



# The Signaling Power of Occupational Certification in the Automobile Service And Information Technology Industries

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**THE SIGNALING POWER OF  
OCCUPATIONAL CERTIFICATION IN THE  
AUTOMOBILE SERVICE AND INFORMATION  
TECHNOLOGY INDUSTRIES**

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## ABSTRACT

The continued high visibility of occupational certification programs and their increasing presence in secondary and postsecondary educational institutions raises questions about the value of these credentials for those seeking entry into the workforce. Of particular interest is the message or signal an occupational certification sends to employers of entry-level workers, as compared to the more traditional qualification of a 2-year community/technical college degree. This study used a quasi-experimental research design, presenting 12 fictitious resumes to managers who make hiring decisions for entry-level jobs in the automotive service and information technology (IT) industries. The resumes reflected typical applicants for entry-level jobs with the treatment conditions of education (high school diploma only, 2-year degree, certification, and both degree and certification) and work experience (none, less than 2 years, and 2 to 4 years). A random sample of 202 managers was selected from three United States cities, chosen for geographic diversity. The managers were first given a 2-page, self-administered questionnaire, intended to gather information on their educational background and demographics, and the characteristics of their firm. They then reviewed and ranked the fictitious resumes and participated in a semistructured interview to further explore the signaling power of certification versus the 2-year degree. Results indicated that the sample resume representing an applicant with both the 2-year degree and certification together with between 2 and 4 years of work experience was selected as the most suitably qualified by two thirds of the automotive industry respondents. Greater variability was found among the IT respondents, who selected the 2-year degree applicant most frequently, closely followed by the certified applicant. IT respondents chose the applicant with the 2-year degree and certification, together with 2 to 4 years of work experience least frequently. The comparison test of signaling power between the two educational qualifications under investigation produced a uniform preference for the 2-year degree over certification, regardless of level of work experience in the IT sample. More mixed results on preference were found among automotive service managers. An investigation into the potential influence of the respondents' educational background and the characteristics of the firm on the resume-ranking task produced significant results at certain levels of work experience. Finally, an in-depth, qualitative analysis of 90 (of the 202 in the sample) randomly selected and transcribed interviews provided a deeper understanding of what managers seek in entry-level applicants, as well as the signaling messages sent by education, certification, and varying levels of prior work experience. Implications of the results are discussed for career and technical education policy makers, researchers, and educators, with suggestions for additional studies in this area.



## BACKGROUND

The external certification of workplace skills is emerging as a key educational trend in many countries (Acemoglu & Pischke, 1999; Miller, Kellie, & Acutt, 2001). Cervero (2001) recently listed the rise in certification programs and their frequent connection to regulation of professional practice as one of the top five trends in continuing professional education. In addition to the rise in the number of certification programs, an increasing number of organizations now offer training and education intended as preparation for occupational certification. Bassi (1999) suggested that the expansion of certification programs and providers is a response to the growing need for highly skilled workers.

In many diverse fields, including automotive service, the building trades, health care, hospitality, and information technology (IT), the increasing number of occupational certifications has been seen as creating a “parallel postsecondary universe” outside the boundary of traditional higher education (Adelman, 2000, p. v). Argetsinger (2001) described certification as often being faster, cheaper, and more focused than traditional educational qualifications and, consequently, the certificate has become the currency of choice in continuing education.

The federal government has a long history of providing support for programs that educate and prepare workers for employment (Wills, 2002). Yet, due to a number of factors, stakeholders have begun questioning the value of traditional means of qualifying workers for today’s marketplace. Mendivil (2002) terms organizations offering occupational certification as the “new providers of higher education” (p. 353). Their emergence and subsequent acceptance challenge several traditional educational qualifications, while often being developed, managed, and controlled by organizations not subject to federal government oversight.

In this study, the value and acceptance of occupational certification in signaling expertise and readiness for employment is compared to that of the more traditional educational qualification represented by the 2-year community/technical college degree. Occupational certification programs in two industries—automotive (auto) service and information technology (IT)—are examined by focusing on two occupations, or job titles, where well-established certification programs exist. These two industries were selected because they have well-established occupational certifications with high visibility. In both cases, the best known, entry-level occupational certification can be earned through a 2-year community/technical college program, or independently by the completion of a program of study and passing an examination(s). Although the specific occupational titles vary, the intent of this investigation is to look at alternate educational pathways leading towards entry-level employment for auto service technicians and IT service technicians.

The educational programs leading to either a 2-year degree or occupational certification that are discussed in this study prepare individuals seeking an entry-level position where the expectation is less than a 4-year college degree and fewer than 5 years of previous work experience. Within the automotive industry, the focus here is on the Automotive Service Excellence certification offered by the National Institute for Automotive Service Excellence under the auspices of the National Automotive Technicians Education Foundation. This credential is available upon completing secondary and postsecondary career and technical

education programs across the country. Within the IT industry the focus here is on the A+ certification offered by the Computing Technology Industry Association. It certifies the competency of entry-level service technicians in the IT industry. This credential is emerging as the preferred entry-level qualification and is increasingly offered as a stand-alone qualification or embedded in introductory computer science and IT classes at both the secondary and postsecondary levels.

### **Operational Definitions**

Many of the terms related to this research are used in a variety of ways, creating confusion in a discussion of credentialing and occupational certification issues. The following operational definitions, terms, certifications, and organizations are those used in this study.

**A+** (or the CompTIA A+ Certification)—recognized as the industry standard for entry-level computer technicians. The CompTIA A+ certification examination validates the knowledge and abilities of an entry-level technician with the equivalent of 500 hours of hands-on experience in the field or laboratory. The certification is earned by passing two examinations: the A+ Core Hardware examination and the A+ Operating Systems (OS) Technologies examination.

**Associate Degrees** (alternately known as 2-year college degrees; the terms will be used interchangeably in this report.)—credential awarded by a 2-year academic institution, also known as a junior or community/technical college, usually requiring a 2-year program of full-time study after the completion of secondary schooling (Brown, 1999). These programs offer both academic degrees in general education, liberal arts, and sciences, as well as degrees for specific professions (Hale, 2000, p. xx).

**Automotive Service Excellence (ASE) certification**—established in 1972 by the independent nonprofit National Institute for Automotive Service Excellence to improve the quality of vehicle repair and service through the testing and certification of repair and service professionals. ASE offers more than 40 examinations leading towards certifications grouped into specialties for automobile, medium/heavy truck, truck equipment, school bus, and collision repair technicians, as well as the categories of engine machinists, alternate fuels technicians, parts specialists, collision damage estimators, and auto service consultants. Certification is earned by passing an examination and fulfilling the minimum work experience requirement. Recertification must be earned every 5 years (ASE, 2003).

**Computing Technology Industry Association (CompTIA)**—a leading global IT trade association dedicated to advancing the growth of the information technology (IT) industry and the development of those working within it (CompTIA, 2003).

**Credential**—a designation, mark, or stamp given to the person, organization, or program that has satisfied a set of standards. Credentials can be college degrees, occupational certifications, licenses, accreditations, and endorsements, and fulfill a controlling function by affecting an individual's opportunity to work and participate in a discipline or profession (Hale, 2000).

**Occupational certification**—“a form of credential awarded by an employer, a vendor, or an association or independent agency” (Hale, 2000, p. xx) that requires “passage of an examination benchmarked to predetermined occupational or professional standards” (Carnevale & Desrochers, 2001, p. 19). Certification may or may not also require prior education and experience.

**Signaling theory**—refers to the process and strength of the contextual clues that reside in the application, resume, interview, test scores, and other information collected during the recruitment process to determine the applicant’s potential worth to the company.





## REVIEW OF LITERATURE

The increased visibility occupational certification enjoys today, and the standardized skill sets that it represents, raises questions for researchers in many academic disciplines. Education researchers have suggested that the certificate is an example of authentic work-related assessment, and therefore, has great potential for measuring student achievement (Lynch, 2000). Certification is also seen as playing a role in determining and assessing skill standards (Schwager, 1998). Yet, one key question remains largely unanswered: How do employers view industry-sponsored credentials, such as occupational certification, compared to more traditional educational qualifications?

The credentialing and certification issue has recently created much discussion about the role of secondary and postsecondary education institutions in preparing workers. Carnevale and Desrochers (2001) described the challenges and opportunities it presents to community colleges in balancing demand for traditional education transfer functions to 4-year colleges or demand for short-term training leading towards occupation certification. Carew and Flynn (2002) suggested that community colleges, for the most part, have been skeptical about certification programs, particularly IT certification, as “they come from a different part of the educational universe, having little, if anything, to do with the credit apparatus upon which we have built our colleges” (p. 10). This seems to highlight the need for research to explore industry-sponsored occupational certification, as its impact on outcomes, such as hiring, advancement, and wages, remains largely unknown—raising many questions about its place in secondary and postsecondary education.

Previous research in the career and technical education field has examined the role of industry-sponsored occupational certification in the IT industry (Bartlett, 2002). Data was collected from both human resource managers and current employees in several large companies to explore the perceived benefit of certification from both organizational and individual perspectives. The findings demonstrated the growing influence of industry-sponsored certification in the recruitment of IT workers, and indicated that significant differences exist in the perceived benefits of these credentials between senior human resource managers and their IT employees. However, this research did not identify the role of educational qualifications in the recruitment process. Furthermore, senior human resource managers may not be the individuals who make the actual hiring decisions. Additional research, utilizing a more rigorous methodology, is required in order to better understand the decision process that hiring managers use to determine the suitability of applicants who present differing educational qualifications. This study addresses this research need by providing new information to the career and technical education field—where certification remains a topic of considerable debate.

Many authors contend that certification should, or at least could, play a role at the postsecondary and continuing education levels, at the point where students are preparing for the job market (Carnevale & Desrochers, 2001; Lynch, 2000). However, the question remains as to how employers view certificates and other alternative credentials, both in terms of initial entry into the workplace and of the long-term development of necessary skills, knowledge, and abilities. Education and training leading to certification also raises questions about the breadth of skills and abilities required for today’s occupations. Research is needed to examine the relative

weight and marketing power of industry-sponsored occupational certificates as compared to academic degrees—the commonly agreed-upon gold standard.

Existing theory provides a strong conceptual framework for this study. Spence's signaling theory (1972) suggested that, because organizations have incomplete information on job applicants, they use certain characteristics, or features, as signals for the missing information. More specifically, Spence defined signaling as "the endogenous market process whereby the employer requires (and the individual transmits) information about the potential employee, which ultimately determines the implicit lottery involved in hiring, the offering of wages, and, in the end, the allocation of jobs to people and people to jobs in the market" (p. 357). The term "signaling" refers to the process and strength of the contextual clues that reside in the application, resume, interview, test scores, and other information collected during the recruitment process to determine the applicant's potential worth to the company.

Extending this theory to the role of education qualifications in the recruitment of new employees, Barber (1998) stated that, in light of incomplete information about an applicant's knowledge, skills, and abilities, firms, or more specifically their hiring managers, use qualifications and credentials as signals for making inferences about missing information. Alternately, the value that organizations place on different qualifications can also act as a signal to applicants. For example, signaling theory suggests that organizational preference for either occupational certification or the more traditional 2- or 4-year college degree provides applicants with information about what it would be like to be a member of that organization and what type of skills and knowledge it values and rewards (Greening & Turban, 2000). Signaling theory offers potential new explanations for the phenomena under investigation in this study. To date, signaling theory has not played a major role in career technical education, despite its apparent utility.

### **Overview of the Automotive Service Industry and the Information Technology Industry**

This study examined the educational qualification preference of the employers in two selected industries: auto service and IT. Occupational certification has been a feature of preemployment education and posthiring advancement for both industries, but especially for the service technician occupations. A range of occupational certifications are available in both industries. Particularly in the IT industry, the range of choices confronting employees seeking recognizable credentials is almost overwhelming. This study focuses attention on the occupational certification most commonly accepted for entry-level jobs in each field.

The following section provides a brief overview of the two industries in which the study was conducted. Both the auto service industry and the IT industry are reviewed using current labor market data, workforce growth projections, response to workforce projections, and educational qualifications required of entry-level employees. Finally, brief descriptions of the occupational certifications specifically examined in this research—the ASE certifications for auto service technicians and the A+ certification for IT technicians—are provided.

### **Background Information on the Automotive Service Industry**

The automotive industry is one of the most powerful in the global economy in terms of the value of its products and services, the income it generates, the jobs it provides, and the taxes it pays (Cosgrove, 2000). Furthermore, by some estimates, one out of every seven jobs in the United States is related directly or indirectly to the automobile industry (Cosgrove). A recent report from the U.S. Department of Commerce (2003) noted that while the domestic market for cars and light trucks is expected to continue falling, it still represents 16.4 million vehicles sold per year. Singleton (1992) noted the United States automotive industry has undergone major structural changes, with the 1980s as a particularly turbulent decade, initiating major transitions in industry employment. This same statement might be made about the industry today. As the motor vehicle becomes increasingly sophisticated, and the preparation for careers in auto service grows more complex, advanced technical training and computer literacy is required.

### **Automotive Service Industry Workforce Growth Projections**

The late 1990s saw the automotive industry continue its slow recovery from the troubled late 1980s, when major United States automobile manufacturers laid off thousands of employees. While the industry continues show shrinkage in the total number of workers, the auto repair/service sector appears to be less likely to be affected by manufacturing downsizing (Cosgrove, 2000). Indeed, the U.S. Bureau of Labor Statistics (2003) stated that automobile dealerships alone will need 35,000 new workers annually through 2010 for high-paying technician jobs, due to growth and net replacement needs. According to the *Occupational Outlook Handbook* produced by the U.S. Bureau of Labor Statistics (2002b), auto service technicians and mechanics held about 840,000 jobs in 2000. However, industry group estimates of auto service employment place the number much higher—at 1,704,000 jobs in 2001 (Plunkett Research, 2004). This figure includes technicians employed in a service capacity, primarily at automotive dealerships, as well as technicians in automobile manufacturing, so overinflation or double counting may exist. The *2002 Current Population Survey* (U.S. Bureau of Labor Statistics, 2002a) listed 1,784,000 workers employed in automobile and repair services, of which 87.9% (1,569,000) were employed full-time, and 12.1% (215,000) working part-time.

The majority of auto service technicians are employed by retail or wholesale automotive dealers, independent repair shops, or auto service facilities. Others are employed in gasoline service stations, taxicab and automobile leasing companies, federal, state, and local governments, and other organizations. It is estimated that about 18% of service technicians are self-employed (U.S. Bureau of Labor Statistics, 2003).

The demand for auto service technicians appears to be expanding, with the increasing sophistication in automotive technology driving the growth. According to projections by the U.S. Bureau of Labor Statistics (2002b), employment opportunities for auto technicians and mechanics are expected to increase at an average rate of at least 10–20% through 2010. The majority of this employment growth in auto service jobs is projected to be concentrated in dealerships and independent service repair shops (U.S. Department of Labor, 2002b). Many new jobs are also expected to be created in small retail operations that provide after-warranty-related services, such as brake repair and air conditioning service, as well as in specializations such as automotive glass installation. In addition to the projected job growth areas, a large number of

technicians will also be needed to replace experienced technicians and first-line supervisors, who are retiring, ascending the management ladder, or moving on to other occupations.

### **Automotive Service Industry Response to Workforce Growth Projections**

Automotive Retailing Today, a consortium of all major United States vehicle manufacturers and major auto dealer associations, recently launched a campaign to respond to the shortage of dealership technicians by focusing on outdated stereotypes. They, and other industry groups, have noted that the primary job of auto service technicians has evolved from being one that was simply mechanical to one that is technology-intensive. The Web site [www.art.org/](http://www.art.org/) reports an ART study (Automotive Retailing Today, 2004) measuring the awareness of, and attitudes towards, automotive industry careers among students, parents, and educators. The results indicated that only 2% of the 606 teenagers (13–18 years old) surveyed indicated that they would choose a career in the industry. Yet, when informed of job growth projections and average pay levels for master-level technicians, 65% said they would be likely to explore a career in auto service.

Considering the projected workforce shortages, much emphasis is directed to education and training requirements needed by persons who service the sophisticated auto technology. The shift from the old stereotyped auto mechanic to the technology-oriented employee needed today has resulted in a general acceptance of the necessity of a formal high school or postsecondary training program.

### **Educational Qualifications of Entry-Level Automotive Service Industry Employees**

Facing an occupational growth rate of 10–20% for auto service technicians, the educational community has recognized that integrated academic and vocational programs are vital. Currently, several educational routes are available for those seeking to enter the auto service profession. A prospective technician can immerse himself or herself in this career path as early as high school. For persons seeking to enter the field at the postsecondary level, auto technology programs have a well-established history in 2-year institutions. Kasper (2002) noted that the 7,474 associate degrees awarded in the field of mechanics and repair caused this field to rank eighth among associate degrees conferred by 2-year community colleges during 1999–2000. Automotive programs are also found in many private vocational and technical schools. In addition, eight universities in the United States offer auto technology baccalaureate degrees (Belcher, Frisbee, & Sandford, 2003).

In addition to formal educational programs in secondary and postsecondary settings, the auto service field has embraced occupational certification. Automotive Service of Excellence (ASE) voluntary certifications have been accepted as a standard credential for auto service technicians (U.S. Bureau of Labor Statistics, 2003). The ASE program is multifaceted (Reckase & Kunce, 2002), although the voluntary certification of automobile and truck repair technicians is the primary focus (National Institute for Automotive Service Excellence, 1998). While a noted feature of this industry is that employers often furnish more advanced training (U.S. Bureau of Labor Statistics, 2002b), occupational certifications are one method used for entry into, and advancement in, the auto service industry. While the U.S. Bureau of Labor Statistics (2002b) acknowledged that some auto technicians still learn the trade by assisting and learning from experienced workers, the rapid expansion in technology is making this increasingly rare.

Questions regarding the preferred qualifications for entry-level auto service technicians have taken on an increased urgency in response to projected workforce shortages and the new technological sophistication of automobiles. Career guides readily acknowledge that entry and success in the field require advanced technical training and computer literacy (Cosgrove, 2000). According to Lewis and Gill (1995), today's auto technician must have thorough knowledge of automotive systems and components, good computer skills, excellent communication skills, above-average mechanical aptitude, good reasoning ability, ability to read and follow instructions, and manual dexterity. These attributes of auto service employees appear to correspond closely to characteristics that employers look for, according to the U.S. Bureau of Labor Statistics *Occupational Outlook Handbook* (2002b). They reported that employers expect an auto technician to have good communication skills; the ability to think analytically; high levels of reading, mathematics, and computer skills; mechanical aptitude; and subject-matter knowledge.

With the increasing sophistication of auto technology, it is imperative that education and training for service technicians meet the needs of employers. Most of the education and training takes place in high schools, community colleges, and private and public vocational and technical schools, although some service technicians still learn their trade solely through on-the-job training. As the visibility of occupational certification increases, and students become more aware of alternative educational pathways available for careers in auto technology, the need for understanding employers' preferences in education and levels of previous work experience has increased.

### **ASE Certification**

The standard industry credential for auto service technicians are the certifications offered by the National Institute for Automotive Service Excellence (ASE). Some have suggested that ASE sponsors what may be the largest certification program in the world outside of the IT industry (Reckase & Kuncze, 2002). The ASE certification program is under the direction of the National Automotive Technicians Education Foundation (NATEF). This organization was founded in 1983 as an independent nonprofit organization to evaluate, encourage, and improve auto technical education. NATEF evaluates technician training programs against standards developed by the automotive industry and then recommends qualifying programs for ASE certification. The NATEF process has resulted in certified automotive education and training programs in all 50 states at the secondary and postsecondary levels.

ASE certification is awarded when technicians have completed 2 years or more of qualifying work experience and have successfully passed one or more of 42 examinations. (A complete list of ASE certifications appears in Appendix A.) The examinations are offered twice a year in paper-and-pencil format. Computer-based tests are available for some specialty areas. ASE certification examinations are constructed from banks of multiple-choice questions, some of which contain illustrations of engine parts, repair procedures, electrical schematics, etc. Most forms of the certification examinations consist of 50–70 items, and with up to 10 pretest items that are examined for potential inclusion in future administrations. All examinations are redeveloped for each semi-annual offering, “with over 100 new test forms created each year” (Reckase & Kuncze, 2002, p. 169). ASE has estimated annual testing volume in the United States

at 230,000. Certification remains current for 5 years, at which time recertification occurs by passing a shorter form of the examination.

Technicians earning certification are awarded sleeve badges to wear on their work uniforms and certificates that are usually framed and prominently displayed in public areas of the workplace. In addition, the technicians' employers will often display large blue signs on the business frontage stating that ASE-certified technicians are employed. ASE directs this marketing effort in the hope that customers will seek out firms with ASE-certified technicians when repairs are needed to their vehicles.

The ASE program also certifies educational providers of automotive technology. Both the ASE certification testing program and the certification of educational programs are based on industry standards. In addition, ASE has sought to determine if the standards contribute to students' learning. Lewis and Gill (1995) found that students from ASE-certified programs scored significantly higher on a standardized test of knowledge of automotive repair than did students from similar noncertified programs. This finding and a fairly extensive marketing campaign (posting large ASE-certified stickers on the windows of repair facilities) have created an environment where hiring managers tend to trust both the ASE content and the expertise of ASE-certified applicants.

### **Background on the Information Technology Industry**

Information technology is a broad field that encompasses all aspects of processing and managing information. Today, the IT field is increasingly recognized as the most important enabling business technology. According to a report from the U.S. Department of Commerce, Office of Technology Policy (1999), IT has provided better information and innovation management, improved productivity and quality of life, and raised the national standard of living. The use of information technology has spread into every sector of the economy, from the traditional IT industry, to manufacturing and services, transportation, health care, education, and government. Developments in IT have also led to lowered computing costs and have facilitated the extension of information technologies into many new areas. Not only has the use of IT led to increased efficiency and productivity, it has also resulted in new business models and new approaches to the organization of work.

### **Information Technology Industry Workforce Growth Projections**

The IT industry is one of the largest and most dynamic industries in the country. Evidence of the size of this industry is seen in the tripling of the number of workers employed in the last decade (Computing Research Association, 1999). IT workers are defined as those who are "engaged primarily in the conception, design, development, adaptation, implementation, deployment, training, support, documentation, and management of IT systems, components, or applications" (National Research Council, 2001, p. 4). According to the U.S. Bureau of Labor Statistics, there were 2,179,000 core IT workers in 1998, with projected growth bringing the number to 3,891,000 by 2008 (U.S. Department of Commerce, Office of Technology Policy, 1999). The core IT occupations (database administrators, systems analysts, computer support specialists, computer engineers, and other computer scientists) together account for the fastest growing occupations projected for the 1998–2008 period, with an expected increase in

employment of 78.6%. Yet, many feel that United States employees lack the 21st century skills to fill the ever-increasing number of IT jobs (Information Technology Association of America, 1998). Moreover, the workplace will become consistently more IT-dependent, forcing virtually all employees to be computer literate to some degree. Without increased numbers of workers receiving IT training, there will be far-reaching shortages, with implications for all government, public, and private sectors of the economy (National Policy Association Digital Economic Opportunity Committee, 2002b, Part 3).

Any discussion of current workforce projections for the IT industry is a task fraught with difficulties, given the fluid nature of the industry and constantly changing job needs. Interestingly, the demand for skilled IT workers has not decreased with the recent slowdown in the economy, the demise of many dot-com firms, and other Internet-related businesses (Hilton, 2001). A study published by the Information Technology Association of America (ITAA) (2001) found that the current national IT workforce consists of 10.4 million workers. This number, however, does not include IT jobs in government, not-for-profit organizations, or small entrepreneurial firms. The underreporting of the true size of the IT workforce reflects the fact that the IT sector is not the only area where information technology workers are employed. IT workers are employed in almost all industries and business areas, where they are increasingly relied upon to design, maintain, and update critical organizational functions. The ITAA study stated that although demand for IT workers is down 44% from forecasts just a year earlier, estimates are that United States companies plan to continue to hire additional IT workers. Furthermore, concern is expressed that many positions are likely to go unfilled because of a lack of applicants with the requisite technical and nontechnical skills.

Microsoft Corporation, a market leader in IT products, services, and training programs, summarized the state of the industry as “stabilizing.” Noting the past exuberant growth of the early years and the uncertainty of recent times, projected job growth rates now appear to be rising in key IT function areas of networking, and technical support, as well as Internet and intranet development (Microsoft Corporation, 2002). While the exact numbers projected by the latest ITAA study are potentially open to debate, given the constant fluctuation in labor needs, it is clear that, based upon current projections, the demand for suitably qualified IT workers still far exceeds the resource pool available. The current growth projection is perhaps best summarized by ITAA (2001), which concluded that the talent gap for IT workers remains large, but substantially less than projected in 2000.

### **Information Technology Industry Response to Workforce Growth Projections**

In spite of the continued growth predicted for IT careers, the pace at which 2- and 4-year college graduates in the computer science, engineering, and mathematics fields are entering the workforce has shown no signs of increasing. The situation has been of serious concern for several years, as evidenced by the U.S. Department of Commerce, Office of Technology Policy (1997) warning that the long-term projected shortage of IT workers could undermine United States innovation, productivity, and competitiveness in world markets. This is due to factors such as the inhibition of cutting-edge technology, constrained industry growth, loss of trade, and increased labor costs. As a result, for the past several years the IT industry has adopted a policy of looking beyond the traditional pool of university graduates for its new workers.

For example, the IT industry is seeking ways to attract and recruit employees from the non-IT related workforce. Employers are trying aggressive recruiting, retraining their existing IT workers, and hiring immigrant IT workers through the H-1B visa program (Watts, 2001). Consequently, the linear career path of high school diploma to college degree to IT employment is being replaced. Organizations with immediate IT human resource needs are seeking pools of applicants whose skill competencies outweigh the settings in which those skills were acquired. In this environment, credentials offered by industry-based groups are providing organizations with applicants who possess IT skill sets that are immediately recognizable and applicable to employers' needs. While the recent trend in outsourcing some IT jobs overseas has made an impact on job availability, most government studies and industry reports continue to forecast IT jobs as a high-demand occupation over the next decade (Tittel, 2003; U.S. Bureau of Labor Statistics, 2004).

### **Educational Qualifications of Entry-Level Information Technology Industry Employees**

Traditionally, entry-level jobs in the IT industry have been thought to require a degree in computer science, engineering, mathematics, science, or a management-related discipline. However, due to the shortage of employees in the IT field, over the past several years new educational pathways have gained acceptance. A 4-year degree in any subject is now acceptable to many firms, since they often will provide specific IT-related training once the employee is on the job. Consequently, the dominant education pathway for core IT employees continues to be the 4-year college degree (ITAA, 2000). However, the number of projected IT jobs that will be unfilled has remained constant, despite the almost 1 million college graduates per year whose educations include preparation for work in the core IT occupations (U.S. Department of Commerce, Office of Technology Policy, 1999). In response to the large numbers of students seeking educational and training experiences and local employers looking for workers, 2-year community/technical colleges have emerged as major providers of IT certifications (Kazis & Liebowitz, 2003). For those people with limited work experience or no postsecondary education, IT certification has become an important education/training option that allows them to acquire IT knowledge and demonstrate the credibility of their training.

The history of IT certifications and their spectacular rise is summarized by Ziob (2003), who reported that IT certifications first appeared about 1989. These early certifications were market-driven—intended to expand the number of people skilled and knowledgeable about specific IT products. One of the primary drivers of early certification programs was the desire to expand IT product penetration. The hope was that skilled and certified IT workers would make purchasing recommendations to their employing organization. Several of these first-generation certifications could be obtained by open-book, paper-based examinations.

The second chapter in the history of IT certifications opened in the late 1990s, as the IT certification industry grew in both numbers of certificates offered and range of quality. This increase was a result of significant developments made in the field of psychometrics and the underlying job and task analyses on which the examinations were based. The third and final stage is the maturation that characterizes the IT certification industry today. Well over 400 different certification programs currently operate. The expansion is truly global, with Microsoft alone having a dedicated testing channel in over 140 countries. Almost all certification providers



now use sophisticated testing methodology and computerized examination technology. The new level of public acceptance of IT certification is captured by Goff (2001), who noted, “Whatever your area of specialization within IT, obtaining certification should be part of your overall training agenda” (p. 296).

The rise in the number of credentialing programs is one the most significant trends in information technology (IT) career education. These certification programs were developed to provide well-trained workers and, in part, to address the shortage of qualified employees within the IT industry. Estimates suggest that there are hundreds of separate IT certification programs (Goff, 2001). Tittel (2003) identified 630 IT certifications in mid-2000, and later increased his estimate to around 750 in December 2003. Industry-sponsored, occupational certification programs such as CompTIA A+, Microsoft Certified Systems Engineer (MCSE), Cisco Certified Internetwork Engineer (CCIE), Certified Novell Engineer, and Sun Certified Programmer for the Java Platform (SCJP), have the advantage of enabling people to quickly learn a defined set of competencies. Upon earning their certificates, students often find multiple hiring opportunities due to the current demand in the job market, although reports of the frequency of several job offers have greatly diminished over the past 2 years. As the economy continues to improve, the need for qualified IT professionals will likely grow. Yet, the impact of entering the IT workforce with an occupational certification rather than traditional educational credentials is largely unknown.

### **CompTIA A+ Certification**

A+ Certification is a testing program sponsored by CompTIA that certifies the competency of service technicians in the computer industry. According to the CompTIA Web site [www.comptia.org](http://www.comptia.org), the A+ Certification was developed for three reasons: to establish an industry-wide, nationally recognized standard of basic competence in the field of computer service; to maximize efficiency in recruiting, hiring, training, and promoting employees; and to develop an individual’s skills in an expanding field. Experts from companies throughout the computer industry collaborated to identify and operationally define the skills that must be acquired for this certification. This process ensured that the certification would have legitimacy among major computer hardware and software vendors, distributors, and IT-related publishers. In the IT industry, the A+ certification is well-regarded as a valid measure, ensuring that an individual possesses the knowledge and skills necessary for successfully holding an entry-level computer service technician position.

To earn the A+ Certification, an individual must pass two tests covering a broad range of hardware and software technologies that are not directly related to any vendor or specific products. To date, over 500,000 people have obtained the A+ certification (CompTIA 2003). Anyone may take the tests; however, content is geared towards entry-level technicians with 6 months of work experience. Although obtaining an A+ certificate is not an appropriate starting point for all IT careers, A+ will help an individual search for an entry-level technician position, such as technical support or computer servicing (Hoffman, 2002.). IT programs designed to meet the requirements for A+ certification can be found in both secondary and postsecondary career and technology education settings (Rubenstein, 2003).

Although little research has been done on the academic merits of the A+ certification, the collaborative process used to establish its standards is assumed to have created a credential that accurately reflects the knowledge and skills needed for entry-level IT jobs. Even as this study will investigate the importance of formal education (2-year college degrees) versus occupational certification, the development process leading to the creation and subsequent revision of the A+ program needs to be acknowledged. Supporters of A+ certification argue that the A+ certification was primarily designed to meet the needs of the industry it serves, which is appropriate. On the other hand, detractors claim that the heavy industry focus, of this and many other IT certifications, has compromised the benefits that a more broadly based introductory education to IT could offer.

### **Education Credentials and Occupational Certification**

There is widespread belief that the gold-standard educational credential in the United States is the baccalaureate degree. However, the United States currently has more baccalaureates (33% of workers hold them) than jobs requiring baccalaureate degrees (21% of jobs; U.S. Bureau of Labor Statistics, 2002a). This has prompted some to ask: “Does everyone need to go to college? Should everyone go to college?” (Wonacott 2003, p. 1). Grubb (1997) noted that the relative demand for sub-baccalaureate employees has grown substantially in the past 25 years, and now includes about 60% of all workers. The number of associate degrees granted has risen from 206,023 in 1969–1970 to 564,933 in 1999–2000 (Snyder, 2002).

In the past several years, a new educational credential has become accepted for entry into many occupations requiring less than a baccalaureate degree. While certification has existed in a variety of forms for many decades, it is only in the last 30 years that certification has attained high visibility as an educational credential fulfilling multiple needs for providers, employers, and students (Hale, 2000, 2003). Colardyn (1996) described several changes that have occurred since the 1970s that have led to the widespread use of certification. Among the most important are the emergence of a global economy, the general expansion of formal education, and the development of several parallel educational structures that cater to adults, vocational education, and workforce training. The resulting rise in alternative assessment and certification practices is in response to “the need to recognize skills and competencies not acquired in a traditional school setting” (Colardyn, p. 266). The emergence of certification and other postsecondary vocational qualification prompted Kerckhof & Bell (1998) to suggest that these credentials often make major contributions to early careers, yet they remain a seldom-used measure of educational attainment. The topic is in need of more systematic data collection and analysis.

The continued growth of occupational certification programs can be attributed to additional factors, including the growing demand for higher education and targeted skill levels for increasingly complex and technological jobs (Kerka, 2000). Certificates have become a “valuable new currency in the information economy” (National Alliance of Business, 2000). Brown (1999) described certificates as functioning as open transcripts of an individual’s application of knowledge and skill over time and learning experiences.

An additional driver in certification growth is the desire for portable educational qualifications (Heise, 1998). As working internationally becomes increasingly common in a globally oriented business environment, more employees are seeking credentials that will be recognized and rewarded beyond the specific nation in which they were earned. This trend is particularly evident in Europe, where traditional national borders have become permeable with the development of the European Economic Community (Heise, 1998). Certification is frequently offered by transnational, if not international, organizations that are not much concerned with the tradition that characterizes the formal higher education systems of many nations. The intersection of these trends has produced a situation where occupational certification has become an issue too large and too significant to be ignored by education providers (Adelman, 2000; Carnevale & Desrochers, 2001; Flynn, 2001). Some have suggested that adult learning is now gripped with “certification fever,” yet the rise in certification continues to pose some unique questions and opportunities for higher education (Center for Adult Learning and Educational Credentials, 2000).

The recent history of occupational certification must be viewed in conjunction with the skill standards movement. The National Skill Standards Act of 1994 (Pub. L. No. 103-227, Title V) created the National Skill Standards Board (NSSB) to establish a voluntary national skill standards system. The NSSB was terminated as a federal entity in 2003, after almost a decade of work in establishing protocols for validating skills across industries; creating frameworks of standards, assessments, and certifications; and developing quality assurance mechanisms for standards and certifications (National Skill Standards Board Institute, 2003). During its life, the NSSB focused on 15 industry sectors with, according to estimates, the potential to impact 56% of the United States workforce, or 51.8 million employees (West, 2003).

Many with a stake in the provision of education qualifications believed that national skill standards would provide “a useful set of tools and a framework for formulating new criteria for development of certification or credential systems” (Flynn, 2001, p. 190). The philosophical shift that occurred with the inception of the standards movement can be seen in the fact that industry has, to some degree, assumed the primary responsibility for determining the content of programs that had previously been the exclusive domain of educators. Industry can now, at least partially, determine what should be learned and mastered, and also require that education providers instruct students to meet industry requirements. Consequently, concern has now arisen over the place of certification vis-a-vis traditional education programs in preparing future workers. While the impact of the NSSB remains open to interpretation, its legacy may well be the acceptance and the focused use of industry standards and certifications in the United States (West, 2003).

### **Theoretical Framework for the Study**

A number of theories provide the conceptual framework through which the signaling power of industry-sponsored certification can be examined. This study draws on theories from economics and education that have been developed to explore the impact of educational qualifications on workforce entry, success, and earnings.

Human capital theory and a group of theories commonly referred to by economists as signaling and screening theories are helpful in an examination of the impact of industry-sponsored certification on gaining entry-level jobs. It should be acknowledged, however, that neither theory offers a complete explanation of how occupational certification is viewed, compared to more traditional educational qualifications, by hiring managers. These theories were developed to explore the workplace impact of more formal qualifications, such as the high school diploma and 2- and 4-year college degrees, although occupational certification often occurs in the nexus of individual education or firm-supported education/training. However, both theories present the opportunity to inform this study.

### **Human Capital Theory**

The premise of human capital theory is that expenditures on education and training are investments that produce capital in human beings in terms of knowledge and skills (Benjamin, Gunderson, & Riddell, 1998). Greater investments in certain types of education produce differing returns to individuals, based on their economic value to the organization. This type of capital differs from traditional definitions of capital (e.g., physical or financial) in that it cannot be moved around easily, since individuals cannot be separated from the knowledge they possess.

Human capital theory proposes that investments in human resources can be expected to improve productivity and, therefore, worker earnings. According to Becker (1993), the most important investments in human capital are education and training. This theory tends to equate an individual's knowledge and abilities with the amount of formal education acquired. Since there is evidence to support the fact that individuals with higher education are more likely to earn higher wages, the benefits of investing in education appear to exceed both the monetary and opportunity costs of acquiring the education (Becker). At its core, human capital theory suggests that the productive capabilities of individuals are comparable to other resources in the workplace. Therefore, if these capabilities are effectively utilized, advantages to the individual, the organization, and to society as a whole are likely to result (Livingstone, 1997).

Furthermore, human capital theory assumes that higher education leads to higher earnings and greater productivity because the schooling gives individuals improved knowledge, skills, and ability to analyze problems. In return, firms reward the increased productivity brought them by highly knowledgeable, skilled, and able employees. The credential earned from education thus becomes important for earnings and productivity, as it conveys information that is relevant to prospective employers.

However, criticisms have been leveled at the relationship between education and earnings, as posited by human capital theory. Data collected since the late 1970s indicate that, although there has been an increase in school enrollment, average incomes have stagnated, unemployment rates have grown, and underemployment of educated people has been identified as a social problem (Livingstone, 1997). Livingstone noted that the expansion of knowledge, the increase in informal learning, and the underemployment of many educated people point to the limits of human capital theory in explaining the benefits of contemporary education. The critique offered by Livingstone has become even more relevant with the emergence of occupational certification in today's environment. The fact that these credentials frequently operate outside the boundaries and

oversight of formal education, and the fact that firms may be willing to pay a wage premium to recognize the certified skill sets, raise the question of whether traditional educational qualifications or an occupational certification should be recognized as the higher-level credential. The preference for one type of qualification over another needs to be understood before the extension of human capital theory to occupational certification can be fully embraced. This study provides an initial exploration into this question by examining how hiring managers in two selected industries view certification compared to the 2-year college degree.

### **Signaling and Screening Theories**

Signaling and screening theories offer an alternative way of looking at employer preference. Signaling theory, as originally proposed by Spence (1972), suggested that prospective employees consider both unalterable observed attributes, such as age and gender, as well as attributes that are subject to change at the initiative of the individual, such as the level of education. Spence referred to these alterable attributes as signals. Education, and the qualifications and credentials that result, have long served as signals for organizations. Because employers do not have a real measure of knowledge, skills, and abilities of applicants, they use education qualifications and credentials as signals for making inferences about missing information (Barber, 1998).

An important recent application of signaling theory to education is the realization that students can also use educational requirements as a signal to gain information about what a prospective employer values (Weiss, 1995). In this case, signaling theory suggests that organizational preferences for occupational certification or more traditional college degrees provide applicants with information about prospective organizations and what types of skills and knowledge they value (Greening & Turban, 2000).

Since organizations do not have a completely accurate gauge of the future productivity of an employee, the assumption is made that a potential employee who has a higher level of education possesses the qualities that will mean higher productivity. Therefore, employers use education as a screen to select potential employees. According to Benjamin, Gunderson, and Riddell (1998), employers use education to signal “unobserved ability” to screen potential employees (p. 322). The signaling and screening theories argue that individuals with higher ability are more likely to obtain higher levels of education than those with lower ability. This position suggests that it is not the education itself that provides individuals with skills and abilities that make them productive in the workplace, but rather that the level of education attainment is a reflection of the inherent abilities of the individuals.

An application of screening theory is the prediction that individuals who receive a recognized educational credential (diploma, degree, or certification) will earn more than their counterparts with the same number of years of schooling who do not possess the credential. This is known as the “sheepskin effect” of education. Sheepskin effects can be described as the wage return specific to educational credentials, rather than to accumulated years of education. It has been postulated by Layard and Psacharopoulos (1974) that “wages will rise faster with extra years of education when the extra years also convey a certificate or credential” (p. 890). In other words, sheepskin effect refers to the difference in earnings between individuals possessing a recognized credential and those who do not after equal years of schooling or training schooling. The

sheepskin effect has been an important point of the debate between adherents of the human capital and signaling explanations of wage levels. With some now asking if certification has become the new sheepskin (Carew & Flynn, 2002), the role of signaling and screening theory becomes an important lens through which to examine the issue.

The distinction between signaling and screening theories depends on which party makes the first move. In signaling models, individuals choose to offer their services to prospective employers that value their level of education. In screening models, employers make wage offers dependent on the applicants' level of education. Traditionally, information on the types of education qualifications presented by applicants has been easily available, which has made the screening process relatively easy for hiring organizations. For example, employers have long ranked the GED below the 2-year associate's degree, which in turn tends to be ranked below the 4-year college degree. Yet, the rapid rise to prominence of occupational certification has left both students and employers questioning the signaling power and the appropriate screening mechanism of certification in relation to other well-established credentials.

## **RESEARCH OBJECTIVES**

The expanding demand for skilled workers in many diverse industries and occupations together with the emergence and increased prominence of alternative educational pathways raise many questions about how educational credentials are viewed by employers. Generally, the objective of this research was to examine the strength and the types of signals communicated by occupation certification as compared to the more traditional 2-year associate degree. More specifically, the objectives of this research project were to:

1. Determine the rank order preference of occupational certification, the 2-year college degree, and the combination of both from the point of view of hiring managers;
2. Examine the signaling power of occupational certification in comparison to the 2-year community college degree;
3. Examine the influence of applicant experience level on the rank order preference of occupational certification, the 2-year college degree, and the combination of both from the point of view of hiring managers;
4. Determine if the educational background of the hiring manager and firm size are determinants of preference for applicants with occupational certification in comparison to the 2-year community college degree;
5. Explore what employers look for in entry-level applicants (what education, certification, and experience signal to them) and in attitudes towards education, certification, and training for employees once they are hired, in the employers' own words.





## METHOD

This section of the report describes the overall research design and briefly reviews other studies that have adopted a similar approach. The population and sample, variables, procedures, and data analysis techniques are described.

### Research Design

A two-group (12-cell) quasi-experimental design was used to collect the data. A series of fictitious resumes was developed using well-known guidebooks to create typical resumes for entry-level jobs (Moreira & Thorpe, 2002). These were then revised in consultation with auto service and IT certificate providers and postsecondary instructors in programs leading to both 2-year degrees and certification. The resulting 12 resumes represented applicants who differed in educational qualifications held and years of previous job-related experience. Other variables known to influence the hiring process (e.g., age, gender, ethnicity, status of credential provider) were controlled and/or held constant.

Variations of this method were used in research previously conducted to determine if preferential treatment occurs in selection decisions, with regard to race (Newman, 1978); race and gender (McIntyre, Moberg, & Posner, 1980); and sexual orientation (Van Hove & Lievens, 2003). Additional applications of this method were used previously to explore the influence of personal attributes and academic background on the career success of high school principals (Batchelor, Bedenbaugh, Leonard, & Williams, 1987), as well as the impact of race on decisions to rent housing units (Yinger, 1995).

Summarized below is the research using a similar quasi-experimental approach and/or using fictitious resumes. Rather than covering all experimental and quasi-experimental studies in the related research, this summary highlights selected studies exploring the signaling power of qualifications or studies using fictitious resumes.

Newman and Krzystofiak (1979) conducted two studies on the impact of affirmative action recruitment practices on organizations. The researchers used bogus resumes of two candidates (one Black, one white). The first study used the unobtrusive design, while the second study, completed a year later, used a self-report design. Results indicated that there were no significant effects for race, qualifications, or any of the interactions. However, there was a significantly less favorable mean response for respondents who participated in the unobtrusive study. Another study that used bogus resumes to evaluate discrimination during the screening phase of the selection process was done by Dipboye, Fromkin, and Wiback (1975). The variables of interest to the researchers were applicant gender, physical attractiveness, and scholastic standing. College students and professional recruiters were asked to rate bogus resumes that were manipulated to present combinations of the three variables. Results indicated that the college students rated applicants more favorably than did the professional managers. Male candidates were rated more favorably than female candidates. Attractive students and those with higher scholastic standings were also rated more favorably than others.

Cohen and Bunker (1975) studied the effects of sex role stereotypes on hiring decisions by presenting job recruiters with bogus employment materials, including a completed application form and interview transcripts of hypothetical applicants. Two hypothetical job applicants were created (male and female) for a male-oriented (personnel technician) and for a female-oriented (editorial assistant) position. Results indicated that significantly more females were recommended for hiring for the editorial assistant position, while significantly more males were recommended for the personnel technician job.

Another study that focused on preselection decisions based on gender and race was done by McIntyre, Moberg, and Posner (1980). The objective of this study was to evaluate the treatment given to Black and female applicants in preselection decisions. Hiring managers were presented with sets of three bogus resumes for a single job category. Two of the resumes represented majority applicants (White males) and the third resume represented a minority applicant (either a Black or white female). Resumes prepared for each job category had variations in format and qualifications. Each resume attribute was rotated to yield 81 different combinations. Results indicated that Black applicants were favored in all but one of the sampled regions, in organizations of all sizes, and in very job category but one. In addition, male candidates were preferred over females.

A similar study on discrimination in recruitment was done by Newman (1978). In this study, hiring managers were sent two fictitious resumes, one from a Black applicant and one from a White applicant. The four factors of interest to the researcher were race, geographic region, company size, and applicant qualifications. Results showed that companies responding to the equivalent resumes showed a preference for the White candidate. However, Black candidates received more favorable treatment with the nonequivalent resumes (favoring the White candidate), pointing to the practice of reverse discrimination. Company size also influenced the hiring decision. Companies with fewer than 5,000 employees showed a slight tendency to favor White applicants. There was also a significant relationship between company size and the time taken to respond to applicants, with larger companies taking more time to respond to applicants.

A recent revival in the use of fictitious resumes in research has been sparked by the groundbreaking research of Bertrand and Mullainathan (2003). Using a field experiment approach to measure racial discrimination in the labor market, a series of fictitious resumes was created and sent in reply to newspaper “Help Wanted” advertisements. Each resume was assigned either a very African-American-sounding name or a very White (American of European descent)-sounding name. The researchers sent out close to 5,000 resumes in response to more than 1,300 employment advertisements. Measurements were made of the number of telephone callbacks or e-mail replies sent to a telephone answering machine or e-mail account listed for each fictitious resume. Results showed a significant discrimination effect against African-American-sounding names, with White names receiving 50% more callbacks for interviews. Organizations listing “Equal Opportunity Employer” in the advertisements were found to discriminate as much as other employers, prompting the researchers to conclude that racial discrimination is still a prominent feature of the United States labor market.

## Population and Sample

The most appropriate respondents for this study were identified as managers in the auto service and IT industries who hire entry-level employees for positions requiring less than a 4-year college degree and fewer than 5 years of previous work experience. Clearly identifying this population created challenges for sampling, as no list or directory of such individuals exists. Furthermore, the job title of the individual responsible for hiring entry-level employees varies greatly among firms. Finally, the task of recruiting and selecting entry-level employees is often shared among managers, depending on specific needs of the firm for any vacancy. A random sample of managers responsible for hiring entry-level applicants was drawn from the business listings of auto service firms and IT sales and service firms in the most recent edition of the “yellow pages” telephone directory in the three United States cities selected for geographic diversity.

## Variables

A brief description of the variables used in this study follows.

Dependent variable—suitability for employment: The dependent variable was suitability, or readiness for employment, in the respondent’s firm. This somewhat ambiguous construct was explained to respondents in two ways. First, managers were asked if the individual represented by the resume would be suitable or ready for an entry-level position in the respondent’s organization if a vacancy were currently available. Second, managers were asked what remedial education or additional training the applicant would need to complete to be considered hireable. The term “entry-level” was defined as a position requiring less than a 4-year degree and fewer than 5 years of previous work experience.

Independent variables: The independent variables in this study were educational qualifications and level of previous work experience.

Educational qualifications were separated into four categories, with fictitious resumes representing applicants with and without occupational certification and with and without a 2-year community or technical college degree. More specifically, the four treatment conditions of educational qualifications were:

- (a) neither occupational certification nor 2-year community or technical college degree
- (b) occupational certification, but no 2-year community or technical college degree
- (c) 2-year community or technical college degree, but no occupational certification
- (d) both occupational certification and 2-year community or technical college degree

Previous work experience was the other independent variable used in this study. After consultation with hiring managers, this variable was divided into categories representing most applicants for entry-level jobs in both the auto service and IT industries. Levels of previous work experience were:

- (a) no work experience
- (b) 2 years or less (fewer than 25 months) of job-related experience
- (c) more than 2, but less than 4, years (25 to 48 months) of job-related experience

Treatment variables: Treatment variables were those that were manipulated on the fictitious resumes. In this study they were considered to be the absence, presence, or combination of the two independent variables. The combination of variables translated to 12 variations, representing 12 different applicant resumes, as shown in Figures 1 and 2. Appendix B contains the 12 resumes used for the auto service industry sample and Appendix C contains the 12 resumes used for the IT industry sample.

The original proposal for this study also included gender as an independent variable. After considering the effect of this variable on the complexity of the experimental design, it was determined by the NRCCTE Director and OVAE to remove gender from consideration.

Potential influencing variables of respondents were also considered. Following the findings of Newman (1978), the respondents's firm size (number of full-time employees) was recorded to determine if this influenced the resume ranking. Similarly, the education level and the number of certifications held by the respondents were also recorded.

## **Procedures**

This section reports on the procedures for respondent recruitment and describes the semistructured interview method used to collect data.

Respondent recruitment: A similar approach was used to identify and recruit respondents in all three cities selected for data collection. Three cities—Atlanta, Portland, and the “Twin Cities” of Minneapolis/St. Paul—were chosen for their geographic diversity.

For the recruitment of managers in the auto service industry, a faculty member from a well-established and highly regarded, postsecondary auto service technology program in each city was contracted. All three of the auto service recruiters had a strong industry background before moving into education. This proved useful, as they could explain the purpose of the study and the benefits of respondent participation to both the auto service industry and career and technical education. All three auto service industry recruiters used the same procedures to recruit respondents. Each recruiter was provided with a randomly drawn list of local firms and their telephone numbers taken from the “Automotive Repair and Service” heading in the latest edition of the “yellow pages” telephone directory in each city.

A minimum target of 30 respondents was set for each industry from each city to produce a projected sample of 180. To account for potential no-shows, an average of 6 (from 4 to 7) additional respondents were recruited in each city.

1	2	3	4	5	6
<i>Qualifications:</i> None	<i>Qualifications:</i> None	<i>Qualifications:</i> None	<i>Qualifications:</i> 2-year degree	<i>Qualifications:</i> 2-year degree	<i>Qualifications:</i> 2-year degree
<i>Experience:</i> None	<i>Experience:</i> Less than 2 years	<i>Experience:</i> 2–4 years	<i>Experience:</i> None	<i>Experience:</i> Less than 2 years	<i>Experience:</i> 2–4 years
7	8	9	10	11	12
<i>Qualifications:</i> ASE Certification	<i>Qualifications:</i> ASE Certification	<i>Qualifications:</i> ASE Certification	<i>Qualifications:</i> 2-year degree and ASE Certification	<i>Qualifications:</i> 2-year degree and ASE Certification	<i>Qualifications:</i> 2-year degree and ASE Certification
<i>Experience:</i> None	<i>Experience:</i> Less than 2 years	<i>Experience:</i> 2–4 years	<i>Experience:</i> None	<i>Experience:</i> Less than 2 years	<i>Experience:</i> 2–4 years

Key:

*Qualifications*

None

2-year degree

Certification only

2-year degree and ASE certification\*

*Description*

Holds neither certification nor a 2-year degree (but does have high school diploma)

Holds a 2-year associate degree only

Holds ASE certification\* only

Holds both a 2-year degree and ASE certification

\*ASE Brakes certified and ASE Suspension and Steering certified

*Experience*

No work experience

Less than 2 years' work experience

2–4 years' work experience

Figure 1: *Variable and cell analysis matrix for automotive resumes.*

1	2	3	4	5	6
<i>Qualifications:</i> None	<i>Qualifications:</i> None	<i>Qualifications:</i> None	<i>Qualifications:</i> 2-year degree	<i>Qualifications:</i> 2-year degree	<i>Qualifications:</i> 2-year degree
<i>Experience:</i> None	<i>Experience:</i> Less than 2 years	<i>Experience:</i> 2–4 years	<i>Experience:</i> None	<i>Experience:</i> Less than 2 years	<i>Experience:</i> 2–4 years
7	8	9	10	11	12
<i>Qualifications:</i> A+ Certification	<i>Qualifications:</i> A+ Certification	<i>Qualifications:</i> A+ Certification	<i>Qualifications:</i> 2-year degree and A+ Certification	<i>Qualifications:</i> 2-year degree and A+ Certification	<i>Qualifications:</i> 2-year degree and A+ Certification
<i>Experience:</i> None	<i>Experience:</i> Less than 2 years	<i>Experience:</i> 2–4 years	<i>Experience:</i> None	<i>Experience:</i> Less than 2 years	<i>Experience:</i> 2–4 years

**Key:**

*Qualifications*

None

2-year degree

A+ certification only

2-year degree and A+ certification

*Description*

Holds neither certification nor a 2-year degree (but does have high school diploma)

Holds a 2-year associate degree only

Holds A+ certification only

Holds both a 2-year degree and A+ certification

*Experience*

No work experience

Less than 2 years' work experience

2–4 years' work experience

Figure 2: Variable and cell analysis matrix for IT resumes.

A multi-stage screening process was used by recruiters to ensure that respondents met eligibility requirements. Recruiters first made contact by telephoning and requested to speak with the individual responsible for hiring entry-level auto service technicians. Those firms that focused primarily on auto body repair or narrow specializations (e.g., installations of car phones or sound systems), rather than the desired target population of auto service and repair, were screened out. A recruitment script was provided (Appendix D). Potential respondents were asked if their firm hires entry-level employees. Entry-level positions were defined as those that require less than a 4-year college degree and fewer than 5 years of previous work experience. Potential respondents were also asked if they had hired such an individual in the past 12 months, or if they planned to make such a hire in the coming year. Those respondents answering “yes” to these eligibility questions were then invited to participate in the study, and the benefits of participation were explained. Upon receiving a consent, the recruiter scheduled the respondent for an interview.

In the IT field, recruitment in Atlanta was conducted by an IT instructor from a local technical college, whereas in Portland and Minneapolis/St. Paul, a local market research firm was contracted to conduct respondent recruitment. A random sample was drawn from the

heading “Computer Sales and Service” in the local “yellow pages” directory for each city. Recruiters followed the same procedures used for the auto service industry in recruiting IT respondents (Appendix E).

The somewhat complex screening process used to determine eligibility made calculating response rates of accepting participants difficult. The highest response rate came from IT managers in Atlanta, where approximately 33% of those meeting eligibility requirements accepted the invitation to participate. The lowest response rate was reported for IT recruitment in Portland, where approximately 20% of those eligible agreed to participate. The final sample size was 202 managers.

Semistructured interview method: For the one-on-one interview, respondents were invited to a dedicated facility, chosen for affordability and travel convenience. In Atlanta, a conference facility on the campus of a suburban technical college was used for both the automotive and IT interviews, with interviews taking place in two adjoining rooms. In Portland, the IT interviews were conducted in a hotel business center, whereas the auto service interviews took place in an automotive classroom of a community college within the metropolitan area. In St. Paul/Minneapolis, a conference room at the University of Minnesota was used for IT interviews. The automotive program classrooms at a local technical college were utilized for the automotive interviews.

Upon arrival at the interview facility, respondents were greeted and checked in by a research assistant, after which eligibility requirements were confirmed. A total of three non-eligible respondents arrived at the interview sites. Once the intent of the study was explained, all three were appreciative of the need for the specified requirements and understood the reason for their noninclusion. Participants meeting eligibility requirements were then asked to read and sign a consent form (Appendix F) before completing a two-page, self-administered questionnaire (Appendixes G1 and G2) intended to gather information on their educational background and demographics, and the characteristics of their firm. Additional data, collected from the questionnaire measuring attitudes toward the benefits of certification, lie beyond the scope of this report and will be published at a later date.

The one-on-one interview commenced with an overview of the interview structure. Managers were then asked to imagine that their firm had published an advertisement for an entry-level (auto service or IT) employee in the local newspaper. In response, they had received 12 resumes, with no cover letter nor additional information provided on the applicants. They were instructed to take as long as needed to review each of the 12 fictitious resumes and rank-sort them from 1st to 12th, based on their opinion of each applicant’s suitability and readiness for a job in their firm. Respondents were informed that they could assign an equal rank to two or more resumes if they felt the applicants were equally suitable (or unsuitable) for an entry-level job in their firm.

When respondents had completed the resume ranking, each was asked for permission to tape-record the interview and then asked to indicate the difficulty of the ranking task. Then the interview followed a scripted, semistructured protocol (see Appendixes H1 and H2). Respondents were asked to focus on the resume(s) that they had ranked most highly. If the respondent had more than one resume ranked in first place, the interviewers were instructed to

probe for the single applicant that the respondent would judge as being the “most suitably qualified.” After the resume number was recorded, respondents were asked:

1. What characteristics of this resume appeal to you?
2. What specific features of the resume signal or indicate to you that this person would be suitable for a job in your firm?
3. How do these characteristics make the applicant the most suitable for the job?
4. Are there any specific qualifications or level of experience that you believe this top-ranked applicant would absolutely need to have before being considered for an entry-level position in your organization?

Attention then turned to the resume that the respondents had ranked last (12th) in terms of suitability for an entry-level position in their firm. The same four questions were asked of this resume. This process was repeated for the third and final time by asking respondents about the characteristics and their decision-making process for the middle (6th) ranked resume. Respondents were given an opportunity to discuss any additional resumes and their ranking procedure before the interviewer wrote down the final ranking of all resumes for later data entry.

The resumes were then set aside and managers were asked to consider a hypothetical situation wherein they were considering two applicants identical in every way except for the education qualification. One applicant was described as holding a 2-year college degree and no certification, while the other applicant held certification (ASE for automotive, and A+ for IT), but no 2-year degree. This question sought to provide an additional direct measure of the signaling power of the two educational qualifications under investigation. A final series of questions asked respondents for (1) their opinions on the advantages of, and (2) their willingness to pay for further education for employees they had already hired who do not have a 2-year degree or certification. Respondents were given an opportunity to offer final thoughts on the topics under investigation before the interview concluded with payment of the incentive and directions for obtaining a copy of the study results.

Pilot test: To determine the appropriateness of the fictitious resumes and the research design, a series of pilot tests were conducted. For the auto service industry, the final draft of the resumes was shown to an automotive instructor from a 2-year community/technical college. Minor changes were suggested in the wording, especially in the descriptions of previous experience. Following this, two hiring managers from automotive dealerships in Minnesota were recruited. At the completion of the resume sorting and interviewing, they were asked to provide detailed feedback on each resume and the research method. Only minor suggestions were made.

In the IT industry, two managers from Minneapolis were selected for the pilot test. One manager had responsibility for all entry-level IT technicians hiring for a national chain of computer sales and service firms, and the second manager represented a computer support firm. As in the auto service industry pilot test, these two managers participated in the study and then



provided feedback on each resume and the interview questions. Both IT managers offered very few suggested changes to the resumes or to the interview protocol.

### **Data Analysis**

Both quantitative and qualitative techniques were used for data analysis.

Quantitative data analysis: Descriptive statistics were used to summarize responses to the survey instrument. To examine the resume ranking, the respondents' preference for each resume was coded to reflect how they ranked it in order from 1st place (most suitable for entry-level job at my firm) to 12th (least suitable). Changing the unit of analysis from respondent to the resumes themselves allowed for examination of the frequency with which each resume was ranked in 1st place.

The difference in rank between resumes with occupation certification, as compared to those with the 2-year degree, was calculated by examining if managers ranked the resume with certification higher, equal to, or lower when compared to the resume with the 2-year degree. To examine the significance of the differences in ranking preference for the two qualifications under investigation (degree and certification) a  $2 \times 3$  chi-square test for independence was conducted. This test indicates if work experience differences influenced the preference of occupation certification over the 2-year degree.

Theoretically, the preference of managers for certification over degree might be influenced by certain characteristics of the respondent and the firm for which each works. To explore if the preference shown by managers for certification over the traditional 2-year degree were influenced by their own education level, attainment of certification, or the size of their firm, a logistic regression model was developed. The dependent, or outcome variable, was preference for certification. (If the respondent ranked resume 5 with certification higher than those with a degree when work experience was held constant.)

Qualitative data analysis: The ultimate purpose of any analysis is to make sense of a body of data (Patton, 2002). Qualitative analysis does so by exploring the data for significant patterns and themes. As these patterns and themes emerge, the essential meaning is revealed (Van Manen, 1998). In this study, it was hoped that by analyzing the respondents' actual words in response to questions about sorting the resumes and the signaling power of specific features of the resumes, an enlarged understanding of the role of occupational certification could be discovered.

The primary source of data for the qualitative analysis was the text transcription of the respondents' interviews. Qualitative data management/analysis software was used to store, review, code, organize, and retrieve the data. Qualitative Solutions and Research NVivo™ Version 2.0, a popular software program for qualitative researchers, was used. It must be clarified that this software does not actually analyze the data, nor identify patterns or themes—it simply presents a sophisticated way to organize and help code large amounts of qualitative data. All synthesis and analysis of data was done by the investigator and a research analyst with specific skills in qualitative methodologies and the NVivo™ software.

In order to make sense of the data, a thematic analysis was conducted following the multistep process of coding and theme-generation described by Bogdan and Biklen (1998). First, 90 interviews (of the 202 completed) were randomly selected for transcription. Cost and time constraints prohibited transcription and analysis of all 202 interviews. The sample was structured to include an equal number of transcripts from each industry and each city (45 from each industry divided into 15 from each city), using the code number of each transcript. These 90 transcripts (in the form of text documents) were then imported into the software program. The program read through each interview, identifying meaningful units of text of varying lengths in a process called “segmenting” (Patton, 2002). For each meaningful unit, a code word or phrase was created and assigned. Next, the coded units were extracted from the original text and categorized by code. The coded units were then linked according to similar content, and organized into levels. The process was circular, not linear, in that items were re-coded and re-organized as their essential meaning became more apparent. The codes were then examined for emerging themes. As themes emerged, a label was created for each. Initial themes were collapsed, combined, reworded, and sometimes eliminated, to arrive at the final themes.

The final themes are not inclusive of all the data, nor are they representative of each participant. The goal was to present a broad-spectrum glimpse into what respondents look for in making hiring decisions, how they educate or further train recent hires, and what is signaled by the 2-year degree, certifications, and experience. In the process of analysis and data reduction, the goal was to allow the strongest patterns and themes to emerge. Data that never were assembled into any pattern, or only into weak patterns, were set aside to be examined further in the future. Thus, the themes capture common preferences and beliefs in the hiring process, leaving less common preferences and beliefs for later examination.

One way to understand how the data were analyzed and themes surfaced is to imagine the use of note cards. The transcript of each interview was broken up into units of text and placed on note cards. Each of these was then given a label—called codes. Then, as each note card was read through, it was placed on the floor, either by itself, or in a pile of note cards with similar ideas. After doing this for each quote, many piles existed. The piles were reexamined multiple times and reorganized by codes. This iterative process is critical to ensure that themes and categories are clear and understandable, in line with current research and theory, as well as true to the data. This process of reorganization of piles and subpiles continued until it was determined that each quote was in the best possible place. Some quotes were copied and placed in more than one pile if they included content appropriate to both piles. The largest piles then became the focus, and it was from them that the results emerged. While the analysis of text is done with the assistance of the NVivo™ computer software, the comparison to manual sorting of note cards helps describe the technique.

The results of the qualitative analysis are presented in the following section, along with direct respondent quotes drawn from the interviews.

## RESULTS

This section of the report presents the results, divided into three major sections. The first section describes the characteristics of the sample; the second reports the quantitative results from the ranking of the fictitious resumes, followed by analysis of potential influences on ranking. The third and final section reports on the qualitative analysis of the transcribed interviews, with selected respondent quotes to support the findings.

### Characteristics of the Sample

A total of 202 interviews were conducted with 95 automotive service and 107 IT managers in Atlanta, GA; Portland, OR; and Minneapolis/St. Paul, MN. Respondents provided their job titles, with the majority classifying themselves as manager. The frequency of the title varied by industry and city, with the majority of automotive service respondents from Atlanta classifying themselves as manager (54.29%), followed by director (20.00%), owner (8.57%), president (8.57%), other (5.71%), and missing (2.86%). In the Portland automotive group, manager was the most frequent title (36.67%), followed by president (23.33%), owner (20.00%), director (10.00%), other (3.33%), and missing (6.67%). In the Minneapolis/St. Paul automotive sample, manager was again the most frequent title (53.33%), followed by owner (23.33%), director (13.33%), other (3.35%), president (3.33%), and missing (3.33%).

In the Atlanta IT group, manager was the most frequent title (32.26%), followed by president (29.03%), and other (29.03%), followed by owner (6.45%), and director (3.23%). In the Portland IT group, manager was the most frequent title (32.50%), followed by president (20.00%), other (15.00%), and director (7.50%). In the Minneapolis/St. Paul IT group, manager was the most frequent title (36.11%), followed by director (25.00%), president (16.67%), and other (16.66%), then by owner (2.78%), and missing (2.78%).

In the entire sample, the mean number of years employed was 8.55 years, with a range of less than 1 year to 41 years. In the automobile group, the mean number of years employed was 10.44 years, with a range of less than 1 year to 41 years. In the IT group, the mean number of years employed was 6.91 years, with a range of less than 1 year to 35 years. All 20 respondents indicated that they had the responsibility for hiring entry-level employees.

### Quantitative Results

The results from quantitative analysis of data are presented in the order that the research questions were listed.

#### Preference for Educational Qualifications in Entry-Level Employees

In order to address the first research question, which sought to determine the rank order preference for the 12 resumes, a calculation of the frequency with which each resume was ranked in first place was conducted. Each of the 202 managers ranked the 12 resumes in order from first to twelfth according to their perception of the suitability of the applicant for an entry-level job in their firm. The unit of analysis for this question was each resume and the frequency with which it was ranked first by each respondent. The results of this analysis are presented in Table 1.

Table 1  
*Frequency Table of Each Resume Ranked in First Place*

Resume	Industry			
	Auto Service		IT	
	<i>n</i>	%	<i>n</i>	%
1	1	1.05	1	0.93
2	2	2.11	4	3.74
3	3	3.16	0	0.00
4	0	0.00	2	1.87
5	3	3.16	6	5.61
6	5	5.26	37	34.58
7	0	0.00	0	0.00
8	5	5.26	0	0.00
9	9	9.47	28	26.17
10	1	1.05	0	0.00
11	0	0.00	6	5.61
12	64	67.37	26	23.36
Total	95	100.00	107	100.00

In general terms, the results show that auto service managers considered work experience as being a key determinant in signaling suitability for employment. Resume 1, which represented an applicant with no educational qualifications other than high school diploma and no relevant work experience, was ranked in first place only once by a single auto service manager (1.05%). The other resumes showing no previous work experience, resumes 4 and 7, were not ranked first by any auto service managers, despite the presence of a 2-year degree and ASE certification respectively. There was a strong preference for the person represented by resume 12. This resume presented an applicant with both a 2-year college degree and ASE certification (in brakes as well as suspension and steering), along with 2 to 4 years of previous work experience. More than two thirds ( $n = 64$ ; 67.37%) of auto service managers ranked this resume in first place.

More variability was found in the top-place ranking for the resumes in the IT industry. The three resumes with the most work experience (2 to 4 years of relevant previous experience) and an educational qualification were ranked in first place considerably more often than those representing less than 2 years' experience or no qualifications. Resume 1, which represented an applicant with no educational qualifications other than high school diploma and no relevant work experience, was ranked in first place by only one IT manager (0.93%). The resume ranked in first place most often (resume 6) represented an applicant with the 2-year degree and 2 to 4 years' work experience. This resume was ranked first by 37 of the 107 IT managers (34.58%). Resume 9, representing an applicant with occupational certification and 2 to 4 years' work experience, was the second most frequently top-ranked with 28 (26.17%) of managers preferring

this candidate above all others. Unlike the auto service managers, who strongly favored resume 12 showing both educational qualifications and 2 to 4 years' experience, only 25 (23.36%) of IT managers ranked this resume in first place.

The following section presents the ranking preference for four selected resumes: resume 1 (no qualifications and no work experience); resume 4 (2-year degree with no experience); resume 7 (certification, but no experience); and resume 12 (both 2-year degree and certification, as well as 2 to 4 years' experience). Appendix I contains the ranking results for each of the 12 resumes in both the auto service and IT samples.

The ranking of resume 1, reflecting an applicant with no qualifications (neither occupational certification nor a 2-year community/technical college degree) and no relevant previous work experience, was singled out as the least suitable by the majority of respondents. Managers from the auto service industry ranked this resume in last (12th) place (56.8% of the time;  $n = 54$ ), with IT managers also ranking this resume last (51.4% of the time;  $n = 55$ ). Figure 3 presents the frequency with which resume 1 was ranked in 1st through 12th place. In each industry, one manager ranked this resume in first place. The rationale provided by both these managers in ranking this resume first, despite its lack of qualifications, was that a person with no educational qualifications and no previous work experience would be a trainable and potentially loyal employee, who would be likely to stay for an extended period of time.

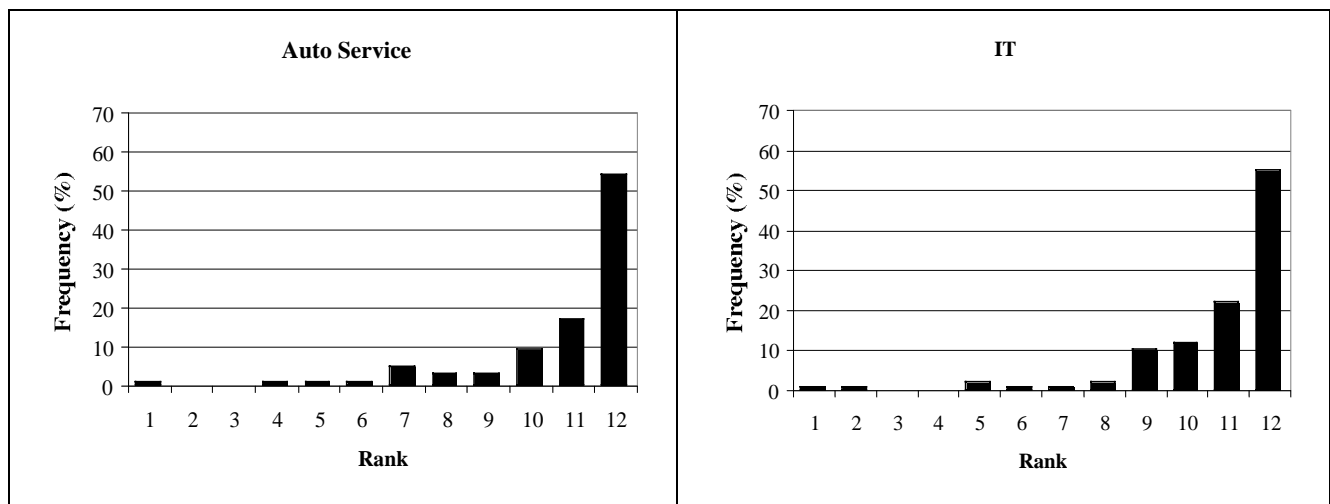


Figure 3: *Frequency ranking for resume 1 (no qualifications, no experience).*

The ranking of resume 4, reflecting an applicant with a 2-year community/technical college degree, but with no relevant previous work experience, produced a skewed distribution tending towards less suitable rankings of 8th to 12th place, as shown in Figure 4. More than half ( $n = 53$ ) of the IT managers ranked this resume within their bottom three (10th to 12th place), compared to only 38 auto service managers. Yet in comparison to the other resumes presented, the 2-year degree alone, without any work experience, had very little support for a top ranking.

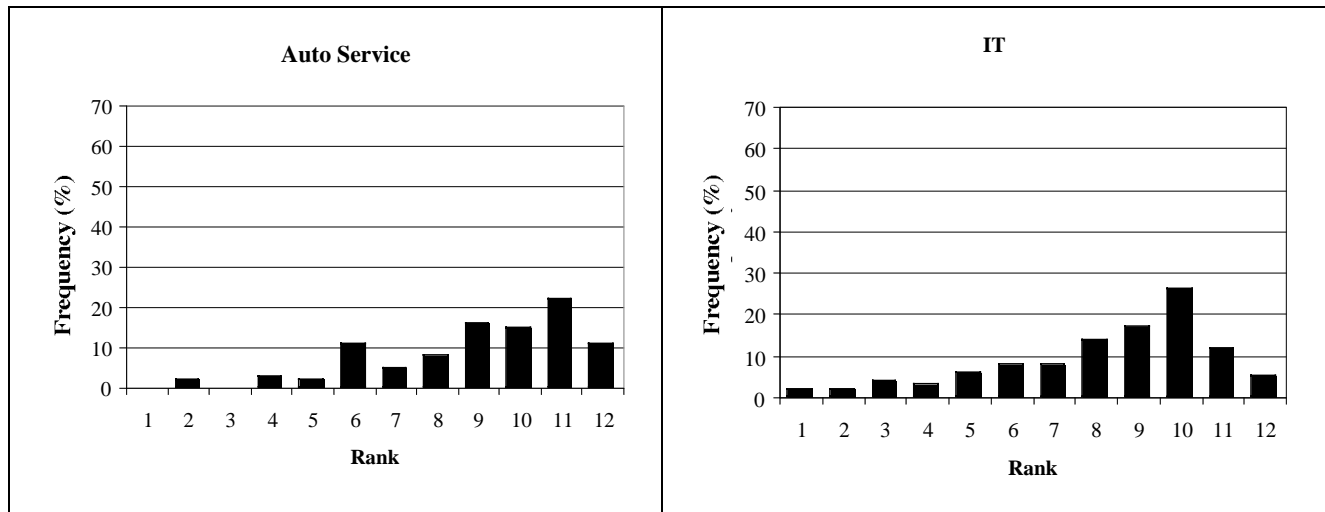


Figure 4: *Frequency ranking for resume 4 (2-year degree, no experience).*

Figure 5 shows the ranking distribution for the resume reflecting an applicant with certification but no experience. This resume also produced a skewed distribution tending towards the least suitable for hire ranking; however, the effect is more pronounced in the IT sample. The auto service managers placed this resume in last or second-to-last position (11th or 12th place) a combined 42.1% of the time, compared to 60.75% from IT managers. This suggests that applicants holding only certification are more likely to be passed over when applying for positions in the IT industry than in the auto service industry.

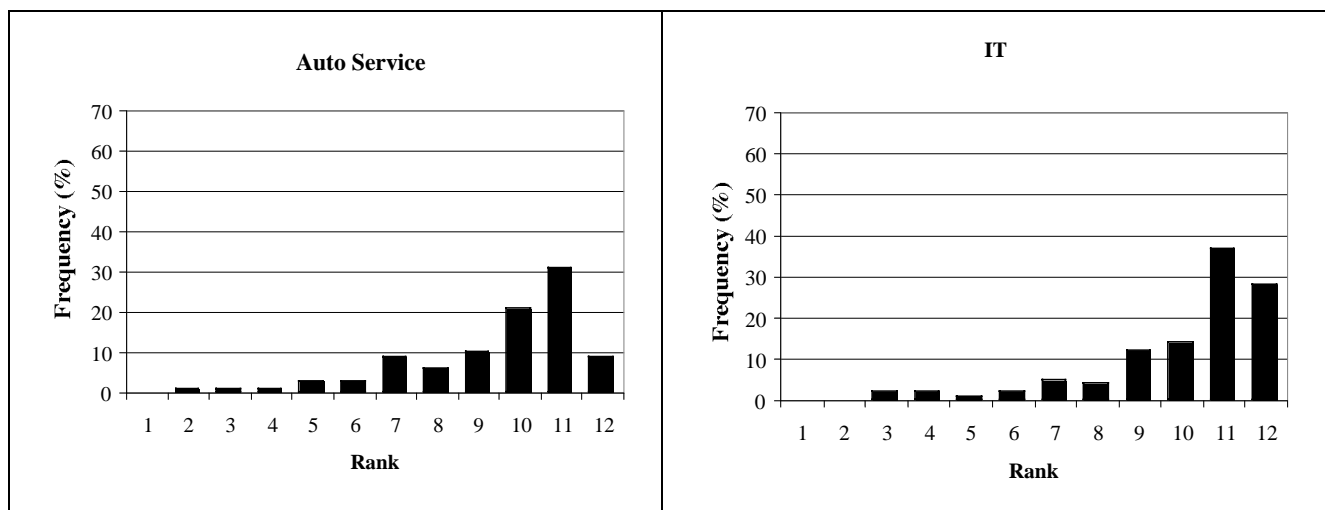


Figure 5: *Frequency ranking for resume 7 (certification, no experience).*

Resume 12 represented the applicant offering the greatest education and previous work experience. Auto service managers ranked this resume in first place 67.37% of the time ( $n = 64$ ), compared to IT managers, who ranked it in first place 23.36% of the time ( $n = 25$ ). As shown in Figure 6, a greater diversity of rankings for this resume was found among IT managers, whereas the vast majority of auto service managers ranked this resume in either first or second place. Surprisingly, this resume was ranked in last place by at least one manager in the both the automotive and IT samples.

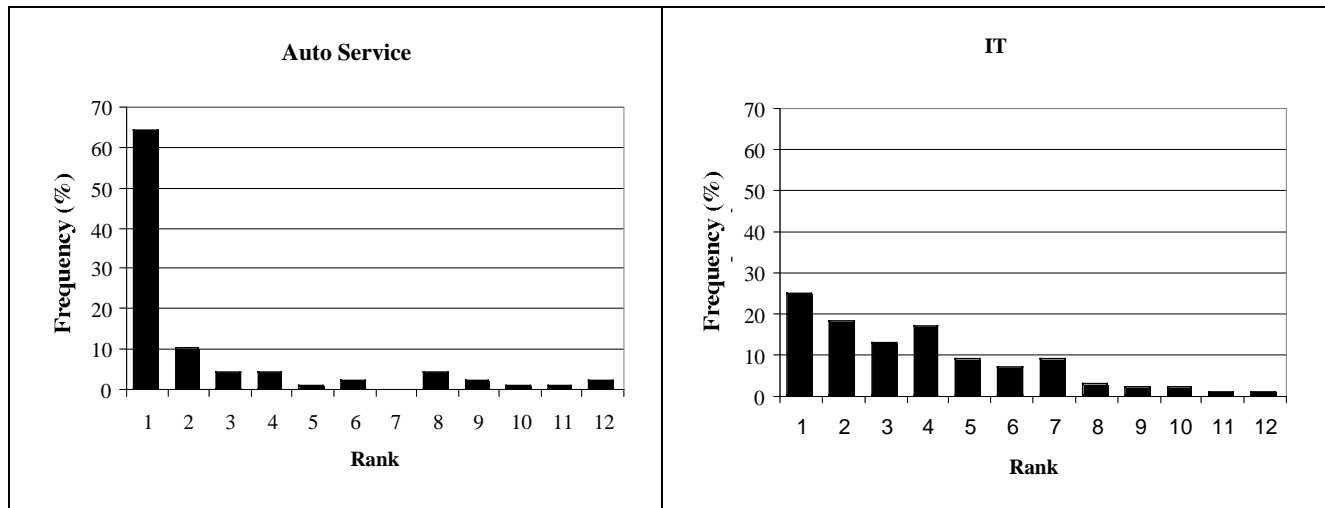


Figure 6: *Frequency ranking for resume 12 (2-year degree, certification, 2–4 years' experience).*

### Comparison of Preference for Educational Credentials Controlling for Experience

Research question 2 examined the signaling power of occupational certification in comparison to the 2-year community college degree. To address this question, those resumes that presented applicants with equal levels of experience, but differing educational credentials, were compared. Figures 7 and 8 display the proportion of auto service and IT managers ranking the 2-year degree higher than occupational certification in the three comparisons, using equal levels of work experience.

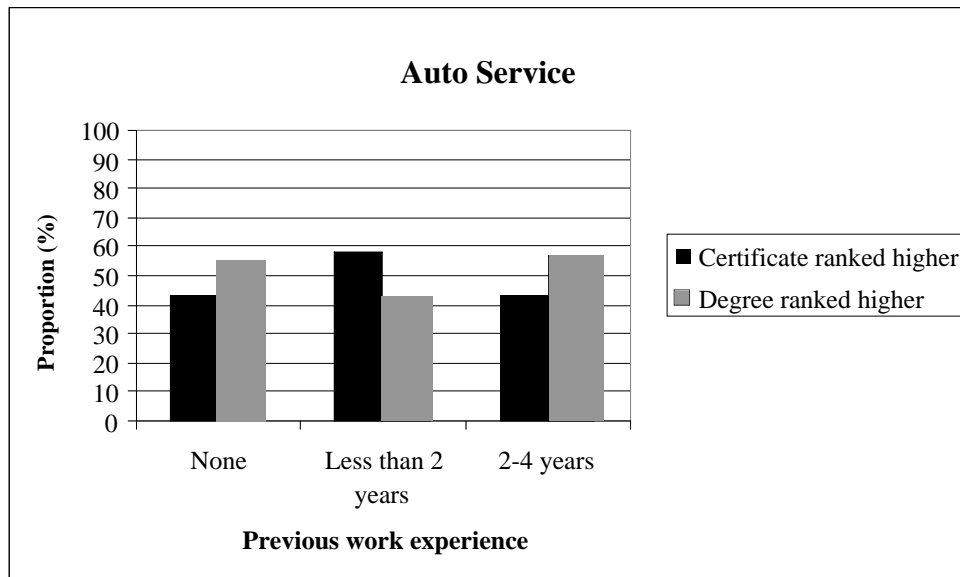


Figure 7: *Manager qualification preference—automotive.*

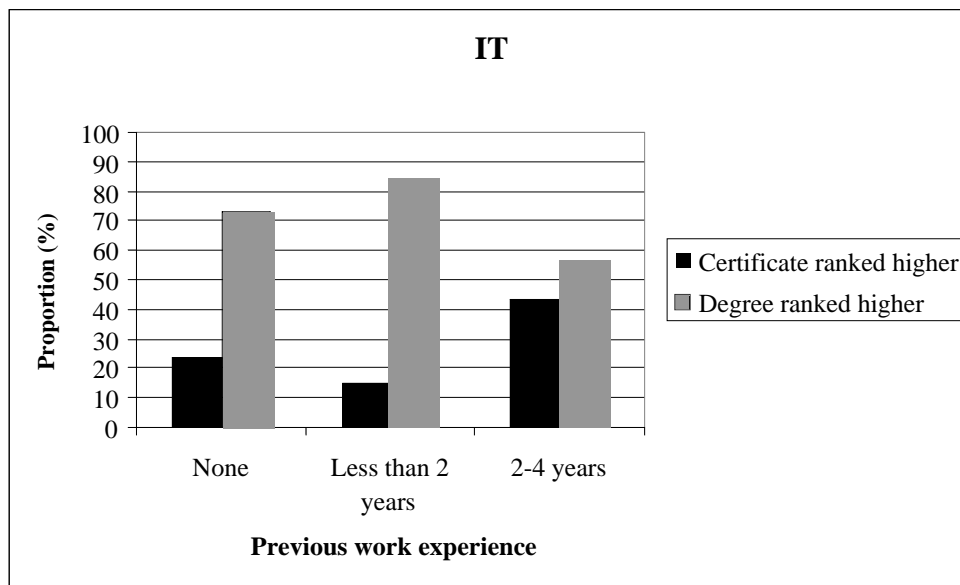


Figure 8: *Manager qualification preference—IT.*

### Comparison of Educational Qualifications for Applicants With No Experience

In the first analysis, the comparison was between the signaling power of the two types of credentials for applicants with no relevant previous work experience. Both resume 4 and resume 7 represented applicants with no previous work experience, with resume 4 having the 2-year degree and resume 7 the certification. The difference in rank between occupational certification compared to the 2-year degree was calculated by determining if the resume with certification



were ranked higher, equal to, or lower than the resume with the 2-year degree. This analysis ignored the overall ranking and only compared how resume 7 (occupational certification and no experience) compared to resume 4 (2-year degree and no experience). If resume 7 were ranked higher than resume 4, it was coded 1; if resume 7 were ranked lower than resume 4, it was coded as -1; and if the respondent had ranked both equally (indicated that they could not discriminate between the two resumes), it was coded as 0.

As shown in Table 2, when work experience (in this case, the lack of previous work experience) was held constant, and the preference for occupational certification over degree was examined, it was found that hiring managers in both the auto service and IT industries preferred the applicant with the degree over the applicant with certification. The strength of preference was stronger among IT managers, with almost two thirds ( $n = 78$ ; 72.90%) ranking the applicant with the A+ certification lower than the applicant with the 2-year community/technical college degree related to IT. Among auto service managers, slightly more than half ( $n = 52$ ; 54.74%) preferred the degree over ASE certification.

Table 2  
*Comparison of Education Credentials for Applicants With No Previous Work Experience*

Certification rank, compared to degree	Sample group			
	Auto Service		IT	
	<i>n</i>	%	<i>n</i>	%
Higher	41	43.16	25	23.36
Equal to	2	2.11	4	3.74
Lower	52	54.74	78	72.90
Total	95	100.00	107	100.00

**Comparison of Educational Qualifications for Applicants With Fewer Than 2 Years’ Experience**

When comparing the resumes of applicants who both have fewer than 2 years’ previous job-related experience, but who have differing educational qualifications, major differences between the auto service and IT samples were found. Table 3 shows that auto service managers were more likely to rank the resume with an ASE-certified applicant higher than the applicant with a degree. More than half of the 95 ( $n = 55$ ; 57.89%) auto service managers ranked certification over the degree, whereas IT managers overwhelmingly ranked the degree over A+ certification ( $n = 90$ ; 84.11%).

Table 3  
*Comparison of Education Credentials for Applicants With Fewer than 2 Years' Previous Work Experience*

Certification rank, compared to degree	Sample group			
	Auto Service		IT	
	<i>n</i>	%	<i>n</i>	%
Higher	55	57.89	16	14.95
Equal to	1	1.05	1	0.93
Lower	39	41.05	90	84.11
Total	95	100.00	107	100.00

**Comparison of Educational Qualification for Applicants With 2 to 4 Years' Experience**

Table 4 shows the results of a comparison between certification and degree preference using the two resumes representing applicants with 2–4 years of work experience. As was the case in the “no work experience” comparison, both sample groups indicated a preference for the 2-year degree over certification.

Table 4  
*Comparison of Education Credentials for Applicants With 2–4 Years' Previous Work Experience*

Certification rank, compared to degree	Sample group			
	Auto Service		IT	
	<i>n</i>	%	<i>n</i>	%
Higher	41	43.16	46	42.99
Equal to	0	0	1	0.93
Lower	54	56.84	60	56.07
Total	95	100.00	107	100.00

In summary, in all three comparisons between resumes with equal levels of experience, the IT managers preferred the degree over occupational certification. But once the resume presents significant previous work experience (2 to 4 years), the strength of the preference is diminished. In the auto service industry, the preference for degree over certification was dependent on the level of previous work experience. When considering an applicant with no work experience, managers indicated a preference for the degree; however, with some experience (fewer than 2 years) the preference was for certification over the degree. When the experience level increased to between 2 and 4 years, the preferred educational qualification again became the 2-year degree.

### **Influence of Applicant Work Experience Level on Educational Qualification Preference**

To examine the significance of the differences of varying levels of applicant work experience in ranking outcome for the two educational qualifications, a  $2 \times 3$  chi-square test for independence was conducted. This test indicated whether applicant work experience differences influenced the preference of occupation certification over the 2-year degree. Results are shown in Table 5. For the auto service sample, a nonsignificant result was found at the .05 level ( $p = .061$ ). However, for the IT sample, a significant result was found at less than .01 level.

Table 5  
*Cross Classification of Preference for the Certification and the Work Experience Level*

Industry	Preference for the certification	Work experience			$\chi^2$	df	p
		No experience	Fewer than 2 years	2–4 years			
Auto (n = 95)	Higher or equal to	43	56	41	5.59	2	0.06
	Lower	52	39	54			
IT (n = 107)	Higher or equal to	29	17	47	20.71	2	< 0.01
	Lower	78	90	60			

### **Influence of Respondent Characteristics on Preference for Educational Credentials**

The managers' qualification preference could be influenced by certain of their own characteristics and those of their employer. More specifically, research question 3 explores the level of education, certification, and firm size of the respondent managers to determine if these variables might influence preference for resumes with one or the other qualification, if the applicants' work experience were equal.

Before examining the potential influence of respondent characteristics on preference for certification over 2-year degree using a logistic regression model, an analysis of the correlations between the variables was conducted. Results of this analysis are shown in Table 6.

Table 6.

*Correlation Matrix of Respondent Characteristics and Preference for the Certification*

Industry		1	2	3	4	5
Auto Service	1. No experience	—				
	2. Fewer than 2 years	0.37**	—			
	3. 2–4 years' experience	0.15	0.04	—		
	4. Educational level	-0.26*	0.02	-0.02	—	
	5. Firm size	0.06	-0.31**	0.12	-0.15	—
	6. IT/ASE certification	-0.01	0.00	0.07	-0.10	-0.37
IT	1. No experience	—				
	2. Fewer than 2 years	-0.03	—			
	3. 2–4 years' experience	-0.07	0.23*	—		
	4. Educational level	-0.06	-0.19	-0.20*	—	
	5. Firm size	0.03	-0.03	-0.28**	0.22*	—
	6. IT/ASE certification	0.18	0.09	-0.07	-0.11	-0.22*

\*\* Correlation is significant at the 0.01 level (two-tailed).

\* Correlation is significant at the 0.05 level (two-tailed).

In the auto service sample, a negative and moderate correlation ( $r = -.26$ ) was found between the respondents' education level and their preference for ranking certificate over degree, if the applicants had no work experience. A negative and moderate correlation ( $r = -.31$ ) was found between the automotive respondents' firm size and their preference for ranking certificate over degree, if the resume applicant had fewer than 2 years of work experience. In the IT manager sample, a negative and moderate correlation ( $r = -.20$ ) was found between the respondents' education level and their preference for ranking certificate over degree, if the resume applicant had 2 to 4 years of work experience. A negative and moderate correlation ( $r = -.28$ ) was found between the respondents' firm size and their preference for ranking certificate over degree if the resume applicant had 2 to 4 years of work experience.

To explore if the preference shown by managers for certification over traditional 2-year degree were influenced by their own education level, certification, or firm size, a logistic regression model was developed. The dependent or outcome variable was preference for certification (if respondent ranked resume with certification higher than degree when the work experience was equal). This became a dichotomous variable with 1 = yes, if the certification were ranked higher, and 0 = no, if the certification were not ranked higher (i.e., degree ranked

higher). The few cases where degree and certification were ranked equally (less than 2.5% of data) were included in the yes category.

The predictor variables were the highest level of education for the respondent. This ordinal variable had seven response categories ranging from some high school to graduate degree. The respondents' attainment of certification was coded as a dummy variable, where 1 = does hold certification ( $n = 34$  auto service;  $n = 33$  IT), and 0 = no certification ( $n = 60$  auto service;  $n = 73$  IT). The size of respondent's firm was measured by the number of full-time employees. A large variation was found in the firm size variable. (The range for the auto service sample was from 1 to 1,800 employees; for the IT sample it was from 1 to 140,000 employees). In the auto service sample, 35.1% of the managers were from firms with 9 or fewer employees, whereas 57.1% of IT managers were from small firms (fewer than 10 employees). A dummy variable was constructed, with small being defined as 9 or fewer employees, and large being 10 or more employees.

The analysis examined six logistic regression models comparing resume ranking preference for no experience, fewer than 2 years, and 2 to 4 years in the auto service and IT industries. In the automotive sample, the examination of qualification preference in applicants with no work experience produced a significant result with education level. When holding other variables constant in the model, manager education level was the only significant predictor ( $p = .02$ ). This suggests that, when considering applicants with no previous work experience, auto service managers with higher levels of education are more likely to rank resumes showing a 2-year degree higher than those with occupation certification. In the model examining those applicant resumes with fewer than 2 years' experience, and when holding other variables constant, the firm size variable emerged as the only significant predictor ( $p > .01$ ). This suggests that as firm size increases, automotive managers are more likely to rank the resumes with a 2-year degree over those with occupation certification when considering applicants with fewer than 2 years' previous work experience. In the final model for the automotive sample, looking at those applicant resumes with 2 to 4 years' experience, a non-significant result was found.

In the IT managers' sample, two of the three models (applicants with no work experience and applicants with fewer than 2 years' experience) were found to be insignificant. In the final model, examining applicants with 2 to 4 years' experience, a significant result was found. When holding other variables constant, firm size was the only significant predictor ( $p = .02$ ). This suggests that as firm size increases, IT managers are more likely to rank the resumes with a 2-year degree over those with occupation certification when considering applicants with 2 to 4 years of previous work experience.

In summary, it was found that managers with certification were not influenced by that background in their preference for ranking certification over degree. However, a respondent's level of education and firm size did influence ranking preference in certain experience level conditions. It can be concluded that the combination of the three predictor variables selected for this analysis had only weak explanatory power in predicting preference for certification over degree. This suggests that further research should consider additional variables likely to explain the preference of managers for applicants with certification or a traditional 2-year college qualification.

This section of the report presented the findings from the quantitative analysis of research questions 1–4. The following section presents the results from the qualitative analysis of research question 5, which looked at the actual words employers used in discussing what they are looking for in entry-level applicants: what education, certification, and experience signal to them, and what their attitudes towards education, certification, and training are for employees after hiring.

### Qualitative Results

Since the cost of transcribing all 202 interviews was prohibitive, 90 interviews (15 automotive and 15 IT from each city) were randomly selected for transcription. Interviews were transcribed verbatim and each transcript then imported into the NVivo™ program. After using the program to sort and manage the data (but not for identifying themes), each interview transcript was read, analyzed for common themes, and coded by the investigators.

Rather than analyze the responses to each question, the answers to three metalevel issues were explored in the transcripts. The benefit of this approach is that a respondent may add valuable insights on a particular issue in answers to a number of different questions. By examining the entire interview transcript, a deeper understanding can be gained of a respondent's attitude towards the signaling power of occupational certification. Consequently, the analysis was conducted and results organized around the three questions:

1. What is looked for in an entry-level employee resume?
2. What do education, certification, and experience signal?
3. What education, certification, and training are required after a person is hired?

The responses to these three questions were divided into categories, which were, in turn, subdivided into several themes. This section presents the categories and themes that developed.

#### **Question 1: What is looked for in an entry-level employee resume?**

All interviews were read through several times in order to identify references to qualifications that are sought in an entry-level employee. Four main types of responses emerged from the data and were categorized and labeled. The four categories were:

Category 1: Formal/traditional educational qualifications

Category 2: Occupational certification

Category 3: Previous work experience within the industry

Category 4: Personal qualities and other factors

*Category 1: Formal/traditional educational qualifications.* In each of the 90 interviews considered, managers made at least one specific reference to formal educational qualifications as playing a role in their ranking decisions. Within the context of this study, the “formal/traditional

education qualification” referred to was the 2-year community/technical college associate degree in either auto service technology or IT.

Attitudes about the 2-year degree represented the largest theme (in terms of the number of managers making comments and number of statements made). The number of statements made was a frequency count of the number of comments made reflective on an identified theme. Respondents often made multiple statements on the same theme at different parts of the interview. The attitudes could be classified into one of three themes: those who view the formal educational qualification as important and want to see evidence of it on applicant resumes; those who do not value formal education qualifications; and those who appeared undecided or neutral towards resumes with the 2-year degree. These results appear to support the belief that employers hold mixed attitudes about the benefit of the 2-year degree.

Many respondents said that the most important characteristic in their top-ranked resumes was the presence of the associate degree and that the degree is their most important criteria for determining applicant suitability. For example, an Atlanta auto service manager responded to the question “What do you look for on a resume?” by stating: “The first thing I always and immediately look for is the degree.” An IT manager from Atlanta said: “If I was [sic] looking at two resumes and I was equally impressed with their work experience, then I would fall back to their education to rank one in front of the other. Education and then certification.”

The preference for educational qualification was tested directly by the question asking respondents to state whether an applicant with associate degree or an applicant with certification, but who was equal to the degreed candidate in every other quality, was the most suitable for hiring. A typical response was from an automotive manager from Minnesota:

*Respondent:* I would take the one with the 2-year degree.

*Interviewer:* Can I ask you why?

*Respondent:* Sure, because anybody can get their [sic] ASE certifications. It shows a lot more commitment to get the 2-year degree than it does to get the ASE certification.

A similar opinion was also expressed by an IT manager from Minnesota:

If everything else was [sic] equal, I would take the associate degree in IT. I would probably look at this first . . . just generally, it might indicate a broader background . . . I mean you can get an A+ really quick, but I know with the associate degree you have to be in school for 2 years.

A small number of respondents ( $n = 5$ ; 5.5%) said that they preferred those applicants who did not have an associate degree. For example, a Portland IT manager commented about those resumes presenting a degree:

. . . [these applicants'] educational background may be a little bit more highly educated than what we are looking for, as far as an entry-level position. I don't want the applicant to be . . . too highly qualified. In other words, a lot of the positions that we would have open would be entry-level positions. I don't want to hire somebody and we end up having to rehire somebody [else] after a short period. I want it to be a good fit for both for them and us.

This statement and similar comments made by two other IT managers seem to imply that more highly educated applicants, in terms of holding an associate degree, are perceived as being more likely to leave in a shorter period of time, compared to those with lower levels of education.

Almost one third ( $n = 29$ ) of the transcribed interviews contained statements that reflected neutral attitudes towards the degree, in that the respondents didn't seem to care if it were present or not, but rather found other factors much more important. For example, one Atlanta respondent stated that: "Education was not the deciding factor there." Another manager, also from Atlanta, commented: "I don't so much look at the degrees . . . they have, I look more at the experience that they have to offer and their background with that experience." A manager in Portland suggested that as long as applicants have a high school diploma, he is satisfied with their education and will then use other criteria, especially work experience and attitude, to make a hiring decision.

*Category 2: Occupational certification.* "Occupational certification" was the second category to be tested. The pattern of responses found in this category was similar to that found in the comments on formal/traditional educational qualifications. The responses tended to reflect one of three attitudes: Respondents looked for certification (theme 1), preferred applicants without certification (theme 2), or didn't care one way or the other about certification (theme 3).

In more than half of the transcribed interviews, respondents indicated that they hope to see certification on the resumes of those applying for entry-level jobs. At different stages in the interview, 67 of the 90 (74%) managers in both fields commented that they were looking for certification when ranking resumes, and that this made applicants more suitable for employment. Several respondents explained that they had given certain resumes a low ranking because certification was absent. Others described the presence of certification as separating otherwise closely matched applicants. As an example, a Portland auto service manager said: "What differentiated rank number one and two was the fact that one had the ASE. That's the only difference." The preference for certification over the degree was voiced by an Atlanta auto service manager, although, he seemed almost apologetic about this preference, noting: "I hate to say this, but I'd probably take the ASE guy over the guy with the 2 years [associate degree]." Here is what an auto service manager from Minneapolis/St. Paul said when asked to decide between two imaginary equal candidates differing only in education:

I would lean towards the gentleman that has the ASE certification. He would be better than somebody who has the 2-year degree, I guess, because the entry-level with just ASE certification would to me indicate that, although he wants to learn,



he hasn't studied as high as the other applicant. Somebody who is a little more green than the 2-year degree. For an entry-level position it is better for me (to have) somebody that you can teach better. . . . A person without the 2-year degree would be more apt to listen to you and follow your ways. If we weren't talking about entry level, my answer would probably be different. But because it is entry level, the gentleman with ASE certification is the one that I would probably look harder at.

Another manager, this time from the IT industry in Portland, was asked how he would rank two resumes from applicants identical in every way except that the one applicant has a 2-year degree and no A+ certification, and the other applicant is A+ certified but does not hold the associate degree. Without pausing to reflect, the manager responded: "One has a 2-year degree, but he is not A+ . The other guy is A+, which means he has got a little more hands-on experience . . . So, the guy with A+ would have more value to me—initially."

An Atlanta IT manager described how he views an associate degree as compared to certification:

The degree and certifications? Certifications first, then the degree, because in many contracts that I get, they [clients] want to know right off the top, are you certified? Do you have a certification? Is your staff A+ certified? Do you have your IT certification? And different certifications, CNE (Certified Novell Engineer) certification, that kind of thing. So that's the first thing I'm looking at.

The potential influence or bias towards 2-year degree or certification sometimes was based on the respondent's own educational background, as was shown by a manager from an independent automotive repair business in Atlanta:

I, myself, was ASE-certified at one time. Actually, I aced it [the examination] back in 1997 or so, so I'm a firm believer. I love ASE certification; okay, so that's one of the reasons I wanted to come here is that, even though I probably don't hold my employees as accountable as I should be for that, because I really am a believer in it, and it's been good to me. Because with that certification, I've had insurance companies call me; some are very strict about who works on the cars that they're warranting. So that's where ASE has really helped me out.

Yet, the educational background of the manager is not always an indication of a preference for the associate degree or for certification. When asked to rank two identical candidates differing only in educational qualifications, an auto service manager from Minneapolis/St. Paul replied:

I just got my AA degree, so as much as I am partial to that, in this business I would go with ASE certification before I would with a college degree, because [with] ASE you have more hands-on. I don't discourage going to school, but when all is said and done, ASE is more important.

Only one respondent stated a preference for applicants without any certifications; and indeed, it is something he looks for. This Minneapolis/St. Paul IT manager appeared to be concerned that certified technicians could affect his workplace when he noted:

My concern is to not to get someone who is overqualified. [I want] somebody who can grow into it, so I would be a little leery about hiring someone with a lot of certifications or even any certifications. I think somebody with a lot of certifications may get bored too quickly and not [find] enough challenges.

An ambivalence towards certification emerged as the third theme in this category. Because an Atlanta auto service manager had not yet mentioned certifications in describing how he ranked the resumes, he was asked specifically about them. He replied:

I've had guys come through with certifications; they have a piece of paper. I ask them to do something and they look at me like I'm dumb because, basically, they've read a book, they've learned the answers, took the test, passed the test. As far as actually doing something, they've never really been in there; it's very minimal. I mean, certifications look good, sound good, but if they can't do something pretty basic, then I know it's just book knowledge, and again, that's the difference with the experience.

Another hiring manager from the IT industry in Portland noticed the resumes with the A+ certification, but wasn't really paying that much attention to certification when it came to making the final resume rankings.

*Category 3: Work experience.* The third category that emerged from the interview data was titled "Work experience." All transcribed interviews had respondents making at least one specific reference to looking for previous work experience in making hiring decisions for entry-level employees. Because of the number of references to work experience and the diversity of opinions on the importance of this factor in ranking resumes, the textual analysis was broken down to find related patterns of responses. A total of four major themes emerged.

The first subtheme indicated that managers were clearly looking for resumes that described applicants with a broad range of related work experiences obtained in previous positions. For example, an IT manager from Atlanta described the importance of diverse work experiences in selecting applicants by giving an example of the variety of computer operating systems on which technicians may be required to work. This manager stated:

I really try to look for some diversity because nowadays that's really what you need, especially in what I work with, as far as on-site techs. You never know what you're going to walk into. It could be DOS on one call, XP on the next call, and '98 on the third call. Sometimes you walk in and somebody has an Apple/Macintosh, so diversity really makes a difference.

Another Atlanta IT manager explained how he finally separated his top two resumes during the ranking exercise. In deciding between two fairly equal resumes, he said, he finally ranked the applicant who had worked in two previous positions over the applicant who had worked in just one. He explained how he reached his decision: “He’s [the applicant represented by the top-ranked resume] been at . . . two companies . . . Other than that, they’re pretty much both equal, but him having a bit more experience in different companies . . . You know, multiple experiences might hedge him or her over the others.” A Portland auto service manager described how he used previous work experience as a key determinant in making his ranking decisions by stating: “I am looking for having a really broad range of experience.”

The second subtheme related to experience was the amount (time) of experience (Subtheme b). Eighty-eight (88.8%) percent of respondents made specific mention of looking at the amount of experience. A manager from Portland, who was asked what he looked for in ranking the resumes, said: “What do I look for? Experience, of course. That was the first thing that I sorted by when going through the resumes. Years of experience.”

Yet, it was not always the amount of time in on-the-job experience that managers sought. An Atlanta IT manager described how the amount of previous work experience may pre-date formal entry into the workforce:

I look for experience, but experience isn’t necessarily job-related. To me, the kid who got the computer when he was 4 or 5 years old, [at] age 10 decided to dismantle it, and by age 15 is a computer whiz and goes on—all that’s experience in that they’re learning, whereas if you have somebody brand-new—yeah, you’ve been in school, whatever, but he didn’t touch the thing ’til he was 18, 19, 20 years old. Really you’re only talking a couple years of experience and though the schooling’s good and so forth, from starting as a kid playing with it, you’re building a bunch of experience. That’s really one thing I look for when I talk to somebody. So I’ll talk to most anybody, and that’s one of the main things I look for is the experience. And when I say experience, it’s not necessarily just job experience; it’s your whole life. You know, I’ll ask them when they got their first computer, what have you done with it, what have you learned on it?

Another subtheme to emerge was that managers look for industry experience related to the job being sought. In other words, managers looked for experience directly related to the responsibilities of the position they intend to fill. In both the auto service and IT samples, managers said they were looking for previous work experience that demonstrated that applicants had strong technical and diagnostic skills. By contrast, very few hiring managers said they were more interested in non-industry-related experience. Of the five managers who made comments in this area, a common sentiment was that respondents sought applicants with work experience in areas such as sales or general customer service positions, where human interaction skills had been developed; they would help the employee work on technical skills once hired. One IT manager noted that he liked to see skills that could have been learned working in the fast food service industry, as the customer focus and ability to work under pressure would translate well to his computer repair business.

The final theme to emerge in this category was avoiding overexperienced applicants. While only mentioned by 11 managers, the specific reference to overlyexperienced candidates appears to be a separate theme from those discussed above. Many of these comments about applicants being overqualified, in terms of amount or type of previous experience, seem to be driven by the perceived cost (wages) of employing such an applicant and how that new employee might fit in with incumbent employees. The overexperienced applicant was also seen to be more at risk of leaving the firm. An example of this concern was expressed by a Portland IT manager: “I don’t want to hire somebody and we end up having to rehire somebody after a short period. I want it to be a good fit for both them and us.” A similar reaction came from an IT manager in Minneapolis/St. Paul: “[Candidates] can also have too much experience and be too set in their ways. They can be with their [current] company too long. I would rather they worked a couple years here and couple years there.”

The resume presenting the applicant with the maximum amount of education and previous work experience (resume 12) was not always viewed favorably. Resume 12 in the IT sample showed an applicant with an associate degree, A+ certification, and almost 4 years of work experience. This prompted the following comment from an IT manager in Atlanta:

For an entry-level position, this applicant has a very full resume. They [sic] have an associate degree in information systems. They have certificates. They have a lot of work experience. This person is going to want to come in and make more money—not suitable for an entry-level position. They would be a short-timer.

In the autoservice sample, the same resume (12), reflecting an applicant with the 2-year degree, ASE certification, and almost 4 years of previous experience, received the following evaluation from a Minneapolis/St. Paul respondent:

This applicant worries me for a number of reasons. Has been out of high school for 4 years. His resume talks like he has upper-level technician ability. Young technicians go through different phases of their career. They get to a phase of “walls,” as we call it in our dealership, where they can’t learn any more. This guy’s there right now, in my mind. He’s talking about motors and transmissions and more technical stuff and not entry-level type work.

*Interviewer:* Can you tell me how suitable this applicant would be for an entry-level job in your firm?

*Respondent:* Um, he might think he’s too good for it.

*Interviewer:* Okay. Would you still consider this applicant?

*Respondent:* No, absolutely not.

*Category 4: Personal qualities and other factors.* The fourth and final category of themes related to what hiring managers seek was labeled “Personal qualities and other factors.” A total of 44 themes emerged from the data related to the desirable personal qualities and other factors that managers look for in applicants. The uniqueness of each respondent’s words within this broad category makes the joining of themes difficult, as the nuances required to understand a respondent’s intended meaning may be lost. The five strongest themes to emerge were: (1)

grooming and appearance; (2) social and communication skills; (3) willingness or desire to learn; (4) good attitude and personality; (5) career- and goal-oriented and motivated. Other frequently occurring comments addressed such factors as being conscientious, respectful, having integrity, and good work ethic.

### **Question 2: What do education, certification, and experience signal?**

Having established what managers were looking for in the resumes when screening for entry-level jobs, the analysis moved on to examine what the 2-year degree, certification, and work experience signal. Common themes relating to qualification signals were grouped into one of the three categories.

*Category 1: What does the 2-year degree signal?* A 2-year community/technical college degree appeared to signal in many different ways. At least 18 separate themes were identified and coded from the analysis of the transcribed interviews. The top five themes to emerge signal that the 2-year degree indicates an applicant is: motivated, has a good foundation of knowledge and theory, is well-rounded, has broad exposure to the field, and is able and willing to learn. The negative aspects signaled by the degree were also identified and grouped as a separate theme. The top five most frequently occurring positive signals are presented along with a brief summary of how the associate degree could signal in a negative fashion.

The theme containing the most comments that were similar demonstrated that the 2-year degree signals that an applicant is motivated. An auto service manager from Portland said:

They're more driven, I think, when they have their college degree, because they've paid for it themselves. Most of them don't get a scholarship, . . . They have to go out and get a loan, or whatever, to go to school. To do this, I think they're more driven and motivated and [know] what they want to get out of [their education] when they have to pay for it themselves. Like, high school kids don't . . . you know; they just go to school, get Cs and Ds, and whatever, as long as they pass that school; but once they get into college, they have to drive themselves. And, I think, that's probably the biggest thing. More drive, and better-quality person, when they go to school [for the 2-year degree].

Another respondent, also an automotive manager from Portland, commented:

The other thing that I'll look at is that if someone has made it through a college degree; I mean, they've actually shown some sort of commitment, that they can actually finish something. ASE tests, I mean, you go and spend a few hours there, you might be sharp and you can pass it, I mean; but what commitment have you had? Paid \$80 and \$100 and a couple of hours. You do have a base knowledge, but I'd much rather hire the guy with the associate degree—they are more motivated.

The second theme related to the signal sent by the 2-year degree is that degree holders possess a foundation of knowledge or theory relevant to the field. A typical illustration of this attitude was made by a Minneapolis/St. Paul IT manager:

The associate degree shows perseverance because some of these certifications, can be got quickly, especially some that last for a week or something. Two years would be better and, I am assuming, I haven't been to college in years, but I am assuming that hiring managers are going to be getting someone with a broader range of experience in terms of inventory control, accounting, and so on. An employee won't need to be an expert, but would at least understand the requirements and know the foundations.

The third theme reflected comments relating to the signaling ability of the 2-year degree in providing students with broad exposure to many ideas, leading to a more well-rounded applicant, compared to one with only certification. For example, an IT manager in Portland stated:

An associate degree is much more well-rounded, or an indication of a much more well-rounded education . . . I am trying to think of the proper word to use here. Well-rounded doesn't quite cut it. Let me start off with my own story here; I remember taking the A+ test. I sat down and took the test without studying it and got 95 percent. So, therefore, that is a limited scope of knowledge that it takes to pass that certification. Whereas, with an associate's degree, you have a much broader scope of knowledge.”

Another IT manager from Portland commented:

That is not to say that someone who has just certification is not promote-able, but it [the degree] tells me that person has a much rounder background.

An applicant who is committed to and recognizes the importance of continued learning was the fourth most frequently mentioned theme within the category of 2-year degree signals. An illustrative comment came from an IT manager in Minneapolis/St. Paul: “The person with 2 years of college, the associate degree, would be preferable. Usually when you are learning, you learn how to learn . . . ”

The degree was also frequently thought to signal an applicant's initiative. An Atlanta IT manager explained:

I'm looking at all the guys with the degrees first because it shows their initiative. It's showing their initiative, that they've gone a little bit further than just got out of (high) school or had a general diploma, so it also shows more of a degree of professionalism. That means that . . . they want themselves to look better, OK? They want that education. They want to show their intelligence. So that's the reason why I look for the associate's degree.

While the vast majority of comments reflected positive attributes associated with obtaining the 2-year degree, some respondents indicated that it also sends negative signals. For example, an Atlanta auto service manager commented: “Sometimes the associate degrees are rather easy to get . . . and you can kind of get by and pass the courses without knowing a lot of the material. I think that I’d put more credence on the test [certification].” An IT manager in Minneapolis/St. Paul said: “We get some of our people from 2-year schools and . . . you could toss everything out the window because . . . they think they know everything and they just don’t get anything done.”

A number of comments in this area also reflect the perception that an applicant with a 2-year degree potentially lacks hands-on experience. An Atlanta IT manager expressed his concern about applicants with degrees by stating:

The problem I’ve had is that the people that have paper education (2-year associate degrees) in this field, really, they get out there and they don’t have a clue. It is harder for me to train a college-educated tech . . . because they over-think stuff. I’ve got a bad taste for the degree, simply because I went through a degree [associate’s] and I think that sometimes . . . [they] go through it, but they’re not actually learning anything.

*Category 2: What does occupational certification signal?* All 90 of the transcribed interviews contained text related to the signal sent by certification. Strong responses were received on the signals sent by occupational certification. The textual analysis identified 12 separate themes. The most frequently occurring theme reflected a negative signal communicated by applicants with certification.

Most of the comments related to the perceived ease of passing the examination and the lack of real knowledge obtained in the field. An IT manager from Atlanta expressed a generally negative attitude towards certification:

It don’t [sic] mean a lot to me at all because I got A+ certification. I just read up on it and had the exams, so it’s not that much. I mean, my wife tried it and she’s not even a tech or anything. She just studied up on it and passed the exam. She don’t know the components, she don’t [sic] know how to do anything.”

An IT manager from Portland was concerned about the ease with which answers can be obtained off Web sites for certification examinations and the general issue of cheating:

Certifications have cheat pages out there where you can go and get the whole test. Braindoms, they call them. So, to me, that taints the whole certification . . . Anybody can go out to one of these braindoms and basically download the whole test . . . Certification indicates a desire at least to get a certification, and I know there are people like me; I wouldn’t cheat just because I like to pass it on my own. You know, it is for me that I am doing this and not the piece of paper, but so, to me, that sort of taints the whole certification . . . So, that would be a good reason why I put more [weight] on an associate’s degree than on the test.

Although a negative attitude toward certification was more strongly evident in the IT industry than the automotive, some respondents in the latter industry also expressed discomfort. An Atlanta auto service manager stated:

To me, the way things have gotten with certifications . . . anybody can go take a weekend class or a week-long class, pass the test, and get certification. Whereas, the 2-year degree shows a level of determination, a more rounded skill set. Most of the certifications that I'm aware of are very pin-pointed, quick, and don't really necessarily mean as much as, say, a more well-rounded 2-year degree.

Another auto service manager from Atlanta described the negative signal he receives from the ASE certification:

I've hired three technicians in the last 2 years who all have ASE certifications, and I wouldn't want them to put windshield washer solvent in my wife's car. The problem is that some training centers will teach to the test [ASE certifications]. And I've seen some ASE Master Technicians who have completed all eight requirements of ASE, and they're clueless. They look good. They have great resumes, but you get them out of the basics, like tune-ups, brakes, tire rotations—the obvious stuff—and you give them a tough electrical problem or a tough noise to follow through, or to pull the dash out, or try to diagnose why an eight-way driver's seat is not functioning in three of eight modes, and they are totally lost. They just give up. And then when you question them about it, it's "Well I'm an ASE Master. What are you doing questioning me?" So my personal feeling about ASE certifications is that it is more of an appeasement to the public, rather than showing what a technician really knows. The problem is that there are a lot of training aids out there that they can take that will train them for the tests.

The final example, also from an automotive service manager from an Atlanta dealership, expresses the belief that certification signals very little: "Some of the best technicians I know don't have one ASE certification, and honestly I know some ASE-certified Master Technicians who I wouldn't let change my oil."

The most frequently reported, positive comments related to the signals sent by certification tended to reflect a theme that applicants have basic level of knowledge. In other words, respondents suggested that seeing certification on a resume tells them that the applicant has a basic level of knowledge in the field. An example of this theme is captured in the following comment from a business development manager in a small IT firm from Atlanta:

If I'm looking for somebody to start immediately, the certification tells me that they know the industry standards . . . they would be more knowledgeable in a work environment to step in and hit the ground running, even though I think the advanced, the associate's, degree is important. I just think the reality is that you can depend more on the certification.



An IT manager from Portland went as far as to suggest that all computer-users would benefit from being A+ certified:

If a person passes A+ certification, even Comp TIA, it designates [that] the person has a basic understanding of computers. The A+ certification is a good, broad evaluation of the person's computer skills, and it's all at one time. So it's not like college where you can take a test and then take another test and then take a few more tests down the line. You've got to know all this information in a short period of time to pass an A+. In fact, I think everybody should be A+ certified before they get on a computer.

A very concise summary of what A+ signals was offered by another IT manager from Portland:

A+ is wonderful . . . A+ shows that you understand the basic functions [of] how hardware and software interact. You know at a basic elementary level and then, again, those are industry standards. A+ shows that at least you understand the basic computer functions.

Among the auto service managers, the following was recorded in an interview with a Minneapolis/St. Paul manager:

At least they've been tested and shown to have a basic knowledge of the systems that they're working on. The certification tells me that they understand the theory and operation, the basic stuff they need to know on those subsystems on the vehicle to work on it. The certifications really help us know that they do understand the basic operations.

The following comment, from a Portland auto service manager, was also in response to the question "What does certification tell you about an applicant?"

ASE tests are somewhat difficult, and you have to know what you are doing . . . It shows myself and my boss and the public that I have extremely competent technicians working for me. Shows me a higher degree of education and smarts. Put another way, it shows that I don't have dummies working for me.

The third-largest theme related to the signals sent by certification was the value it conveys to a firm's clients. This is an interesting concept, since this benefit is not directly to the certified individual, but rather to the employer's customers or clients. Of course, in turn, this drives sales, which makes certified applicants more attractive to firms in the hiring process. An illustration of this theme came from a manager of an Atlanta automotive dealership:

I'd probably [choose] the ASE guy over the guy with the 2-year [degree] . . . Your customers want to know are these people ASE-certified. That is a big thing out there in the public world. Are your techs ASE certified? However I look at it, my techs have to be ASE-certified really before they can start work for me as a technician. Because GM really wants that. They want to see that, [but] . . . it doesn't mean they can't come in and get ASE-certified . . . Customers want to know if this person working on their car is ASE-certified. The public has no idea what the ASE really means, other than it being like Triple-A [American Automobile Association]-rated.

The increased public demand for auto service technicians to have certifications brought an amusing response from another respondent from Atlanta:

*Interviewer:* What does having the applicant be ASE-certified mean to you?

*Respondent:* That he's committed to it. He recognizes, whether he learned it in school or whatever, he recognizes that that is something that people look for. I would say, probably, customers look for that more than the industry, itself. It's very important to customers. It's very important to upper management in my company, for example, because of the recognition. That's the biggest reason. The industry is promoted, and ASE has promoted itself so well that, I mean I have customers call us and say, you know, 'Do you have ASE master technicians?' before they'll bring their car.

*Interviewer:* Really?

*Respondent:* So, you just tell them, yes we do. It might not be that person working on your car, but 'Yes, there is a [ASE] master here.'

A Portland IT respondent explained how A+ and other certifications hold value:

Certifications in the industry do hold value. People see that and think this person has those skills and abilities. I don't think a lot of people in the industry are as critical of the certification process as I am.

*Interviewer:* By people in the field, do you mean the customers?

*Respondent:* The customers specifically. I have got a business card that has so many letters [on it], that most doctors would wish they had that many. Customers see that and they are impressed. And when hiring managers see that, they are impressed. I have actually had job offers based on my business card—well, interviews, at least, I should say.

A Minneapolis/St. Paul IT manager explained that he and his company value certification because: "Our company likes to hang its hat on having certified techs, but we are in a profession where certification is real important. You don't get clients and contracts and agreements unless you have certification." Another quote from an IT manager from Portland illustrates the economic value to the firm of certified employees. The respondent was the owner of a small consulting firm that specialized in the maintenance of computers. He was asked, "Why do you like the certified resumes over the 2-year-degree resumes?"

*Respondent:* Because I could sell him easier.

*Interviewer:* What do you mean by that?

*Respondent:* When a client calls, a prospective new client, and they have a large IT department and they need some people to come in and do some work, I could say, ‘Yes, I have six qualified people,’ instead of maybe just one and a handful of loaners. Yeah, you can sell them better. You can sell your product, which is the service of these guys, much easier to companies.

*Interviewer:* Why do you think that the companies care or recognize that one has the certification?

*Respondent:* That is actually a shame, because I have run across a lot more good, you know, smarter people who did not have the certificate. It is an insecurity fixation. They [companies] want something to say that people are certified . . . I don’t know why.

Perhaps the answer to this question can be found in the final quote—this one from an auto service manager from Minneapolis/St. Paul:

*Interviewer:* What does the certification signal to you, or tell you about an applicant?

*Respondent:* First of all, industry standard, you know; when you put what an industry standard is in front of a potential customer, they respect that ASE certification. And that’s probably one of the most critical things. Our customers.

*Category 3: What does work experience signal?* Work experience was seen as conveying information about the suitability of an applicant. Unlike the analysis of the signals sent by the 2-year degree and certification, only five themes emerged to describe the types of signals that previous work experience sends. In order of the frequency of comments, these themes were labeled: Committed to the field; Stable, stays with jobs awhile; Hands-on experience; Ready to go—knows the stuff; and Can do the job. No negative themes emerged.

Theme 1—work experience signaling commitment to the field—was expressed by many respondents. A fairly typical comment is that of an IT manager in Minneapolis/St. Paul. He noted the dates of previous work experience of a fictitious applicant and said that the fact that the applicant had started working in the computer industry before he had even graduated from high school revealed that he was interested in the field. A Portland IT manager, who was asked about the features that helped determine the top-ranked resume, responded:

[The applicant] is very focused on what it is that he wants to do, and he is actually doing it. He has actually sought good work experience. He is working in his field. Some of the work is actually before his college time, so he obviously got interested in the field from hands-on, then got some formal training, and is ready to continue that.

The second theme emerged as a separate collection of comments related to employee stability and staying with jobs for awhile. This type of comment seemed more prevalent among the IT managers, who tended to equate length of employment in a single firm as a measure of loyalty. Loyalty or commitment to the employing organizations was frequently raised as a key industry issue in IT due to the continued high turnover of many entry-level workers. The fear of turnover and subsequent recruitment costs was a constant worry for many IT managers. Respondents suggested that this fear could be at least partly allayed by examining the length of employment of applicants' previous work histories.

The final three themes in this category tended not to produce extensive supporting comments from respondents. The names of the final three themes in this category are a succinct reflection of the other main signals of work experience. The third theme, Hands-on experience, reflects hiring managers' assessment that work experience signals that the applicant can actually do the tasks associated with the job. The fourth category, Ready to go—knows the stuff, reflects the belief that applicants with work experience will not require extensive on-the-job training prior to being able to commence work. A related theme, and the last of the five to emerge in this category, Can do the job, indicates that part of the concern of an entry-level employee actually being able to do the work required is reduced with evidence of previous work experience.

### **Question 3: What education, certification, and training are required once employed?**

The purpose of this question was to explore whether employers would show a preference for certain kinds of additional training—education (2-year degrees), certification, or specific work experiences—for entry-level workers once they were hired.

*Category 1: Additional formal education.* This first category looked for references in the text that revealed a preference for current employees to seek the additional formal educational qualifications. Specific references to earning an associate's degree were sought. Respondents were asked whether they would encourage, and then pay for, currently employed workers without the 2-year degree to earn the credential. Slightly more than half the managers ( $n = 48$ ; 53%) made comments indicating they would encourage their employees to earn the 2-year degree. One auto service manager from Atlanta explained why:

I have encouraged people to do that [seek the 2-year degree]; the employees that I've had who wanted to go to school, I've helped them out financially with it . . . I mean, I don't go out and push them, and say, 'Hey, if you'll go to college, I'll pay for it.' If they approach me and say, 'Hey look, I want to go to night classes, you know, because 10 years from now I want to get into management.' . . . I like to hear that. That means, one, they want to stick with you, and two, they're thinking on down the road, and those are the type of people who tend to achieve more and are a more stable employee.

In contrast, 38 of the 90 (42%) of the managers said they would not encourage their employees to earn the 2-year degree. Most comments reflected the attitude that the degree would not enhance the ability of entry-level employees to do their work.

*Category 2: Occupational certification.* Encouraging employees to earn a certification produced stronger support, with 68 of 90 (75.5%) managers saying they would support such endeavors. Many added that they would also provide financial assistance to current employees for obtaining and maintaining certifications. In contrast, 21 of 90 (23.3%) managers said they would not encourage earning certification.

*Category 3: Training and development.* The type of training and development provided to newly hired, entry-level employees was mentioned by relatively few respondents. The two themes emerging from this category reflected the two main delivery mechanisms for training: on-the-job training and specific, external, vendor-provided training. On-the-job training was mentioned by 10 of 90 (11%) managers, whereas slightly more ( $n = 13$ ; 14.4%), noted that specific, external vendor training is provided.

### **Summary of Qualitative Analysis**

In summary, the textual analysis of 90 transcribed interviews provided deeper insight into the features of a resume that managers look for in applicants for entry-level jobs, what certain resume features signal, and attitudes towards education, certification, and training once employed. While a variety of responses were explored, the dominant themes that emerged highlight the importance of work experience, education, and certification in the screening of resumes. Furthermore, both the 2-year degree and certification appear to signal far more than the domains of knowledge that each type of credentials attests to codify. The issue of existing employees earning either the 2-year degree or certification once employed seemed to elicit statements of encouragement, at best, but few employers required earning these qualifications once an employee was hired. This seems to support the contention that education and certification play an important role in applicant recruitment, but that on-going career development after hire isn't viewed as a mechanism for improving firm productivity. These and other conclusions will be discussed further in the following section.



## DISCUSSION

This report provides data from a study investigating the signaling influence of occupational certification, as compared to the more traditional educational qualification of the 2-year college degree, in the hiring of entry-level employees. The study was situated within two selected industries important in the United States economy: the automotive (auto) service and the information technology (IT) industries. Both industries have well-established occupational certification programs, with many offered as stand-alone credentials or embedded in career and technical education programs in both secondary and postsecondary institutions. A quasi-experimental research design, employing a series of fictitious resumes, was used to examine the preference of hiring managers for entry-level applicants coming from the two different educational pathways (certification and 2-year community/technical college degree).

The data were collected from 202 managers, with 95 from the auto service industry and 107 from the IT industry. Data were collected from managers in roughly equal numbers from three United States cities selected for their regional diversity (Atlanta, GA; Portland, OR; and Minneapolis/St. Paul, MN). Respondents completed a self-administered, paper-and-pencil questionnaire, a resume sorting exercise, and finally participated in a one-on-one, semistructured interview. The resume ranking exercise presented respondents with 12 fictitious applicants who varied in terms of educational qualification (none, certification, or 2-year degree) and work experience (none, fewer than 2 years, and 2 to 4 years).

To determine the preference for certification or 2-year degree, the frequency with which each resume was ranked in first place was calculated. The results showed that managers from the auto service sample ranked the resume with both qualifications higher than the resume with either certification or the degree alone. By contrast, managers from the IT sample most frequently ranked the resume with degree and 2 years' work experience in first place, followed by the resume with certification and 2 years' work experience. In third place was the resume with both certification and degree and 2 years' work experience. The results suggest that previous work experience is a stronger signal for workplace readiness than educational qualifications.

To further examine the signaling power of the two qualifications under investigation, a comparison was undertaken of those resumes presenting equal levels of work experience, but differing in the credential held. In the IT sample, the comparison test produced a uniform preference for the 2-year degree, regardless of level of work experience. More mixed results were found among auto service managers in terms of their preference for the associate degree over ASE certification.

A logistic regression model was developed to explore whether preference for certification over a traditional 2-year degree was influenced by the background of managers participating in the study. More specifically, the potential influences of respondents' education level, attainment of certification, and firm size were examined by considering their preference for certification over degree, when work experience levels were equal. The results indicated that respondents with certification were not influenced in their preference for occupational certification over the 2-year degree. However, respondents' level of education and firm size were found to influence preference in some (but not all) experience level conditions.

Finally, an in-depth qualitative analysis of 90 randomly selected and transcribed interviews provided a deeper understanding of what managers seek in entry-level applicants, along with the signaling messages sent by education, certification, and varying levels of prior work experience. Respondents were candid in their explanations of the features they seek in applicants, with the formal education qualification receiving a higher number of comments than certification. Yet, the analysis of the text indicated that respondents held a diversity of attitudes towards the 2-year degree—many using this as a screening device. Others expressed a preference for applicants without degrees, and a large group was neutral or undecided as to the importance of this formal qualification. The desire to see occupational certification also produced a range of responses, with selected quotes revealing that many respondents hold strong positive or negative attitudes towards certification.

Comments on previous work experience provided strong support for the key role played by this attribute in screening job applicants. The number of themes identified in the category of personal qualities sought by hiring managers highlights the need for education providers to stress communication skills, good grooming and appearance, a desire to learn, motivation, and a pleasant personality, in addition to specific technical skills. The analysis of respondent quotes on the signaling qualities of 2-year degrees, certification, and work experience provided rich data to supplement the findings from the quantitative resume ranking and comparisons.

In conclusion, the results of this study on the signaling power of occupational certification seem to suggest that employers place great value on previous work experience that aligns with the needs of their firm. In most situations examined, both auto service and IT managers ranked the degree as more desirable in job applicants than certification. However, the certification was ranked higher than the degree in the auto service sample when applicants had fewer than 2 years of previous work experience. This latter finding should be interpreted within the limitations of the research method and in consideration of the certifications examined (ASE brakes, and suspension/steering for auto service, and CompTIA A+ for IT).

The results of this study have also revealed the varied messages signaled by certification and education. Clearly, the type of signal sent is of interest to students and their instructors, but perhaps, given the certifications under investigation, much additional communication, marketing, and public education needs to occur. It is important that managers have the information they need to make correct judgments on the value of occupational certification when screening applicants for entry-level positions.

Moss and Tilly (2001) demonstrated that employer's perceptions of the suitability of a job candidate is often colored by stereotypes and expectations. The findings from this study suggest that much further research is also needed to explore what drives managerial perceptions about different educational qualifications.

This seems especially relevant in the case of occupational certification, as many managers perceive that it only indicates that an applicant is a good test-taker. The providers of occupational certifications have invested considerable effort in recent years to move from credentials that indicate a pass on simple knowledge tests to more performance-based assessments that certifies the ability to apply knowledge consistently under real working conditions. Future research



should also examine the decision drivers for students as they consider the merits of certification or traditional credentials in maximizing the return on their educational investment. This line of inquiry grows more important as new entrants into the two industries move away from an either/or choice toward obtaining both qualifications. The question then becomes: At what stage should the various qualifications be earned?

Additional research is also needed to further understand the mechanisms of how education, previous work experience, and other applicant characteristics signal suitability for entry into the labor market to employers, as well as signaling subsequent suitability for promotion and opportunities for training and career development. This research need suggests an opportunity for certification providers and the CTE field to work together in developing educational programs and assessments that meet the needs of employers, as well as provide new workers with the required knowledge, skills, and abilities necessary for them to thrive in new, complex workplaces.

The certification issue is likely to remain of great interest to secondary and postsecondary education, in part because of the issues raised for delivery systems by these credentials. The increasing tacit acceptance of the standards movement, and the need for the workforce to possess the skills and knowledge demanded by today's economy, will continue to fuel credential refinement and expansion of certification into other industries and occupations.

Perhaps, too, the rise in certification reflects the increasing professionalization occurring in many occupations. Technology, global competition, and an increasingly knowledgeable consumer base are impacting many service occupations. Several industries have responded by expressing the need for individual employees and the industry as a whole to reflect higher standards of professionalism. Sabatini, Ginsburg, and Russell (2002) described professionalization in general terms as "the movement in any field toward some standards of educational preparation and competency" (p. 204). The role of certification is captured in Shanahan, Meehan, and Mogge's (1994) definition of professionalization as "the process of using education and certification to enhance the quality of performance of those within an occupational field" (p. iii). They state further that professionalization is a movement that seeks to:

- use education or training to improve the quality of practice
- standardize professional responses
- better define a collection of persons as representing a field of endeavor
- enhance communication within that field (Shanahan, Meehan, & Mogge, p. 1)

The findings of this research indicate that the auto service and IT industries clearly see professionalization as an integral part of attracting sufficient numbers of workers to address projected employee shortages. In addition, professionalization is also fostered as both fields experience massive and constant technological changes that create the need to codify and standardize operating procedures for jobs evolving from simple to complex.

The coming challenge may be to ensure that the letters representing professional certification don't become an alphabet soup that creates confusion among employers and customers (Stephenson, 2002). However, the two certifications examined in this study appear to be well-established, well-recognized, and trusted credentials. To maintain and strengthen this reputation will require a coordinated approach from a far larger group of stakeholders than have traditionally been involved with certification. The National Commission for Certifying Agencies (1996) noted:

A certification organization that conducts a certification program or programs that evaluate the competence of practitioners has a responsibility to individuals seeking and holding certification, employers of those individuals, agencies, and customers that pay for or require the services of the practitioners, and the public (p. xiii).

This responsibility seems well-understood by ASE and CompTIA, organizations that perhaps can serve as a role model for other industries looking to occupational certification as an aspect of educational preparation for careers within the field.

This study has provided an initial examination of the signaling power of two certifications in occupations where choices in educational pathways now confront the students wishing to gain entry into the workforce. Its findings indicate that, rather than the choice between traditional educational qualifications or certification being an either/or issue, it may be a “both/and” situation. The findings suggest that employers seek the knowledge and skills that both types of credentials signal. The concern that occupational certification might create a “parallel postsecondary universe” outside the boundary of traditional higher education (Adelman, 2000, p. v), may have evolved into “converging universes,” where there are new models for professional certification and academic credentials (Evans, Saflund, & Wijenaik, 2002).

To remain competitive in the face of increased pressures, employers are demanding more of the institutions providing their human capital (Robinson & Manacorda). Comments from the interview portion of this study demonstrate that respondents believe that educational institutions bear the brunt of this challenge, but the family and community also play a role in ensuring that new entrants to the workforce possess all the desired attributes sought by employers. These appear to include technical, social, emotional, and intellectual skills that experience and education provide.

Rather than narrowing the education curricula to address specific knowledge standards, it may be that education policy makers need to broaden programs, ensuring a range of workplace learning experiences (i.e., cooperative learning, internships, service learning) while still offering a broad base of academic learning and technical skills. Certainly, promoting the concept of the “life-long learner” (Guile, 2003) is an additional requirement, given the magnitude of changes likely to be experienced in the auto service and IT industries.

The certification phenomenon is unlikely to diminish in future years. Indeed, scholars in the certification, credentialing, and licensure testing areas predict that certification will expand. They see the need and use of more rigorous strategies to identify the content domain to be assessed, a continued move to [uncompromised] computerized delivery systems for testing, and increased evaluation of the psychometric quality of certification examinations (Jaeger, 2002). The current study has shown that occupational certification and the traditional 2-year college degree are major components of the screening criteria used by hiring managers, and that both credentials send strong signals about workforce readiness. Additional research is needed to ensure students can make informed choices about differing educational qualifications, and that United States organizations have timely access to applicants equipped with the knowledge, skills, and abilities to excel in the workplace.



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## **APPENDIX A**

### **List of ASE Certificates**

#### **Auto/Light Truck Series**

- A1 Engine Repair
- A2 Automatic Transmission/Transaxle
- A3 Manual Drive Train and Axles
- A4 Suspension and Steering
- A5 Brakes
- A6 Electrical/Electronics Systems
- A7 Heating and Air Conditioning
- A8 Engine Performance

#### **Alternate Fuels Series**

- F1 Light Vehicles—Compressed Natural Gas

#### **Medium/Heavy Truck Series**

- T1 Gasoline Engines
- T2 Diesel Engines
- T3 Drive Train
- T4 Brakes
- T5 Suspension and Steering
- T6 Electrical/Electronic Systems
- T7 Heating, Ventilation, and A/C
- T8 Preventive Maintenance Inspection

#### **Parts Specialist Series**

- P1 Medium/Heavy Truck Dealership Parts Specialist
- P2 Automobile Parts Specialist
- P3 Medium/Heavy Truck Aftermarket Brake Parts Specialist
- P4 General Motors Parts Consultant
- P9 Medium/Heavy Truck Aftermarket Suspension And Steering Parts Specialist

#### **Advanced Series**

- L1 Automobile Advanced Engine Performance Specialist
- L2 Truck Advanced Electric Diesel Engine Diagnosis

**Collision Repair and Refinish Series**

- B2 Painting and Refinishing
- B3 Non-Structural Analysis and Damage Repair
- B4 Structural Analysis and Damage Repair
- B5 Mechanical and Electrical Components
- B6 Damage Analysis and Estimating

**School Bus Series**

- S1 Body Systems and Special Equipment
- S2 Diesel Engines
- S3 Drive Train
- S4 Brakes
- S5 Suspension and Steering
- S6 Electrical/Electronic Systems
- S7 Air Conditioning Systems and Controls

**Engine Machinist Series**

- M1 Cylinder Head Specialist (Gas or Diesel)
- M2 Cylinder Block Specialist (Gas or Diesel)
- M3 Assembly Specialist (Gas or Diesel)

**Truck Equipment Series**

- E1 Installation and Repair Specialist
- E2 Electrical/Electronic Systems
- E3 Auxiliary Power Systems

**Specialty Test Series**

- X1 Exhaust Systems

## APPENDIX B

### AUTOMOTIVE SERVICE INDUSTRY RESUMES

#### Auto Resume 1

---

##### Objective

Seeking entry-level position where I can enhance my automotive skills.

##### Education

*Sheboygan North School, Sheboygan, WI ('02)*

- High School Diploma
- 1 year of Auto Classes
- Summer internship with *Jerry's Car Shop, McFarland, WI ('01)*

##### Certification

- ASE Certified ('03)  
(Brakes, Suspension, & Steering)

##### Work Experience

*Jim's Car Shop, McFarland, WI (05/02–present)*

- Tune ups, brake and exhaust work
- Diagnose and recondition hydraulic systems
- Shock and strut replacement
- Repair faulty parts including wheel bearings, shock absorbers, and steering mechanisms

## Auto Resume 2

---

### Objective

To apply and build on my automotive knowledge, skills, and abilities in the automotive services field.

### Education

*Milwaukee Technical College, WI ('03)*

- Associate of Applied Science (AAS) in Auto Service Technology

*Lake Park East High School, Lake Park, WI ('01)*

- High School Diploma
- 1 year of Auto Classes
- Summer internship with *Fast-Lube*, WI ('00)

### Work Experience

*Federal Express, Kenosha, WI (07/02–present)*

- Perform oil changes in a fast-paced environment
- Check engine fluids and add necessary amounts
- Check tire pressure and tire safety
- Report visual problems
- Complete daily maintenance logs in computer on all vehicles serviced



## Auto Resume 3

---

### Objective

Seeking a position in the automotive area where I can use my experience and acquire more skills.

### Education

*Roosevelt High School, Milwaukee, WI ('02)*

- High School Diploma
- 1 year of Auto Classes
- Summer internship at *Quick Lube*, Milwaukee ('01)

### Work Experience

*Tony's Car Shop, Roseville, WI (03/02–present)*

- Perform oil changes
- Check engine fluids
- Check tire pressure and tire safety
- Tune-ups, brake, and exhaust work
- Shock and strut replacement

## Auto Resume 4

---

### Objective

An opportunity to advance my career in the automotive services industry.

### Education

*Blackhawk Technical College, Janesville, WI ('00)*

- Associate of Applied Science (AAS) in Auto Service Technology

*Springfield Central High School, Springfield, WI ('98)*

- High School Diploma
- 1 year of Auto Classes
- Summer internship at *Texon Auto Shop, Springfield, WI ('97)*

### Certification

- ASE Certified ('03)  
(Brakes, Suspension, & Steering)

### Work Experience

*Galaxy Auto Repair, Milwaukee, WI (07/00–present)*

- Analyze and diagnose mechanical problems and malfunctions on all types of engines, transmissions, final drives, track systems, differentials, and planetary systems
- Rebuild and replace major assemblies and components such as diesel engines, automatic and standard transmissions, air and hydraulic brake systems
- Perform electrical work, including the repair and rebuilding of electronic brake systems, alternators, starters, air conditioning systems, and wiring harnesses

## Auto Resume 5

---

### Objective

To use and build my automotive technician skills in a full-service automotive shop.

### Education

*Green Bay High School*, Green Bay, WI ('99)

- High School Diploma
- 1 year of Auto Classes
- Summer internship, *Al's Repair Shop*, Green Bay, WI ('98)

### Certification

- ASE Certified ('02)  
(Brakes, Suspension, & Steering)

### Work Experience

*Al's Repair Shop*, Green Bay, WI (03/00–present)

- Perform diagnosis and repair of starting and charging systems, electrical wiring systems, gauges and warning systems, and accessory systems
- Diagnose and repair ventilation
- Ensure proper care in the use and maintenance of equipment and supplies
- Promote continuous improvement of workplace safety and environmental practices

## Auto Resume 6

---

### Objective

To gain entry-level employment in the automotive industry.

### Education

*Lafollette High School*, Madison, WI ('01)

- High School Diploma
- 1 year of Auto Classes
- Summer internship at *Adam's Auto Service*, McFarland, WI ('00)

### Work Experience

*ComPath*, Garland, WI (01/02–present)

Inventory Control Clerk

- Ship materials to production lines for manufacture
- Receive incoming supplies and document existing inventory
- Perform data entry and confirm shipments
- Fulfill current and back orders

## Auto Resume 7

---

### Objective

To obtain an entry-level position where I can enhance my automotive skills.

### Education

*Green Bay High School, Green Bay, WI ('00)*

- High School Diploma
- 1 year of Auto Classes
- Summer internship with *Bob's Car Shop, Green Bay, WI ('99)*
- 1 year after-school job at *Bob's Car Shop*

### Certification

- ASE Certified ('01)  
(Brakes, Suspension, & Steering)

### Work Experience

*Rob's Sprinkler Store, Green Bay, WI (06/01–present)*

- Install sprinkler systems
- Maintain older systems
- Receive incoming supplies and maintain inventory

## Auto Resume 8

---

### Objective

Seeking a position in the automotive service area where I can use my experience and acquire more skills.

### Education

*Fox Valley Technical College, WI ('03)*

- Associate of Applied Science (AAS) in Auto Service Technology

*Roosevelt High School, Milwaukee, WI ('00)*

- High School Diploma
- 1 year of Auto Classes
- Summer internship at *Quick Lube, Milwaukee ('99)*

### Work Experience

*Home Depot, Milwaukee, WI (05/00–09/01)*

- Assisted with implementation of drive-thru procedures
- Documented incoming products and outgoing shipments
- Maintained sufficient supplies for monthly pre-boxing (i.e., boxes, shrink wrap)
- Involved in customer service

## Auto Resume 9

---

### Objective

To apply my knowledge and experience to advance my career in the automotive services industry.

### Education

*Moraine Park Technical College, WI ('00)*

- Associate of Applied Science (AAS) in Auto Service Technology

*Lake Park East High School, Lake Park, WI ('98)*

- High School Diploma
- 1 year of Auto Classes
- Summer internship, *Advanced Car Shop, WI ('97)*

### Work Experience

*Quick-Lube, Milwaukee, WI (03/00–present)*

- Remove and install transmissions
- Perform diagnosis of suspension, steering, power assist, and alignment systems
- Perform all phases of maintenance required for fleet vehicles operation
- Perform complex main engine, engine ignition, fuel system, and engine emission control system diagnosis and repair

## Auto Resume 10

---

### Objective

Seeking a position in the automotive area where I can use my experience and acquire more skills.

### Education

*Stevens Point High School*, Stevens Point, WI ('00)

- High School Diploma
- 1 year of Auto Classes
- Summer internship at *Quality Midwest Auto*, Stevens Point, WI ('99)

### Work Experience

*Jim's Repair Shop*, Milwaukee, WI (09/00–present)

- Perform equipment inspections, adjustments, and certifications
- Maintain records of time and materials
- Perform routine safety and preventative maintenance inspections of motorized vehicles and equipment
- Service, clean, and lubricate vehicles and equipment
- Repair tires and tubes; balance wheels; change spark plugs; adjust headlights; service automatic transmissions; and adjust hydraulic and air brakes



## Auto Resume 11

---

### Objective

To apply my automotive knowledge and troubleshooting abilities in the automotive services field.

### Education

*Milwaukee Area Technical College, WI ('02)*

- Associate of Applied Science (AAS) in Auto Service Technology

*Lake Park East High School, Lake Park, WI ('99)*

- High School Diploma
- 1 year of Auto Classes
- Summer internship with *Fast-Lube*, Lake Park, WI ('99)

### Certification

- ASE Certified ('02)  
(Brakes, Suspension, & Steering)

### Work Experience

*Federal Express, Kenosha, WI (05/02–present)*

- Perform oil changes in a fast-paced environment
- Check engine fluids and added necessary amounts
- Check tire pressure and tire safety
- Report visual problems

## Auto Resume 12

---

### Objective

To apply my automotive knowledge and troubleshooting abilities in the automotive services field.

### Education

*Madison Area Technical College, WI ('03)*

- Associate of Applied Science (AAS) in Auto Service Technology

*Madison High School, Madison, WI ('99)*

- High School Diploma
- 1 year of Auto Classes
- Summer internship with *Best Auto Repair*, Madison, WI ('98)
- 1 year after-school job at *Best Auto Repair*

### Certification

- ASE Certified ('03)  
(Brakes, Suspension, & Steering)

### Work Experience

*MicroAge Infosystems, Madison, WI (09/99–09/01)*

Moves Specialist

- Break down computer workstations and prepare for moving
- Install computers at new location, set up printers and scanners to client needs

## APPENDIX C

### IT INDUSTRY RESUMES

#### IT Resume 1

---

##### Objective

To apply my technology knowledge and troubleshooting abilities in the information technology field.

##### Education

*Sheboygan North High School*, Sheboygan, WI ('02)

- High School Diploma

##### Certification

*TechData Training Center*, WI ('02)

- CompTIA A+ Certified

##### Work Experience

*Wegner Technologies*, Mequon, WI (08/02–present)

##### Technician

- Troubleshoot hardware, software, and network problems
- Maintain accurate inventory and repair records
- Experience with Macintosh networking, including Open Transport, TCP/IP, and Appletalk

## IT Resume 2

---

### Objective

To apply and build on my technical knowledge and troubleshooting abilities in the information technology field.

### Education

*Milwaukee Area Technical College, WI ('00)*

- Associate Degree in Information Systems

### Certification

*Sleimens Training Institute, WI ('02)*

- CompTIA A+ Certified

### Work Experience

*Supersolutions Corp., Kenosha, WI (01/02–present)*

#### Computer Technician

- Install, configure, and upgrade operating systems and software
- Troubleshoot problems with computer systems
- Assist with the planning, design, research, and acquisition of new or upgraded hardware and software systems

## IT Resume 3

---

### Objective

Seeking a position in the technical support area where I can use my experience and acquire more skills.

### Education

*Milwaukee Lutheran High School, WI ('02)*

- High School Diploma

### Work Experience

*Milwaukee Independent School District, WI (07/02–present)*

#### PC Technician

- Novell Network System installation and maintenance
- PC hardware and software configuration and management
- Microsoft Word, Excel, and DAC Access database
- Supervise and train subordinates in all software applications
- Troubleshoot end-user problems

## IT Resume 4

---

### Objective

An opportunity to advance my career in computer systems support and networking.

### Education

*Western Wisconsin Technical College, La Crosse, WI ('01)*

- Associate Degree in Computer Information Systems—Microcomputer Specialist

### Certification

*ITT Technical Institute, Greenfield, WI ('02)*

- CompTIA A+ Certified

### Work Experience

*Compuware, Greenfield, WI (03/01–present)*

#### Lab Technician

- Maintain, troubleshoot, and replace hardware
- Provide technical support to staff, faculty, and students
- Rebuild computer labs every term
- Install and configure latest software programs

*MicroAge Infosystems, La Crosse, WI (06/99–09/00)*

#### Moves Specialist

- Break down computer workstations and prepare for moving
- Install computers at new location, set up printers and scanners to client needs

## IT Resume 5

---

### Objective

Position as Computer Support Specialist in order to gain expertise in design/installation, diagnosis/troubleshooting, maintenance/back-up, customer service and supervision.

### Education

*Fox Valley High School, WI ('00)*

- High School Diploma

### Certification

*Skyline Computer Training Center, WI ('01)*

- CompTIA A+ Certified

### Work Experience

*Howard Reichbach Enterprises, Appleton, WI (06/00–present)*

#### Computer Support

- Diagnosis/Troubleshooting
  - Handle troubleshooting for peripheral components including printers, monitors, and scanners
  - Remedy operating system software problems via telephone or on location
  - Identify and restore network connectivity problems
  - Receive repeat business and frequent compliments for providing effective technical support
- Maintenance/Back-up
  - Maintain local network connectivity by utilizing performance and diagnostic tools
  - Perform scheduled backups of data

## IT Resume 6

---

### Objective

To apply my technology knowledge and troubleshooting abilities in information technology field.

### Education

*Lafollette High School*, McFarland, WI ('02)

- High School Diploma

### Work Experience

*ComPath*, Garland, WI (04/02–present)

Inventory Control Clerk

- Ship materials to production lines for manufacture
- Receive incoming supplies and document existing inventory
- Perform data entry and confirm shipments
- Fulfill current and back orders



## IT Resume 7

---

### Objective

Seeking entry-level position where I can enhance my computer skills while utilizing my health care knowledge.

### Education

*Memorial High School*, McFarland, WI ('99)

- High School Diploma

### Certification

*Madison Area Technical College*, Madison, WI

- CompTIA A+ Certified ('03)

### Work Experience

*Dane County EMS*, Madison (01/01–present)

- Emergency Medical Care Attendant (Class “F” license)

*Middleton Area Ambulance* (07/99–12/00)

- Emergency Medical Care Attendant (Class “F” license)

## IT Resume 8

---

### Objective

To obtain a position utilizing skills in installation, troubleshooting, and maintenance, while requiring both leadership and team member qualities.

### Education

*Fox Valley Technical College, Appleton, WI ('03)*

- Associate Degree in Specialized Technology  
Major: Electronic Engineering Technology  
Minor: Applied Mathematics

### Work Experience

*Lucent Technologies, Milwaukee, WI (01/00–09/01)*

Worked in the installation department

- Installed phone equipment, cabling, fiber optic cable, power cable, cable racks, and superstructure
- Ran tests on equipment

## IT Resume 9

---

### Objective

To obtain a position as a Network/Systems Administrator/Technical Support Analyst where I can use my technical and organizational skills in a team environment.

### Education

*Moraine Park Technical College, WI ('00)*

- Associate of Applied Science Degree—P.C. Support Specialist

### Work Experience

*Protech Computer Corporation, Green Bay, WI (07/00–present)*

#### Technical Support Analyst

- Analyze, troubleshoot, and solve problems with Windows 2000 and NT operating systems, and Internet Access, TCP/IP, Network Printers, and Remote Access Service
- Member of five-person team supporting 500-plus end-users, not only giving accurate information to their technical questions and concerns, but constantly focused on teaching them how to utilize their software more efficiently

## IT Resume 10

---

### Objective

To apply my technology knowledge and troubleshooting abilities in the information technology field.

### Education

*Stevens Point Area Senior High School*, Stevens Point, WI ('00)

- High School Diploma

### Work Experience

*Tech Associates, Inc.*, Madison, WI (04/00–present)

#### Technical Support Analyst

- Maintain and upgrade existing computers
- Maintain and troubleshoot problems within the LAN
- Install and configure software as needed for instructional classes

## IT Resume 11

---

### Objective

An opportunity to advance my career in computer systems support and networking.

### Education

*Milwaukee Area Technical College, WI ('02)*

- Associate Degree in Information Systems

### Certification

*Sleimens Training Institute, WI ('03)*

- CompTIA A+ Certified

### Work Experience

*Kenosha Independent School District, WI (05/02–present)*

#### PC Technician

- Configure, install, and maintain personal computer equipment
- Analyze and provide solutions for a wide range of IT-related problems
- Assist in troubleshooting server and/or network issues
- Work with IT network engineering staff, maintain tape backup of servers

## IT Resume 12

---

### Objective

To obtain a position utilizing skills in installation, troubleshooting, and maintenance, while requiring both leadership and team member qualities.

### Education

*Fox Valley Technical College, Appleton, WI ('03)*

- Associate Degree in Specialized Technology
- Major: Electronic Engineering Technology  
Minor: Applied Mathematics

### Certification

*New Horizon Computer Learning Center, Milwaukee, WI ('03)*

- CompTIA A+ Certified

### Work Experience

*Electronic & Communication Systems, Milwaukee, WI (05/00–08/01)*

- Installed and Serviced: Fire alarms, nurse call, sound equipment telephones, intercoms, and security systems

## APPENDIX D

### RECRUITMENT SCRIPT FOR AUTOMOTIVE SERVICE MANAGERS

Hello,

**(1)** This is (name) calling from [.....]. I've been contracted by the University of Minnesota to help recruit hiring managers from the automotive industry for participation in a study. Could I speak with the person responsible for hiring entry level automotive service employees?

[Yes - that is me] - Go to (3)

[No - that is not me you need to speak with .....] - Go to (2)

**(2)** Hello, this is (name) calling from [.....]. I've been contracted by the University of Minnesota to help recruit hiring managers from the automotive industry for participation in a study. They need a small number of people from [.....] who as part of their job recruit entry level automotive service employees. Is this something that you do?

[Yes] Go to (3)

[No] Is there someone else in this company who is responsible for hiring entry level automotive service employees that I could speak with?

[Yes] Go to (2)

[No] So, just to understand, there is no one at this firm who hires entry level auto service employees – is that correct? [If correct]. Can I ask who does the recruiting and hiring of entry level auto service employees for you? Could you give me the name and contact details of the person or the firm that does your hiring of entry level auto employees.

Thank you for your time. (Mark on sampling frame that no one at this firm hires entry level)

Note: Only call this if it is an auto firm (e.g., the regional office of a chain of auto dealers) and not if it is a general recruitment or employment services firm.

**(3)** This is my reason for calling as I am inviting a small number of managers from the Twin Cities to participate in this study.

Let me very briefly tell you about the study. The study has been commissioned by the U.S. Department of Education and it aims to understand what qualifications hiring managers look for in entry-level positions. The results of this study are important for both vocational and technical education as well as the automotive industry. Only a limited number of people have been

selected for this study. We hope that you will be able to participate because you represent many other people, and your opinions, experience, and insights will provide valuable data to the research team.

The study will require only 45-60 minutes of your time. The process will involve filling out a simple survey and then participating in an interview with a member of the research team from the University of Minnesota. They want to find out what you look for in terms of education and experience if you were to hire an entry level auto service employee. You will receive \$100 for your time and a certificate recognizing your participation. The interview will be held at [ ] during the week of [ ].

Would you be willing to participate in this important study?

Do you have questions that I could answer at this time?

[No]. Thank you for your time

[Yes]. Provide information about location, time and other details. I will also send you a letter to confirm the details of your participation.



## APPENDIX E

### RECRUITMENT SCRIPT FOR IT MANAGERS

Hello,

**(1)** This is (name) calling from [.....]. I've been contracted by the University of Minnesota to help recruit hiring managers from the IT industry for participation in a study. Could I speak with the person responsible for hiring entry level IT service employees?

[Yes - that is me] - Go to (3)

[No - that is not me you need to speak with .....] - Go to (2)

**(2)** Hello, this is (name) calling from [.....]. I've been contracted by the University of Minnesota to help recruit hiring managers from the IT industry for participation in a study. They need a small number of people from [.....] who as part of their job recruit entry level IT service employees. Is this something that you do?

[Yes] Go to (3)

[No] Is there someone else in this company who is responsible for hiring entry level IT service employees that I could speak with?

[Yes] Go to (2)

[No] So, just to understand, there is no one at this firm who hires entry level IT service employees—is that correct? [If correct]. Can I ask who does the recruiting and hiring of entry level IT service employees for you? Could you give me the name and contact details of the person or the firm that does your hiring of entry level auto employees.

Thank you for your time. (Mark on sampling frame that no one at this firm hires entry level)

Note: Only call this if it is an IT firm (e.g., the regional office of a chain of IT dealers) and not if it is a general recruitment or employment services firm.

**(3)** This is my reason for calling as I am inviting a small number of managers from the Twin Cities to participate in this study.

Let me very briefly tell you about the study. The study has been commissioned by the U.S. Department of Education and it aims to understand what qualifications hiring managers look for in entry-level positions. The results of this study are important for both vocational and technical education as well as the IT industry. Only a limited number of people have been selected for this

study. We hope that you will be able to participate because you represent many other people, and your opinions, experience, and insights will provide valuable data to the research team.

The study will require only 45-60 minutes of your time. The process will involve filling out a simple survey and then participating in an interview with a member of the research team from the University of Minnesota. They want to find out what you look for in terms of education and experience if you were to hire an entry level auto service employee. You will receive \$100 for your time and a certificate recognizing your participation. The interview will be held at [ ] during the week of [ ].

Would you be willing to participate in this important study?

Do you have questions that I could answer at this time?

[No]. Thank you for your time

[Yes]. Provide information about location, time and other details. I will also send you a letter to confirm the details of your participation.

## **APPENDIX F**

### **CONSENT FORM**

You have been invited to be in a research study of how different educational credentials influence hiring decisions. You were selected as a possible participant through a random selection of business listings. We ask that you read this form and ask any questions you may have before agreeing to be in the study.

This study is being conducted by Dr. Ken Bartlett of the College of Education and Human Development at the University of Minnesota. This research is sponsored by the U.S. Department of Education through the National Research Center for Career Technical Education.

#### **Procedures:**

You will be asked to complete a short survey that includes general questions about your business and your opinion of what firms should look for when hiring. Following this you will be asked to sort and rank 12 fake resumes typical of applicants for entry level jobs in your field. Then an interviewer will ask questions about how you sorted these resumes and what helps you make decisions of who to hire. This interview part of today will be tape-recorded.

#### **Risks and Benefits of Being in the Study:**

The risks associated with participating in this study are minimal if not non-existent. The information provided will be kept strictly confidential and will be used only in aggregate summaries. Audiotapes will be transcribed, and both the transcription and audiotape of the interview will be kept in a locked file drawer until they are destroyed at the end of the study. No one other than the investigating researchers will be permitted access to the individual responses. It will be impossible to identify an individual or organization from the information you provide. Please note that you are free to discontinue participation in the study at any time.

#### **Confidentiality:**

The records of this study will be kept private. In any published report from this study no information will be provided so an individual person could be identified or their firm of employment. If you are uncomfortable with the audio taping of the interview, you can request to have the audiotape turned off at any time. The audiotapes used in this research will be erased after data analysis, no later than 6/30/04. Your decision whether or not to participate will not affect your current or future relations with the University of Minnesota or the U.S. Department of Education. If you decide to participate, you are free to withdraw at any time without affecting those relationships. If you choose to withdraw at any time before the conclusion of the interview no monetary rewards will be given.

**Contacts and Questions:**

The researcher conducting this study is Dr. Kenneth Bartlett. You may ask any questions you have now. If you have questions later, you may contact him at the University of Minnesota: (612) 624-4935. If you have any questions or concerns regarding the study and would like to talk to someone other than the researcher(s), contact Research Subjects' Advocate line, D528 Mayo, 420 Delaware Street S.E., Minneapolis, Minnesota 55455; telephone (612) 625-1650.

You will be given a copy of this form to keep for your records.

---

**Statement of Consent:**

I have read the above information. I have asked questions and have received answers. I consent to participate in the study.

Signature \_\_\_\_\_ Date \_\_\_\_\_

Signature of Investigator \_\_\_\_\_ Date \_\_\_\_\_

**APPENDIX G1**

**AUTOMOTIVE SERVICE INDUSTRY CERTIFICATION SURVEY**

What is your title? \_\_\_\_\_

How long have you been at your current position? \_\_\_\_\_ years

What is your highest level of formal education? Check one.

- Some high school     
  Some tech/2-year college     
  Some 4-year college     
  Graduate degree  
 High school diploma     
  Tech/2-year college degree     
  4-year college degree     
  Other \_\_\_\_\_

Do you have current ASE Certification? Check one.       Yes       No

If so, which certification(s) do you currently have? Please list. \_\_\_\_\_  
 \_\_\_\_\_

How long have you been employed in the auto industry? \_\_\_\_\_ years

In total, how many years have you hired automotive employees? \_\_\_\_\_ years

How many people does your company currently employ on a full-time basis? \_\_\_\_\_ employees

What are the **THREE most common** entry-level automotive job titles that you are in charge of filling? Please list.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

Where are you currently employed? Check one

- Dealership     
  Franchise     
  Independent shop     
  Other \_\_\_\_\_

To what extent do you agree or disagree with the following statements? Circle one.

	Strongly Disagree	Somewhat Disagree	Neither	Somewhat Agree	Strongly Agree
In general, our company finds it easy to hire for entry-level positions.	1	2	3	4	5
Increasing numbers of newly hired entry-level employees have ASE credentials	1	2	3	4	5

How many months or years of job experience is your company's **minimum** requirement? \_\_\_\_\_ months \_\_\_\_\_ years

How many months or years of job experience does your company **prefer** for entry-level new hires? \_\_\_\_\_ months \_\_\_\_\_ years

How likely are you to **check references** for applicants **WITHOUT** ASE certification (compared to those with ASE certification)? Check one       More likely       Less likely       Same for both

Thinking specifically about the organization you currently work for, how much do you agree or disagree with these statements about the benefits of ASE certification? Circle one.

	Strongly Disagree	Somewhat Disagree	Neither	Somewhat Agree	Strongly Agree
<b>Occupational certification (ASE).....</b>					
Makes it easier to identify applicant's knowledge, skills, abilities	1	2	3	4	5
Makes the recruitment process <u>easier</u>	1	2	3	4	5
Makes the recruitment process <u>cheaper</u>	1	2	3	4	5

Makes the recruitment process <u>more time efficient</u>	1	2	3	4	5
Reduces training costs for our firm	1	2	3	4	5
Reduces the time for a new employee to learn his/her job	1	2	3	4	5
Improves the ability to creatively solve automotive problems	1	2	3	4	5
Improves the theoretical understanding of automotive service	1	2	3	4	5
Improves the perception of the general public towards automotive service professionals	1	2	3	4	5
Fosters feelings teamwork among workers	1	2	3	4	5
Reduces the likelihood of turnover	1	2	3	4	5

Thinking specifically about employees **WITH** ASE certification (compared to those **without** ASE certification), how much do you agree or disagree with these statements? Circle one.

	Strongly Disagree	Somewhat Disagree	Neither	Somewhat Agree	Strongly Agree
<b>A person with ASE certification....</b>					
Gets more job offers	1	2	3	4	5
Is more likely to be hired at my firm	1	2	3	4	5
Receives higher pay	1	2	3	4	5
Is more knowledgeable about automotive service	1	2	3	4	5
Is a more skilled automotive professional	1	2	3	4	5
Earns higher productivity ratings	1	2	3	4	5
Receives more customer complaints	1	2	3	4	5
Is less able to deal with change occurring in the industry	1	2	3	4	5
Is more motivated to learn	1	2	3	4	5
Participates in more <u>in-house</u> training and employee development activities	1	2	3	4	5
Participates in more <u>external</u> training activities <u>related</u> to auto service	1	2	3	4	5
Participates in more <u>external</u> training activities <u>not related</u> to auto service (leadership, customer service, etc)	1	2	3	4	5
Receives more promotions	1	2	3	4	5
Is more likely to have a successful automotive career	1	2	3	4	5
Earns the respect of co-workers	1	2	3	4	5
Is more likely to be absent from work	1	2	3	4	5
Aspires to management related positions	1	2	3	4	5
Receives promotion to management	1	2	3	4	5
Is satisfied with their jobs	1	2	3	4	5
Is more committed to the firm	1	2	3	4	5
Is more committed to the automotive industry	1	2	3	4	5
Is more committed to their career	1	2	3	4	5
Has a higher sense of self-esteem	1	2	3	4	5
Is more likely to leave the organization	1	2	3	4	5
Positively enhances the image of the profession	1	2	3	4	5

**Thanks for your responses!**

**APPENDIX G2**

**IT INDUSTRY CERTIFICATION SURVEY**

What is your title? \_\_\_\_\_

How long have you been at your current position? \_\_\_\_\_ years

What is your highest level of formal education? Check one.

- Some high school       Some tech/2-year college       Some 4-year college       Graduate degree  
 High school diploma       Tech/2-year college degree       4-year college degree       Other \_\_\_\_\_

Do you have current IT Certification? Check one.       Yes       No

If so, which certification(s) do you currently have? Please list. \_\_\_\_\_  
 \_\_\_\_\_

How long have you been employed in the IT industry? \_\_\_\_\_ years

In total, how many years have you hired IT employees? \_\_\_\_\_ years

How many people does your company currently employ on a full-time basis? \_\_\_\_\_ employees

What are the **THREE most common** entry-level IT job titles that you are in charge of filling? Please list.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

To what extent do you agree or disagree with the following statements? Circle one.

	Strongly Disagree	Somewhat Disagree	Neither	Somewhat Agree	Strongly Agree
In general, our company finds it easy to hire for entry-level positions.	1	2	3	4	5
Increasing numbers of newly hired entry-level employees have IT credentials	1	2	3	4	5

How many months or years of job experience is your company's **minimum** requirement? \_\_\_\_\_ months \_\_\_\_\_ years

How many months or years of job experience does your company **prefer** for entry-level new hires? \_\_\_\_\_ months \_\_\_\_\_ years

How likely are you to **check references** for applicants **WITHOUT** IT certification (compared to those with IT certification)? Check one.       More likely       Less likely       Same for both

Thinking specifically about the organization you currently work for, how much do you agree or disagree with these statements about the benefits of IT certification? Circle one.

<b>Occupational certification (IT).....</b>	Strongly Disagree	Somewhat Disagree	Neither	Somewhat Agree	Strongly Agree
Makes it easier to identify applicant's knowledge, skills, abilities	1	2	3	4	5
Makes the recruitment process <u>easier</u>	1	2	3	4	5
Makes the recruitment process <u>cheaper</u>	1	2	3	4	5
Makes the recruitment process <u>more time efficient</u>	1	2	3	4	5
Reduces training costs for our firm	1	2	3	4	5
Reduces the time for a new employee to learn his/her job	1	2	3	4	5

Improves the ability to creatively solve IT problems	1	2	3	4	5
Improves the theoretical understanding of IT field	1	2	3	4	5
Improves the perception of the general public towards IT professionals	1	2	3	4	5
Fosters feelings teamwork among workers	1	2	3	4	5
Reduces the likelihood of turnover	1	2	3	4	5

Thinking specifically about employees **WITH** IT certification (compared to those **without** IT certification), how much do you agree or disagree with these statements? Circle one.

	Strongly Disagree	Somewhat Disagree	Neither	Somewhat Agree	Strongly Agree
<b>A person with IT certification....</b>					
Gets more job offers	1	2	3	4	5
Is more likely to be hired at my firm	1	2	3	4	5
Receives higher pay	1	2	3	4	5
Is more knowledgeable about IT	1	2	3	4	5
Is a more skilled IT professional	1	2	3	4	5
Earns higher productivity ratings	1	2	3	4	5
Receives more customer complaints	1	2	3	4	5
Is less able to deal with change occurring in the industry	1	2	3	4	5
Is more motivated to learn	1	2	3	4	5
Participates in more <u>in-house</u> training and employee development activities	1	2	3	4	5
Participates in more <u>external</u> training activities <u>related</u> to IT	1	2	3	4	5
Participates in more <u>external</u> training activities <u>not related</u> to IT (leadership, customer service, etc)	1	2	3	4	5
Receives more promotions	1	2	3	4	5
Is more likely to have a successful IT career	1	2	3	4	5
Earns the respect of co-workers	1	2	3	4	5
Is more likely to be absent from work	1	2	3	4	5
Aspires to management related positions	1	2	3	4	5
Receives promotion to management	1	2	3	4	5
Is satisfied with their jobs	1	2	3	4	5
Is more committed to the firm	1	2	3	4	5
Is more committed to the IT industry	1	2	3	4	5
Is more committed to their career	1	2	3	4	5
Has a higher sense of self-esteem	1	2	3	4	5
Is more likely to leave the organization	1	2	3	4	5
Positively enhances the image of the profession	1	2	3	4	5

**Thanks for your responses!**



## APPENDIX H1

### AUTOMOTIVE SERVICE INDUSTRY INTERVIEW PROTOCOL

Before we begin it is important that we have a formal written agreement of your voluntary participation in this study. I have a consent form that I need you to read and sign—is it OK if I read this or would you rather read it yourself?

To get things started I'd like you to answer the following questions on this brief questionnaire. Again, I can read them to you or you can read and respond to the questions yourself. There are no right or wrong answers, we are just interested in your opinion.

Great—thanks for doing the survey.

Next, is a simulation exercise of how you might select an applicant for a job. This simulation is designed to mimic the process you may go through when hiring an entry-level employee. I'd like you to imagine that you had posted an advertisement for an entry-level position last week, and have received these 12 resumes in the mail. There were no cover letters attached. It is important to note that all of the applicants are from out of state (I believe they are all from Wisconsin actually). However, all are planning to move here and would relocate at their own expense.

So, take as long as you need to look at each resume and sort them according to who is most suited for an entry-level position in your organization. You may be able to sort and rank them from 1st being the most qualified to 12th being the least qualified. Or perhaps if this is too daunting you could sort the resumes into three piles: (1) suitable for employment, (2) not suitable for employment, and (3) something in the middle. Or you can come up with your own approach. We are ultimately looking for your opinion on which applicant or applicants are most suitable for this imaginary entry-level job at your firm and which applicants are least suitable. You can write on the resumes or highlight features that stand out if you wish.

You may ask me questions or clarifications at any time during this process.

(Make a note of the time—how long does it take the respondent to sort?)

(When the sorting is complete) (Took respondent \_\_\_\_\_ minutes to sort)

**(Turn the recorder ON)**

(Congratulate respondent on a job well done—perhaps note that they seem very skilled at sorting resumes)

Just for my records can we note the ranking or the categorizing that you came up with. (If respondents ranked from 1–12 write number corresponding to their ranking on resumes. If in piles, note and record (write on resumes) 1 for all in top pile, 2 for second, 3 for third etc.)

Could you tell me in general terms—did you find the sorting of the resumes to be:

very difficult,  somewhat difficult,  easy, or  very easy?

Now let's focus on the resumes of the applicants that you ranked the highest. Which resume or resumes did you rank the highest?

1. What characteristics of this applicant's resume appeal to you?
2. What specific features of the resume signal or indicate to you that this person (or persons) would be suitable for a job in your firm?
3. How do these characteristics make the applicant most suitable for the job?
4. Are there any specific qualifications or level of experience that you believe this top ranked applicant (or applicants) would absolutely need to have before he/she could be considered for an entry-level position in your organization?

(If respondent has more than one resume ranked in first place use these questions to try and tease out a single applicant as being "most suitably qualified". At the end of this section try to have one resume in first place)

Now let's turn our attention to the resumes of those applicants that you discarded or considered to be not suitable.

(For the resumes that are considered "not suitable for employment")

1. What are the reasons for not considering this (or these) applicant's resume?
2. Are there any specific qualifications or level of experience this applicant would need to have before he/she can be considered for an entry-level position in your organization?

What about those that were somewhere in the middle.

1. What are the reasons for not considering this applicant's resume?
2. Are there any specific qualifications or level of experience this applicant would need to have before he/she can be considered for an entry-level position in your organization?

Now we are done talking about these specific resumes. But I'd like to ask you a few final questions about the role that different types of qualifications play in how you make a hiring decision.

I'd like you to imagine two identical candidates for a single job. Both have exactly the same experience, age, skills, and so on. The only difference between the two is that one has a two-year associate degree in auto service technology and no ASE certification, and the second applicant is ASE certified in both brakes, and steering and suspension but does not have a two-year college qualification. Which one of these two applicants do you think would be most ready for a job in your organization?

Why?

Which applicants have an advantage in the hiring process, those with ASE certification, those without certification but with a automotive service related two-year degree, or those who have both?

- ASE
- Two-year degree and no ASE
- Both

Would your company encourage people who have a certification to go and get the formal qualification of the two-year college degree in automotive service?

- Yes
- No

Why.

Would your firm pay?

What about the reverse situation, if you hired someone who had the degree but had not taken the tests for ASE certification, would your company encourage that the certifications be earned.

- Yes
- No

Why.

Would your firm pay?

Does your company have a policy of requiring certification for entry-level auto jobs?

- Yes
- No

If yes, list the certifications that are required.  
(Have list of ASE certifications available)

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What other qualities in an applicant make them stand out above the others?  
(How and what do these qualities signal to you?)

Are there any final questions you have about the study? Thank you for your time.

Now I'm going to take you back to (name) who will complete the final paper work and get you the \$100 we promised.



## APPENDIX H2

### IT INDUSTRY INTERVIEW PROTOCOL

Before we begin it is important that we have a formal written agreement of your voluntary participation in this study. I have a consent form that I need you to read and sign—is it OK if I read this or would you rather read it yourself?

To get things started I'd like to you to answer the following questions on this brief questionnaire. Again, I can read them to you or you can read and respond to the questions yourself. There are no right or wrong answers, we are just interested in your opinion.

Great—thanks for doing the survey.

Next, is a simulation exercise of how you might select an applicant for a job. This simulation is designed to mimic the process you may go through when hiring an entry-level employee. I'd like you to imagine that you had posted an advertisement for an entry-level position last week, and have received these 12 resumes in the mail. There were no cover letter attached. It is important to note that all of the applicants are from out of state (I believe they are all from Wisconsin actually). However, all are planning to move here and would relocate at their own expense.

So, take as long as you need to look at each resume and sort them according to who is most suited for an entry-level position in your organization. You may be able to sort and rank them from 1st being the most qualified to 12th being the least qualified. Or perhaps if this is too daunting you could sort the resumes into three piles: (1) suitable for employment, (2) not suitable for employment, and (3) something in the middle. Or you can come up with your own approach. We are ultimately looking for your opinion on which applicant or applicants are most suitable for this imaginary entry-level job at your firm and which applicants are least suitable. You can write on the resumes or highlight features that stand out if you wish.

You may ask me questions or clarifications at any time during this process.

(Make a note of the time—how long does it take the respondent to sort?)

(When the sorting is complete) (Took respondent \_\_\_\_\_ minutes to sort)

**(Turn the recorder ON)**

(Congratulate respondent on a job well done—perhaps note that they seem very skilled at sorting resumes)

Just for my records can we note the ranking or the categorizing that you came up with. (If respondents ranked from 1–12 write number corresponding to their ranking on resumes. If in piles, note and record (write on resumes) 1 for all in top pile, 2 for second, 3 for third etc.)

Could you tell me in general terms—did you find the sorting of the resumes to be:

very difficult,  somewhat difficult,  easy, or  very easy?

Now let's focus on the resumes of the applicants that you ranked the highest. Which resume or resumes did you rank the highest?

1. What characteristics of this applicant's resume appeal to you?
2. What specific features of the resume signal or indicate to you that this person (or persons) would be suitable for a job in your firm?
3. How do these characteristics make the applicant most suitable for the job?
4. Are there any specific qualifications or level of experience that you believe this top ranked applicant (or applicants) would absolutely need to have before he/she could be considered for an entry-level position in your organization?

(If respondent has more than one resume ranked in first place use these questions to try and tease out a single applicant as being "most suitably qualified". At the end of this section try to have one resume in first place)

Now let's turn our attention to the resumes of those applicants that you discarded or considered to be not suitable.

(For the resumes that are considered "not suitable for employment")

1. What are the reasons for not considering this (or these) applicant's resume?
2. Are there any specific qualifications or level of experience this applicant would need to have before he/she can be considered for an entry-level position in your organization?

What about those that were somewhere in the middle.

1. What are the reasons for not considering this applicant's resume?
2. Are there any specific qualifications or level of experience this applicant would need to have before he/she can be considered for an entry-level position in your organization?

Now we are done talking about these specific resumes. But I'd like to ask you a few final questions about the role that different types of qualifications play in how you make a hiring decision.

I'd like you to imagine two identical candidates for a single job. Both have exactly the same experience, age, skills, and so on. The only difference between the two is that one has a two-year associate degree in information technology and no CompTIA A+ certification, and the second applicant is CompTIA A+ certified but does not have a two-year college qualification. Which one of these two applicants do you think would be most ready for a job in your organization?

Why?

Which applicants have an advantage in the hiring process, those with CompTIA A+ certified, those without CompTIA A+ certified but with an IT related two-year degree, or those who have both?

- CompTIA A+ certified
- Two-year degree and no CompTIA A+ certified
- Both

Would your company encourage people who have a certification to go and get the formal qualification of the two-year college degree in IT field.

- Yes
- No

Why.

Would your firm pay?

What about the reverse situation, if you hired someone who had the degree but had not CompTIA A+ certified, would your company encourage that the certification be earned.

- Yes
- No

Why.

Would your firm pay?

Does your company have a policy of requiring certification for entry-level IT jobs?

- Yes
- No

If yes, list the certifications that are required.

(Have list of IT certifications available)

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---

What other qualities in an applicant make them stand out above the others?  
(How and what do these qualities signal to you?)

Are there any final questions you have about the study? Thank you for your time.

Now I'm going to take you back to (name) who will complete the final paper work and get you the \$100 we promised.

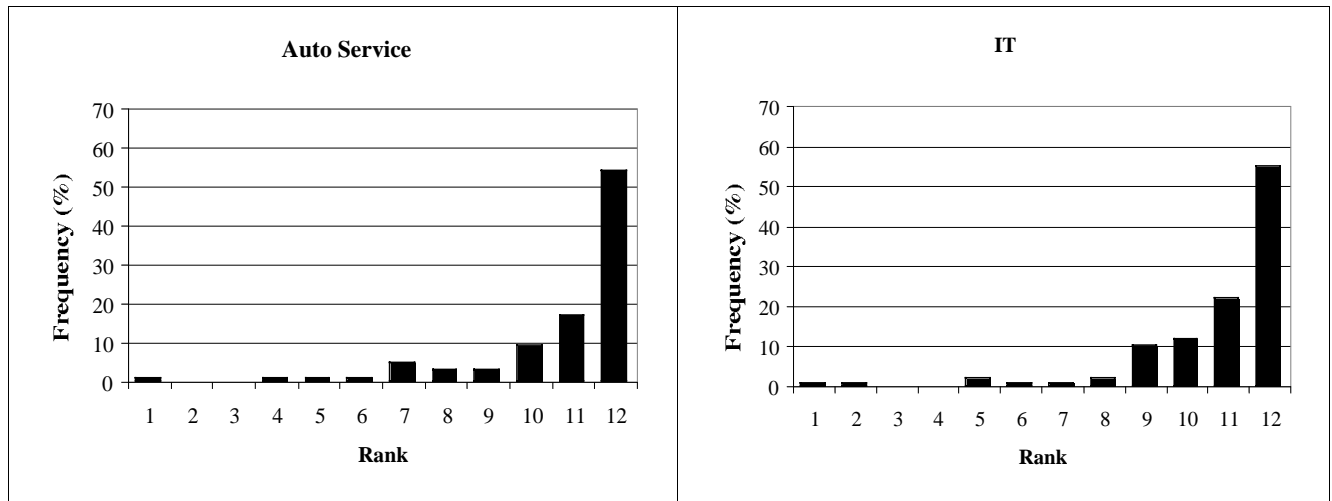




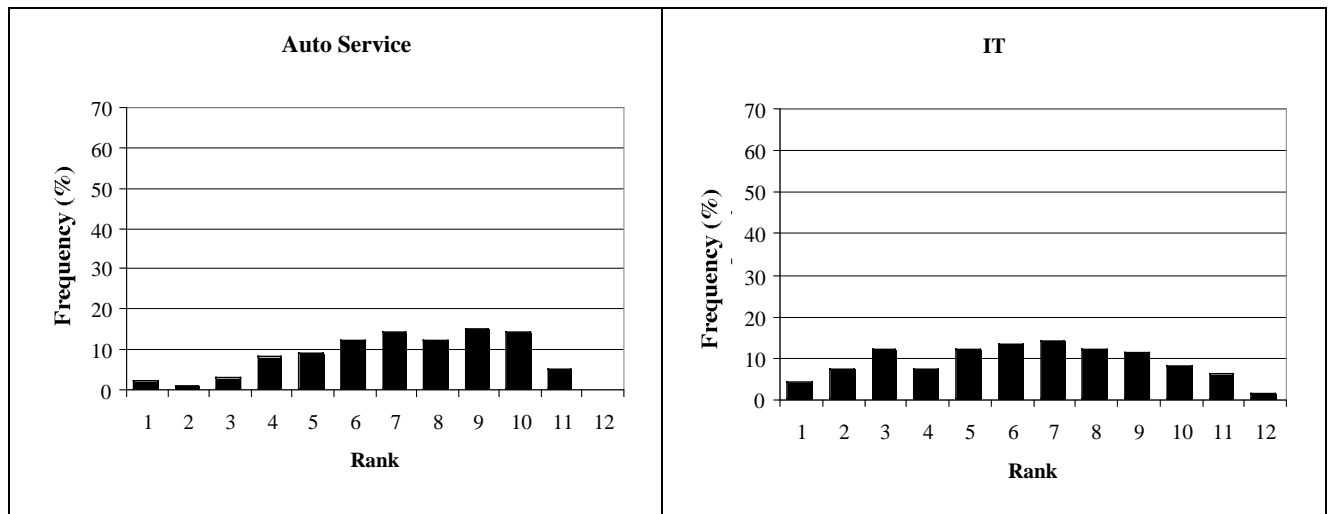
**APPENDIX I**

**FREQUENCY RANKINGS FOR EACH RESUME**

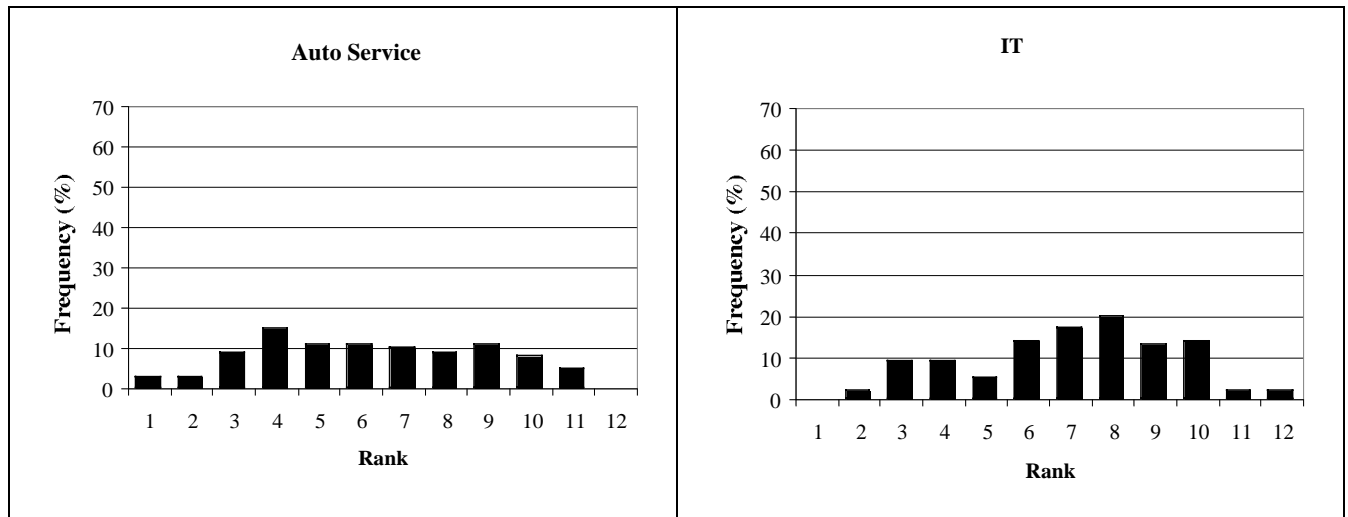
Frequency rankings for resume 1—no qualifications, no experience



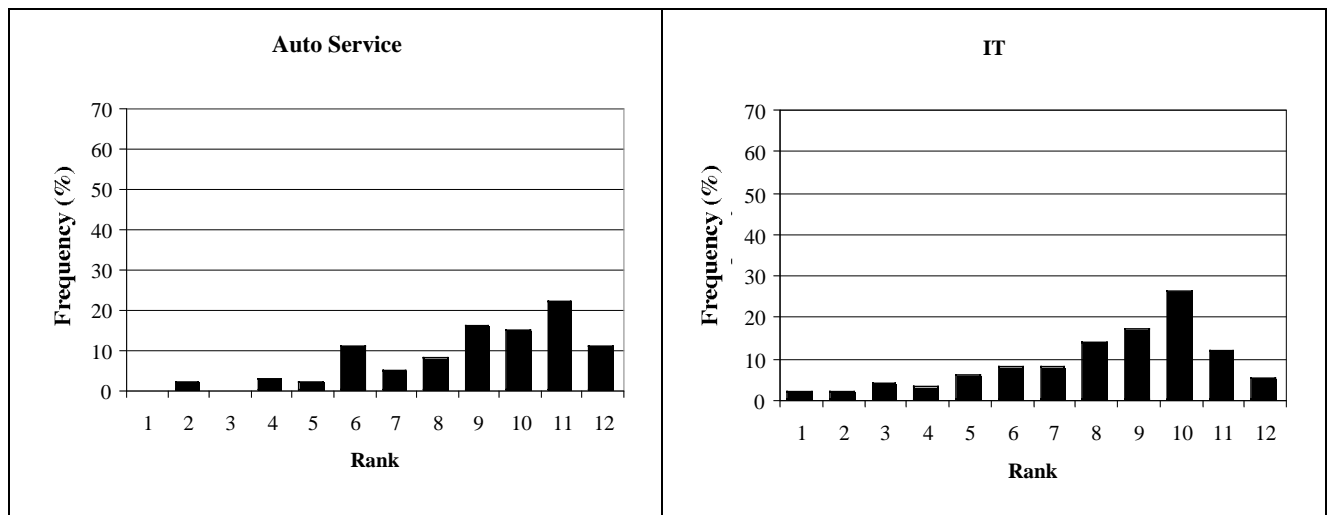
Frequency rankings for resume 2—no qualifications, fewer than 2 years' experience



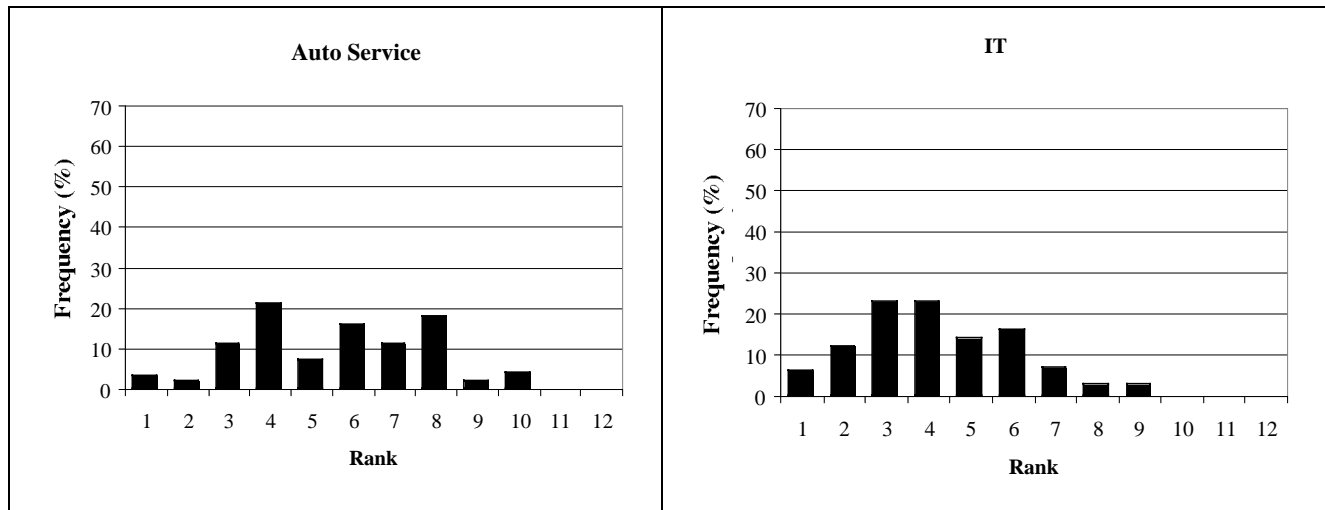
Frequency rankings for resume 3—no qualifications, 2–4 years' experience



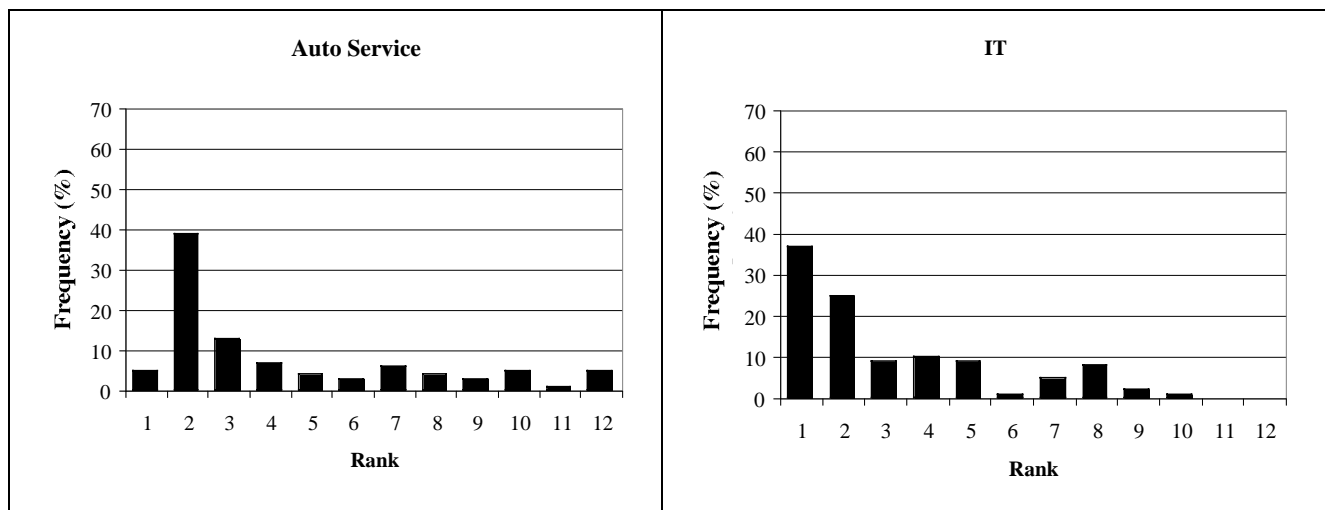
Frequency rankings for resume 4—2-year degree, no experience



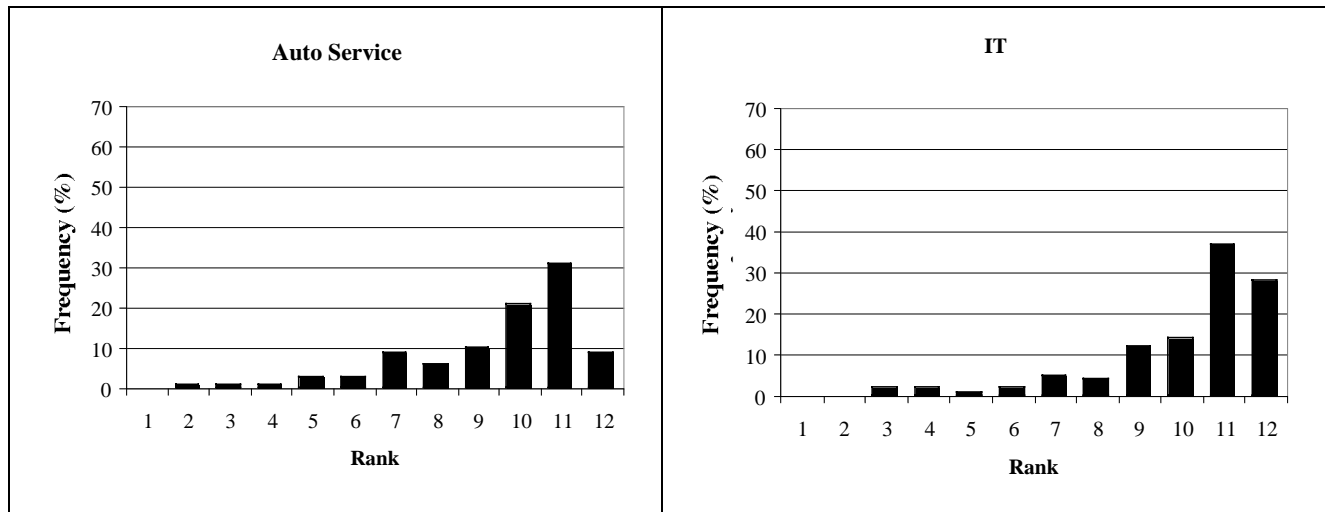
Frequency rankings for resume 5—2-year degree, fewer than 2 years' experience



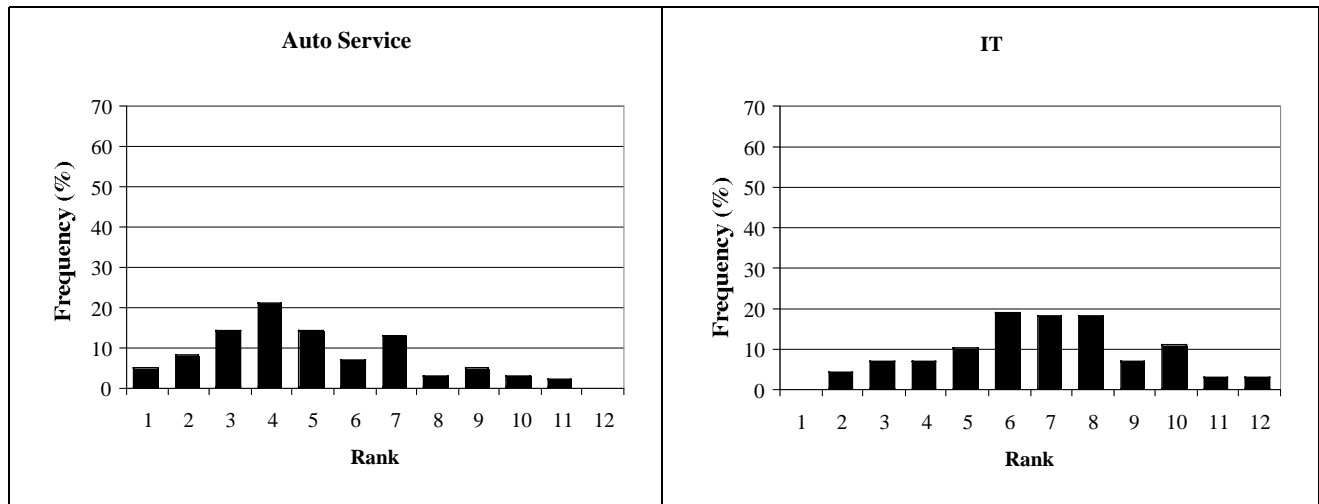
Frequency rankings for resume 6—2-year degree, 2–4 years' experience



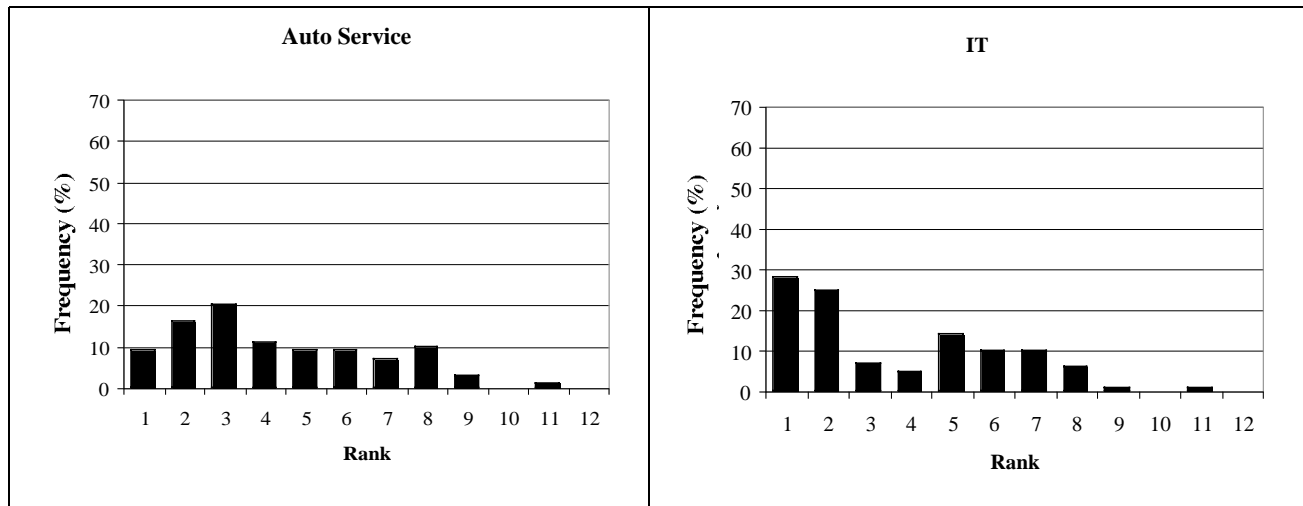
Frequency rankings for resume 7—A+ certification, no experience



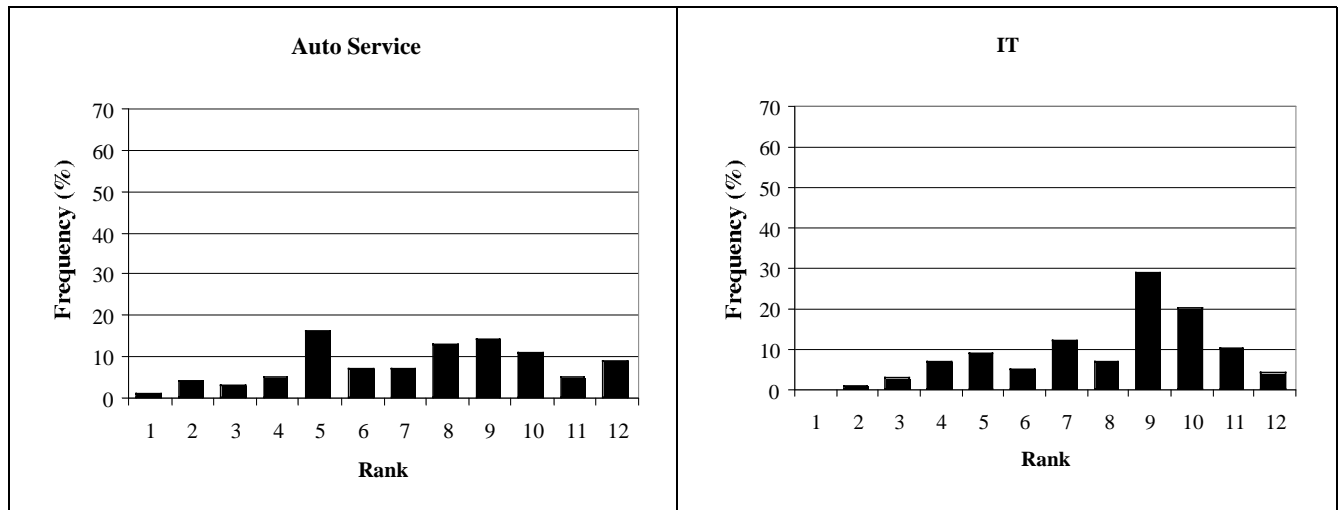
Frequency rankings for resume 8—A+ certification, fewer than 2 years' experience



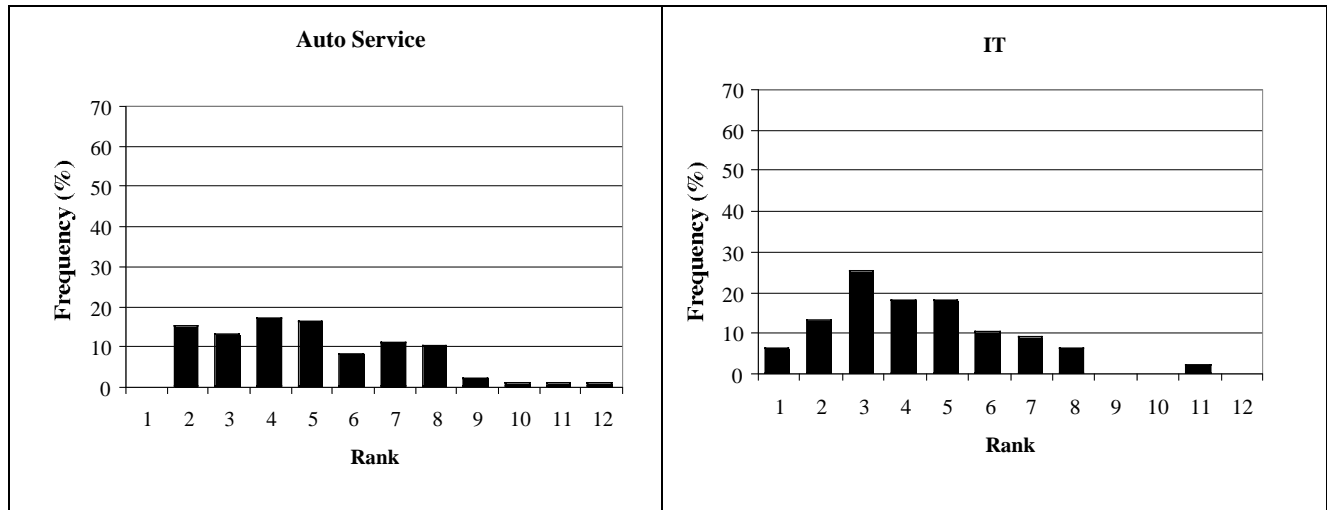
Frequency rankings for resume 9—A+ certification, 2–4 years' experience



Frequency rankings for resume 10—2-year degree, A+ certification, no experience



Frequency rankings for resume 11—2-year degree, A+ certification, fewer than 2 years' experience



Frequency rankings for resume 12—2-year degree, A+ certification, 2–4 years' experience

