

Each returned survey was reviewed for completeness before being transferred to a Microsoft Access database. A copy of the survey showing how the data was coded for entry is presented in Appendix B. As mentioned previously, several responses to survey question number two regarding training methodology and location preferences did not follow the requested format. Although the directions for completing this question were very clear, they may have been ignored due to their length. This problem with question

two did not present itself with the focus group or the initial mailing to the general survey population. Therefore, when the problem became evident it was too late to change the wording of the question since the majority of surveys had already been mailed. Consequently, two types of responses were entered into the database for this question. The majority followed the requested 1 - 6 rating scale, while the second type of responses just involved the choice of the most desired location for each methodology. The complete survey data including a thorough explanation of the responses to question two is presented in Chapter 4.

The data gathered by the instrument during this study is considered to be valid and reliable due to the substantial effort employed during the instrument validation process. However, a great deal of the reliability and validity can be traced to the phone calls made prior to distribution of the instrument. Making sure the survey was sent to the appropriate individual at the company location insured the quality of the responses. Also, an explanation of the purposes of the study over the phone in addition to the survey cover letter offered a greater understanding of the need for complete and accurate data. Lastly, the significant size of the sample relative to the population insures that any appropriate companies that were mistakenly excluded from the study would be properly represented by the data obtained. A complete explanation of the results of the study follows in Chapter 4.

Chapter 4

Results

Introduction

This field problem studied the feasibility of an Industrial Electronics Maintenance Certificate Program at Western Wisconsin Technical College (WWTC). The purpose of this study was to obtain substantive justification of the need for a series of courses that would provide the necessary fundamental information in the industrial maintenance areas of electronics/electrical, mechanical, and fluid power. This curriculum would allow incumbent workers or new students to complete this fundamental training in a short period of time through courses designed at an industrial training level, as opposed to the depth and math intensive nature of the current associate degree curriculum. The required math skills would be taught as part of the new curriculum and eliminate the need for students to take additional math courses.

The information that was gathered during this study will be used to write a grant for funding of the certificate program. The grant is necessary since the current WWTC budget cannot support the instructional and equipment costs necessary to perform this training. It was surmised that if a grant could be obtained to fund the original equipment purchase and the first two years of development and instructional costs, then the school would be in a position to continue the funding of a successful effort.

Chapter 4 contains the results of the study. It begins with a summary of the process employed for return of the surveys and also includes overall response rate data. The remainder of the chapter is organized in the order of the survey questions and begins with information regarding the desired training topics. The chapter continues by

documenting the responses to question two of the survey. Question two addresses the desired training delivery methodologies and locations. This section also details the research problem experienced involving responses to question two that did not follow the desired format. This information is followed by survey response data regarding the number of current and future employees that will require this training and also information regarding current training and hiring practices. The chapter concludes with information regarding company size, curriculum development assistance, and a short summary of the survey response data.

Overall Survey Response Rate

The survey instrument for this study was sent to 170 subjects that had been previously contacted by phone. Eighty-three of the surveys were returned promptly without further contact by the researcher. Each of the 87 non-respondents was contacted after a period of ten days from the original delivery of the survey to solicit the return of the completed instrument. After review of the instrument, and further discussion with the researcher, 24 of these 87 subjects indicated that the study was not applicable to their training needs. Each of these 24 respondents indicated that work of this nature was either subcontracted or hired on a case-by-case basis depending on company size and industrial maintenance requirements. Twenty of the non-respondents indicated that they had never received the survey or had inadvertently lost it. These subjects were all sent a second copy of the instrument.

After a multitude of follow-up phone calls an additional 46 completed surveys were returned. One subject said that they had already mailed the survey, which was never received. An additional respondent said that he would like to fill out the survey, but did

not have any time. This left a total of 15 subjects who did not respond to repeated phone messages soliciting the return of the completed survey. Therefore, 155 of the 170 subjects surveyed provided a response for an overall response rate of 91.2%. This response rate is more than sufficient to insure the validity of the data with regard to the study's population. A chart of the overall response data is presented in table 4.1.

Table 4.1 Overall Response Rate Data

Total surveys distributed	170
Number of completed surveys returned	129
Number of subjects indicating that the study was not applicable	24
Number of returned surveys lost in the mail	1
Number of respondents indicating no time to complete the survey	1
Total number of responses	155
Overall Response Rate	**91.2%**

Question 1: Desired Training Topics

Question 1 requested input regarding the current and future training needs of the district employers. The question read: Please indicate your current and future training needs by checking any of the following topics: (You may check more than one box.) There were 18 choices supplied along with an option to indicate other needs specific to the respondent. Table 4.2 shows the survey responses to question 1 providing the name of the topic, the total number of subjects that indicated this need, and the percentage of respondents that indicated this need. The table is organized in the manner of most popular topic to least popular topic as opposed to the order in which the topics were listed on the survey.

Table 4.2 Desired Training Topics

Training Topic	**Total**	**%**
AC/DC Fundamentals	81	63.8
Programmable Logic Controllers	76	59.8
Single phase and 3 phase AC motors	70	55.1
AC Motor Drives	67	52.8
Test Instrument Usage	61	48.0
Mechanical Drive Systems	59	46.5
National Electrical Code	56	44.1
Blueprint Reading	55	43.3
Fluid Power	51	40.2
Relay Ladder Logic/Pilot Devices	48	37.8
Electronic Devices (Semiconductors)	48	37.8
Digital Logic Circuits	48	37.8
DC Motor Drives	48	37.8
In-Plant Power Distribution	41	32.3
DC Motors/Generators	38	29.9
Process Control	26	20.5
Soldering/Surface Mount	26	20.5
Industrial Networks	17	13.4
Other	08	06.3

The eight respondents that provided input on other training needs included items such as: machine safety, lift truck instruction, electricity distribution, HVAC, specific DC electric controls, computer software applications and machinist training.

As table 4.2 shows, the highest demand for training occurs in the areas of AC/DC Fundamentals, Programmable Logic Controllers and AC Motors and Drives. Each of these training topics was indicated as necessary by over 50% of the respondents.

Question 2: Methodology and Location

The purpose of question two was to collect data that reflected the respondents training desires with regard to methodology and location. The initial portion of the question reads as follows: Please indicate your preferred modes of instructional delivery by choosing your top six of the 21 methods listed below and ranking them 1-6 (1 being

your most preferred). Note that by placing a number in a box you are selecting both a delivery method and a training location.

A further explanation of the options was provided for those subjects that may not have been familiar with the choices.

> The one-day and multi-day workshops would be provided on a cost-recovery basis and therefore workshop availability and individual student costs would depend on enrollment levels. The traditional lecture/lab courses and the open lab individualized instruction would be at an industrial training level as opposed to associate degree depth. They would be continuing education credit courses that could be packaged to create a WWTC certificate program specific to your organization. They would also be low cost since they would be delivered at standard course and material fees. The traditional lecture/lab courses would be subject to enrollment levels whereas the open lab individualized instruction would not. However, the open lab individualized instruction would be available only on the La Crosse campus.

The instrument development focus group agreed that this explanation was necessary in order for the respondents to make an informed choice regarding methodologies and locations. However, the length of the explanation may have caused some respondents to forego reading its entirety and resulted in erroneous entries. As indicated earlier, some respondents just placed an "x" in front of their most desirable choices as opposed to ranking them 1 – 6. Table 4.3 lists each of the 21 choices for methodology and campus location along with the responses received for each choice.

Table 4.3 Methodology/Location Rankings

Methodology	**Location**	**1**	**2**	**3**	**4**	**5**	**6**	**x**	**Total Entries**	**Total Score**
One-Day Workshop	On-Site	17	4	7	6	12	11	5	62	233
One-Day Workshop	La Crosse	16	14	8	19	3	9	11	80	336
One-Day Workshop	Black River	4	3	2		1		1	11	55
One-Day Workshop	Independence		1		1	1		3	6	28
One-Day Workshop	Mauston	3	1	2	2	3	2		13	45
One-Day Workshop	Tomah	3	4	5	4	2	6	2	26	92
One-Day Workshop	Viroqua	3	1	1			1	3	9	46
Multi-Day Workshop	On-Site	3	9	6	13	18	4	6	59	202
Multi-Day Workshop	La Crosse	8	16	12	10	12	4	10	72	294
Multi-Day Workshop	Black River	2	2	2	1	3		1	11	45
Multi-Day Workshop	Independence		2	1				3	6	32
Multi-Day Workshop	Mauston	3	3	5	1	1	1		14	59
Multi-Day Workshop	Tomah		6	4	10	1	4	1	26	88
Multi-Day Workshop	Viroqua	1	3	1	1	1		3	10	48
Traditional Lect/Lab	La Crosse	7	8	22	11	5	15	15	83	318
Traditional Lect/Lab	Black River	1	3	1		3		1	9	37
Traditional Lect/Lab	Independence		1			2	1	3	7	28
Traditional Lect/Lab	Mauston	2	1	5	1	3			12	46
Traditional Lect/Lab	Tomah		4	3	3	2	2	2	16	59
Traditional Lect/Lab	Viroqua	2		1		2	1	3	9	39
Open Lab Individual	La Crosse	24	10	9	7	5	16	12	83	349

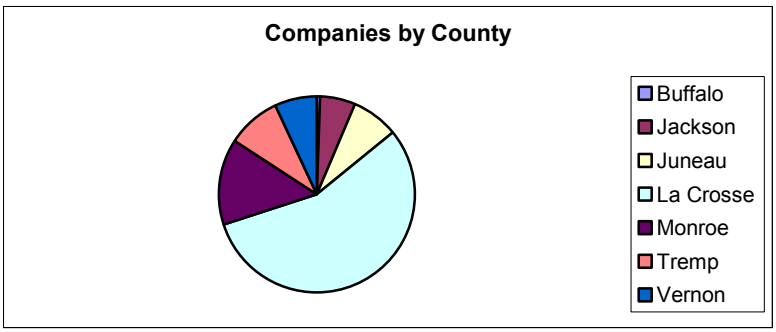
The last column of table 4.3 indicates a total score for each choice obtained by the following calculation method. Each response of number "1" was multiplied by a factor of 6. Each response of "2" was multiplied by 5, "3" by 4, "4" by 3, "3" by 2, "2" by 1 and "x" by 6. These results were then totaled and placed in the final column of the table. This number represents a cumulative rating for each methodology/location. Table 4.4 represents the same data of table 4.3 sorted in decreasing order of respondent preference.

Table 4.4 Methodology/Location Sorted by Response Ranking

Methodology	Location	1	2	3	4	5	6	x	Total Entries	Total Score
Open Lab Individual	La Crosse	24	10	9	7	5	16	12	83	349
One-Day Workshop	La Crosse	16	14	8	19	3	9	11	80	336
Traditional Lect/Lab	La Crosse	7	8	22	11	5	15	15	83	318
Multi-Day Workshop	La Crosse	8	16	12	10	12	4	10	72	294
One-Day Workshop	On-Site	17	4	7	6	12	11	5	62	233
Multi-Day Workshop	On-Site	3	9	6	13	18	4	6	59	202
One-Day Workshop	Tomah	3	4	5	4	2	6	2	26	92
Multi-Day Workshop	Tomah		6	4	10	1	4	1	26	88
Multi-Day Workshop	Mauston	3	3	5	1	1	1		14	59
Traditional Lect/Lab	Tomah		4	3	3	2	2	2	16	59
One-Day Workshop	Black River	4	3	2		1		1	11	55
Multi-Day Workshop	Viroqua	1	3	1	1	1		3	10	48
One-Day Workshop	Viroqua	3	1	1			1	3	9	46
Traditional Lect/Lab	Mauston	2	1	5	1	3			12	46
One-Day Workshop	Mauston	3	1	2	2	3	2		13	45
Multi-Day Workshop	Black River	2	2	2	1	3		1	11	45
Traditional Lect/Lab	Viroqua	2		1		2	1	3	9	39
Traditional Lect/Lab	Black River	1	3	1		3		1	9	37
Multi-Day Workshop	Independence		2	1				3	6	32
One-Day Workshop	Independence		1		1	1		3	6	28
Traditional Lect/Lab	Independence		1			2	1	3	7	28

The training locations choices indicated by the responses can be closely correlated to the locations of the companies that were part of the survey. Figure 4.1 shows the distribution of the survey population by county.

Figure 4.1 Companies by County



The location choices for training are closely aligned with the company's proximities to each of the six district campus locations. The data shows strong support for instructional delivery in the open lab as well as traditional lecture/lab courses on the La Crosse campus. One-day and multi-day workshops, both on-site and in La Crosse were also highly desired. The Tomah area generated the most interest of the extended campuses followed by Mauston, Black River Falls, Viroqua and Independence.

Question 3: Number of current employees requiring training

If cost, content and scheduling issues were resolved, how many of your current employees would you foresee benefiting from the type of training selected in question over the next five years? The responses to this question are provided in table 4.5 below.

Table 4.5 Number of Current Employees Requiring Training

None	1-2	3-5	6-10	More than 10	Total
2	43	47	26	8	420-661

The data gathered in question three is key information with regard to fulfilling the purpose of the study. An indicated training need for between 420 and 661 incumbent district employees provides significant justification for the need of the Industrial Electronics Maintenance Certificate Program.

Question 4: New Employee Hiring

Whereas question three focused on incumbent worker training, question four addresses the issue of hiring new employees with industrial maintenance skills. The question asks: Would you hire a new employee who possessed the skills selected in question one? Table 4.6 provides the response data for question 4.

Table 4.6 New Employee Hiring

Would Hire	Would Not Hire	% That Would Hire
112	15	88%

The data of table 4.6 shows that the vast majority of the respondents (88%) would hire an employee with just the requisite skill set required as opposed to hiring only graduates of degree programs. This data is a clear indication of the need for the type of training proposed as part of this study.

Question 5: Number of New Employees to be Hired

If you answered, "yes" to question 4, how many new employees with this training would you hire over the next five years? The responses to question five are presented in table 4.7.

Table 4.7 Number of New Employees to be Hired

None	1-2	3-5	6-10	More than 10	Total
8	66	29	5	2	203-347

The responses to question five show a significant need for new employees with the industrial level training proposed by this study. The respondents indicated the need for between 203 and 347 new employees with these skills over the next five years. This data depicts a viable option for individuals starting or changing careers with limited time for retraining.

Question 6: Current Employer Training Practices

Where do your current employees receive this type of training? The responses to this question are presented in Table 4.8.

Table 4.8 Current Employer Training Practices

Training Type	**Number of responses**
Private Technical/Trade School	17
Public Technical College	31
No training received	12
Private Training Companies	27
On the Job	93
Other	12

The data of question six shows that the majority of this type of training currently occurs on the job. The twelve subjects that provided alternatives to the listed training included responses such as: past work history, in-house training, factory technical support, apprenticeships, video training, equipment manufacturer training and university education.

Question 7: Obtaining New Employees

Where do you presently obtain new employees with these types of skills? The responses to this question are presented in Table 4.9.

Table 4.9 Obtaining New Employees

New Employees	**Number of responses**
Public Technical College Graduates	30
Private Technical/Trade School Graduates College	10
Apprenticeship Programs	2
Unable to Obtain	28
Other	43

The data gathered by this question clearly indicates a shortage of workers skilled in the areas mentioned in this study. Twenty-eight of the respondents offered that they were

unable to obtain new workers with the necessary skills in the industrial electronics maintenance field. A significant number of respondents provided answers to question 7 that fell in the "other" category. Table 4.10 provides data for these entries.

Table 4.10 Obtaining New Employees ("Other" Responses)

Employee Source	**Number of responses**
Military	2
Other Companies	9
University	1
General Advertising (Paper) Companies	11
Have not hired	3
Local Union/Trades	3

Question 8: Company Size

Please indicate the number of individuals currently employed by your company.

This demographic data is presented in table 4.11. Although the original population was to exclude companies with less than 20 employees, it appeared that the original database obtained from the Western Wisconsin Region Division of Workforce Excellence had overstated the number of employees of some of the companies. This explains the 21 entries that fall in the category of less than 20 employees.

Table 4.11 Company Size

Number of Employees	**Number of responses**
Less than 20	21
20-49	27
50-99	19
100-249	31
250 or more	30

Figure 4.2 shows the data of table 4.11 in a pie chart for easier viewing.

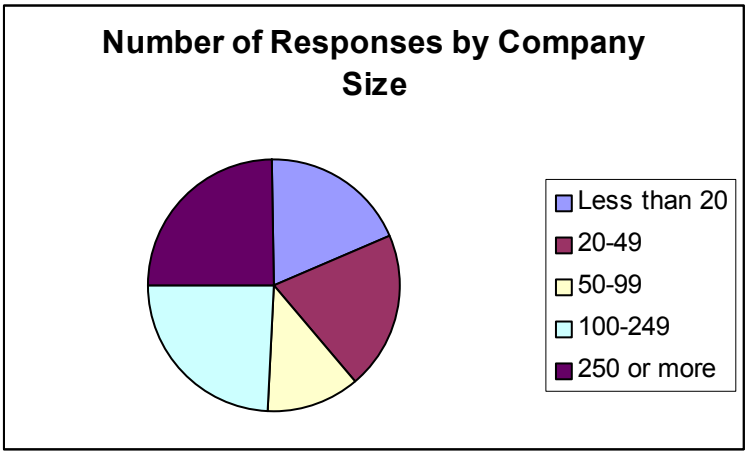


Figure 4.2

Question 9: Curriculum Development Assistance

Please indicate whether you wish to be contacted regarding your input into curriculum development and/or delivery of this type of skills training. The responses to question 9 are presented in table 4.12.

Table 4.12 Curriculum Development Assistance

Desired to be contacted regarding curriculum development and/or delivery		**Percentage of Total Responses**	
Yes	**No**	**Yes**	**No**
54	75	42%	58%

Although less than half of the respondents indicated they would be willing to assist with curriculum development, 42% is a very significant figure. The fact that this many company personnel at the level of plant manager, facilities manager, training manager, supervisor or maintenance manager are willing to devote part of their extremely busy schedules to this task is a testament to the extreme need for this training.

Summary

The survey data presented in this chapter clearly supports the skilled worker shortage detailed in the literature review. The population of the study indicated the need for industrial electronics maintenance related training for between 420 and 661 of their incumbent workforce over the next five years. The data also portrayed the need for 203 to 347 new employees with this type of training over the same period. The combination of incumbent workers and new employees requiring this training is between 623 and 1008 people.

The need for industrial level training as opposed to strictly associate degree college curriculum was also heavily supported by the study. Eight-eight % of the survey respondents indicated that they would hire an individual with the appropriate industrial maintenance skill set regardless of whether they were program graduates.

The results of the study also verified the need for flexible delivery methods and locations for the training. Substantial interest in one-day and multi-day workshops was expressed along with continued support for traditional lecture/lab delivery and individualized open lab instruction.

Chapter 5

Summary, Conclusions and Recommendations

Summary

This field problem studied the feasibility of an Industrial Electronics Maintenance Certificate Program at Western Wisconsin Technical College (WWTC). While manufacturing jobs continue to decrease across the nation as a whole, Wisconsin's manufacturing sector continues to grow, demanding additional skilled workers. The study sought to document the need for a series of courses that would supply training in the areas of electronics/electrical, mechanical and fluid power at an industrial level as opposed to associate degree college courses. The effort would address the skilled worker shortage in the district by providing much needed training to both incumbent workers and potential new employees in the industrial maintenance field. The information gathered by the training needs survey was used to write a grant to obtain funding to support the effort.

In Wisconsin, the skilled worker shortage is a function of actual numbers of workers in addition to a lack of necessary skills. Many Wisconsin employers are having difficulty filling job openings. In its January 2001 publication, Wisconsin Projections, the Wisconsin Department of Workforce Development (DWD) states that the gap between the number of jobs and the number of people in the labor force is widening. By 2008, about 3,295,820 non-farm jobs (including self-employment) are expected to exist. The 2008 labor force is projected to have 3,091,600 people. This indicates a difference of 204,220 between the number of non-farm jobs and the number of labor force participants. The 2001 DWD report also states that manufacturing industries are expected to remain an important source of Wisconsin jobs between 1998 and 2008.

> Despite ongoing mergers, consolidations, and substitutions of machines for people, manufacturing is projected to add about 25,500 new jobs to grow to a total of 642,200 by 2008. Wisconsin's manufacturing growth is in contrast to a decline for the nation as a whole, which is expected to lose about 132,000 jobs during the 1998 to 2008 period. (p.6)

Besides the 25,500 new jobs, the Wisconsin manufacturing sector will have an additional 134,880 job openings available due to people permanently leaving the industry via retirement.

The seriousness of the skilled worker shortage is clearly summarized in a letter dated December 1, 1999, from then Governor of Wisconsin, Tommy G. Thompson, to WWTC President, Dr. Lee Rasch:

> As you well know, we are experiencing a shortage of skilled workers that shows no signs of improving. Projections show 40 percent of the state's current skilled workers have reached or will reach retirement age between 1995 and 2005. The year 2016 will present us with what in the business world is called an inflection point. In that year, for the first time, more Wisconsinites will turn 65 than turn 18, and the number of children born in our state will be less than the number of our citizens who pass away.

Many people across the nation are under stress. Their primary concern is to lead safe, healthy, prosperous, and meaningful lives. Good jobs and careers are essential; yet finding convenient training opportunities to get and keep good jobs is a real challenge. Ziess (2000) states:

> Community colleges across the nation are also under stress. Attempting to meet

> today's market demands with yesterday's model for education and training is like trying to navigate the Internet with a typewriter. (p. 48)

The time-honored notion that students are candidates for degrees conferred by faculty has shifted dramatically. Students have become consumers and faculty members are becoming facilitators of learning. Students (customers is more accurate) are becoming active learners in a new deregulated, open learning environment. The faculty driven monolithic university approach to knowledge and skills acquisition must yield to a consumer-driven, open learning delivery system (Duderstadt, 1999).

A recent study of community college student preferences by Baker (1998) indicates that the main reason people attend community and technical college is to gain occupational skills, not degrees. Ziess (2000) states that community colleges present the obvious solution to employer, citizen, and community concerns about getting and keeping skilled workers. However, Ziess adds that two formidable obstacles must be overcome before a viable solution can be developed. First, campus leaders must understand and embrace this new, more community-integrated role of the college, and secondly, community leaders must also understand and support this more market-driven role of the college. Swindle (1999) states that major advances have occurred on this front:

> Community and technical colleges across the country have become important allies of business, particularly for technology companies, in the "war for talent." Over the past decade, community colleges have shown that they can respond to industry needs by designing, staffing, and launching new training and educational programs. This responsiveness has led to many company-unique programs. This trend continues as industry moves more of the job-training roles to the colleges.

> Training that has been done in-house by companies for years is moving into well-equipped college labs and classrooms. (p.16)

However, for the manufacturing community, the strides made thus far are not enough. Eisen (1997) comments on the critical role the community and technical colleges play in workforce development for the manufacturing sector:

> Community colleges must realize that so much depends on them. Manufacturers need them, employees need them, and an economy increasingly dependent on a highly skilled workforce needs them. Connecting education to the workplace is a critical role for today's community colleges, which are in a position to be leaders in making the connection, particularly for U.S. manufacturers.

This sentiment regarding the significant role of the technical college is echoed in former Governor Tommy Thompson's letter of December 1, 1999 to WWTC president Dr. Lee Rasch where he writes, "Perhaps never in our history has the Wisconsin Technical College System (WTCS) been so important to the economic health and future of our state". It is with this thought in mind that this project was undertaken.

The population for this study was defined as all manufacturing companies with 20 or more employees in the eight-county area of the WWTC district. Each manufacturing employer was contacted via telephone prior to distribution of the survey to verify applicability to the study and to determine the most appropriate company contact. These phone conversations yielded a total of 170 subjects that agreed to receive the survey and constituted the entire population of appropriate district employers. However, possible omissions may have existed in the database and therefore the 170 companies must be viewed as a significant sample of the population as opposed to its entirety.

One hundred and fifty-five replies were received out of the 170 mailed surveys for a response rate of 91.2%. Twenty-four of those replies indicated that the industrial maintenance activities at their company were performed by subcontractors and therefore were not applicable to the study. One hundred and twenty-nine completed surveys were returned. Input was received regarding topics for training as well as methodology and location preferences. The most requested topics included, AC/DC fundamentals, AC motors and controls, and programmable logic controllers. These three topics were indicated as necessary by over 50% of the respondents. The most desired location for training was in La Crosse due to the overwhelming majority of businesses located in La Crosse County. The methodology preferences were quite evenly split between one-day workshops, multi-day workshops, traditional lecture/lab courses and individualized open lab instruction. The next most popular choices were one-day and multi-day workshops on-site at the company. The highest demand for training outside the La Crosse area was in Tomah, followed by Mauston, Black River Falls, Viroqua, and Independence.

Every respondent except one indicated a need for employee training on one or more of the topics listed in the survey. The data showed that between 420 and 661 incumbent workers in the district require this type of training over the next five years. In addition, almost 90% of the respondents indicated that they would hire an individual with the required industrial maintenance skill set regardless of whether they had completed a degree. The data showed that between 203 and 347 of these new employees would be required over the next five years. These two combined responses show a training need for between 623 and 1008 workers in the area of industrial electronics maintenance. These numbers provide substantial support for the program.

Information was also gathered regarding current training options and new employee recruitment activities. Over 20% of the respondents indicated that they were unable to obtain new employees with industrial maintenance skills. Finally, over 40 % of the respondents indicated that they would be willing to take time out of their already busy schedules to provide assistance regarding curriculum development and delivery planning. This is truly a testament to the extreme need for this training.

Conclusions

Both the review of literature and the results of the study support the need for industry-specific customized training in the area of industrial electronics maintenance. The previous research and the results of this study clearly document the extreme need for electronics/electrical; mechanical and fluid power training that is delivered in a fashion that is more suitable to the needs of employers. The 600 – 1000 combined incumbent and new employees that require training in this manner over the next five years truly indicates the seriousness of the skilled worker shortage that is faced by manufacturing employers in the WWTC district.

Recommendations

The results of this study should be used to write a state or federal grant soliciting funds to support the purchase of the necessary training equipment, the development of the required curriculum, and delivery of the desired training. The purpose of the grant would be to defray the high start-up costs associated with training equipment and curriculum development that would occur in the first two years of the project. The goal would be to provide this type of instruction at standard course and material fees as opposed to the high price tag of cost-recovery based training. The courses should be birthed as

continuing education courses that receive standard state aid reimbursement. The program should be able to operate independently after the initial two years of grant funded activities.

The grant should support a full-time faculty position to not only develop and deliver the training, but to develop the WWTC-employer relationships as well. The faculty member should physically meet each survey respondent that expressed a desire to assist with curriculum development. WWTC must show a solid commitment to meet the training needs of the district manufacturing constituents before the lack of skilled workers forces them to relocate outside the district.

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Appendix A

Cover Letter and Survey Instrument

WWTC Letterhead

Company Contact **Today's Date**
Company Name
Company Address

Dear: **Company Contact**

Recently we had a phone conversation regarding industrial electronics and maintenance training by WWTC. During that conversation we touched on several key issues:

- The need to provide this type of instruction at an industrial training level as opposed to associate degree depth.
- The ability to deliver this type of training in several formats and locations.
- The flexibility of the open lab individualized instruction currently offered.
- The necessity to document these training needs in order to obtain grant funding.

Your completion of the following survey will be extremely beneficial toward addressing the aforementioned issues. It is important that we are able to receive complete feedback in this area since this data will help us focus our efforts on the training formats and locations most desired by the employers we serve.

Please return the completed survey by **insert date *(10 days from date of mailing)***. . Thank you very much for your cooperation in this matter and we look forward to providing training responsive to your indicated needs.

Sincerely,

Ron J. Petersen
Electronics Instructor
Western Wisconsin Technical College

Alan Foster
Associate Dean – Industrial Division
Western Wisconsin Technical College

1. Please indicate your current and future training needs by checking any of the following topics**: (You may check more than one box)**

☐ AC/DC Fundamentals	☐ Relay Ladder Logic/Pilot Devices
☐ Electronic Devices (Semiconductors)	☐ Programmable Logic Controllers
☐ Digital Logic Circuits	☐ Industrial Networks
☐ DC Motors/Generators	☐ Fluid Power
☐ DC motor Drives	☐ Process Control
☐ Single phase and 3 phase AC motors	☐ Blueprint Reading
☐ In-Plant Power distribution	☐ Test Instrument Usage
☐ AC motor Drives	☐ Soldering/Surface Mount
☐ Mechanical Drive Systems	☐ National Electrical Code
☐ Other _____	☐ Other _____

2. Please indicate your preferred modes of instructional delivery by choosing your **top six** of the 21 methods listed below and **ranking them 1-6**. (1 being your most preferred) Note that by placing a number in a box you are selecting both a delivery method and a training location. The **one-day** and **multi-day** workshops would be provided on a cost-recovery basis and therefore workshop availability and individual student costs would depend on enrollment levels. The **traditional lecture/lab** courses and the **open lab individualized instruction** would be at an industrial training level as opposed to associate degree depth. They would be continuing education credit courses that could be packaged to create a WWTC certificate program specific to your organization. They would also be low cost since they would be delivered at standard course and material fees. The traditional lecture/lab courses would be subject to enrollment levels whereas the open lab individualized instruction would not. However, the open lab individualized instruction would be available only on the La Crosse campus.

<u>One-day non-credit workshop</u> ☐ On-site at Company ☐ On the La Crosse Campus ☐ On the Black River Falls Campus ☐ On the Independence Campus ☐ On the Mauston Campus ☐ On the Tomah Campus ☐ On the Viroqua Campus	**<u>Multi-day non-credit workshop</u>** ☐ On-site at Company ☐ On the La Crosse Campus ☐ On the Black River Falls Campus ☐ On the Independence Campus ☐ On the Mauston Campus ☐ On the Tomah Campus ☐ On the Viroqua Campus
<u>Traditional lecture/lab courses*</u> ☐ On the La Crosse Campus ☐ On the Black River Falls Campus ☐ On the Independence Campus ☐ On the Mauston Campus ☐ On the Tomah Campus ☐ On the Viroqua Campus * 16 or 8 week courses meeting 1 or 2 times per week	**<u>Open Lab Individualized Instruction</u>** ☐ The open lab courses would be on the La Crosse campus in a self-paced, open lab environment with individualized instruction. Attendance would be flexible with morning, afternoon and evening hours of operation. Course completion time would vary upon the individual student attendance schedule.

**** <u>When question 2 above is completed, there should be only six filled boxes with the numbers 1 – 6 !!</u>***

Over →

3. If cost, content and scheduling issues were resolved, how many of your current employees would you foresee benefiting from the type of training selected in question one over the next five years?

☐ None ☐ 1 – 2 ☐ 3 - 5 ☐ 6-10 ☐ More than 10

4. Would you hire a <u>new</u> employee who possessed the skills selected in question number one?

☐ Yes ☐ No

5. If you answered "yes' to question number four, how many new employees with this training would you hire over the next five years?

☐ None ☐ 1 – 2 ☐ 3 - 5 ☐ 6-10 ☐ More than 10

6. Where do your <u>current</u> employees receive this type of training?

☐ Private technical/trade school ☐ Public technical college ☐ No training received
☐ Private training companies ☐ On the job ☐ Other_____

7. Where do you presently obtain <u>new</u> employees with these types of skills?

☐ Public technical college graduates ☐ Private technical/trade school graduates
☐ Apprenticeship programs ☐ Unable to obtain ☐ Other_____

8. Please indicate the number of individuals currently employed by your company.

☐ Less than 20 ☐ 20 - 49 ☐ 50 - 99 ☐ 100 - 249 ☐ 250 or more

9. Please indicate whether you wish to be contacted regarding your input into curriculum development and/or delivery of this type of skills training.

☐ Yes ☐ No **If yes, please provide the following information:**

Name: _____ Title: _____

Company Name: _____

Phone: _____ Email: _____

Address: _____
(Street) (City) (State) (Zip)

Participation in this study is strictly voluntary. By returning this questionnaire, consent is given to utilize the supplied data in researching the need for training in this area. Confidentiality of data will be maintained and no additional contact by the researcher will result from this document unless indicated in question 9 above.

Appendix B

Survey Instrument Data Entry Codes

1. Please indicate your current and future training needs by checking any of the following topics**: (You may check more than one box)**

A ☐ AC/DC Fundamentals	**J** ☐ Relay Ladder Logic/Pilot Devices
B ☐ Electronic Devices (Semiconductors)	**K** ☐ Programmable Logic Controllers
C ☐ Digital Logic Circuits	**L** ☐ Industrial Networks
D ☐ DC Motors/Generators	**M** ☐ Fluid Power
E ☐ DC motor Drives	**N** ☐ Process Control
F ☐ Single phase and 3 phase AC motors	**O** ☐ Blueprint Reading
G ☐ In-Plant Power distribution	**P** ☐ Test Instrument Usage
H ☐ AC motor Drives	**Q** ☐ Soldering/Surface Mount
I ☐ Mechanical Drive Systems	**R** ☐ National Electrical Code
☐ Other _____	**S** ☐ Other _____

2. Please indicate your preferred modes of instructional delivery by choosing your **top six** of the 21 methods listed below and **ranking them 1-6**. (1 being your most preferred) Note that by placing a number in a box you are selecting both a delivery method and a training location. The **one-day** and **multi-day** workshops would be provided on a cost-recovery basis and therefore workshop availability and individual student costs would depend on enrollment levels. The **traditional lecture/lab** courses and the **open lab individualized instruction** would be at an industrial training level as opposed to associate degree depth. They would be continuing education credit courses that could be packaged to create a WWTC certificate program specific to your organization. They would also be low cost since they would be delivered at standard course and material fees. The traditional lecture/lab courses would be subject to enrollment levels whereas the open lab individualized instruction would not. However, the open lab individualized instruction would be available only on the La Crosse campus.

<u>One-day non-credit workshop</u> **A** **1**☐ On-site at Company **2**☐ On the La Crosse Campus **3**☐ On the Black River Falls Campus **4**☐ On the Independence Campus **5**☐ On the Mauston Campus **6**☐ On the Tomah Campus **7**☐ On the Viroqua Campus	**<u>Multi-day non-credit workshop</u>** **B** **1**☐ On-site at Company **2**☐ On the La Crosse Campus **3**☐ On the Black River Falls Campus **4**☐ On the Independence Campus **5**☐ On the Mauston Campus **6**☐ On the Tomah Campus **7**☐ On the Viroqua Campus
<u>Traditional lecture/lab courses*</u> **C** **1**☐ On the La Crosse Campus **2**☐ On the Black River Falls Campus **3**☐ On the Independence Campus **4**☐ On the Mauston Campus **5**☐ On the Tomah Campus **6**☐ On the Viroqua Campus ***** 16 or 8 week courses meeting 1 or 2 times per week	**<u>Open Lab Individualized Instruction</u>** **D** ☐ The open lab courses would be on the La Crosse campus in a self-paced, open lab environment with individualized instruction. Attendance would be flexible with morning, afternoon and evening hours of operation. Course completion time would vary upon the individual student attendance schedule.

**** <u>When question 2 above is completed, there should be only six filled boxes with the numbers 1 – 6 !!</u>***

Over →

3. If cost, content and scheduling issues were resolved, how many of your current employees would you foresee benefiting from the type of training selected in question one over the next five years?

A☐ None **B**☐ 1 – 2 **C**☐ 3 - 5 **D**☐ 6-10 **E**☐ More than 10

4. Would you hire a <u>new</u> employee who possessed the skills selected in question number one?

A☐ Yes **B**☐ No

5. If you answered "yes' to question number four, how many new employees with this training would you hire over the next five years?

A☐ None **B**☐ 1 – 2 **C**☐ 3 - 5 **D**☐ 6-10 **E**☐ More than 10

6. Where do your <u>current</u> employees receive this type of training?

A☐ Private technical/trade school **B**☐ Public technical college **C**☐ No train Rcvd
D☐ Private training companies **E**☐ On the job **F**☐ Other_____

7. Where do you presently obtain <u>new</u> employees with these types of skills?

A☐ Public technical college graduates **B**☐ Private technical/trade school graduates
C☐ Apprenticeship programs **D**☐ Unable to obtain **E**☐ Other_____

8. Please indicate the number of individuals currently employed by your company.

A☐ Less than 20 **B**☐ 20 - 49 **C**☐ 50 – 99 **D**☐ 100 – 249 **E**☐ ≥250

9. Please indicate whether you wish to be contacted regarding your input into curriculum development and/or delivery of this type of skills training.

A☐ Yes **B**☐ No **If yes, please provide the following information:**

Name: _____ Title: _____

Company Name: _____

Phone: _____ Email: _____

Address: _____
(Street) (City) (State) (Zip)

Participation in this study is strictly voluntary. By returning this questionnaire, consent is given to utilize the supplied data in researching the need for training in this area. Confidentiality of data will be maintained and no additional contact by the researcher will result from this document unless indicated in question 9 above.

Appendix C

Complete Survey Data

Question 1 Survey Data

S#	R	dna	1A	1B	1C	1D	1E	1F	1G	1H	1I	1J	1K	1L	1M	1N	1O	1P	1Q	1R	1S
1	Yes	Ye	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
2	Yes	Ye	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
3	Yes	No	No	No	No	No	Ye	No	Yes	No	Ye	No	No	No	Yes	No	Ye	No	No	Ye	No
4	Yes	No	Ye	No	No	No	Ye	Ye	No	Ye	No	Ye	Ye	No	No	No	Ye	No	No	Ye	No
5	Yes	No	Ye	No	No	Ye	Ye	Ye	Yes	Ye	No	No	Ye	No	Yes	No	Ye	Ye	Ye	Ye	No
6	Yes	No	No	No	Yes	No	No	Ye	Yes	No	No	Ye	Ye	No	No	No	No	No	No	No	No
7	Yes	No	Ye	No	No	Ye	Ye	Ye	No	Ye	Ye	No	No	No	No	No	No	No	No	No	Ye
8	Yes	No	Ye	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Ye	Ye
9	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Ye	Ye	No	Ye	Ye
10	Yes	No	Ye	Ye	Yes	Ye	Ye	Ye	Yes	Ye	Ye	Ye	Ye	No	Yes	No	No	Ye	Ye	Ye	No
11	Yes	No	Ye	No	Yes	No	Ye	Ye	Yes	Ye	No	Ye	Ye	Ye	No	No	No	No	No	No	No
12	Yes	No	Ye	No	No	Ye	Ye	Ye	No	Ye	Ye	No	No	No	No	Ye	No	Ye	No	Ye	No
13	Yes	Ye	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
14	Yes	No	No	No	No	No	No	No	No	No	No	No	Ye	No	Yes	No	No	No	No	Ye	Ye
15	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
16	Yes	No	Ye	Ye	Yes	No	No	Ye	No	Ye	No	No	Ye	No	No	Ye	Ye	Ye	No	No	No
17	Yes	No	Ye	Ye	No	Ye	Ye	Ye	Yes	Ye	No	Ye	Ye	No	No	No	Ye	No	No	Ye	No
18	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
19	Yes	No	Ye	Ye	Yes	No	No	Ye	No	Ye	No	Ye	Ye	No	No	Ye	Ye	No	No	Ye	No
20	Yes	No	Ye	No	Yes	No	No	Ye	No	Ye	Ye	Ye	Ye	Ye	Yes	Ye	Ye	Ye	Ye	Ye	No
21	Yes	Ye	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
22	Yes	Ye	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
23	Yes	Ye	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
24	Yes	No	Ye	No	No	No	No	No	No	No	No	No	No	No	No	No	Ye	No	No	No	No
25	Yes	Ye	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
26	Yes	No	No	No	No	No	No	Ye	No	No	Ye	No	Ye	No	No	Ye	No	No	No	No	No
27	Yes	No	Ye	Ye	Yes	No	No	No	No	Ye	Ye	No	No	No	No	No	Ye	Ye	Ye	No	No
28	Yes	No	Ye	Ye	Yes	Ye	Ye	No	No	No	Ye	Ye	Ye	No	Yes	Ye	No	Ye	Ye	No	No
29	Yes	No	Ye	Ye	No	No	No	Ye	No	Ye	Ye	Ye	No	No	Yes	No	Ye	Ye	No	Ye	No
30	Yes	No	Ye	No	No	No	Ye	Ye	No	No	Ye	Ye	Ye	Ye	Yes	No	No	No	No	No	No
31	Yes	No	Ye	No	No	No	No	Ye	Yes	No	No	No	No	No	No	No	Ye	No	No	Ye	No
32	Yes	No	Ye	Ye	No	No	No	No	No	No	Ye	No	No	No	No	No	No	Ye	No	No	No
33	Yes	No	Ye	Ye	No	Ye	Ye	No	No	Ye	Ye	No	No	No	Yes	No	Ye	Ye	Ye	No	Ye
34	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
35	Yes	No	Ye	No	No	No	No	Ye	Yes	Ye	No	Ye	Ye	No	No	No	No	Ye	No	Ye	No

S#	R	dna	1A	1B	1C	1D	1E	1F	1G	1H	1I	1J	1K	1L	1M	1N	1O	1P	1Q	1R	1S
36	Yes	No	Ye	No	No	No	No	No	No	No	No	Ye	No	Ye	No	No	Ye	Ye	No	No	No
37	Yes	No	Ye	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
38	Yes	No	Ye	Ye	No	Ye	Ye	Ye	No	Ye	Ye	No	Ye	No	No	No	No	Ye	Ye	No	No
39	Yes	No	Ye	Ye	Yes	No	No	No	No	No	No	Ye	No	No	No	No	No	Ye	No	No	No
40	Yes	No	Ye	No	No	Ye	Ye	No	No	No	Ye	No	No	No	Yes	No	No	Ye	No	No	No
41	Yes	No	Ye	Ye	No	No	No	Ye	No	No	Ye	No	Ye	No	No	No	No	No	No	No	No
42	Yes	No	Ye	No	Yes	No	No	Ye	No	Ye	No	Ye	Ye	No	No	No	Ye	Ye	No	No	No
43	Yes	No	Ye	No	No	No	No	Ye	No	Ye	Ye	No	No	No	Yes	No	No	No	No	Ye	No
44	Yes	Ye	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
45	Yes	No	Ye	Ye	Yes	Ye	Ye	Ye	No	Ye	No	Ye	Ye	No	No	No	No	No	No	Ye	No
46	Yes	Ye	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
47	Yes	No	No	No	Yes	No	No	No	Yes	No	Ye	No	Ye	No	No	No	No	No	No	No	No
48	Yes	No	No	Ye	Yes	Ye	Ye	Ye	No	Ye	Ye	Ye	Ye	No	Yes	Ye	No	No	No	No	No
49	Yes	Ye	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
50	Yes	No	Ye	Ye	Yes	Ye	Ye	Ye	Yes	Ye	Ye	Ye	Ye	Ye	Yes	Ye	Ye	Ye	Ye	Ye	No
51	Yes	No	No	No	No	No	No	No	No	No	No	Ye	Ye	No	Yes	No	No	No	No	No	No
52	Yes	No	Ye	Ye	Yes	Ye	Ye	Ye	No	Ye	Ye	No	Ye	No	Yes	Ye	Ye	No	Ye	Ye	No
53	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
54	Yes	No	Ye	Ye	Yes	No	No	No	No	No	No	No	Ye	No	No	No	Ye	No	No	Ye	No
55	Yes	No	Ye	Ye	Yes	Ye	Ye	Ye	No	Ye	Ye	Ye	Ye	No	Yes	Ye	Ye	Ye	No	No	No
56	Yes	No	Ye	No	No	No	No	Ye	No	Ye	Ye	No	Ye	No	Yes	No	No	Ye	No	No	No
57	Yes	No	No	Ye	No	No	Ye	No	No	Ye	No	No	Ye	No	No	No	No	Ye	No	No	No
58	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
59	Yes	No	Ye	No	No	Ye	Ye	Ye	Yes	Ye	No	No	Ye	No	Yes	No	Ye	Ye	Ye	Ye	No
60	Yes	Ye	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
61	Yes	No	No	No	Yes	No	Ye	Ye	No	No	No	Ye	No	Ye	No	No	No	No	No	No	No
62	Yes	No	No	No	No	No	No	Ye	No	No	Ye	No	No	No	No	No	No	No	No	No	No
63	Yes	Ye	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
64	Yes	No	Ye	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
65	Yes	No	Ye	No	No	No	No	Ye	No	No	No	No	Ye	No	No	No	Ye	No	No	Ye	No
66	Yes	No	Ye	Ye	No	Ye	Ye	Ye	Yes	Ye	Ye	Ye	Ye	No	No	No	Ye	No	No	Ye	No
67	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Ye
68	Yes	No	No	No	No	No	No	No	No	No	Ye	No	No	Ye	No	No	Ye	Ye	No	No	No
69	Yes	No	Ye	Ye	Yes	Ye	Ye	Ye	No	Ye	Ye	Ye	Ye	Ye	Yes	Ye	Ye	No	Ye	Ye	No
70	Yes	No	Ye	No	No	Ye	Ye	Ye	No	Ye	Ye	Ye	No	No	No	No	Ye	Ye	No	No	No
71	Yes	No	Ye	No	No	No	No	Ye	No	Ye	No	No	No	No	No	No	Ye	Ye	No	No	No
72	Yes	No	No	No	Yes	Ye	Ye	Ye	Yes	Ye	Ye	No	Ye	No	No	No	No	Ye	No	Ye	No

S#	R	dna	1A	1B	1C	1D	1E	1F	1G	1H	1I	1J	1K	1L	1M	1N	1O	1P	1Q	1R	1S
73	Yes	No	Ye	Ye	No	No	No	Ye	No	No	Ye	No	No	No	Yes	No	No	Ye	No	No	No
74	Yes	No	Ye	No	Yes	No	No	Ye	Yes	No	No	No	Ye	No	Yes	No	No	No	No	No	No
75	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
76	Yes	No	Ye	Ye	Yes	No	No	No	No	No	No	No	No	No	No	No	Ye	Ye	Ye	No	No
77	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Ye	No
78	Yes	No	No	No	No	No	No	No	No	Ye	Ye	No	Ye	No	Yes	Ye	No	No	No	No	No
79	Yes	No	No	No	No	No	No	Ye	Yes	Ye	No	No	Ye	No	No	No	Ye	Ye	No	Ye	No
80	Yes	No	Ye	No	Yes	No	Ye	No	No	Ye	No	Ye	Ye	No	No	No	Ye	No	No	Ye	No
81	Yes	No	No	No	No	No	No	No	No	Ye	No	Ye	Ye	No	No	No	No	No	No	No	No
82	Yes	No	Ye	No	No	No	No	No	No	No	No	No	No	No	Yes	No	Ye	No	No	No	No
83	Yes	No	No	No	No	No	No	No	No	No	No	Ye	Ye	No	Yes	No	No	No	No	No	No
84	Yes	No	Ye	Ye	Yes	Ye	Ye	No	Yes	No	No	Ye	Ye	No	No	Ye	No	No	No	No	No
85	Yes	Ye	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
86	Yes	Ye	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
87	Yes	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	Ye	No	No	No	No
88	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
89	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
90	Yes	Ye	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
91	Yes	Ye	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
92	Yes	No	Ye	Ye	Yes	No	Ye	No	Yes	Ye	No	No	Ye	No	No	Ye	No	Ye	No	Ye	No
93	Yes	No	No	No	No	No	No	No	No	No	No	Ye	No	No	No	No	No	No	No	No	No
94	Yes	No	No	No	No	No	No	Ye	Yes	No	No	No	Ye	No	Yes	No	No	No	No	No	No
95	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
96	Yes	No	No	No	Yes	No	Ye	No	No	Ye	No	Ye	Ye	Ye	No	No	No	No	No	No	No
97	Yes	No	No	No	Yes	No	No	Ye	Yes	No	Ye	No	Ye	Ye	Yes	No	No	No	Ye	Ye	No
98	Yes	No	No	No	Yes	No	No	No	No	Ye	No	No	Ye	No	No	No	No	No	No	No	No
99	Yes	No	Ye	Ye	Yes	No	No	No	No	No	No	Ye	Ye	No	Yes	No	No	Ye	No	Ye	No
100	Yes	Ye	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
101	Yes	No	Ye	No	No	No	No	Ye	Yes	Ye	No	No	No	No	Yes	No	Ye	Ye	Ye	Ye	Ye
102	Yes	No	Ye	Ye	No	No	No	No	No	No	Ye	No	No	No	No	Ye	Ye	Ye	No	No	No
103	Yes	No	No	No	No	Ye	No	Ye	No	No	No	No	No	No	No	No	No	No	No	No	No
104	Yes	No	No	No	No	No	No	Ye	Yes	Ye	No	No	No	No	No	No	Ye	Ye	No	No	No
105	Yes	No	Ye	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Ye	Ye	No	No
106	Yes	No	Ye	Ye	Yes	Ye	Ye	Ye	Yes	Ye	Ye	Ye	Ye	No	Yes	No	No	No	No	Ye	No
107	Yes	No	Ye	No	Yes	No	No	Ye	Yes	Ye	Ye	No	Ye	No	No	No	Ye	Ye	Ye	Ye	No
108	Yes	No	Ye	No	No	No	No	Ye	No	Ye	No	No	No	No	No	No	Ye	No	No	No	No
109	Yes	No	No	Ye	Yes	No	Ye	No	No	Ye	No	No	Ye	No	No	No	No	Ye	No	No	No

S#	R	dna	1A	1B	1C	1D	1E	1F	1G	1H	1I	1J	1K	1L	1M	1N	1O	1P	1Q	1R	1S
110	Yes	No	Ye	Ye	Yes	Ye	Ye	Ye	Yes	Ye	Ye	Ye	Ye	Ye	Yes	Ye	Ye	Ye	Ye	Ye	No
111	Yes	No	Ye	Ye	No	No	No	No	No	No	No	No	No	No	No	No	No	Ye	Ye	No	No
112	Yes	No	Ye	No	No	No	No	Ye	No	No	No	No	No	No	Yes	No	No	Ye	No	Ye	No
113	Yes	Ye	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
114	Yes	No	No	No	No	No	No	No	No	No	No	No	Ye	No	Yes	No	No	No	No	Ye	No
115	Yes	No	No	No	No	No	No	Ye	Yes	Ye	No	No	No	No	No	No	Ye	No	Ye	No	No
116	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
117	Yes	No	No	No	No	No	No	Ye	No	Ye	No	No	No	No	No	No	No	No	No	No	No
118	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Ye	No	Ye	No
119	Yes	No	No	No	Yes	No	No	No	No	No	No	No	No	No	No	No	No	Ye	No	No	No
120	Yes	No	No	Ye	Yes	No	No	No	No	No	No	Ye	Ye	No	No	No	No	No	No	Ye	No
121	Yes	No	Ye	No	No	Ye	Ye	Ye	Yes	No	Ye	No	Ye	No	Yes	No	Ye	No	No	Ye	No
122	Yes	No	Ye	No	No	Ye	Ye	Ye	Yes	Ye	No	Ye	Ye	No	Yes	Ye	Ye	Ye	Ye	Ye	No
123	Yes	No	No	Ye	No	No	Ye	No	No	Ye	Ye	No	Ye	No	Yes	No	No	Ye	No	Ye	No
124	Yes	No	No	No	No	Ye	Ye	Ye	Yes	Ye	No	No	Ye	No	No	No	Ye	Ye	No	Ye	No
125	Yes	No	Ye	Ye	No	Ye	Ye	Ye	No	Ye	Ye	Ye	Ye	No	Yes	Ye	Ye	Ye	Ye	Ye	No
126	Yes	No	Ye	Ye	Yes	No	No	Ye	Yes	No	Ye	Ye	Ye	No	Yes	No	No	Ye	No	Ye	No
127	Yes	No	Ye	Ye	Yes	Ye	Ye	Ye	No	Ye	Ye	Ye	No	No	Yes	No	Ye	Ye	No	No	No
128	Yes	No	Ye	Ye	No	No	No	Ye	No	No	Ye	No	No	No	Yes	No	No	Ye	Ye	No	No
129	Yes	Ye	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
130	Yes	No	Ye	No	No	No	Ye	Ye	Yes	Ye	Ye	No	No	No	Yes	No	No	Ye	No	No	No
131	Yes	No	No	No	No	No	Ye	Ye	No	Ye	Ye	Ye	Ye	No	Yes	No	Ye	Ye	No	No	No
132	Yes	Ye	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
133	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
134	Yes	No	Ye	No	No	No	No	No	No	No	No	No	No	No	No	No	Ye	No	No	No	No
135	Yes	No	No	No	No	No	No	Ye	No	No	Ye	No	No	No	Yes	No	Ye	Ye	No	No	No
136	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
137	Yes	No	No	No	No	No	No	No	Yes	Ye	Ye	No	Ye	No	No	No	No	No	No	No	No
138	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
139	Yes	No	Ye	Ye	Yes	No	Ye	No	No	No	No	Ye	Ye	No	No	No	No	No	No	Ye	No
140	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
141	Yes	Ye	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
142	Yes	No	Ye	Ye	Yes	No	No	Ye	Yes	Ye	Ye	No	Ye	No	Yes	Ye	No	No	No	No	No
143	Yes	No	No	No	Yes	No	No	No	No	No	No	No	Ye	Ye	No	No	No	No	No	No	No
144	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
146	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
147	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

S#	R	dna	1A	1B	1C	1D	1E	1F	1G	1H	1I	1J	1K	1L	1M	1N	1O	1P	1Q	1R	1S
148	Yes	No	Ye	No	No	Ye	Ye	Ye	Yes	Ye	Ye	Ye	Ye	No	Yes	Ye	Ye	Ye	No	Ye	No
149	Yes	Ye	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
150	Yes	Ye	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
151	Yes	No	No	No	No	Ye	Ye	Ye	No	No	No	No	No	No	No	No	No	No	No	No	No
152	Yes	No	Ye	Ye	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
153	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
154	Yes	Ye	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
155	Yes	No	Ye	No	No	No	No	No	No	Ye	Ye	No	Ye	No	Yes	No	No	No	No	No	No
201	Yes	No	No	No	Yes	No	No	No	No	No	No	No	Ye	No	No	No	No	No	No	No	No
202	Yes	No	Ye	No	No	Ye	Ye	Ye	No	Ye	Ye	No	No	No	No	No	Ye	No	No	No	No
203	Yes	No	Ye	No	Yes	No	No	Ye	Yes	Ye	Ye	Ye	Ye	Ye	Yes	Ye	Ye	Ye	No	Ye	No
204	Yes	No	No	No	Yes	No	No	No	No	No	No	No	Ye	No	No	No	No	No	No	No	No
205	Yes	No	No	No	No	No	No	No	Yes	No	Ye	No	Ye	No	Yes	No	No	No	No	No	No
206	Yes	No	Ye	Ye	No	Ye	Ye	Ye	No	Ye	Ye	Ye	Ye	No	No	No	No	Ye	Ye	Ye	No
207	Yes	No	Ye	Ye	No	No	No	Ye	No	Ye	Ye	Ye	Ye	No	Yes	No	Ye	Ye	No	Ye	No
208	Yes	No	Ye	Ye	Yes	Ye	Ye	Ye	Yes	Ye	Ye	Ye	Ye	Ye	No	Ye	Ye	Ye	No	Ye	No
209	Yes	No	Ye	Ye	Yes	No	No	No	Yes	Ye	Ye	No	Ye	No	No	No	Ye	No	No	Ye	No
210	Yes	No	Ye	Ye	Yes	Ye	Ye	Ye	Yes	Ye	Ye	No	Ye	Ye	Yes	Ye	Ye	Ye	Ye	Ye	No
211	Yes	No	No	No	No	Ye	No	No	Yes	No	No	Ye	Ye	No	Yes	No	No	No	No	No	No
212	Yes	No	Ye	Ye	No	Ye	Ye	Ye	Yes	Ye	Ye	Ye	Ye	Ye	Yes	Ye	Ye	Ye	Ye	Ye	Ye
213	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Ye	No
214	Yes	No	No	No	No	No	No	No	No	Ye	No	No	No	No	No	Ye	No	No	No	No	No
215	Yes	No	Ye	Ye	Yes	Ye	Ye	Ye	No	Ye	Ye	Ye	Ye	No	No	No	No	Ye	No	Ye	No
216	Yes	No	Ye	Ye	Yes	Ye	No	Ye	Yes	Ye	Ye	Ye	Ye	Ye	Yes	Ye	Ye	Ye	Ye	Ye	No
S#	R	dna	1A	1B	1C	1D	1E	1F	1G	1H	1I	1J	1K	1L	1M	1N	1O	1P	1Q	1R	1S
	-155	-24	-81	-48	-49	-38	-49	-72	-42	-68	-59	-48	-77	-17	-52	-26	-55	-61	-26	-56	-8

Survey Data Question 2

Employer Number	2A1	2A2	2A3	2A4	2A5	2A6	2A7	2B1	2B2	2B3	2B4	2B5	2B6	2B7	2C1	2C2	2C3	2C4	2C5	2C6	2D
1																					
2																					
3	x							x												x	x
4					5	6						3	4					1	2		
5						6			5					4	3					1	2
6							x							x						x	
7							x							x	x						x
8		4					1		5					2	6					3	
9		2					1		4					3	6					5	
10	6						2	5						1	4						3
11	5	6						2	4						3						1
12		4							3					5		2				6	1
13																					
14		6					3		5					2	4					1	
15																					
16		1							2						3						4
17	6	4						5	3						1						2
18																					
19		1	2						3				4								
20	3	4						2	5						6						1
21																					
22																					
23																					
24		x							x						x						
25																					
26	3	4						5	6						1						2
27																					
28	5	4						3	1												2
29		x							x						x						x
30		1																			
31		2							3						4						1
32		1							2						3						
33									x						x						
34																					

Employer Number	2A1	2A2	2A3	2A4	2A5	2A6	2A7	2B1	2B2	2B3	2B4	2B5	2B6	2B7	2C1	2C2	2C3	2C4	2C5	2C6	2D
35	5	1						6	2						3						4
36	4	3						6	5						2						1
37	6	4						5	1						3						2
38	6	4						5	1						3						2
39																					
40		1							2						3						
41		4				1			5				2		6				3		
42						x							x						x		
43		1				2			3				4		6						5
44																					
45		6				4							2		5				3		1
46																					
47		2				5			1						4				6		3
48	1	4						3	5						6						2
49																					
50						6		5					4		3				2		1
51	1					2		5					3						4		6
52	1					2		4					5						3		6
53																					
54		3					1		4					2						5	6
55		6	5						2	1					4	3					
56	3			4				1			2						5				6
57				x							x										
58																					
59			1			3				5			6			2			4		
60																					
61	6	3						5	2						1						4
62		x							x												
63																					
64	x							x									x				
65				x							x						x				x
66	4	1		2											5		6				3
67	1	2						4	5						3						6
68	1	2							3						4						
69		x							x						x						x
70		3							2						1						
71															x						

Employer Number	2A1	2A2	2A3	2A4	2A5	2A6	2A7	2B1	2B2	2B3	2B4	2B5	2B6	2B7	2C1	2C2	2C3	2C4	2C5	2C6	2D
72	4	1													3						2
73		x							x						x						x
74	4	6	8					5	1						3						2
75																					
76		5				1			4				2						6		3
77	1					3		2					4		6				5		
78						x		x											x		x
79	5					1		4					3						2		6
80	5	4						6	2						3						1
81		1							2						4						3
82		x						x							x						
83	3	6						5	2						4						1
84	6	4						5	3						2						1
85																					
86																					
87		x							x						x						x
88																					
89																					
90																					
91																					
92	5	6						3	4						2						1
93		1							2						3						4
94	6	4						5	2						3						1
95																					
96	1	5						2	6						3						4
97	5	3						4	2						6						1
98	5	3						6	4						1						2
99		1				5	6		4						2						3
100																					
101		3				4			6						1				2		5
102	1					3		2											4		5
103							x							x						x	
104			2		6	4				1		5	3								
105		4	1						6	3						5					2
106	5		3					4		2					6	1					
107	x							x							x						x
108		x							x						x						

Employer Number	2A1	2A2	2A3	2A4	2A5	2A6	2A7	2B1	2B2	2B3	2B4	2B5	2B6	2B7	2C1	2C2	2C3	2C4	2C5	2C6	2D
109	1	2						3	4						5						6
110	6	4						5	1						2						3
111	1	2						3	4						5						6
112	4		1					5		3					6	2					
113																					
114	1	6	3					2		4						5					
115	3		1			6		4		2						5					
116	x							x													
117	1					3			2				4						5		6
118	1		2					4		5			6		3						
119			x							x						x					
120												3						2			1
121	x	x						x	x						x						x
122	1				4			5				2	6					3			
123	1				3			2				4						5			
124					3	6						1	2					4	5		
125					4				5			3			2			1			6
126		6			1			5				2			4			3			
127	4				1	6		5				2						3			
128	1				6	3		2					4						5		
129																					
130					5							1	2					3	4		6
131					5							1	2					3	4		6
132																					
133																					
134	1				2							3	4					5	6		
135	3	2						4	5						6						1
136																					
137		x													x						x
138																					
139		2				4			1				3		5						6
140																					
141																					
142	4	5						2	3						6						1
143		4						5	2						3						1
144																					
146																					

Employer Number	2A1	2A2	2A3	2A4	2A5	2A6	2A7	2B1	2B2	2B3	2B4	2B5	2B6	2B7	2C1	2C2	2C3	2C4	2C5	2C6	2D
147																					
148	3	4						1	2						6						5
149																					
150																					
151					1	2						3	4					5	6		
152		x							x						x						
153																					
154																					
155	2					3		1					4		5						6
201		2							4						3						1
202	5	1						4	3						2						6
203	6	4						5	2						3						1
204		2							1												3
205	5	3						4	2				6								1
206	5	2						4	3						1						6
207									x												
208		6							1		2				3		5				4
209	2	1						5	4						3						6
210	2	4						3	5						6						1
211	2	1						4	3						6						5
212									3	5		6	4		2						1
213	6	2						5	3						4						1
214		1							2						3						4
215	6			5				4			3						2				1
216	1	2						6	5						4						3

Survey Question 3-9

S#	3A	3B	3C	3D	3E	4A	4B	5A	5B	5C	5D	5E	6A	6B	6C	6D	6E	6F	7A	7B	7C	7D	7E	8A	8B	8C	8D	8E	9A	9
1	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
2	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
3	No	Ye	No	No	No	Ye	No	No	Ye	No	No	No	No	No	No	No	Ye	No	No	No	No	Ye	No	No	No	Ye	No	No	Ye	No
4	No	Ye	No	No	No	Ye	No	No	Ye	No	No	No	No	No	Ye	No	No	No	Ye	No	No	No	No	No	Ye	No	No	No	No	Ye
5	No	No	No	Ye	No	Ye	No	No	Ye	No	No	No	No	No	No	No	Ye	No	No	No	No	No	No	No	No	No	Ye	No	Ye	No
6	No	No	Ye	No	No	No	Ye	No	No	No	No	No	No	No	No	No	Ye	No	No	No	No	Ye	No	No	No	No	Ye	No	Ye	No
7	No	Ye	No	No	No	Ye	No	No	Ye	No	No	No	No	No	No	Ye	No	No	No	No	No	No	Ye	Ye	No	No	No	No	Ye	No
8	No	No	Ye	No	No	Ye	No	No	Ye	No	No	No	Ye	Ye	No	Ye	No	No	Ye	No	No	No	No	No	Ye	No	No	No	No	Ye
9	No	No	Ye	No	No	Ye	No	No	Ye	No	No	No	No	No	No	Ye	Ye	No	Ye	No	No	No	No	No	Ye	No	No	No	Ye	No
10	No	Ye	No	No	No	Ye	No	No	Ye	No	No	No	No	No	Ye	No	Ye	No	No	No	No	No	No	No	Ye	No	No	No	No	Ye
11	No	No	Ye	No	No	Ye	No	No	Ye	No	No	No	Ye	No	No	No	Ye	No	No	Ye	Ye	Ye	No	No	No	No	Ye	No	Ye	No
12	No	No	Ye	No	No	Ye	No	No	No	Ye	No	No	Ye	No	No	No	Ye	No	Ye	No	No	No	No	Ye	No	No	No	No	Ye	No
13	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
14	No	No	Ye	No	No	Ye	No	No	No	Ye	No	No	No	No	No	Ye	No	No	No	No	No	No	Ye	No	No	No	Ye	No	Ye	No
15	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
16	No	No	Ye	No	No	Ye	No	No	Ye	No	No	No	No	Ye	No	No	Ye	No	Ye	No	No	No	No	No	Ye	No	No	No	No	Ye
17	No	Ye	No	No	No	Ye	No	No	Ye	No	No	No	No	Ye	No	No	No	No	Ye	No	No	No	No	No	No	No	Ye	No	No	Ye
18	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
19	No	No	Ye	No	No	No	Ye	No	No	No	No	No	No	No	No	Ye	Ye	No	No	No	No	No	No	No	No	Ye	No	No	No	Ye
20	No	No	Ye	No	No	Ye	No	No	Ye	No	No	No	No	Ye	No	No	No	No	Ye	No	No	No	No	Ye	No	No	No	No	No	Ye
21	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
22	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
23	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
24	No	No	Ye	No	No	Ye	No	No	No	Ye	No	No	No	No	No	No	Ye	No	No	No	No	No	Ye	No	Ye	No	No	No	No	Ye
25	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
26	No	No	Ye	No	No	No	Ye	No	No	No	No	No	No	Ye	No	No	Ye	No	No	No	No	No	Ye	No	No	No	No	Ye	No	Ye
27	No	No	No	No	No	Ye	No	No	No	Ye	No	No	No	No	No	No	Ye	No	Ye	Ye	No	No	No	No	No	Ye	No	No	No	Ye
28	No	No	Ye	No	No	Ye	No	No	Ye	No	No	No	No	No	No	Ye	No	No	No	No	No	No	Ye	No	Ye	No	No	No	Ye	No
29	No	No	No	Ye	No	No	No	No	No	No	No	No	No	Ye	No	No	No	No	No	No	Ye	No	Ye	No	Ye	No	No	No	No	Ye
30	No	Ye	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Ye	No	No	No	No	No	No	No	No	Ye	No	No	Ye	No
31	No	Ye	No	No	No	Ye	No	No	Ye	No	No	No	No	No	No	No	Ye	No	No	No	No	No	Ye	No	Ye	No	No	No	No	Ye
32	No	Ye	No	No	No	Ye	No	No	Ye	No	No	No	No	Ye	No	No	No	No	Ye	No	No	No	No	No	Ye	No	No	No	Ye	No
33	No	Ye	No	No	No	Ye	No	Ye	No	No	No	No	No	No	No	Ye	Ye	Ye	No	No	No	No	Ye	No	Ye	No	No	No	Ye	No
34	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
35	No	No	No	No	Ye	Ye	No	No	No	No	Ye	No	Ye	No	No	No	No	No	No	No	Ye	No	No	No	Ye	No	No	No	Ye	No

S#	3A	3B	3C	3D	3E	4A	4B	5A	5B	5C	5D	5E	6A	6B	6C	6D	6E	6F	7A	7B	7C	7D	7E	8A	8B	8C	8D	8E	9A	9
36	No	No	No	No	Ye	Ye	No	No	No	No	No	Ye	No	No	No	Ye	No	No	Ye	No	No	No	No	No	No	No	No	Ye	No	Ye
37	No	No	No	Ye	No	Ye	No	No	No	Ye	No	No	No	Ye	No	No	Ye	No	No	No	No	Ye	No	No	Ye	No	No	No	Ye	No
38	No	Ye	No	No	No	Ye	No	No	Ye	No	No	No	Ye	No	No	No	Ye	No	No	No	Ye	Ye	No	Ye	No	No	No	No	No	Ye
39	No	Ye	No	No	No	Ye	No	No	No	Ye	No	No	Ye	Ye	No	No	Ye	No	No	Ye	No	No	Ye	Ye	No	No	No	No	Ye	No
40	No	Ye	No	No	No	Ye	No	No	Ye	No	No	No	No	No	No	No	Ye	No	No	No	No	Ye	No	No	No	Ye	No	No	No	Ye
41	No	No	Ye	No	No	Ye	No	No	Ye	No	No	No	No	Ye	No	No	Ye	No	Ye	No	No	No	No	No	No	No	Ye	No	No	Ye
42	No	Ye	No	No	No	Ye	No	No	Ye	No	No	No	No	No	No	No	Ye	No	No	No	No	No	No	Ye	No	No	No	No	No	Ye
43	No	Ye	No	No	No	Ye	Ye	No	No	No	No	No	No	No	No	No	Ye	No	No	Ye	No	No	No	Ye	No	No	No	No	Ye	No
44	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
45	No	No	No	No	Ye	Ye	No	No	No	Ye	No	No	No	Ye	No	No	No	No	No	No	Ye	No	No	No	No	No	Ye	No	Ye	No
46	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
47	No	No	Ye	No	No	Ye	No	No	No	Ye	No	No	No	Ye	No	No	No	No	No	No	No	Ye	No	No	No	No	Ye	No	No	Ye
48	No	No	No	Ye	No	Ye	No	No	No	Ye	No	No	No	No	No	No	Ye	No	No	No	No	No	Ye	No	No	No	Ye	No	No	Ye
49	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
50	No	No	No	Ye	No	Ye	No	No	No	Ye	No	No	No	Ye	No	Ye	Ye	No	No	No	No	No	No	No	No	No	Ye	No	No	Ye
51	No	Ye	No	No	No	Ye	No	Ye	No	No	No	No	No	No	No	No	Ye	No	No	No	No	No	Ye	No	No	Ye	No	No	No	Ye
52	No	No	No	Ye	No	No	Ye	No	No	No	No	No	No	No	No	No	Ye	No	No	No	Ye	No	No	No	No	No	No	Ye	Ye	No
53	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
54	No	Ye	No	No	No	Ye	No	Ye	No	No	No	No	No	No	No	No	Ye	No	No	No	No	No	No	No	No	No	No	Ye	No	Ye	No
55	No	No	No	Ye	No	Ye	No	No	No	Ye	No	No	Ye	No	No	No	Ye	No	No	No	No	Ye	No	Ye	No	No	No	No	No	Ye
56	No	No	No	Ye	No	Ye	No	No	Ye	No	No	No	No	No	Ye	No	Ye	No	No	No	No	No	Ye	No	No	No	No	Ye	Ye	No
57	No	No	Ye	No	No	Ye	No	No	Ye	No	No	No	No	No	Ye	No	No	No	No	No	No	No	Ye	No	Ye	No	No	No	Ye	No
58	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
59	No	No	No	No	Ye	Ye	No	No	Ye	No	No	No	No	Ye	No	No	Ye	No	Ye	No	Ye	No	No	No	No	Ye	No	No	No	Ye
60	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
61	No	Ye	No	No	No	Ye	No	No	Ye	No	No	No	Ye	No	No	No	No	No	No	No	No	No	No	Ye	No	No	Ye	No	No	Ye
62	No	No	Ye	No	No	Ye	No	No	Ye	No	No	No	No	No	No	No	Ye	No	No	No	No	No	Ye	No	Ye	No	No	No	Ye	No
63	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
64	No	Ye	No	No	No	Ye	No	No	Ye	No	No	No	No	No	No	No	Ye	No	No	No	No	No	Ye	No	Ye	No	No	No	No	Ye
65	No	Ye	No	No	No	Ye	No	No	Ye	No	No	No	No	No	Ye	No	No	No	No	No	No	No	Ye	No	No	Ye	No	No	No	Ye
66	No	Ye	No	No	No	No	Ye	No	No	No	No	No	No	No	No	No	No	Ye	No	No	Ye	No	No	No	No	No	Ye	No	Ye	No
67	Ye	No	No	No	No	Ye	No	No	Ye	No	No	No	No	No	Ye	No	No	No	No	No	No	No	Ye	No	No	Ye	No	No	No	Ye
68	No	Ye	No	No	No	Ye	No	No	Ye	No	No	No	Ye	No	No	No	No	No	No	No	Ye	No	No	No	Ye	No	No	No	Ye	No
69	No	No	No	No	Ye	Ye	No	No	Ye	No	No	No	No	No	No	Ye	Ye	No	No	No	Ye	No	No	No	No	No	No	Ye	Ye	No
70	No	No	Ye	No	No	Ye	No	No	No	Ye	No	No	No	No	No	Ye	Ye	No	No	No	No	Ye	No	No	No	No	No	Ye	Ye	No
71	No	Ye	No	No	No	Ye	No	Ye	No	No	No	No	No	No	No	No	Ye	No	No	No	No	No	No	No	Ye	No	No	No	No	Ye
72	No	No	No	Ye	No	Ye	No	No	No	Ye	No	No	No	Ye	No	No	Ye	No	No	No	No	No	No	No	No	No	No	Ye	Ye	No
73	No	No	No	Ye	No	Ye	No	No	Ye	No	No	No	No	No	No	No	Ye	No	No	No	No	Ye	No	No	Ye	No	No	No	Ye	No

S#	3A	3B	3C	3D	3E	4A	4B	5A	5B	5C	5D	5E	6A	6B	6C	6D	6E	6F	7A	7B	7C	7D	7E	8A	8B	8C	8D	8E	9A	9
74	No	No	Ye	No	No	Ye	No	No	No	Ye	No	No	No	No	No	No	Ye	No	No	No	No	Ye	No	No	No	No	No	Ye	Ye	No
75	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
76	No	No	Ye	No	No	Ye	No	No	Ye	No	No	No	No	No	No	No	No	Ye	No	No	No	No	Ye	No	Ye	No	No	No	No	Ye
77	No	Ye	No	No	No	No	Ye	No	No	No	No	No	Ye	No	No	No	No	No	No	No	No	Ye	No	Ye	No	No	No	No	No	Ye
78	No	No	Ye	No	No	Ye	No	No	Ye	No	No	No	No	Ye	No	No	Ye	Ye	No	No	No	No	Ye	No	No	No	No	Ye	No	Ye
79	No	No	No	No	Ye	Ye	No	No	No	Ye	No	No	No	No	No	No	Ye	No	No	No	No	No	Ye	Ye	No	No	No	No	No	Ye
80	No	No	Ye	No	No	Ye	No	No	Ye	No	No	No	No	No	No	No	Ye	No	No	No	No	Ye	No	No	Ye	No	No	No	Ye	No
81	No	Ye	No	No	No	Ye	No	Ye	No	No	No	No	No	No	No	Ye	No	No	No	No	No	No	No	No	Ye	No	No	No	No	Ye
82	No	Ye	No	No	No	No	Ye	No	No	No	No	No	No	No	No	No	Ye	No	No	No	No	No	Ye	No	Ye	No	No	No	No	Ye
83	No	No	No	Ye	No	Ye	No	No	No	Ye	No	No	No	No	No	No	Ye	No	No	No	No	Ye	No	No	No	No	No	Ye	Ye	No
84	No	Ye	No	No	No	Ye	No	No	Ye	No	No	No	Ye	Ye	No	No	Ye	No	Ye	Ye	No	No	No	No	No	No	Ye	No	No	Ye
85	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
86	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
87	No	Ye	No	No	No	Ye	No	No	Ye	No	No	No	No	No	Ye	No	No	No	No	No	No	Ye	No	Ye	No	No	No	No	No	Ye
88	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
89	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
90	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
91	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
92	No	No	No	Ye	No	Ye	No	No	Ye	No	No	No	No	No	No	No	No	Ye	No	No	No	No	Ye	No	No	Ye	No	No	Ye	No
93	No	Ye	No	No	No	Ye	No	No	Ye	No	No	No	Ye	No	No	No	Ye	Ye	Ye	No	No	No	No	Ye	No	No	No	No	No	Ye
94	No	Ye	No	No	No	No	Ye	Ye	No	No	No	No	No	Ye	No	No	No	No	No	No	No	No	Ye	No	No	No	Ye	No	No	Ye
95	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
96	No	Ye	No	No	No	No	Ye	No	No	No	No	No	No	No	No	Ye	Ye	Ye	No	No	No	No	Ye	No	No	No	No	Ye	No	Ye
97	No	No	No	Ye	No	Ye	No	No	Ye	No	No	No	No	No	No	No	Ye	No	No	No	Ye	No	No	No	No	No	No	Ye	No	Ye
98	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Ye
99	No	Ye	No	No	No	Ye	No	No	Ye	No	No	No	No	No	No	No	Ye	Ye	No	No	Ye	No	No	No	No	Ye	No	No	No	Ye
100	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
101	No	No	Ye	No	No	Ye	No	No	Ye	No	No	No	No	No	No	Ye	No	No	No	No	No	No	Ye	No	No	No	Ye	No	Ye	No
102	No	Ye	No	No	No	Ye	No	No	Ye	No	No	No	No	Ye	No	No	Ye	No	Ye	No	No	No	No	No	No	No	No	Ye	Ye	No
103	No	Ye	No	No	No	No	Ye	No	No	No	No	No	No	No	No	No	Ye	No	No	No	No	No	No	No	Ye	No	No	No	No	Ye
104	No	No	Ye	No	No	Ye	Ye	No	No	No	No	No	No	No	No	No	Ye	No	No	No	No	Ye	No	No	No	No	Ye	No	No	Ye
105	No	Ye	No	No	No	Ye	No	No	Ye	No	No	No	No	No	No	No	Ye	Ye	No	No	No	Ye	No	No	No	No	Ye	No	No	Ye
106	No	No	No	Ye	No	Ye	No	No	Ye	No	No	No	No	No	No	No	Ye	No	No	No	No	No	No	No	No	No	Ye	No	No	Ye
107	No	Ye	No	No	No	Ye	No	No	Ye	No	No	No	No	Ye	No	No	No	No	Ye	No	No	No	No	No	No	No	No	Ye	No	Ye
108	No	No	Ye	No	No	Ye	No	No	No	Ye	No	No	Ye	No	No	No	No	No	Ye	No	No	No	No	Ye	No	No	No	No	No	Ye
109	No	No	Ye	No	No	Ye	No	No	Ye	No	No	No	No	No	No	Ye	No	No	No	No	No	No	No	No	No	Ye	No	No	Ye	No
110	No	No	Ye	No	No	Ye	No	Ye	No	No	No	No	No	No	No	No	Ye	No	No	No	No	Ye	No	No	No	No	No	Ye	Ye	No
111	No	No	No	Ye	No	Ye	No	No	No	No	Ye	No	No	No	No	No	Ye	No	No	Ye	No	No	No	No	No	No	Ye	No	No	Ye

S#	3A	3B	3C	3D	3E	4A	4B	5A	5B	5C	5D	5E	6A	6B	6C	6D	6E	6F	7A	7B	7C	7D	7E	8A	8B	8C	8D	8E	9A	9
112	No	No	Ye	No	No	Ye	No	No	No	Ye	No	No	No	No	No	No	Ye	No	Ye	No	No	No	Ye	No	No	No	No	Ye	No	Ye
113	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
114	No	No	No	Ye	No	Ye	No	No	No	Ye	No	No	No	No	No	No	Ye	No	Ye	No	No	No	No	No	No	No	Ye	No	No	Ye
115	No	No	Ye	No	No	Ye	No	No	Ye	No	No	No	No	No	Ye	No	No	No	No	No	No	Ye	No	Ye	No	No	No	No	Ye	No
116	Ye	No	No	No	No	Ye	No	No	No	No	Ye	No	No	No	No	No	Ye	No	Ye	No	Ye	No	No	No	No	No	Ye	No	No	Ye
117	No	No	Ye	No	No	Ye	No	No	No	No	No	No	No	No	No	No	Ye	No	No	No	No	No	Ye	No	Ye	No	No	No	No	Ye
118	No	Ye	No	No	No	Ye	No	No	Ye	No	No	No	No	Ye	No	No	Ye	No	No	No	Ye	No	No	Ye	No	No	No	No	No	Ye
119	No	No	Ye	No	No	Ye	No	No	Ye	No	No	No	No	No	No	Ye	Ye	No	No	No	No	No	Ye	No	No	No	No	Ye	No	Ye
120	No	Ye	No	No	No	Ye	No	No	Ye	No	No	No	No	No	No	No	Ye	No	No	No	No	No	Ye	No	No	Ye	No	No	Ye	No
121	No	No	Ye	No	No	Ye	No	No	Ye	No	No	No	No	No	No	No	Ye	No	No	No	No	No	Ye	No	No	Ye	No	No	Ye	No
122	No	No	No	Ye	No	Ye	No	No	Ye	No	No	No	No	Ye	No	No	Ye	Ye	No	No	Ye	No	No	No	No	No	Ye	No	Ye	No
123	No	Ye	No	No	No	Ye	No	No	Ye	No	No	No	No	No	No	No	Ye	No	No	No	No	No	Ye	Ye	No	No	No	No	No	Ye
124	No	No	Ye	No	No	Ye	No	No	Ye	No	No	No	No	No	No	No	Ye	No	Ye	No	No	No	Ye	No	No	No	Ye	No	No	Ye
125	No	No	Ye	No	No	Ye	No	No	No	Ye	No	No	No	No	No	No	Ye	No	No	Ye	No	No	No	No	No	No	Ye	No	No	Ye
126	No	No	Ye	No	No	No	Ye	No	No	No	No	No	No	No	No	Ye	Ye	No	No	No	No	No	Ye	No	No	No	Ye	No	Ye	No
127	No	No	No	Ye	No	Ye	No	No	No	Ye	No	No	No	No	No	No	Ye	No	No	No	No	No	Ye	No	No	Ye	No	No	No	Ye
128	No	Ye	No	No	No	Ye	No	No	Ye	No	No	No	No	No	Ye	No	Ye	No	No	No	Ye	Ye	No	Ye	No	No	No	No	No	Ye
129	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
130	No	No	Ye	No	No	Ye	No	No	Ye	No	No	No	No	No	No	No	Ye	No	No	No	No	Ye	No	No	No	No	No	Ye	Ye	No
131	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Ye	Ye	No	No	No	No	Ye	No	No	No	Ye	No	No	No	Ye
132	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
133	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
134	No	No	No	Ye	No	Ye	No	No	No	Ye	No	No	No	No	No	No	Ye	No	No	No	No	No	Ye	Ye	No	No	No	No	No	Ye
135	No	Ye	No	No	No	No	Ye	No	No	No	No	No	No	No	No	No	Ye	No	No	No	No	No	No	Ye	No	No	No	No	No	Ye
136	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
137	No	No	Ye	No	No	Ye	No	No	Ye	No	No	No	Ye	No	No	Ye	No	No	No	No	No	Ye	No	No	No	No	No	Ye	No	Ye
138	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
139	No	No	Ye	No	No	Ye	No	No	Ye	No	No	No	No	No	Ye	No	Ye	No	No	No	No	No	Ye	No	No	Ye	No	No	Ye	No
140	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
141	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
142	No	No	Ye	No	No	Ye	No	No	No	Ye	No	No	No	Ye	No	Ye	Ye	No	Ye	No	Ye	No	No	No	No	No	No	Ye	Ye	No
143	No	No	Ye	No	No	Ye	No	No	Ye	No	No	No	No	No	No	Ye	Ye	No	No	No	No	Ye	No	No	No	No	No	Ye	No	Ye
144	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
146	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
147	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
148	No	No	No	Ye	No	Ye	No	No	No	Ye	No	No	No	No	No	Ye	Ye	No	No	No	No	No	Ye	No	No	No	Ye	No	No	Ye
149	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
150	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

S#	3A	3B	3C	3D	3E	4A	4B	5A	5B	5C	5D	5E	6A	6B	6C	6D	6E	6F	7A	7B	7C	7D	7E	8A	8B	8C	8D	8E	9A	9
151	No	Ye	No	No	No	Ye	No	No	Ye	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Ye	No	No	No	No	No	Ye
152	No	No	Ye	No	No	Ye	No	No	No	Ye	No	No	No	No	No	Ye	No	No	No	No	Ye	No	No	No	No	No	No	Ye	No	Ye
153	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
154	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
155	No	No	Ye	No	No	Ye	No	No	Ye	No	No	No	No	No	Ye	No	Ye	No	No	No	No	No	Ye	No	No	Ye	No	No	No	Ye
201	No	No	Ye	No	No	Ye	No	No	Ye	No	No	No	No	No	No	No	Ye	No	No	No	No	No	Ye	No	Ye	No	No	No	Ye	No
202	No	No	No	Ye	No	Ye	No	No	No	No	Ye	No	No	No	No	No	Ye	No	No	No	Ye	No	No	No	Ye	No	No	No	No	Ye
203	No	No	No	Ye	No	Ye	No	No	No	Ye	No	No	No	Ye	No	No	Ye	No	Ye	No	Ye	No	No	No	No	No	No	Ye	Ye	No
204	No	No	Ye	No	No	Ye	No	Ye	No	No	No	No	No	No	No	Ye	Ye	No	No	No	No	No	Ye	Ye	No	No	No	No	Ye	No
205	No	No	No	Ye	No	Ye	No	No	No	No	No	Ye	Ye	Ye	No	No	No	No	Ye	Ye	No	No	No	No	No	No	Ye	No	No	Ye
206	No	No	No	Ye	No	Ye	No	No	No	Ye	No	No	No	Ye	No	No	Ye	Ye	No	No	No	Ye	No	No	No	No	Ye	No	Ye	No
207	No	No	No	Ye	No	Ye	No	No	No	No	Ye	No	No	No	No	No	Ye	No	No	No	No	Ye	No	No	No	No	Ye	No	Ye	No
208	No	No	Ye	No	No	Ye	No	No	Ye	No	No	No	No	No	Ye	No	Ye	No	Ye	No	No	No	No	No	No	No	No	Ye	Ye	No
209	No	No	Ye	No	No	Ye	No	No	Ye	No	No	No	No	Ye	No	No	Ye	No	Ye	No	No	No	No	No	No	No	No	Ye	No	Ye
210	No	No	No	No	Ye	Ye	No	No	Ye	No	No	No	No	No	No	Ye	Ye	No	Ye	No	No	No	No	No	No	No	No	Ye	Ye	No
211	No	No	Ye	No	No	Ye	No	No	Ye	No	No	No	No	No	No	Ye	No	No	No	No	No	Ye	No	No	No	No	No	Ye	No	Ye
212	No	No	Ye	No	No	Ye	No	No	Ye	No	No	No	No	Ye	No	No	Ye	Ye	Ye	No	Ye	No	Ye	No	No	No	Ye	No	Ye	No
213	No	Ye	No	No	No	Ye	No	No	No	Ye	No	No	No	Ye	No	No	Ye	No	No	No	No	Ye	No	No	No	No	Ye	No	Ye	No
214	No	Ye	No	No	No	No	Ye	No	No	No	No	No	No	No	No	No	Ye	No	No	Ye	No	No	No	No	No	No	No	Ye	No	Ye
215	No	No	No	Ye	No	Ye	No	No	No	Ye	No	No	Ye	Ye	No	No	Ye	No	Ye	No	No	No	Ye	No	No	No	No	Ye	Ye	No
216	No	No	No	No	Ye	Ye	No	No	Ye	No	No	No	Ye	Ye	No	Ye	Ye	No	Ye	Ye	No	No	No	No	No	No	No	Ye	No	Ye
S#	3A	3B	3C	3D	3E	4A	4B	5A	5B	5C	5D	5E	6A	6B	6C	6D	6E	6F	7A	7B	7C	7D	7E	8A	8B	8C	8D	8E	9A	9
	-2	-43	-47	-26	-8	-112	-15	-8	-66	-29	-5	-2	-17	-31	-12	-27	-93	-12	-30	-10	-2	-28	-43	-21	-27	-19	-31	-30	-54	-75